AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

BPA NO. | 1. CONTRACT ID CODE | PAGE 1 OF PAGES 70

2. AMENDMENT/MODIFICATION NUMBER	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NUMBER	5. PROJECT NUMBER (if applicable)
00002	06-05-2018	573-18-3-3285-0023	573-14-600

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 6)	CODE
Department of Veterans Affairs Network Contracting Activity 8 Malcom Randall VA Medical Center 1601 SW Archer Road, Room E508-1 Gainesville FL 32608	36C248	See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (Number, street, county, State and ZIP Code)	(X)	9A. AMENDMENT OF SOLICITATION NUMBER
To all Offerors/Bidders		36C24818R0271
	X	9B. DATED (SEE ITEM 11)
		10A. MODIFICATION OF CONTRACT/ORDER NUMBER
		10B. DATED (SEE ITEM 13)
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☒ is extended, ☒ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Project: Replace Boilers
Location: Malcom Randall VA Medical Center, Gainesville, FL
Proposal due date is extended to Wednesday, June 13, 2018, 1:00 PM (Eastern). Per the solicitation, proposals are to be emailed to: William.Clark1@va.gov. Also, per the solicitation, the Bid Bond should both be emailed and mailed.
Amendment items are attached, and include:
A. Clause and Provision Changes. B. Revised Price Schedule - Item 2 corrected to indicate DEDUCT and REPLACE.
C. Geotechnical Report provided. D. All Request for Information (RFI) Responses.
E. Specification 23 07 11 included (HVAC and Boiler Plant Insulation).
F. Revised Drawings - Five (5).

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		William Clark Contracting Officer	V814L2-64740
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED

See attached document: Clause and Provision Changes.

See attached document: Price Schedule_Item 2 Revision.

See attached document: Geotechnical Report.

See attached document: RFI Responses.

See attached document: 23 07 11 HVAC and Boiler Plant Insulation.

See attached document: Revised Sheets.

See attached document: EP101 2018-05-31 Rev 1.

See attached document: EP711 2018-05-31 Rev 1.

See attached document: ET102 2018-05-31 Rev 1.

See attached document: FA101 2018-05-31 Rev 1.

See attached document: MP711-SK001-Boiler Gas Detection.

Item 14- continued.

A. The following clauses/provisions are added by reference:

1. FAR 52.203-14 Display of Hotline Poster(s) (Oct 2015)
2. FAR 52.227-4 Patent Indemnity-Construction Contracts (Dec 2007)
3. FAR 52.236-28 Preparation of Proposals-Construction (Oct 1997)

B. The following clauses/provisions are added in full text:

1. 52.225-11 BUY AMERICAN—CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (OCT 2016) ALTERNATE I (MAY 2014)

(a) *Definitions.* As used in this clause—

"Bahrainian, Mexican, or Omani construction material" means a construction material that—

(1) Is wholly the growth, product, or manufacture of Bahrain, Mexico or Oman; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in Bahrain, Mexico, or Oman into a new and different construction material distinct from the materials from which it was transformed.

"Caribbean Basin country construction material" means a construction material that—

(1) Is wholly the growth, product, or manufacture of a Caribbean Basin country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a Caribbean Basin country into a new and different construction material distinct from the materials from which it was transformed.

"Commercially available off-the-shelf (COTS) item"— (1) Means any item of supply (including construction material) that is—

(i) A commercial item (as defined in paragraph (1) of the definition at FAR 2.101);

(ii) Sold in substantial quantities in the commercial marketplace; and

(iii) Offered to the Government, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace; and

(2) Does not include bulk cargo, as defined in 46 U.S.C. 40102(4), such as agricultural products and petroleum products.

"Component" means an article, material, or supply incorporated directly into a construction material.

"Construction material" means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

"Cost of components" means—

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the construction material.

"Designated country" means any of the following countries:

(1) A World Trade Organization Government Procurement Agreement (WTO GPA) country (Armenia, Aruba, Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, Ukraine, or United Kingdom);

(2) A Free Trade Agreement (FTA) country (Australia, Bahrain, Canada, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Korea (Republic of), Mexico, Morocco, Nicaragua, Oman, Panama, Peru, or Singapore);

(3) A least developed country (Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Tanzania, Timor-Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, or Zambia); or

(4) A Caribbean Basin country (Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bonaire, British Virgin Islands, Curacao, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saba, St.

Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sint Eustatius, Sint Maarten, or Trinidad and Tobago).

> "Designated country construction material" means a construction material that is a WTO GPA country construction material, an FTA country construction material, a least developed country construction material, or a Caribbean Basin country construction material.

"Domestic construction material" means—

(1) An unmanufactured construction material mined or produced in the United States;

(2) A construction material manufactured in the United States, if—

(i) The cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic; or

(ii) The construction material is a COTS item.

"Foreign construction material" means a construction material other than a domestic construction material.

"Free Trade Agreement country construction material" means a construction material that—

(1) Is wholly the growth, product, or manufacture of a Free Trade Agreement (FTA) country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a FTA country into a new and different construction material distinct from the materials from which it was transformed.

"Least developed country construction material" means a construction material that—

(1) Is wholly the growth, product, or manufacture of a least developed country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a least developed country into a new and different construction material distinct from the materials from which it was transformed.

"United States" means the 50 States, the District of Columbia, and outlying areas.

"WTO GPA country construction material" means a construction material that—

(1) Is wholly the growth, product, or manufacture of a WTO GPA country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a WTO GPA country into a new and different construction material distinct from the materials from which it was transformed.

(b) Construction materials.

(1) This clause implements 41 U.S.C. chapter 83, Buy American, by providing a preference for domestic construction material. In accordance with 41 U.S.C. 1907, the component test of the

Buy American statute is waived for construction material that is a COTS item. (See FAR 12.505(a)(2)). In addition, the Contracting Officer has determined that the WTO GPA and all the Free Trade Agreements except the Bahrain FTA, NAFTA, and the Oman FTA apply to the this acquisition. Therefore, the Buy American statute restrictions are waived for designated country construction materials other than Bahrainian, Mexican, or Omani construction materials.

(2) The Contractor shall use only domestic or designated country construction material other than Bahrainian, Mexican, or Omani construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to information technology that is a commercial item or to the construction materials or components listed by the Government as follows:

None

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that—

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American statute is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American statute to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American statute.

(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including—

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American statute applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American statute applies, use of foreign construction material is noncompliant with the Buy American statute.

(d) *Data.* To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction Material Description	**Unit of Measure**	**Quantity**	**Price (Dollars)***
Item 1:			
Foreign Construction Material			
Domestic Construction Material			
Item 2:			
Foreign Construction Material			
Domestic Construction Material			

[*List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary*.]

[*Include other applicable supporting information*.]

[* *Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued)*.]

(End of Clause)

2. **52.225-12 NOTICE OF BUY AMERICAN REQUIREMENT—CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (MAY 2014) ALTERNATE I (MAY 2014) AND ALTERNATE II (JUN 2009**)

(a) *Definitions.* "Bahrainian, Mexican, or Omani construction material," "commercially available off-the-shelf (COTS) item," "construction material," "designated country construction material," "domestic construction material," and "foreign construction material," as used in this provision, are defined in the clause of this solicitation entitled "Buy American—Construction Materials Under Trade Agreements" (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) *Requests for determination of inapplicability.* An offeror requesting a determination regarding the inapplicability of the Buy American statute shall submit the request with its offer, including the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11.

(c) Evaluation of offers.

(1) The Government will evaluate an offer requesting exception to the requirements of the Buy American statute, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers.

(1) When an offer includes foreign construction material, except foreign construction material from a designated country other than Bahrain, Mexico, or Oman that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic or designated country construction material other than Bahrainian, Mexican, or Omani construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic or designated country construction material other than Bahrainian, Mexican, or Omani construction material. An offer based on use of the foreign construction material for which an exception was requested—

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations. *(End of Provision*).

3. VAAR 852.236-89 Buy American Act (Jan 2008) (ALT II) (Jan 2008)

(a) Reference is made to the clause entitled "Buy American Act - Construction Materials under Trade Agreements," FAR 52.225-11 and its Alternate I.

(b) The restrictions contained in this clause 852.236-89 are waived for World Trade Organization (WTO) Government Procurement Agreement (GPA) country, Australian, Chilean, or Moroccan, least developed country, or Caribbean Basin country construction material, as defined in FAR 52.225-11 and its Alternate I. Notwithstanding a bidder's right to offer identifiable foreign construction material in its bid pursuant to FAR 52.225-11, VA does not anticipate accepting an offer that includes foreign construction material, other than WTO GPA country, Australian, Chilean, or Moroccan, least developed country, or Caribbean Basin country construction material.

(c) If a bidder chooses to submit a bid that includes foreign construction material, that bidder must provide a listing of the specific foreign construction material he/she intends to use and a price for said material. Bidders must include bid prices for comparable domestic construction material. If VA determines not to accept foreign construction material and no comparable domestic construction material is provided, the entire bid will be rejected.

(d) Any foreign construction material proposed after award will be rejected unless the bidder proves to VA's satisfaction:(1) it was impossible to request the exemption prior to award, and (2) said domestic construction material is no longer available, or (3) where the price has escalated so dramatically after the contract has been awarded that it would be unconscionable to require performance at that price. The determinations required by (1), (2), and (3) of this paragraph shall be made in accordance with Subpart 825.2 and FAR 25.2.

(e) By signing this bid, the bidder declares that all articles, materials and supplies for use on the project shall be domestic unless specifically set forth on the Bid Form or addendum thereto.

(End of Clause)

C. The Request for Information (RFI) questions and responses are indicated on the EXCEL spreadsheet (attached).

DESCRIPTION	U/I	QTY	UNIT PRICE	TOTAL PRICE
Project Title: REPLACE BOILERS (Project 573-14-600) **Location: Malcom Randall VA Medical Center, Gainesville, FL.**				
ITEM NO.1 (BASE ITEM): Work includes all Architectural and Engineering associated installation components as shown on the contract documents, with all necessary removal of existing systems and installation of new systems. Contract performance period of 730 calendar days upon issuance of a Notice to Proceed (NTP).	JB	**1**	**$_____**	**$_____**
ITEM NO. 2 (DEDUCT ALTERNATE NO. 1): Includes all work in Item NO. 1, except DEDUCT AND REPLACE as follows: 1) DEDUCT the exterior face brick as shown on the documents and, 2) REPLACE with exterior synthetic stucco system on metal studs where the brick was previously shown. Contract performance period of 730 calendar days upon issuance of a NTP.	JB	**1**	**$_____**	**$_____**

ITEM NO. 3 (DEDUCT ALTERNATE NO. 2): Includes all work in Item NO.1 except DEDUCT: The specific portions of the redundant electrical feed to the new boiler plant, specifically the following items: 1) ATS-BPB and associated new normal breaker in US-9 and new emergency breaker in EMSGR-ACA, 2) Normal and emergency conductors and raceways on line side of ATS-BPB, 3) Conductors on load side of ATS-BPB extending to BPB, 4) Exposed raceway extending from ATS-BPB to boiler plant (underground raceway extending from southwest terminus of tunnel to BPB shall remain regardless of alternate item), 5) BPB main breaker and associated power meter (switchboard section and main breaker provisions to remain regardless of alternate item). Contract performance period of 730 calendar days upon issuance of a NTP.	JB	**1**	**$_____**	**$_____**

GEOTECHNICAL REPORT

Malcom Randall VA Medical Center
Boiler Building

Prepared by:

Gator Engineering & Aquifer Restoration, Inc.
1173 Spring Centre South Blvd., Suite C
Altamonte Springs, FL 32714-1976
Ph: 407-682-2009 • Fx: 407-682-3400
www.gearengineer.com

August 2012

TABLE OF CONTENTS

Attachment A:

- Soil Boring Logs (3)
- Boring Location Plan
- Key to Soil Boring Logs
- Field Exploration Procedures
- Key to Soil Classification (Unified Soil Classification System)

1.0 PROJECT INFORMATION

1.1 General

The Malcom Randall VA Medical Center (hereinafter referred to as the 'VA') requested a study to determine the best approach to replace their existing, aged steam boiler plant. Gator Engineering & Aquifer Restoration (GEAR), with Cape Design Engineering Company (CDE) as its team partner, was contracted to accomplish this study.

The recommendation was made to provide a new building with two levels that houses boilers and auxiliary equipment as well as piping, locker rooms, control room and a storage room, space for electrical panels service, fuel oil pumps and piping, natural gas piping and controls, make up water piping, condensate piping, and control panels. The preferred location was Location 2A, this geotechnical study was performed in this location.

1.2 Project Description

The Malcom Randall VA Medical Center is located at 1601 SW Archer Road in Gainesville, Florida. The site (Location 2A) for the planned Boiler Building is located in the back section of the Center off of SW 16th Avenue. The general site location is shown on the Boring Location Plan figure in **Attachment A**.

The proposed project includes the construction of a two-story structure to house the boiler plant. No specific building details are known as this geotechnical exploration is part of a feasibility study to explore for potential issues on this specific site. Therefore, it is assumed the structure will consist of load bearing masonry walls with steel interior and exterior columns and a poured-in-place concrete slab-on-grade first floor. Also assumed is the column, wall, and floor loads will not exceed 100 kips, 5 kips per linear foot (klf) and 200 pounds per square foot (psf), respectively. Finally, it is assumed the building area will be supported on less than 2 feet of fill above the presently existing ground surface.

Trucks will access the boiler plant on a regular basis; therefore, it is assumed that a heavy-duty pavement section will be necessary, and will consist of either a flexible (asphalt) or rigid (concrete) pavement section. The anticipated frequency and typical loading of the trucks is not known at this time.

If actual project information varies from these conditions, then the recommendations in this report may need to be re-evaluated. Any changes in these conditions should be provided so the need for re-evaluation of our recommendations can be assessed prior to final design.

2.0 FIELD EXPLORATION

A field exploration was performed on July 7, 2012, based on a copy of an aerial plan that showed the approximate location of the boiler building. This plan was modified to show the approximate location of the borings and is included as the Boring Location Plan figure in **Attachment A**. The boring locations were determined in the field by our

personnel referencing the existing parking areas and adjacent buildings roadways; thus, the attached figure should be considered approximate.

2.1 SPT and Auger Borings

To explore the subsurface conditions within the area of the proposed structure, three Standard Penetration Test (SPT) borings were located and performed. The borings were advanced to depths of approximately 25 and 35 feet below the existing ground surface. The upper 4 to 5 feet of each boring was advanced with a hand-held bucket auger due to the potential presence of utilities in this area. The remainder of each boring was advanced in general accordance with the methodology outlined in ASTM D 1586. The auger and split-spoon soil samples recovered during performance of the borings were visually described in the field by the field crew, and representative portions of the samples were transported to our laboratory for further evaluation. A summary of the field procedures is included in **Attachment A**.

3.0 LABORATORY TESTING

Representative soil samples obtained during the field exploration were visually classified by a geotechnical engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. A Key to the Soil Classification System is included in **Attachment A**.

Quantitative laboratory testing was performed on selected soil samples encountered during the field exploration. The purpose of this testing was to better define the composition of the soils encountered, and to provide data for correlation to their anticipated strength and compressibility characteristics. The laboratory testing determined the natural moisture content, percent fines (percent passing the US No. 200 Sieve) and Atterberg Limits (Liquid Limit and Plasticity Index) of the selected soil samples. These results are shown on the Log of Boring records at the respective depths from which the tested samples were recovered.

4.0 GENERAL SUBSURFACE CONDITIONS

4.1 General Soil Profile

Detailed boring records are included in **Attachment A**. When reviewing these records, it should be understood that the soil conditions will vary between the boring locations. The following paragraph summarizes the soil conditions encountered.

Borings SB-1 and SB-3 encountered the parking area surficial pavement layer consisting of an asphalt surface layer, about 2 inches thick, underlain by an 11-inch thick limerock base layer. Boring SB-2 was located in the unpaved area between the parking areas and encountered a surfical layer of fine sands (SP) with trace amounts of roots. Below the surficial pavement and sand layers were generally fine sands with silt (SP-SM) and silty sands (SM) that were encountered to a depth of about 13 feet in a dense to very dense state. Underlying the silty soil strata was generally loose to medium dense, clayey to very clayey fine sands (SC) to the terminating depth of the shallower borings of 25 feet. Strata of dense to very dense fine sands with silt (SP-SM) and silty fine sands (SM) were occasionally encountered within this general stratum. The clayey to very clayey sand stratum continued to a depth of about 28 feet in the deeper boring, underlain by stiff sandy clays (CH) through the terminating depth of 35 feet.

4.2 Groundwater Level

The groundwater level was not encountered within the depths explored at the boring locations. However, that does not mean that groundwater does not exist at these locations. It should be anticipated that groundwater levels will fluctuate seasonally and with changes in climate. In addition, it is possible that groundwater may perch on top of the shallow silty sands following rain events due to their relatively slow permeability. Therefore, groundwater may be encountered within the depths explored at these locations at some time in the future. As such, we recommend that the groundwater table be verified prior to construction.

4.3 Review of Soil Survey Map

The results of a review of the USDA Natural Resource Conservation Service (NRCS) Web Soil Survey of Alachua County are shown in the table below. The soil map units identified by the Soil Survey at the site are the Arrendondo-Urban land complex, 0 to 5 percent slopes, and the Urban land-Millhopper Complex. Each soil map unit number, soil type, drainage class, frequency of ponding/flooding, hydrologic group, and estimated seasonal high groundwater levels reported in the Soil Survey are as follows:

Soil No.	Soil Type	Drainage Class	Frequency of Ponding/Flooding	Hydrologic Group	Depth to the Water Table (inches)
4	Arrendondo-Urban land complex, 0 to 5 percent slopes	Well Drained	None	A	> 80 inches
45	Urban land-Millhopper complex	Moderately Well Drained	None	---	42 to 72

The "Water table" above refers to a saturated zone in the soil that occurs during specified months. Estimates of the upper limit shown in the Web Soil Survey are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

4.4 Normal Seasonal High Groundwater Level

In general, the seasonal high groundwater level is affected by a number of factors, including the amount of impervious surface area in the site vicinity, the drainage characteristics of the soils, the land surface elevation, relief points such as canals, drainage ditches, swamp areas, etc., and distance to relief points. At this site, the soil borings did not encounter the groundwater level within the depths explored, or 25 to 35 feet below existing grade. Based on the seasonal high water levels presented by the Soil Survey as shown in the table above, it is our opinion that the groundwater level at this site is being influenced significantly by factors caused by the development of the area. Therefore, we recommend installing piezometers within the project area to measure groundwater levels over time so that a reasonable estimate of the seasonal high groundwater level can be made.

5.0 DESIGN RECOMMENDATIONS

5.1 General

The following evaluation and recommendations are based on the assumed project information as presented in this report, the results of the field exploration and laboratory testing performed, and the construction techniques recommended in Section 7.0 below. If the assumed project conditions are incorrect or changed after this report, or subsurface conditions encountered during construction are different from those reported, we should be notified so these recommendations can be re-evaluated and revised, if necessary. It is recommend that the foundation plans and earthwork specifications be reviewed by a geotechnical engineer to verify that the recommendations in this report have been properly interpreted and implemented.

5.2 Foundation Design Recommendations

Based on the results of this exploration, the subsurface conditions at the site are considered adaptable for support of the proposed structure when constructed on a properly designed shallow foundation system, provided the site preparation and earthwork construction recommendations outlined in Section 6.0 of this report are performed, the following parameters may be used for foundation design.

5.2.1 Bearing Pressure

The maximum allowable net soil bearing pressure for use in shallow foundation design should not exceed 2,000 psf. Net bearing pressure is defined as the soil bearing pressure at the foundation bearing level in excess of the natural overburden pressure at that level. The foundations should be designed based on the maximum load that could be imposed by all loading conditions.

5.2.2 Foundation Size

The minimum widths recommended for any isolated column footings and continuous wall footings are 24 inches and 18 inches, respectively. Even though the maximum allowable soil bearing pressure may not be achieved, these width recommendations should control the size of the foundations.

5.2.3 Bearing Depth

The exterior foundations should bear at a depth of at least 24 inches below the exterior final grades, and the interior foundations should bear at a depth of at least 24 inches below the finish floor elevation to provide confinement to the bearing level soils. It is recommended that stormwater be diverted away from the building exterior to reduce the possibility of erosion beneath the exterior footings.

5.2.4 Bearing Material

The foundations may bear in either the compacted suitable natural soils or compacted structural fill. The bearing level soils, after compaction, should exhibit densities equivalent to 95 percent of the modified Proctor maximum dry density (ASTM D 1557), to a depth of at least one foot below the foundation bearing levels.

5.2.5 Settlement Estimates

Post-construction settlements of the structure will be influenced by several interrelated factors, such as: 1) subsurface stratification and strength/compressibility characteristics; 2) footing size, bearing level, applied loads, and resulting bearing pressures beneath the foundations; and 3) site preparation and earthwork construction techniques used by the contractor. Settlement estimates for the structure are based on the use of site preparation/earthwork construction techniques as recommended in Section 6.0 of this report. Any deviation from these recommendations could result in an increase in the estimated post-construction settlements of the structure.

Due to the sandy nature of the near-surface soils, the majority of settlement is expected to occur in an elastic manner and fairly rapidly during construction. Using the recommended maximum bearing pressure, the supplied/assumed maximum structural loads, and the field and laboratory test data that have been correlated to geotechnical strength and compressibility characteristics of the subsurface soils, it is estimated that total settlements of the structure could be on the order of one inch or less.

Differential settlements result from differences in applied bearing pressures and variations in the compressibility characteristics of the subsurface soils. Because of the general uniformity of the subsurface conditions and the recommended site preparation and earthwork construction techniques outlined in Section 6.0, anticipated differential settlements of the structure should be within tolerable magnitudes.

5.2.6 Floor Slab

The concrete poured-in-place floor slab can be constructed as a slab-on-ground, provided unsuitable material is removed and replaced with compacted structural fill as outlined in Section 6.0. The recommend modulus of subgrade reaction of 200 pci should be used for design of the floor slab. It is recommended that the floor slab bearing soils be covered with an impervious membrane to reduce moisture entry and floor dampness. A 6-mil thick plastic membrane is commonly used for this purpose. Care should be exercised not to tear large sections of the membrane during placement of reinforcing steel and concrete. In addition, it is recommend that a minimum separation of 2 feet be maintained between the finished floor levels and the estimated normal seasonal high groundwater level.

5.2.7 Soil Properties for Wall Backfill

Understanding that there may be an underground aspect of this structure that will require a retaining wall, It is our opinion that the foundation soils are suitable to support a retaining wall to a depth of about 10 feet. However, the silty soils encountered beginning at a depth of 4 to 5 feet below existing grade may be difficult to excavate and compact at the foundation bearing elevation. Therefore, excavation of these soils to a depth of 12 to 24 inches and replacement of suitable sand backfill may be necessary. Preliminarily, the wall foundations may be designed for the net allowable soil bearing pressure given above; however, once the final wall design details are known, a geotechnical engineer should be consulted to provide final recommendations for foundation design and construction.

In general, walls that have adjacent compacted fill will be subjected to lateral earth pressures. Walls that are restrained at the top and bottom will be subjected to at-rest soil pressures, while walls that are not restrained at the top, and where sufficient movement is anticipated, will be subjected to active earth pressures. Surcharge effects for sloped backfill,

point or area loads behind the walls, and adequate drainage provisions should be incorporated in the wall design. Passive resistance, resulting from footing embedment at the wall toe, could be neglected for safer design.

The following soil parameters are recommended to be used in design of the wall(s) for the project:

- Retained Soil Unit Weight, Saturated (γ_{sat}) = 120 pcf
- Retained Soil Unit Weight, Moist (γ_m) = 110 pcf
- Retained Soil Angle of Internal Friction (ø) = 30 degrees
- Coefficient of Active Earth Pressure, k_a = 0.33
- Coefficient of Passive Earth Pressure, k_p = 3.0
- Coefficient of At-Rest Earth Pressure, k_o = 0.5
- Foundation Soil Unit Weight, Moist (γ_m) = 115 pcf
- Foundation Soil Unit Weight, Saturated (γ_{sat}) = 125 pcf
- Foundation Soil Angle of Internal Friction (ø) = 30 degrees

The above parameters are based on clean sand backfill (SP) placed behind the wall, and compaction of the wall foundation soils as discussed in Section 6.5. A coefficient of friction for poured in-place concrete of 0.45 may be used in the wall design.

It is recommend that the retaining walls earth pressure analysis include slope stability, overturning about the toe, sliding of the base of the wall and a check that the resulting vertical pressure against the base of the retaining wall (i.e., the retaining wall footing) is within the middle-one-third of the base. The walls should be designed to include all temporary construction and permanent traffic and surcharge loads acting on the walls

5.3 Pavement Considerations

Based on the results of the exploration, the subsurface conditions at the site are considered favorable for support of a heavy-duty flexible or rigid pavement section when constructed on properly prepared subgrade soils as outlined in Section 6.0 of this report. Typical pavement sections used to support truck traffic are shown on the following table. If requested, a project-specific pavement design can be prepared if specific traffic data is provided.

TYPICAL PAVEMENT SECTION	
Pavement Layer	**Heavy-Duty Truck Areas**
Asphaltic Concrete Wearing Surface	2.0"
Limerock Base (1)	8.0"
Stabilized Subgrade (1)	12.0"
(1) Groundwater should be maintained at least 2.5 feet below the pavement surface.	

CONCRETE TYPICAL PAVEMENT SECTION	
Pavement Layer	**Heavy-Duty Truck Areas**
Concrete Wearing Surface	6"
Stabilized Subgrade (1)	6.0"
(1) Groundwater should be maintained at least 2.5 feet below the pavement surface.	

5.3.1 Wearing Surface

The wearing surface should consist of Florida Department of Transportation (FDOT) Type S asphaltic concrete having a minimum Marshall Stability of 1,500 lbs. Concrete pavement should have a minimum 28-day strength of 3,000 psi. Specific requirements for Type S asphaltic concrete wearing surface are outlined in the latest edition of the *Florida Department of Transportation, Standard Specifications for Road and Bridge Construction.*

5.3.2 Base and Subgrade

The limerock base course should have a minimum Limerock Bearing Ratio (LBR) of 100 and should be compacted to 98 percent of the modified Proctor maximum dry density (AASHTO T-180) value.

The subgrade material should have a minimum LBR of 40 and be compacted to 98 percent of the modified Proctor maximum dry density (AASHTO T-180) value.

6.0 SITE PREPARATION AND EARTHWORK RECOMMENDATIONS

Site preparation as outlined in this section should be performed to provide more uniform foundation bearing conditions, to reduce the potential for post-construction settlements of the planned structure(s) and to maintain the integrity of a flexible pavement section.

6.1 Clearing and Stripping

Prior to construction, the location of existing underground utility lines within the construction area should be established. Provisions should then be made to relocate interfering utilities to appropriate locations. It should be noted that, if underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion, which may subsequently lead to excessive settlement of overlying structures.

The "footprint" of the proposed building plus a minimum additional margin of 5 feet, and of the hardscape areas (parking/driveway) plus a minimum additional margin of 3 feet, should be stripped of all existing pavement layers (asphalt surface and limerock base) as well as surface vegetation, stumps, debris, organic topsoil, or other deleterious materials. During grubbing operations, roots with a diameter greater than 0.5-inch, stumps, or small roots in a concentrated state, should be grubbed and completely removed.

Based on the results of this field exploration, it should be anticipated that 13 to 14 inches of pavement material and 6 inches of topsoil or soils containing significant amounts of organic materials may be encountered across the site. The actual depths of unsuitable soils and materials should be determined by a designated representative using visual

observation and judgment during earthwork operations. Any topsoils removed from the building and parking/drive areas can be stockpiled and used subsequently in areas to be grassed.

6.2 Compaction

After completing the clearing and stripping operations, the exposed surface area should be compacted with a vibratory drum roller having a minimum static, at-drum weight, on the order of 10 tons. Typically, the material should exhibit moisture contents within ±2 percent of the modified Proctor optimum moisture content (ASTM D 1557) during the compaction operations. Compaction should continue until densities of at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557) have been achieved within the upper 2 feet of the compacted natural soils at the site.

Should the bearing level soils experience pumping and soil strength loss during the compaction operations, compaction work should be immediately terminated; the disturbed soils should be removed and backfilled with dry structural fill soils, which are then compacted; or the excess moisture content within the disturbed soils should be allowed to dissipate before recompacting.

Care should be exercised to avoid damaging any nearby structures while the compaction operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified, and the existing conditions of the structures should be documented with photographs and survey (if deemed necessary). Compaction should cease if deemed detrimental to adjacent structures, and we should be contacted immediately. It is recommended that the vibratory roller remain a minimum of 50 feet from existing structures. Within this zone, use of a track-mounted bulldozer or a vibratory roller, operating in the static mode, is recommended.

6.3 Structural Backfill and Fill Soils

Any structural backfill or fill required for site development should be placed in loose lifts not exceeding 12 inches in thickness and compacted by the use of the above described vibratory drum roller. The lift thickness should be reduced to 8 inches if the roller operates in the static mode or if track-mounted compaction equipment is used. If hand-held compaction equipment is used, the lift thickness should be further reduced to 6 inches.

Structural fill is defined as a non-plastic, inorganic, granular soil having less than 10 percent material passing the No. 200 mesh sieve and containing less than 4 percent organic material. It should be noted that soils with more than 10 to 12 percent passing the No. 200 sieve will be more difficult to compact, due to their nature to retain soil moisture, and may require drying. Typically, the material should exhibit moisture contents within ±2 percent of the modified Proctor optimum moisture content (ASTM D 1557) during the compaction operations. Compaction should continue until densities of at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557) have been achieved within each lift of the compacted structural fill.

We recommend that material excavated from the pipeline trenches which will be reused as backfill be stockpiled a safe distance from the excavations and in such a manner that promotes runoff away from the open trenches and limits saturation of the materials.

6.4 Foundation Areas

After satisfactory placement and compaction of the required structural fill, the foundation

areas may be excavated to the planned bearing levels. The foundation bearing level soils, after compaction, should exhibit densities equivalent to 95 percent of the modified Proctor maximum dry density (ASTM D 1557), to a depth of one foot below the bearing level. For confined areas, such as the footing excavations, any additional compaction operations can probably best be performed by the use of a lightweight vibratory sled or roller having a total weight on the order of 500 to 2000 pounds.

6.5 Retaining Wall Areas

To reduce the loads applied to the retaining wall structures, groundwater drainage behind the wall should be promoted. It is recommended that a granular backfill be placed directly behind the walls. These soils should be relatively clean sands containing less than 5-percent passing the No. 200 sieve and containing less than 2- percent organic material. Positive drainage of these backfill soils should also be provided by such means as a sock enclosed perforated pipe toe-drain or weep holes.

To avoid wall damage during the compaction process, heavy compaction equipment should not be used within 5 feet of the wall. Hand-held compaction equipment should be used in these areas. The fill soil should be placed in loose lifts of 6 inches or less and compacted to achieve a maximum density of 95-percent of the modified Proctor maximum dry density (ASTM D 1557). Backfill densities in excess of 95-percent of the modified Proctor maximum dry density can result in overstressing of the retaining walls.

6.6 Pavement Areas

After completing the clearing/stripping operations in the pavement areas, any underlying clayey sands and sandy clays that are within 2 feet of the bottom of the pavement base should be over-excavated from within the pavement areas. Structural backfill and fill required to achieve the finish pavement grades then can be placed and compacted as described Section 6.3 above. As an exception, densities of at least 98 percent of the modified Proctor maximum dry density (ASTM D1557) should be obtained within the upper one foot of the materials immediately below the proposed base course.

6.7 Excavation Protection

Excavation work for below-ground construction will be required to meet OSHA Excavation Standard Subpart P regulations for Type C Soils. The use of excavation support systems will be necessary where there is not sufficient space to allow the side slopes of the excavation to be laidback to at least 2H:1V (2 horizontal to 1 vertical) to provide a safe and stable working area and to facilitate adequate compaction along the sides of the excavation.

The method of excavation support should be determined by the contractor but can consist of a trench box, drilled-in soldier piles with lagging, interlocking steel sheeting or other methods. The support structure should be designed according to OSHA sheeting and bracing requirements by a Florida registered Professional Engineer.

7.0 QUALITY CONTROL TESTING

A representative number of field in-place density tests should be made in the upper 2 feet of compacted natural soils, in each lift of compacted backfill and fill, and in the upper 12 inches below the bearing levels in the footing excavations. The density tests are considered necessary to verify that satisfactory compaction operations have been performed. It is recommend that density testing be performed as listed below:

one location for every 5,000 square feet of building area with a minimum of three tests;

25-percent of any isolated column footing locations;

one location for every 100 linear feet of continuous wall footings;

one location for every 10,000 square feet of pavement area with a minimum of three tests; and

one location for every 100 feet of retaining wall backfill.

8.0 REPORT LIMITATIONS

This report has been prepared for the exclusive use of the VA and their clients for specific application to the design and construction of the Malcom Randall VA Medical Center Boiler Building project. The work for this project was performed in accordance with generally accepted geotechnical engineering practice. No warranty, express or implied, is made.

The analyses and recommendations contained in this report are based on the data obtained from the borings performed for the proposed Boiler Building structure. This testing indicates subsurface conditions only at the specific locations and times, and only to the depths explored. These results do not reflect subsurface variations that may exist away from the boring locations and/or at depths below the boring termination depths. Subsurface conditions and ground water levels at other locations may differ from conditions occurring at the tested locations. In addition, it should be understood that the passage of time may result in a change in the conditions at the tested locations. If variations in subsurface conditions from those described in this report are observed during construction, the recommendations in this report must be reevaluated.

If changes in the design or location of the structure occur, the conclusions and recommendations contained in this report may need to be modified. It is recommended that these changes be provided for further consideration. Neither G.E.A.R, nor Meskel & Associates Engineering are responsible for conclusions, interpretations, opinions or recommendations made by others based on the data contained in this report.

Gator Engineering & Aquifer Restoration, Inc.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% 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 (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more 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 of 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 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

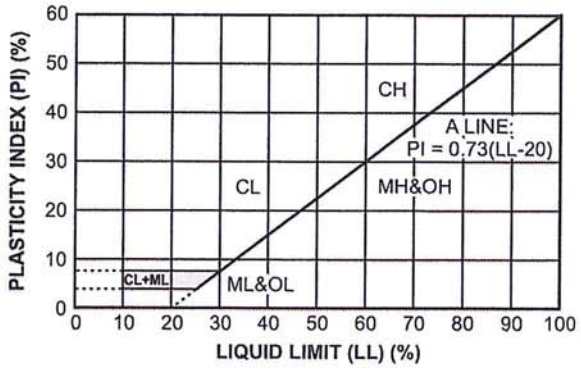
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



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BORING SB-1

PAGE 1 OF 1

PROJECT NO. 0010-0003

PROJECT NAME Malcom Randall VA Medical Center Boiler Building

PROJECT LOCATION Gainesville, Florida **CLIENT** VAMC Gainesville

DATE STARTED 7/7/12 **COMPLETED** 7/7/12 **STATION** _____ **OFFSET** _____

DRILLING CONTRACTOR Reliable Drilling **DRILLING METHOD** Rotary Wash Drill

LOGGED BY Wilson **CHECKED BY** Kelly **GROUND ELEVATION** _____ **HAMMER TYPE** Safety

DEPTH (ft)	SAMPLE DEPTH	NUMBER	MATERIAL DESCRIPTION	UCSC	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		1	2-1/8" Asphalt; 11" Limerock Base												
		2													
		3	Brown Silty Fine SAND	SM				14	38						
		4	Light Brown to Brown Fine SAND with Nodules of Brown Clayey Fine SAND	SP-SC											
5		5				5-8-4-5	12								
		6													
		7	Medium Dense to Very Dense, Dark Brown Silty Fine SAND	SM		7-9-8-9	17	21	20		NP	NP			
10															
15		8	Loose to Medium Dense, Gray to Light Gray Clayey to Very Clayey Fine SAND	SC		2-5-6	11								
		9				11-18-31	49								
20		10													
		11	Dense to Very Dense, Pale Brown Fine SAND with Silt	SP-SM		18-31-38	69								
25															

Bottom of borehole at 25.0 feet.

NOTES Boring advanced by hand auger to 5 feet (utilities)
NR - Not Recorded

GROUND WATER LEVELS

▽AT TIME OF DRILLING	▼
Not Encountered	—

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BORING SB-2

PROJECT NO. 0010-0003

PROJECT NAME Malcom Randall VA Medical Center Boiler Building

PROJECT LOCATION Gainesville, Florida **CLIENT** VAMC Gainesville

DATE STARTED 7/7/12 **COMPLETED** 7/7/12 **STATION** _____ **OFFSET** _____

DRILLING CONTRACTOR Reliable Drilling **DRILLING METHOD** Rotary Wash Drill

LOGGED BY Wilson **CHECKED BY** Kelly **GROUND ELEVATION** _____ **HAMMER TYPE** Safety

DEPTH (ft)	SAMPLE DEPTH	NUMBER	MATERIAL DESCRIPTION	UCSC	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0															
		1	Brown Fine SAND, Trace Roots	SP											
		2													
		3	Brown Fine SAND with Silt	SP-SM				4	6						
		4													
5		5				3-5-8-11	13								
						11-8-10-17	18	16	27						
		6	Medium Dense to Very Dense, Dark Brown Silty Fine SAND	SM		14-17-38-32	55								
10		7													
15		8				18-28-35	63								
			Dense to Very Dense, Pale Brown Fine SAND with Silt	SP-SM											
20		9				11-17-27	44								
25		10	Dense, Grayish Brown Silty Fine SAND	SM		21-24-34	58								

GROUND WATER LEVELS

NOTES Boring advanced by hand auger to 4 feet (utilities)
NR - Not Recorded

AT TIME OF DRILLING	▼
Not Encountered	—

(Continued Next Page)

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BORING SB-2

PROJECT NO. 0010-0003

PROJECT NAME Malcom Randall VA Medical Center Boiler Building

PROJECT LOCATION Gainesville, Florida **CLIENT** VAMC Gainesville

DEPTH (ft)	SAMPLE DEPTH	NUMBER	MATERIAL DESCRIPTION	UCSC	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
25			Dense, Grayish Brown Silty Fine SAND *(continued)*	SM											
		11				3-5-6	11								
30		12	Stiff, Greenish Gray to Yellowish Gray Sandy CLAY	CH											
		13				6-7-7	14								
35		14													

Bottom of borehole at 35.0 feet.

NOTES Boring advanced by hand auger to 4 feet (utilities)
NR - Not Recorded

GROUND WATER LEVELS

▽AT TIME OF DRILLING	▼
Not Encountered	—

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BORING SB-3

PROJECT NO. 0010-0003

PROJECT NAME Malcom Randall VA Medical Center Boiler Building

PROJECT LOCATION Gainesville, Florida **CLIENT** VAMC Gainesville

DATE STARTED 7/7/12 **COMPLETED** 7/7/12 **STATION** _____ **OFFSET** _____

DRILLING CONTRACTOR Reliable Drilling **DRILLING METHOD** Rotary Wash Drill

LOGGED BY Wilson **CHECKED BY** Kelly **GROUND ELEVATION** _____ **HAMMER TYPE** Safety

DEPTH (ft)	SAMPLE DEPTH	NUMBER	MATERIAL DESCRIPTION	UCSC	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0			1-3/4" Asphalt; 11" Limerock Base												
		1	Grayish Brown Fine SAND with Silt, Trace Gravel (Rock Fragments)	SP-SM											
		2													
		3	Brown Fine SAND with Silt	SP-SM											
5		4	Medium Dense to Very Dense, Dark Brown Silty Fine SAND	SM		14-18-15-17	33	11	24						
		5				16-25-31-31	56								
10		6				8-15-23-29	38								
15		7	Loose to Medium Dense, Gray to Light Gray Clayey to Very Clayey Fine SAND	SC		5-5-4	9								
20		8	Medium Dense, Gray Very Clayey Fine SAND, Trace Gravel (Rock Fragments	SC		4-5-8	13								
25		9				6-5-6	11								

Bottom of borehole at 25.0 feet.

NOTES Boring advanced by hand auger to 4 feet (utilities)
NR - Not Recorded

GROUND WATER LEVELS

▽AT TIME OF DRILLING	▼
Not Encountered	—

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
1	Pg. 46, Section 4.35 PROPOSAL EVALUATION AND AWARD	We would like to include completed CPARS as a part of our proposal evaluation; if the offeror is inclined to include CPARS, would the government allow the inclusion of CPARS into the Appendix of the proposal submission?		Please provide only information requested per the solicitation. The VA will conduct a separate past performance review. The VA will review contractor performance information stored in the CPARS/(PPIRS) database. Thus, no separate past performance submission is required
2		230911 outlines the requirements for the SCADA system (e.g. points, graphics, etc.). These points are further outlined (and expanded) on the MP603, MP604, & MP605 drawings. Many of these points that are going back to the SCADA are also indicated to go back to the BAS. Please confirm it is the VA's intent to monitor the same exact points at both the SCADA and the BAS. This appears to be redundant, and will add significant cost to the project. If required, please confirm all points can be picked up via bacnet interface at the SCADA workstation.		Confirmed, points should go back to the SCADA system and the DDC control system. SCADA system controls the boiler plant and is locally monitored with the workstation in the control room. The DDC control system allows for remote monitoring of the plant. Points to the DDC control system through the SCADA workstation should be through a BACnet (read only) interface as specified.
3		230911 2.15 states to transmit alarm signal to the boiler plant Control Room. Audible and visual alarm shall be provided at this location. The VHA Safety Device Testing manual requires transmitting an alarm signal to a designated location outside of the boiler plant. Please provide the location, and the means for transmitting the signal to this location. A one-line diagram would convey this.		Refer to attached control diagram. Audible/Visual alarm and warning sign should be located outside the plant and in the control room as noted. The status (normal/alarm) of this system, should be monitored by the SCADA workstation as well as the DDC control system as noted in comment response to question #2.
4				
5	01 00 00 1.23	Please confirm the Government wants a Photographic Documentation indexing and navigation system (similar to Mulitvista) as outlined in 01 00 00 1.23.		Yes, the VA wants this.
6	01 00 00 1.1	Please confirm the Government will retain the testing laboratory services (as outlined in 01 00 00 1.1).		Contractor will provide all Inspection and Testing. Testing and Inspection Agencies will be nominated by the contractor, approved by the VA, and paid for by the contractor.
7		Please confirm there is no sole-source justification to utilize Cleaver Brooks firetube boilers (basis of design). Please confirm any manufacturer can be utilized as long as they meet the solicitation document requirements.		Cleaver Brooks boilers are not sole source. Any boiler manufacturer can be utilized as long as they meet the solicitation and as long as the contractor makes the necessary adjustments to other trades and other systems for proper construction coordination with his boiler of choice
8		Please confirm this project should include FL state/local sales tax.		The total price offered for the base and alternative deduct items should include all applicable taxes and fees.
9	01 35 26	Please confirm the General Contractor shall have a Project Superintendent AND a SSHO on site during construction. Generally the Project Superintendent can serve the duties of the SSHO.		The Project Superintendent can perform both duties.
10		Please confirm the Project Superintendent can also serve the role as Quality Control Manager.		The Project Superintendent can perform both duties.
11	01 91 00	Please confirm the General Contractor is required to hire the Commissioning Agent (not the Government) as outlined in 01 91 00.		The Commissioning Agent will be approved by the VA but paid for by the contractor and included as part of the overall contract price.

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
12		Please confirm this contract requires NO new steam trap monitors (part 232111 2.24)		No steam trap monitoring is required, but all steam traps should have the capability for future steam trap monitoring per 232111.2.24.G.
13		The General Contractor is required to provide an inspector certified by the National Board of Boiler and Pressure Vessels Inspectors to conduct tests after equipment is installed (23 52 39 Part 3). Please confirm the Government will retain an inspector as outlined in 23 52 39 Part 3 after all operational tests are complete. In the past, the Government has wanted the General Contractor to pick-up both costs.		VA to retain the Inspector, per 23 52 39, Part 3.
14	01 91 00	Operation & Maintenance Training Requirements (01 91 00). Please verify if this section will be enforced as part of this solicitation. Is it the Government's intention that the contractor engage in the commercial production of a compilation of professional training videos as detailed.		Yes
15	23 21 11 2.26	23 21 11 2.25 Piping Support System – please confirm these engineered documents are required (outside of the current plans).		Required. Refer to Paragraph 232111.1.4.L for submittal requirements of the Pipe Support Systems
16	22 05 11 & 23 05 10	Layout Drawings – 22 05 11 & 23 05 10 require complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same area. Please advise if the Government requires these drawings in a certain format (e.g. AutoCAD, AutoDesk Revit, etc.).		Yes - Autocad, Revit, pdf.
17	23 09 11 & 23 51 00	Opacity Monitors - Opacity monitors are mentioned in 230911 and 235100 (“if required”), please confirm Opacity Monitors are not required.		Opacity Monitors are required, they are specified in 230911.2.8 and shown on plans MP603, MP709.
18	23 09 11	Stainless Steel Tubing - 23 09 11 (stainless steel tubing) – please confirm that the stainless steel tubing requirements (as outlined in 230911) are COMPLETELY depicted on the drawings. We assume that all the mechanical details and P&ID’s on the drawings outline the extent of the stainless steel tubing requirements.		Stainless Steel tubing in control panels is not required.
19	23 09 11	Please confirm that the controls series drawings depict the complete extent of required interconnecting conduit and wiring as required for a complete system (as outlined in 230911) – including, but not limited to the Automatic Boiler/Burner Control System, Burner Management System with Safety Interlocks and Accessories, Main Instrumentation and Control Panel, Boiler/Burner Control Panels, Computer Workstation, Flue Gas Oxygen Analyzers, Flow Meters, Pressure sensors and transmitters, Boiler draft gages, temperature sensors and transmitters, recorders, and Boiler Plant Building Dangerous Gas Detection System.		Interconnecting conduit and wiring is not shown on the drawings. Complete wiring diagrams shall be submitted by contractor per 230911.1.4.D.3, 1.4.E.5, and 1.4.H.

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
20	1. Page 17, Section 2.10 Proposal Instructions	In regards to submittal of the proposals, please clarify if the bidder is to submit redacted Technical and Price Proposals on the one (1) CD/DVD copy or if we are to submit a second CD/DVD copy with redacted Technical and Price Proposal.		Offeror should not submit and proposal information on CD/DVD. Proposal should only be emailed".
21	2. Page 20, Factor IV – Past Performance	Will the government consider the submission of CPARS in place of PPQs?		See RFI Item 1 response.
22	Page 19, Factor I – Specialized Exp. & Capability (Project Information Form)	In regards to item 10, the government specifies they are seeking the prime/key subcontractors involved in the example project, and "their respective contract numbers." Please clarify if the "respective contract numbers" is intended to be the internal, administrative contract number that is specific to the firm or the government issued contract number.		Offeror discretion regarding this. Subcontractor referenced contract numbers can either be contract/subcontract agreement number between the general contractor and that subcontractor; or for example, if the subcontractor performed on a federal contract, and knows the general contractor's federal contract number, they can choose to reference that. Either way is acceptable, and if needed, the VA will later seek further clarification."
23		Layout Drawings – 22 05 11 & 23 05 10 require complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same area. Please advise if the Government requires these drawings in a certain format (e.g. AutoCAD, AutoDesk Revit, etc.).		Yes, AutoCad, Revit, pdf
24		VHA Boiler Plant Safety Device Testing – please confirm the requirements that are outlined in the VHA Boiler Plant Safety Device Testing manual have been transposed onto the drawings (i.e. please confirm no changes to details in the drawings will need to be made in order to meet the requirements of the manual).		Installation details for each safety device have been transposed from the Boiler Plant Safety Device Testing Manual onto the project drawings. Safety device testing procedures and checklists were not copied onto the project documents, and should be reviewed by the bidders.
25		Please confirm seismic design and calculations as normally outlined in 13 05 41 (i.e. delegated design) is NOT required.		Not in specifications. Not required.

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
26		The current form of the technical proposal requires only the provision of 2 (or more) past completed projects that are relevant in nature. While past experience is very important, the proposal format includes no opportunity for respondents to provide any information related to the specifics of the project at hand. Given the incredibly complex and technical nature of this project, along with the potential for the project to negatively impact on-going medical center operations, it would seem that a description of the respondent's technical approach to this specific project would be an important consideration. For instance, many RFPs for projects of this particular nature require provision of a project schedule (and associated phasing narrative) that outlines key milestones and critical-path activities. They also include the requirement to outline anticipated project-specific risks, along with mitigation plans that will help ensure critical services to the medical center are not interrupted. Any firm that is capable and qualified to perform this project should be accustomed to providing this sort of technical information. Given that the VA is already considering technical qualifications as part of the selection process, adding elements such as schedule/phasing plans and/or risk mitigation plans would only help the VA make the most informed decision possible.		See RFI Item 1 and 4 responses.
27		Plan S-001 under Note 2 States that a Geotechnical Report was performed by Gator Engineering & Aquifer Restoration, Inc. (G.E.A.R), dated August 2012; Entitled “Geotechnical Report, Malcom Randall VA MC Boiler Building”. We have been unable to locate this geotechnical report. Please advise where this report can be located or provide them to the contractors in an Amendment.		Geotechnical report to be included with this amendment.
28		Please confirm there is no sole-source justification to utilize Cleaver Brooks firetube boilers (basis of design). Please confirm any manufacturer can be utilized as long as they meet the solicitation document requirements.		Asbestos and/lead abatement should NOT be included in the price. Rather it will be handled later as a change order.
29		Are we to exclude all abatement of Asbestos or Lead from our base bid cost? Please confirm that cost for abatement shall be required only after direction of COR when notified of such abatement and that cost shall be implemented by way of change order		Asbestos and/lead abatement should NOT be included in the price. Rather it will be handled later as a change order.
30		Please issue name of existing plant water treatment company		Vendor is Water Solutions and they use Ashberry equipment.

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
31		Please confirm that the Owner will be providing Inspection and Testing agencies for Soil Backfill Compaction along with Concrete and Structural Steel Inspections and Testing		No, the contractor will provide all Inspection and Testing. Testing and Inspection Agencies will be nominated by the contractor, approved by the VA, and paid for by the contractor.
32		At the location where the seven parking spots are being 'removed' to the East of the main project, it calls for NO demolition, yet if you compare the existing sheet against the proposed sheet there is at least some curb being removed, and the proposed curb being added usually cannot be poured directly onto the existing concrete/asphalt there. The proposed plans don't show the existing curb along the sidewalk and the north end. Clarification is needed.		The proposed plans should indicate that the existing features are left in place. Please refer to C001 - topographic survey base file which indicates the existing road crossing, concrete landing pad, sidewalk and the 7 northernmost parking spaces, whose area some or partially falls within the limits of the 50-ft physical security boundary. VA review called for these seven spots to be restricted from available parking. Construction: The intent on C200 of no demolition is to restrict the spots from available parking without having to demo any of the existing physical features. The intent shown on C300 is to create a barrier to the parking spots by placing high curb alongside the west edge and south of the 7 parking spots. The barrier may be formed in such manner as to prevent cars from rolling over, i.e.; high concrete curb shape with a vertical side and rounded top; or very high rounded speed bump shape of asphalt. It should not be continuous so that there is drainage relief. See the example photo next to the curb note on C300. A concrete material could be placed with dowels into the subsurface for support. An asphalt material could be placed and formed directly on top of the existing asphalt roadway surface.
33		Does this project fall under the requirements of the "Buy American Act"?		Yes – please refer (and your subcontractor) to FAR 52.225-11 and 12.
34		We need the Control Devices shown on MP-603, MP-604 and MP-605 in Excel Format, if possible.		Control devices are not available in Excel format.
35		Does this project fall under the Executive Order 13706 for Paid Sick Leave?		Yes.
36		NO SPECIFICATIONS FOR WATER TREATMENT SYSTEM – (23-25-00 is listed but not in docs)		Chemical Treatment is specified in 235011.2.12.

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
37		The drawings do not show the following: Chemical Tank VOLUME and material of construction. Is a Containment Basin needed? Injection Quills (Confirm the type and number needed)? The drawing shows one line for caustic feed and one line for polymer feed but 3x pumps for each? Are there 3 x caustic feed lines and 3 x polymer feed lines or only one, each? Boiler Boil-out: Need Boiler volume. What chemical solution is required?		The plans and the specs show everything required. Tanks are specified in 235011.2.12. A containment basin is not needed. Quills are specified in 235011.2.12, quantities are obtained from the drawings, specifically on MP607, MP701, and MP703. Drawing is correct - separate Caustic and Polymer pumps are required for each of 3 boilers. Each boiler will have its own interlocked caustic pump and its own interlocked polymer pump. Three pumps discharge into a single line for caustic and single line for polymer. Please read the chemical treatment sequence of operation on MP607, and follow the drawings MP701 and MP703 which show where the chemical treatment system lines inject chemicals into the feedwater piping and steam header. Obtain boiler volume from the chosen boiler manufacturer which is being used in your bid. Refer to 235239.3.2. Chemical solution shall be as recommended by boiler manufacturer or ASME Code Section VII.
38		For bidding purposes, How long do we need to treat the boilers-Time period?		Once a boiler(s) is ready for final inspection and then officially accepted by the VA, the responsibility ends. The following is from the boiler clean-out section in specs, but there is no time frame: Chemical Treatment: The quality of the water in the boilers shall be maintained by a professional water treatment organization. This organization shall provide on-site supervision to maintain the required water quality during periods of boiler storage, operating, standby and test conditions. Furnish monthly reports by the water treatment organization, to the (RE). The Contractor shall provide all chemicals, labor and professional services until the Government has accepted the boilers for operation.
39		Several questions: What material of construction for the water treatment lines? What type of automatic blowdown controllers are required? What is the dimension of the concrete pad for the chemical storage tanks? What is the pH sensor being used for? Will they inject the amine into the steam header? If so, then a retractable injection quill should be provided.		1. Stainless Steel per 232111.2.12. 2. Microprocessor based controller as Specified in 235011.2.13. 3. Refer to S201 where dimensions are shown. 4. Please read the sequence of operation of the Chemical Treatment system on MP607 which states, “Amines will be injected into the main steam header based on the PH sensor in the main condensate return pipe.” 5. Retractable chemical injection quills shown on MP701, and MP703, and specified in 235011.2.12.E.
40		Per MP-104 in the plan set, It says for Pad removal, see Structural Drawings. However, there does not appear to be Structural Demo Drawings in the plan set relevant to this scope.		All existing equipment pads indicated on MP-104 to be removed, shall instead remain in place (not be demolished).
41		We need to know how deep the concrete pad is (thickness). We also need to know how you anticipate this existing Boiler Room looking after equipment and pad is removed (are we putting anything back).		All existing equipment pads indicated on MP-104 to be removed, shall instead remain in place (not be demolished).

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
42		There is a contradiction between the plans and specs on the Corner Guards. From Page 534 / 1430, 2.2 CORNER GUARDS, A. Surface-Mounted, Resilient, Plastic Corner Guards: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware; fabricated with 90-degree turn to match wall condition. 1. Basis-of-Design Product: Subject to compliance with requirements, provide CS Group SSM20 4'-0" high units, (color shall be selected by Architect) with all caps, retainers and mounting hardware or a comparable product by one of the following: a. American Floor Products Co., Inc. b. Arden Architectural Specialties, Inc. c. Balco, Inc. d. Construction Specialties, Inc. e. IPC Door and Wall Protection Systems; Division of InPro Corporation. f. Korogard Wall Protection Systems; a division of RJF International Corporation. g. Musson Rubber Company. h. Pawling Corporation. i. Tepromark International, Inc. j. WallGuard.com From Page 53 / 124 – Page A-601, CG-1- CORNER GUARD (SURFACE MOUNT) MANUF: IN PRO CORPORATION STYLE: TYPE 1&2 MODEL 180 COLOR: STAINLESS STEEL SIZE: 1-1/2"		Corner guards will not be required for this project.
43		In the original Solicitation the NAICS code says: 238220 (Plumbing, Heating and Air Conditioning Contractors). This project has Division 1-33 Specs (Which falls way beyond the Division 22 & 23 Specs of NAICS code 238220). We are a SDVOSB Certified General Contractor with NAICS Code: 236210 & 236220. We would like to confirm that we can bid the project as a SDVOSB Set Aside as the current solicitation is showing.		NAICS has been reconfirmed and remains 238220.
44		Drawing PL-201 shows a recirculation pump also specified in pump schedule on PL-600 as CP-1. The corresponding power for this pump is not indicated on EP-101 in Shop Area 101. Where is power to be provided from for pump CP-1?		See new attached drawings EP-101 and EP711. A receptacle and homerun for CP-1 have been added, and the reference to SFCCP has been removed.
45		Can you see if you can get drawing numbers MP-603, MP-604, and MP-605 in Excel Format. We tried to get this last time, but I think our request was too late. There is a lot of information on this drawings, that goes to several different vendors. It would help us manage this better if we were able to sort this and filter it. (From Mechanical Contractor)		Control devices are not available in Excel format.

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
46		Materials purchased by contractors, outside and inside Florida and installed on this proect will be subject to sales tax as required by local statutes (state law). Will the Contracting Officer require the successul contractor to provide proof that sales tax is paid for major equipment installed on the project?		First, please refer to RFI 8 response. Second, the VA will not require to documented proof the that applicable taxes and fees are paid. General contractor responsibility.
47		On sheet S203, it appears that some of the layers may have not transferred to the drawings as published. Specifically, in detail 1&2 the existing building 25 is not showing up and in detail 5 it appears that some items are missing. We have been seeing this on quite a few projects recently and just wanted to bring it to the A/E's attention to verify that everything that has been designed is showing up on the published drawing sheets.		Thank you for the notification. Everything that has been designed is showing up on the published drawing sheets.
48		Sheet C400 indicates to install bollards but no details or specifications can be found. Please advise on type and installation design.		See attached Typical Bollard Detail - C1.
49		We cannot locate the size of the fuel tank. Please advise.		MP707 – 40,000 gallon.
50		Sheet S200 detail 5 isometric has omitted the continuous footing for the masonry walls along column line a. It appears that at column line A4 the spread footing elevation is much lower than the adjacent footings. Please confirm whether the continuous footings are to step or maintains the same elevation regardless of the spread footing elevations.		The intent of the isometrics is to define beam locations and should not be used to determine types and locations of footings. Please refer to structural plans, details, and sections for accurate depiction of all footings.
51		Sheet S001 Note C indicates that a Geotechnical Report exists and that we are to that reports for additional requirements. This report cannot be located. Please advise.		See RFI response 27.
52		There is a light weight insulating concrete specification for the roof deck but the structural drawings appear to have specified a reinforced 4000 psi composite deck. Please confirm the concrete roof deck's composition.		Omit light weight concrete specification. Composite deck shall include 4000 psi concrete.
54		There is an asbestos abatement and lead abatement survey indicating the need for abatement work, but no specification. Please provide specifications for asbestos abatement and lead abatement.		The GLE report showed no asbestos but they couldn't sample parts of the boilers since they were steaming. The GLE report did show lead paint, however. Since this part of the project is at the back end, after the new boiler plant is on-line, this abatement can be treated as a change, if necessary. It will not affect the schedule of production.
55		Sheet G003 General Instruction and Note 4 states the VAMC makes no expressed or implied guarantee of accuracy or that that other utilities are not located in the construction vicinity. Furthermore, the Contractor shall be responsible for repairing or replacing any utilities damaged by the contractor during construction at no expense to the VAMC. If a utility is unknown and cannot be located by Ground Penetrating Radar, how can the Contractor quantify and price this requirement?		If the contractor did their due diligence, we would consider this as an "as found" unknown condition, for which the contractor would not be held liable. Key here is due diligence. Your example of using ground penetrating radar is a good one. VA expects that level of diligence.

Replace Boilers at Malcom Randall VAMC - Bid Phase RFI Responses

QUESTION NO.	REFERENCE (Sect/Para/Page)	QUESTION	OFFEROR - COMPANY NAME	GOVERNMENT RESPONSE
56		Deduct Alternate 1 indicates to install a synthetic stucco system on metal studs. Please provide the requirements for the construction assembly. Design criteria for metal studs, sheathing materials, waterproofing, etc is needed to determine an appropriate cost.		Deduct Alt. #1: In leu of brick cladding (and associated ledger angles and flashings), substitute an Exterior Insulation Finish Synthetic Stucco System (EIFS) over the CMU backing and vapor barrier as shown on the documents. The Synthetic Stucco system shall comprise of a minimum of 2" of closed cell rigid insulation board adhered/fastened directly to the CMU/VB back-up followed by the manufacturers recommended finish stucco system. EIFS Manufacturer's flashings, termination flashings, trims, corner trims, drips and associated expansion joints shall be utilized with the EIFS substitution. Since the EIFS is a shallower system then the brick, Aluminum trim pieces will be needed to abut other dimensionally different materials such as the louvers and metal panel system. Sto-Wall and Drivit are acceptable manufacturers.
57		Due to the complexity of the project and the Memorial Day weekend cutting into our estimating time, we would like to propose a minimum one week extension to the bid date and if possible a bid date in the middle of the week. It is has been our experience that bids on Monday's typically lead to less subcontractor participation which typically has a negative effect to the budget.		The proposal due date may be extended, dependent on official issuance of this RFI Amendment; however, the extension will be minimal. Offeror's can anticipate proposals being due approximately 7 calendar days after RFI Amendment issuance.

SECTION 23 07 11

HVAC AND BOILER PLANT INSULATION

03-09-18

PART 1 - GENERAL

1.1 DESCRIPTION

A. Field applied insulation for thermal efficiency and condensation control for
   1. HVAC piping, ductwork and equipment.
   2. Boiler plant mechanical systems including burner fuel oil storage and handling facilities but excluding outside steam distribution.

B. Definitions
   1. ASJ: All service jacket, white finish facing or jacket.
   2. Air conditioned space: Space having air temperature and/or humidity controlled by mechanical equipment.
   3. Cold: Equipment, ductwork or piping handling media at design temperature of 16 degrees C (60 degrees F) or below.
   4. Concealed: Ductwork and piping above ceilings and in chases, and pipe spaces.
   5. Exposed: Piping, ductwork, and equipment exposed to view in finished areas including mechanical, Boiler Plant and electrical equipment rooms or exposed to outdoor weather.
   6. FSK: Foil-scrim-kraft facing.
   7. Hot: HVAC Ductwork handling air at design temperature above 16 degrees C (60 degrees F);HVAC equipment or piping handling media above 41 degrees C (105 degrees F); Boiler Plant breechings and stack temperature range 150-370 degrees C(300-700 degrees F) and piping media and equipment 32 to 230 degrees C(90 to 450 degrees F).
   8. Density: kg/m^3 - kilograms per cubic meter (Pcf - pounds per cubic foot).
   9. Thermal conductance: Heat flow rate through materials.
      a. Flat surface: Watt per square meter (BTU per hour per square foot).
      b. Pipe or Cylinder: Watt per square meter (BTU per hour per linear foot).
   10. Thermal Conductivity (k): Watt per meter, per degree C (BTU per inch thickness, per hour, per square foot, per degree F temperature difference).

11. Vapor Retarder (Vapor Barrier): A material which retards the transmission (migration) of water vapor. Performance of the vapor retarder is rated in terms of permeance (perms). For the purpose of this specification, vapor retarders shall have a maximum published permeance of 0.1 perms and vapor barriers shall have a maximum published permeance of 0.001 perms.
12. HPS: High pressure steam (415 kPa [60 psig] and above).
13. HPR: High pressure steam condensate return.
14. MPS: Medium pressure steam (110 kPa [16 psig] thru 414 kPa [59 psig].
15. MPR: Medium pressure steam condensate return.
16. LPS: Low pressure steam (103 kPa [15 psig] and below).
17. LPR: Low pressure steam condensate gravity return.
18. PC: Pumped condensate.
19. FWPD: Feedwater pump discharge.
20. FWPS: Feedwater pump suction.
21. CTPD: Condensate transfer pump discharge.
22. CTPS: Condensate transfer pump suction.
23. CPD: Condensate pump discharge.
24. R: Pump recirculation.
25. FOS: Fuel oil supply.
26. FOR: Fuel oil return.
27. CW: Cold water.
28. SW: Soft water.
29. HW: Hot water.
30. RS: Refrigerant suction.
31. PVDC: Polyvinylidene chloride vapor retarder jacketing, white.

1.2 RELATED WORK

A. Section 02 82 11, TRADITIONAL ASBESTOS ABATEMENT: Insulation containing asbestos material.
B. Section 07 84 00, FIRESTOPPING: Mineral fiber and bond breaker behind sealant.
C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC: General mechanical requirements and items, which are common to more than one section of Division 23.
D. Section 23 05 10, COMMON WORK RESULTS FOR BOILER PLANT and STEAM GENERATION: General requirements pertaining to mechanical Boiler Plant work.

E. Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING and EQUIPMENT
F. Section 23 21 11, BOILER PLANT PIPING SYSTEMS: Boiler plant piping.
G. Section 23 21 23, HYDRONIC PUMPS
H. Section 23 22 13, STEAM and CONDENSATE HEATING PIPING
I. Section 23 22 23, STEAM CONDENSATE PUMPS
J. Section 23 50 11, BOILER PLANT MECHANICAL EQUIPMENT
K. Section 23 51 00, BREECHINGS, CHIMNEYS, and STACKS
L. Section 23 23 00, REFRIGERANT PIPING: Requirements for refrigerant piping and fittings.
M. Section 23 21 13, HYDRONIC PIPING and Section 23 22 13, STEAM and CONDENSATE HEATING PIPING: Piping and equipment.
N. Section 23 21 13, HYDRONIC PIPING: Hot water, chilled water, and glycol piping.
O. Section 23 31 00, HVAC DUCTS AND CASINGS: Ductwork, plenum and fittings.
P. Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS. Requirements for commissioning, systems readiness checklists, and training.

1.3 QUALITY ASSURANCE

A. Refer to article QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC and Section 23 05 10, COMMON WORK RESULTS FOR BOILER PLANT and STEAM GENERATION.
B. Criteria:
   1. Comply with NFPA 90A, particularly paragraphs 4.3.3.1 through 4.3.3.6, 4.3.10.2.6, and 5.4.6.4, parts of which are quoted as follows:

      4.3.3.1 Pipe insulation and coverings, duct coverings, duct linings, vapor retarder facings, adhesives, fasteners, tapes, and supplementary materials added to air ducts, plenums, panels, and duct silencers used in duct systems, unless otherwise provided for in 4.3.3.1.1 or 4.3.3.1.2., shall have, in the form in which they are used, a maximum flame spread index of 25 without evidence of continued progressive combustion and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.

      4.3.3.1.1 Where these products are to be applied with adhesives, they shall be tested with such adhesives applied, or the adhesives used shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when in the final dry state. *(See 4.2.4.2.)*

      4.3.3.1.2 The flame spread and smoke developed index requirements of 4.3.3.1.1 shall not apply to air duct weatherproof coverings

where they are located entirely outside of a building, do not penetrate a wall or roof, and do not create an exposure hazard.

4.3.3.2 Closure systems for use with rigid and flexible air ducts tested in accordance with UL 181, Standard for Safety Factory-Made Air Ducts and Air Connectors, shall have been tested, listed, and used in accordance with the conditions of their listings, in accordance with one of the following:

(1) UL 181A, Standard for Safety Closure Systems for Use with Rigid Air Ducts and Air Connectors

(2) UL 181B, Standard for Safety Closure Systems for Use with Flexible Air Ducts and Air Connectors

4.3.3.3 Air duct, panel, and plenum coverings and linings, and pipe insulation and coverings shall not flame, glow, smolder, or smoke when tested in accordance with a similar test for pipe covering, ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation, at the temperature to which they are exposed in service.

4.3.3.3.1 In no case shall the test temperature be below 121°C (250°F).

4.3.3.4 Air duct coverings shall not extend through walls or floors that are required to be fire stopped or required to have a fire resistance rating, unless such coverings meet the requirements of 5.4.6.4.

4.3.3.5* Air duct linings shall be interrupted at fire dampers to prevent interference with the operation of devices.

4.3.3.6 Air duct coverings shall not be installed so as to conceal or prevent the use of any service opening.

4.3.10.2.6 Materials exposed to the airflow shall be noncombustible or limited combustible and have a maximum smoke developed index of 50 or comply with the following.

4.3.10.2.6.1 Electrical wires and cables and optical fiber cables shall be listed as noncombustible or limited combustible and have a maximum smoke developed index of 50 or shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

4.3.10.2.6.4 Optical-fiber and communication raceways shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance with UL 2024, Standard for Safety Optical-Fiber Cable Raceway.

4.3.10.2.6.6 Supplementary materials for air distribution systems shall be permitted when complying with the provisions of 4.3.3.

5.4.6.4 Where air ducts pass through walls, floors, or partitions that are required to have a fire resistance rating and where fire dampers are not required, the opening in the construction around the air duct shall be as follows:

(1) Not exceeding a 25.4 mm (1 in.) average clearance on all sides

(2) Filled solid with an approved material capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste when subjected to the time-temperature fire conditions required for fire barrier penetration as specified in NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*

2. Test methods: ASTM E84, UL 723, or NFPA 255.
3. Specified k factors are at 24 degrees C (75 degrees F) mean temperature unless stated otherwise. Where optional thermal insulation material is used, select thickness to provide thermal conductance no greater than that for the specified material. For pipe, use insulation manufacturer's published heat flow tables. For domestic hot water supply and return, run out insulation and condensation control insulation, no thickness adjustment need be made.
4. All materials shall be compatible and suitable for service temperature, and shall not contribute to corrosion or otherwise attack surface to which applied in either the wet or dry state.

C. Every package or standard container of insulation or accessories delivered to the job site for use must have a manufacturer's stamp or label giving the name of the manufacturer and description of the material.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.

B. Shop Drawings:

1. All information, clearly presented, shall be included to determine compliance with drawings and specifications and ASTM, federal and military specifications.
   a. Insulation materials: Specify each type used and state surface burning characteristics.
   b. Insulation facings and jackets: Each type used. Make it clear that white finish will be furnished for exposed ductwork, casings and equipment.
   c. Insulation accessory materials: Each type used.
   d. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.

e. Make reference to applicable specification paragraph numbers for coordination.

C. Samples:

1. Each type of insulation: Minimum size 100 mm (4 inches) square for board/block/ blanket; 150 mm (6 inches) long, full diameter for round types.
2. Each type of facing and jacket: Minimum size 100 mm (4 inches square).
3. Each accessory material: Minimum 120 ML (4 ounce) liquid container or 120 gram (4 ounce) dry weight for adhesives / cement / mastic.

1.5 STORAGE AND HANDLING OF MATERIAL

A. Store materials in clean and dry environment, pipe covering jackets shall be clean and unmarred. Place adhesives in original containers. Maintain ambient temperatures and conditions as required by printed instructions of manufacturers of adhesives, mastics and finishing cements.

1.6 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.

B. Federal Specifications (Fed. Spec.):

L-P-535E (2)- 99.....Plastic Sheet (Sheeting): Plastic Strip; Poly (Vinyl Chloride) and Poly (Vinyl Chloride - Vinyl Acetate), Rigid.

C. Military Specifications (Mil. Spec.):

MIL-A-3316C (2)-90.....Adhesives, Fire-Resistant, Thermal Insulation

MIL-A-24179A (1)-87.....Adhesive, Flexible Unicellular-Plastic Thermal Insulation

MIL-C-19565C (1)-88.....Coating Compounds, Thermal Insulation, Fire-and Water-Resistant, Vapor-Barrier

MIL-C-20079H-87.....Cloth, Glass; Tape, Textile Glass; and Thread, Glass and Wire-Reinforced Glass

D. American Society for Testing and Materials (ASTM):

A167-99(2004).....Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

B209-07.....Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

C411-05.....Standard test method for Hot-Surface Performance of High-Temperature Thermal Insulation

C449-07.....Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement

C533-09.....Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation

C534-08.....Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form

C547-07.....Standard Specification for Mineral Fiber pipe Insulation

C552-07.....Standard Specification for Cellular Glass Thermal Insulation

C553-08.....Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications

C585-09.....Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System) R (1998)

C612-10.....Standard Specification for Mineral Fiber Block and Board Thermal Insulation

C1126-04.....Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation

C1136-10.....Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

D1668-97a (2006).....Standard Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing

E84-10.....Standard Test Method for Surface Burning Characteristics of Building Materials

E119-09c.....Standard Test Method for Fire Tests of Building Construction and Materials

E136-09b.....Standard Test Methods for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C (1380 F)

E. National Fire Protection Association (NFPA):

90A-09.....Standard for the Installation of Air Conditioning and Ventilating Systems

96-08.....Standard~~s~~ for Ventilation Control and Fire Protection of Commercial Cooking Operations

101-09.....Life Safety Code

251-06.....Standard methods of Tests of Fire Endurance of Building Construction Materials

255-06.....Standard Method of tests of Surface Burning Characteristics of Building Materials

F. Underwriters Laboratories, Inc (UL):

723.....UL Standard for Safety Test for Surface Burning Characteristics of Building Materials with Revision of 09/08

G. Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS):

SP58-2009.....Pipe Hangers and Supports Materials, Design, and Manufacture

PART 2 - PRODUCTS

2.1 MINERAL FIBER OR FIBER GLASS

A. ASTM C612 (Board, Block), Class 1 or 2, density 48 kg/m^3 (3 pcf), k = 0.037 (0.26) at 24 degrees C (75 degrees F), external insulation for temperatures up to 204 degrees C (400 degrees F) with foil scrim (FSK) facing.

B. ASTM C553 (Blanket, Flexible) Type I, Class B-5, Density 32 kg/m^3 (2 pcf), k = 0.04 (0.27) // at 24 degrees C (75 degrees F), for use at temperatures up to 204 degrees C (400 degrees F) with foil scrim (FSK) facing.

C. ASTM C547 (Pipe Fitting Insulation and Preformed Pipe Insulation), Class 1, k = 0.037 (0.26) at 24 degrees C (75 degrees F), for use at temperatures up to 230 degrees C (450 degrees F) with an all service vapor retarder jacket with polyvinyl chloride premolded fitting covering.

2.2 MINERAL WOOL OR REFRACTORY FIBER

A. Comply with Standard ASTM C612, Class 3, 450 degrees C (850 degrees F).

2.3 RIGID CELLULAR PHENOLIC FOAM

A. Preformed (molded) pipe insulation, ASTM C1126, type III, grade 1, k = 0.021(0.15) at 10 degrees C (50 degrees F), for use at temperatures up

to 121 degrees C (250 degrees F) with all service vapor retarder jacket with polyvinyl chloride premolded fitting covering.

B. Equipment and Duct Insulation, ASTM C 1126, type II, grade 1, k = 0.021 (0.15) at 10 degrees C (50 degrees F), for use at temperatures up to 121 degrees C (250 degrees F) with rigid cellular phenolic insulation and covering, and all service vapor retarder jacket.

2.4 CELLULAR GLASS CLOSED-CELL

A. Comply with Standard ASTM C177, C518, density 120 kg/m^3 (7.5 pcf) nominal, k = 0.033 (0.29) at 24~~0~~ degrees C (75 degrees F).

B. Pipe insulation for use at temperatures up to 200 degrees C (400 degrees F) with all service vapor retarder jacket.

2.5 CALCIUM SILICATE

A. Preformed pipe Insulation: ASTM C533, Type I and Type II with indicator denoting asbestos-free material.

B. Premolded Pipe Fitting Insulation: ASTM C533, Type I and Type II with indicator denoting asbestos-free material.

C. Equipment Insulation: ASTM C533, Type I and Type II

D. Characteristics:

Insulation Characteristics

ITEMS	TYPE I	TYPE II
Temperature, maximum degrees C (degrees F)	649 (1200)	927 (1700)
Density (dry), Kg/m^3 (lb/ ft3)	232 (14.5)	288 (18)
Thermal conductivity: Min W/ m K (Btu in/h ft^2 degrees F)@ mean temperature of 93 degrees C (200 degrees F)	0.059 (0.41)	0.078 (0.540)
Surface burning characteristics: Flame spread Index, Maximum	0	0
Smoke Density index, Maximum	0	0

2.6 INSULATION FACINGS AND JACKETS

A. Vapor Retarder, higher strength with low water permeance = 0.02 or less perm rating, Beach puncture 50 units for insulation facing on exposed ductwork, casings and equipment, and for pipe insulation jackets.

Facings and jackets shall be all service type (ASJ) or PVDC Vapor Retarder jacketing.

B. ASJ jacket shall be white kraft bonded to 0.025 mm (1 mil) thick aluminum foil, fiberglass reinforced, with pressure sensitive adhesive closure. Comply with ASTM C1136. Beach puncture 50 units, Suitable for painting without sizing. Jackets shall have minimum 40 mm (1-1/2 inch) lap on longitudinal joints and minimum 75 mm (3 inch) butt strip on end joints. Butt strip material shall be same as the jacket. Lap and butt strips shall be self-sealing type with factory-applied pressure sensitive adhesive.

C. Vapor Retarder medium strength with low water vapor permeance of 0.02 or less perm rating), Beach puncture 25 units: Foil-Scrim-Kraft (FSK) or PVDC vapor retarder jacketing type for concealed ductwork and equipment.

D. Field applied vapor barrier jackets shall be provided, in addition to the specified facings and jackets, on all exterior piping and ductwork as well as on interior piping and ductwork. The vapor barrier jacket shall consist of a multi-layer laminated cladding with a maximum water vapor permeance of 0.001 perms. The minimum puncture resistance shall be 35 cm-kg (30 inch-pounds) for interior locations and 92 cm-kg (80 inch-pounds) for exterior or exposed locations or where the insulation is subject to damage.

E. Glass Cloth Jackets: Presized, minimum 0.18 kg per square meter (7.8 ounces per square yard), 2000 kPa (300 psig) bursting strength with integral vapor retarder where required or specified. Weather proof if utilized for outside service.

F. Factory composite materials may be used provided that they have been tested and certified by the manufacturer.

G. Pipe fitting insulation covering (jackets): Fitting covering shall be premolded to match shape of fitting and shall be polyvinyl chloride (PVC) conforming to Fed Spec L-P-335, composition A, Type II Grade GU, and Type III, minimum thickness 0.7 mm (0.03 inches). Provide color matching vapor retarder pressure sensitive tape.

H. Aluminum Jacket-Piping systems: ASTM B209, 3003 alloy, H-14 temper, 0.6 mm (0.023 inch) minimum thickness with locking longitudinal joints. Jackets for elbows, tees and other fittings shall be factory-fabricated to match shape of fitting and of 0.6 mm (0.024) inch minimum thickness aluminum. Fittings shall be of same construction as straight run

jackets but need not be of the same alloy. Factory-fabricated stainless steel bands shall be installed on all circumferential joints. Bands shall be 13 mm (0.5 inch) wide on 450 mm (18 inch) centers. System shall be weatherproof if utilized for outside service.

2.7 REMOVABLE INSULATION JACKETS

A. Insulation and Jacket:

1. Non-Asbestos Glass mat, type E needled fiber.
2. Temperature maximum of 450°F, Maximum water vapor transmission of 0.00 perm, and maximum moisture absorption of 0.2 percent by volume.
3. Jacket Material: Silicon/fiberglass and LFP 2109 pure PTFE.
4. Construction: One piece jacket body with three-ply braided pure Teflon or Kevlar thread and insulation sewn as part of jacket. Belt fastened.

2.8 PIPE COVERING PROTECTION SADDLES

A. Cold pipe support: Premolded pipe insulation 180 degrees (half-shells) on bottom half of pipe at supports. Material shall be cellular glass or high density Polyisocyanurate insulation of the same thickness as adjacent insulation. Density of Polyisocyanurate insulation shall be a minimum of 48 kg/m^3 (3.0 pcf).

Nominal Pipe Size and Accessories Material (Insert Blocks)	
Nominal Pipe Size mm (inches)	Insert Blocks mm (inches)
Up through 125 (5)	150 (6) long
150 (6)	150 (6) long
200 (8), 250 (10), 300 (12)	225 (9) long
350 (14), 400 (16)	300 (12) long
450 through 600 (18 through 24)	350 (14) long

B. Warm or hot pipe supports: Premolded pipe insulation (180 degree half-shells) on bottom half of pipe at supports. Material shall be high density Polyisocyanurate (for temperatures up to 149 degrees C [300 degrees F]), cellular glass or calcium silicate. Insulation at supports shall have same thickness as adjacent insulation. Density of Polyisocyanurate insulation shall be a minimum of 48 kg/m^3 (3.0 pcf).

C. Boiler Plant Pipe supports: MSS SP58, Type 39. Apply at all pipe support points, except where MSS SP58, Type 3 pipe clamps provided as part of the support system.

2.9 ADHESIVE, MASTIC, CEMENT

A. Mil. Spec. MIL-A-3316, Class 1: Jacket and lap adhesive and protective finish coating for insulation.

B. Mil. Spec. MIL-A-3316, Class 2: Adhesive for laps and for adhering insulation to metal surfaces.

C. Mil. Spec. MIL-A-24179, Type II Class 1: Adhesive for installing flexible unicellular insulation and for laps and general use.

D. Mil. Spec. MIL-C-19565, Type I: Protective finish for outdoor use.

E. Mil. Spec. MIL-C-19565, Type I or Type II: Vapor barrier compound for indoor use.

F. ASTM C449: Mineral fiber hydraulic-setting thermal insulating and finishing cement.

G. Other: Insulation manufacturers' published recommendations.

2.10 MECHANICAL FASTENERS

A. Pins, anchors: Welded pins, or metal or nylon anchors with galvanized steel-coated or fiber washer, or clips. Pin diameter shall be as recommended by the insulation manufacturer.

B. Staples: Outward clinching monel or galvanized steel.

C. Wire: 1.3 mm thick (18 gage) soft annealed galvanized or 1.9 mm (14 gage) copper clad steel or nickel copper alloy.

D. Bands: 13 mm (0.5 inch) nominal width, brass, galvanized steel, aluminum or stainless steel.

2.11 REINFORCEMENT AND FINISHES

A. Glass fabric, open weave: ASTM D1668, Type III (resin treated) and Type I (asphalt treated).

B. Glass fiber fitting tape: Mil. Spec MIL-C-20079, Type II, Class 1.

D. Hexagonal wire netting: 25 mm (one inch) mesh, 0.85 mm thick (22 gage) galvanized steel.

E. Corner beads: 50 mm (2 inch) by 50 mm (2 inch), 0.55 mm thick (26 gage) galvanized steel; or, 25 mm (1 inch) by 25 mm (1 inch), 0.47 mm thick (28 gage) aluminum angle adhered to 50 mm (2 inch) by 50 mm (2 inch) Kraft paper.

F. PVC fitting cover: Fed. Spec L-P-535, Composition A, 11-86 Type II, Grade GU, with Form B Mineral Fiber insert, for media temperature 4 degrees C (40 degrees F) to 121 degrees C (250 degrees F). Below 4 degrees C (40 degrees F) and above 121 degrees C (250 degrees F). Provide double layer insert. Provide color matching vapor barrier pressure sensitive tape.

2.12 FIRESTOPPING MATERIAL

A. Other than pipe and duct insulation, refer to Section 07 84 00 FIRESTOPPING.

2.13 FLAME AND SMOKE

A. Unless shown otherwise all assembled systems shall meet flame spread 25 and smoke developed 50 rating as developed under ASTM, NFPA and UL standards and specifications. See paragraph 1.3 "Quality Assurance".

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Required pressure tests of duct and piping joints and connections shall be completed and the work approved by the Resident Engineer for application of insulation. Surface shall be clean and dry with all foreign materials, such as dirt, oil, loose scale and rust removed.

B. Except for specific exceptions, insulate entire specified equipment, piping (pipe, fittings, valves, accessories), and duct systems. Insulate each pipe and duct individually. Do not use scrap pieces of insulation where a full length section will fit.

C. Where removal of insulation of piping, ductwork and equipment is required to comply with Section 02 82 11, TRADITIONAL ASBESTOS ABATEMENT and Section 02 82 13.13, GLOVEBAG ASBESTOS ABATEMENT, such areas shall be reinsulated to comply with this specification.

D. Insulation materials shall be installed in a first class manner with smooth and even surfaces, with jackets and facings drawn tight and smoothly cemented down at all laps. Insulation shall be continuous through all sleeves and openings, except at fire dampers and duct heaters (NFPA 90A). Vapor retarders shall be continuous and uninterrupted throughout systems with operating temperature 16 degrees C (60 degrees F) and below. Lap and seal vapor retarder over ends and exposed edges of insulation. Anchors, supports and other metal projections through insulation on cold surfaces shall be insulated and vapor sealed for a minimum length of 150 mm (6 inches).

E. Install vapor stops at all insulation terminations on either side of valves, pumps and equipment and particularly in straight lengths of pipe insulation.

F. Construct insulation on parts of equipment that must be opened periodically for maintenance or repair, so insulation can be removed and replaced without damage. Install insulation with bolted 1 mm thick (20 gage) galvanized steel or aluminum covers as complete units, or in

sections, with all necessary supports, and split to coincide with flange/split of the equipment.

G. Insulation on hot piping and equipment shall be terminated square at items not to be insulated, access openings and nameplates. Cover all exposed raw insulation with white sealer or jacket material.

H. Protect all insulations outside of buildings with aluminum jacket using lock joint or other approved system for a continuous weather tight system. Access doors and other items requiring maintenance or access shall be removable and sealable.

I. HVAC work not to be insulated:

1. Internally insulated ductwork and air handling units.
2. Relief air ducts (Economizer cycle exhaust air).
3. Exhaust air ducts and plenums, and ventilation exhaust air shafts.
4. Equipment: steam condensate pumps.
5. In hot piping: Unions, flexible connectors, control valves, safety valves and discharge vent piping, vacuum breakers, thermostatic vent valves, steam traps 20 mm (3/4 inch) and smaller, exposed piping through floor for convectors and radiators. Insulate piping to within approximately 75 mm (3 inches) of uninsulated items.

J. Boiler plant work not to be insulated:

1. Pipes, valves and fittings:
   a. Gas fuel
   b. Oil unheated
   c. Compressed Air
   d. Flowmeter sensing piping and blowdown
   e. Level sensor piping and blowdown
   f. Tank drains
   g. Vents-tank, safety and back pressure valves except protective.
   h. Continuous blowdown and boiler water sampling except protective.
   i. Threaded valves
   j. Check valves
   k. Unions
   l. Orifice flanges
   m. Dielectric flanges and unions
   n. Steam header drains
   o. Non-return stop and check valve drains
   p. Pneumatic controls
   q. Pressure transmission to gages

r. Piping in control panels
s. Tube cleaning piping
t. Chemical feed from pump-type feeders
u. Condensate piping from flash tank to condensate return pump

2. Boilers:
a. Water column, piping and blowdown
b. Auxiliary low water cutoff, piping and blowdown
c. Remote water level indicators and piping blowdown
d. Steam gage piping
e. Soot blower and piping
f. Safety valves and drip pan ells
g. Water level sensors and piping except where required by equipment manufacturer
h. Control piping and devices or interlocks

3. Equipment:
a. Condensate return pump units
d. Flash tanks
e. Safety valves
f. Water meters
g. Oil meters
h. Air compressors and tanks
i. Refrigerated or desiccant air drier
j. Chemical feeders
k. Boiler and feedwater sampler
l. All nameplates

4. Specialties:
b. Control valves-water and steam
c. Level sensors-piping, valves and blowdown
d. Back pressure regulators-oil and steam
e. Strainers under 65 mm (2-1/2 inch) pipe size
f. Expansion bellows
g. Flexible connectors
h. Ball joints except piping between joints//

K. Apply insulation materials subject to the manufacturer's recommended temperature limits. Apply adhesives, mastic and coatings at the manufacturer's recommended minimum coverage.

L. Elbows, flanges and other fittings shall be insulated with the same material as is used on the pipe straights. // The elbow/ fitting

insulation shall be field-fabricated, mitered or factory prefabricated to the necessary size and shape to fit on the elbow/ fitting.// Use of polyurethane spray-foam to fill a PVC elbow jacket is prohibited on cold applications.

M. Firestop Pipe and Duct insulation:
   1. Provide firestopping insulation at fire and smoke barriers through penetrations. Fire stopping insulation shall be UL listed as defines in Section 07 84 00, FIRESTOPPING.
   2. Pipe and duct penetrations requiring fire stop insulation including, but not limited to the following:
      a. Pipe risers through floors
      b. Pipe or duct chase walls and floors
      c. Smoke partitions
      d. Fire partitions

N. Freeze protection of above grade outdoor piping (over heat tracing tape): 26 mm (10 inch) thick insulation, for all pipe sizes 75 mm(3 inches) and smaller and 25 mm(1inch) thick insulation for larger pipes. Provide metal jackets for all pipes. Provide for cold water make-up to cooling towers and condenser water piping and chilled water piping as described in Section 23 21 13, HYDRONIC PIPING (electrical heat tracing systems).

O. Provide vapor barrier jackets over insulation as follows:
   1. All piping and ductwork exposed to outdoor weather.
   2. All interior piping and ducts conveying fluids below ambient air temperature.

P. Provide metal jackets over insulation as follows:
   1. All piping and ducts exposed to outdoor weather.
   3. A 50 mm (2 inch) overlap is required at longitudinal and circumferential joints.

3.2 INSULATION INSTALLATION

A. Mineral Fiber Board:
   1. Faced board: Apply board on pins spaced not more than 300 mm (12 inches) on center each way, and not less than 75 mm (3 inches) from each edge of board. In addition to pins, apply insulation bonding adhesive to entire underside of horizontal metal surfaces. Butt insulation edges tightly and seal all joints with laps and butt strips. After applying speed clips cut pins off flush and apply vapor seal patches over clips.

2. Plain board:
   a. Insulation shall be scored, beveled or mitered to provide tight joints and be secured to equipment with bands spaced 225 mm (9 inches) on center for irregular surfaces or with pins and clips on flat surfaces. Use corner beads to protect edges of insulation.
   b. For hot equipment: Stretch 25 mm (1 inch) mesh wire, with edges wire laced together, over insulation and finish with insulating and finishing cement applied in one coat, 6 mm (1/4 inch) thick, trowel led to a smooth finish.
   c. For cold equipment: Apply meshed glass fabric in a tack coat 1.5 to 1.7 square meter per liter (60 to 70 square feet per gallon) of vapor mastic and finish with mastic at 0.3 to 0.4 square meter per liter (12 to 15 square feet per gallon) over the entire fabric surface.
3. Exposed, unlined ductwork and equipment in unfinished areas, mechanical and electrical equipment rooms and duct work exposed to outdoor weather:
   a. 50 mm (2 inch) thick insulation faced with ASJ (white all service jacket): Supply air duct.
   b. 40 mm (1-1/2 inch thick insulation faced with ASJ: Return air duct, mixed air plenums and prefilter housing.
   c. Outside air intake ducts: 25 mm (one inch) thick insulation faced with ASJ.
   d. Exposed, unlined supply and return ductwork exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with a reinforcing membrane and two coats of vapor barrier mastic or multi-layer vapor barrier with a maximum water vapor permeability of 0.001 perms.
6. Hot equipment: 40 mm (1-1/2 inch) thick insulation faced with ASJ.
   a. Steam condensate pump receivers.

B. Flexible Mineral Fiber Blanket:
1. Adhere insulation to metal with 75 mm (3 inch) wide strips of insulation bonding adhesive at 200 mm (8 inches) on center all around duct. Additionally secure insulation to bottom of ducts exceeding 600 mm (24 inches) in width with pins welded or adhered on 450 mm (18 inch) centers. Secure washers on pins. Butt insulation edges and seal joints with laps and butt strips. Staples may be used

to assist in securing insulation. Seal all vapor retarder penetrations with mastic. Sagging duct insulation will not be acceptable. Install firestop duct insulation where required.

2. Supply air ductwork to be insulated includes main and branch ducts from AHU discharge to room supply outlets, and the bodies of ceiling outlets to prevent condensation. Insulate sound attenuator units, coil casings and damper frames. To prevent condensation insulate trapeze type supports and angle iron hangers for flat oval ducts that are in direct contact with metal duct.
3. Concealed supply air ductwork.
   a. Above ceilings at a roof level, in attics, and duct work exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with FSK.
   b. Above ceilings for other than roof level: 40 mm (1 ½ inch) thick insulation faced with FSK.
5. Concealed outside air duct: 40 mm (1-1/2 inch) thick insulation faced with FSK.

C. Molded Mineral Fiber Pipe and Tubing Covering:
1. Fit insulation to pipe or duct, aligning longitudinal joints. Seal longitudinal joint laps and circumferential butt strips by rubbing hard with a nylon sealing tool to assure a positive seal. Staples may be used to assist in securing insulation. Seal all vapor retarder penetrations on cold piping with a generous application of vapor barrier mastic. Provide inserts and install with metal insulation shields at outside pipe supports. Install freeze protection insulation over heating cable.
2. Contractor's options for fitting, flange and valve insulation:
   a. Insulating and finishing cement for sizes less than 100 mm (4 inches) operating at surface temperature of 16 degrees C (61 degrees F) or more.
   b. Factory premolded, one piece PVC covers with mineral fiber, (Form B), inserts. Provide two insert layers for pipe temperatures below 4 degrees C (40 degrees F), or above 121 degrees C (250 degrees F). Secure first layer of insulation with twine. Seal seam edges with vapor barrier mastic and secure with fitting tape.
   c. Factory molded, ASTM C547 or field mitered sections, joined with adhesive or wired in place. For hot piping finish with a

smoothing coat of finishing cement. For cold fittings, 16 degrees C (60 degrees F) or less, vapor seal with a layer of glass fitting tape imbedded between two 2 mm (1/16 inch) coats of vapor barrier mastic.

d. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 50 mm (2 inches).

3. Nominal thickness in millimeters and inches specified in the schedule at the end of this section.

D. Rigid Cellular Phenolic Foam:

1. Rigid closed cell phenolic insulation may be provided for piping, ductwork and equipment for temperatures up to 121 degrees C (250 degrees F).
2. Note the NFPA 90A burning characteristics requirements of 25/50 in paragraph 1.3.B
3. Provide secure attachment facilities such as welding pins.
4. Apply insulation with joints tightly drawn together
5. Apply adhesives, coverings, neatly finished at fittings, and valves.
6. Final installation shall be smooth, tight, neatly finished at all edges.
7. Minimum thickness in millimeters (inches) specified in the schedule at the end of this section.
8. Exposed, unlined supply and return ductwork exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with a multi-layer vapor barrier with a maximum water vapor permeance of 0.00 perms.
9. Condensation control insulation: Minimum 25 mm (1.0 inch) thick for all pipe sizes.
   a. HVAC: Cooling coil condensation piping to waste piping fixture or drain inlet. Omit insulation on plastic piping in mechanical rooms.

E. Cellular Glass Insulation:

1. Pipe and tubing, covering nominal thickness in millimeters and inches as specified in the schedule at the end of this section.
2. Exposed, unlined supply and return ductwork exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with a reinforcing membrane and two coats of vapor barrier mastic or multi-layer vapor barrier with a water vapor permeability of 0.00 perms.

F. Calcium Silicate:

1. Minimum thickness in millimeter (inches) specified in the schedule at the end of this section for piping other than in boiler plant. See paragraphs 3.3 through 3.7 for Boiler Plant Applications.

3.3 APPLICATION –BOILER PLANT, PIPE, VALVES, STRAINERS AND FITTINGS:

A. Temperature range 120 to 230 degrees C (251 to 450 degrees F);

1. Application; Steam service 110 kpa (16 psig nominal) and higher, high pressure condensate to trap assembly, boiler bottom blowdown from boiler to blowdown valve closest to boiler.
2. Insulation and Jacket:
   a. Calcium silicate for piping from zero to 1800 mm (6 feet) above boiler room floor, feedwater heater mezzanine floor or access platform and any floors or platforms on which tanks or pumps are located.
   b. Mineral fiber for remaining locations.
   c. ASJ with PVC premolded fitting coverings.
   d. Aluminum jacket from zero to 1800 mm (6 feet) above floor on atomizing steam and condensate lines at boilers and burners.
3. Thickness:

Nominal Thickness of Calcium Silicate Insulation (Boiler Plant)

Pipe Diameter mm (in)	Insulation Thickness mm (in)
<25 (Less than 1)	125 (5)
25 to 38 (1 to 1-1/4)	125 (5)
38 (1-1/2) and above	150 (6)

Nominal Thickness of Mineral Fiber Insulation (Boiler Plant)

Pipe Diameter mm (in)	Insulation Thickness mm (in)
<25 (Less than 1)	75 (3)
25-32 (1 to 1-1/4)	100 (4)
38 (1-1/2) and above	113 (4.5)

~~Nominal Thickness Of Calcium Silicate Insulation (Boiler Plant)~~	
~~Pipe Diameter mm (in)~~	~~Insulation Thickness mm (in)~~
~~25 (1 and below)~~	~~125 (5)~~
~~25 to 38 (1-1/4 to 1-1/2)~~	~~125 (5)~~
~~38 (2) and above~~	~~150 (6)~~

B. Temperature range 100 to 121 degrees C (211 to 250 degrees F):

1. Application: Steam service 103 kpa (15 psig) and below, trap assembly discharge piping, boiler feedwater from feedwater heater to boiler feed pump recirculation, feedwater heater overflow, heated oil from oil heater to burners.
2. Insulation and Jacket:
   a. Calcium silicate for piping from zero to 1800 mm (0 to 6 feet) above boiler room floor, feedwater heater mezzanine floor and access platform, and any floors or access platforms on which tanks or pumps are located.
   b. Mineral Fiber or rigid closed cell phenolic foam for remaining locations.
   c. ASJ with PVC premolded fitting coverings.
   d. Aluminum jacket from zero to 1800 mm (6 feet) above floor on condensate lines at boilers and burners.
3. Thickness-calcium silicate and mineral fiber insulation:

Nominal Thickness of Insulation	
Pipe Diameter mm (in)	Insulation Thickness mm (in)
<25 (Less than 1)	62 (2.5)
25 to 38 (1 to 1-1/4)	62 (2.5)
38 (1-1/2) and above	75 (3)

~~Nominal Thickness Of Insulation~~	
~~Pipe Diameter mm (in)~~	~~Insulation Thickness mm (in)~~
~~25 (1 and below)~~	~~50 (2)~~
~~25 to 38 (1-1/4 to 1-1/2)~~	~~50 (2)~~
~~38 (1-1/2) and above~~	~~75 (3)~~

4. Thickness-rigid closed-cell phenolic foam insulation:

Nominal Thickness of Insulation	
Pipe Diameter mm (in)	Insulation Thickness mm (in)
<25 (Less than 1)	50 (2)
25 to 32 (1 to 1-1/4)	50 (2)
38 (1-1/2) and above	75 (3)

~~Nominal Thickness Of Insulation~~	
~~Pipe Diameter mm (in)~~	~~Insulation Thickness mm (in)~~
~~25 (1 and below)~~	~~38 (1.5)~~
~~25 to 38 (1-1/4 to 1-1/2)~~	~~38 (1.5)~~
~~38 (1-1/2) and above~~	~~75(3)~~

C. Temperature range 32 to 99 degrees C (90 to 211 degrees F):

1. Application: Pumped condensate, vacuum heating return, gravity and pumped heating returns, condensate transfer, condensate transfer pump recirculation, heated oil system to heaters and returns from burners, condensate return from convertors and heated water storage tanks.
2. Insulation Jacket:
   a. Calcium silicate for piping from zero to 1800 mm (six feet above boiler room floor, feedwater heater mezzanine floor and access platform and any floor or access platform on which tanks or pumps are located.
   b. Mineral fiber or rigid closed-cell phenolic foam for remaining locations.
   c. ASJ with PVC premolded fitting coverings.
3. Thickness-calcium silicate and mineral fiber insulation:

Nominal Thickness Of Insulation	
Pipe Diameter mm (in)	Insulation Thickness mm (in)
25 (1 and below)	38 (1.5)
25 to 38 (1-1/4 to 1-1/2)	50(2)
38 (1-1/2) and above	75 (3)

4. Thickness-rigid closed-cell phenolic foam insulation:

Nominal Thickness of Insulation	
Pipe Diameter mm (in)	Insulation Thickness mm (in)
<25 (Less than 1)	25 (1)
25 to 32 (1 to 1-1/4)	38 (1.5)
38 (1-1/2) and above	50 (2)

~~Nominal Thickness Of Insulation~~	
~~Pipe Diameter mm (in)~~	~~Insulation Thickness mm (in)~~
~~25 (1 and below)~~	~~19 (0.75)~~
~~25 to 38 (1-1/4 to 1-1/2)~~	~~19 (0.75)~~
~~38 (1-1/2) and above~~	~~25 (1)~~

D. Protective insulation to prevent personnel injury:

1. Application: Piping from zero to 1800 mm (6 feet) above all floors and access platforms including continuous blowdown, feedwater and boiler water sample, blowdown tank vent, flash tank vents and condensate tank vent, shot-type chemical feed, fire tube boiler bottom blowdown after valves, valve by-passes.
2. Insulation thickness: 25 mm (1 inch).
3. Insulation and jacket: Calcium silicate with ASJ except provide aluminum jacket on piping at boilers within 1800 mm (6 feet) of floor. Use PVC premolded fitting coverings when all service jacket is utilized.

E. Installation:

1. At pipe supports, weld pipe covering protection saddles to pipe, except where MS-SP58, type 3 pipe clamps are utilized.
2. Insulation shall be firmly applied, joints butted tightly, mechanically fastened by stainless steel wires on 300 mm (12 inch) centers.
3. At support points, fill and thoroughly pack space between pipe covering protective saddle bearing area.
4. Terminate insulation and jacket hard and tight at anchor points.
5. Terminate insulation at piping facilities not insulated with a 45 degree chamfered section of insulating and finishing cement covered with jacket.
6. On calcium silicate, mineral fiber and rigid closed-cell phenolic foam systems, insulated flanged fittings, strainers and valves with sections of pipe insulation cut, fitted and arranged neatly and firmly wired in place. Fill all cracks, voids and coat outer surface

with insulating cement. Install jacket. Provide similar construction on welded and threaded fittings on calcium silicate systems or use premolded fitting insulation.

7. On mineral fiber systems, insulate welded and threaded fittings more than 50 mm (2 inches) in diameter with compressed blanket insulation (minimum 2/1) and finish with jacket or PVC cover.
8. Insulate fittings 50 mm (2 inches) and smaller with mastic finishing material and cover with jacket.
9. Insulate valve bonnet up to valve side of bonnet flange to permit bonnet flange removal without disturbing insulation.
10. Install jacket smooth, tight and neatly finish all edges. Over wrap ASJ butt strips by 50 percent. Secure aluminum jacket with stainless steel bands 300 mm (12 inches) on center or aluminum screws on 200 mm (4 inch) centers.
11. Do not insulate basket removal flanges on strainers.

3.4 APPLICATION-BOILER FLUE GAS SYSTEMS

A. Temperature range 150 to 370 degrees C (300 to 700 degrees F):
   1. Application: Transitions, stacks and breechings from boiler outlet to stack outlet; induced draft fans (if provided); flue gas recirculation fans and ductwork (if provided).
   2. Thickness:
      a. Single-wall duct systems: 50 mm (2 inches).
      b. Double-wall factory-fabricated duct systems with air space between walls: None.
   3. Insulation and jacket: Calcium Silicate with aluminum sheet metal jacket.

B. Protective Insulation to Prevent Personnel Injury:
   1. Application: Double wall factory-fabricated duct system with uninsulated air space between walls within 900 mm (3 feet) horizontally and 1800 mm (6 feet) vertically of platform or floor.
   2. Insulation thickness; 25 mm (1 inch).
   3. Insulation and jacket: Calcium Silicate with aluminum sheet metal jacket.

C. Insulating:
   1. Provide attachment facilities such as angles, welded studs, clip angles.
   2. Apply insulation with joints tightly butted and staggered. Seal joints with high temperature cement.

3. Provide metal corner beads.
4. Band insulation firmly in place to provide a smooth surface. Maximum band spacing shall not be more than 300 mm (12 inches).
5. Install jacket. All surfaces outside of building must be weather tight. At termination of stub stacks, provide metal closure system which is connected and sealed to perimeter of stack to prevent water penetration of insulation.

3.5 APPLICATION-BOILER DEAERATING FEEDWATER HEATER, TANKS

A. Temperature range 38 to 120 degrees C (100 to 250 degrees F)
   1. Application: Deaerating feedwater heater and storage tank, condensate storage tanks, heat exchangers, blowdown separator.
   2. Insulation Thickness:
      a. Feedwater heater and storage tanks: 75 mm (3 inches)
      b. Condensate storage tanks: 50 mm (2 inches)
      c. Blowdown separator, heat exchangers: 25 mm (1 inch).
   3. Insulation and covering: Calcium silicate with glass cloth jacket.

B. Insulating:
   1. Insulate tanks with an assembly of chamfered block to fit curvature. Secure with 1.6 mm diameter (16 gage) wire or stainless steel bands 300 mm (12 inches) on centers, fill all voids and interstices with finishing cement coat, imbed hexagonal wire mesh in first finish coat. Provide a second finish coat and a glass cloth covering.
   2. Apply glass cloth with adhesive, smooth, tight and neatly finished at all cloth edges; prime to receive paint.
   3. Do not insulate over nameplates and data plates. Nameplates and data plates must be legible.

3.7 COMMISSIONING

A. Provide commissioning documentation in accordance with the requirements of section 23 08 00 – COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.

B. Components provided under this section of the specification will be tested as part of a larger system. Refer to section 23 08 00 – COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

3.8 PIPE INSULATION SCHEDULE

Provide insulation for piping systems as scheduled below:

Insulation Thickness Millimeters (Inches)					
		Nominal Pipe Size Millimeters (Inches)			
Operating Temperature Range/Service	Insulation Material	Less than 25 (1)	25 - 32 (1 - 1¼)	38 - 75 (1½ - 3)	100 (4) and Above
251-450 degrees F (HPS, MPS, HPR to trap)	Mineral Fiber	75 (3)	100 (4)	113 (4.5)	113 (4.5)
251-450 degrees F (HPS, MPS, HPR to trap, BBD from boiler to first valve)	Calcium Silicate	125 (5)	125 (5)	150 (6)	150 (6)
212-250 degrees F (LPS, HPR, MPR, FWPD, vent piping from PRV Safety Valves)	Mineral Fiber (above 6 feet) Calcium Silicate (below 6 feet)	62(2.5)	62 (2.5)	75 (3)	75 (3)
212-250 degrees F (LPS, HPR, MPR, FWPD, vent piping from PRV Safety Valves)	Rigid Cellular Phenolic Foam (above 6 feet)	50(2)	50 (2)	75 (3)	75 (3)
90-211 degrees F (LPR, PC, CTPS, CTPD)	Mineral Fiber (above 6 feet) Calcium Silicate (below 6 feet)	38 (1.5)	50 (2)	75 (3)	75 (3)
90-211 degrees F (LPR, PC, CTPS, CTPD)	Rigid Cellular Phenolic Foam (above 6 feet)	25 (1)	38 (1.5)	50 (2)	50 (2)

~~Insulation Thickness Millimeters (Inches)~~					
		~~Nominal Pipe Size Millimeters (Inches)~~			
~~Operating Temperature Range/Service~~	~~Insulation Material~~	~~Less than 25 (1)~~	~~25 - 32 (1 - 1¼)~~	~~38 - 75 (1½ - 3)~~	~~100 (4) and Above~~
~~122-177 degrees C (251-350 degrees F) (HPS, MPS)~~	~~Mineral Fiber (Above ground piping only)~~	~~75 (3)~~	~~100 (4)~~	~~113 (4.5)~~	~~113 (4.5)~~
~~93-260 degrees C (200-500 degrees F)~~	~~Calcium Silicate~~	~~100 (4)~~	~~125 (5)~~	~~150 (6)~~	~~150 (6)~~

~~(HPS, HPR)~~					
~~100-121 degrees C (212-250 degrees F)~~ ~~(HPR, MPR, LPS, vent piping from PRV Safety Valves, Condensate receivers and flash tanks)~~	~~Mineral Fiber (Above ground piping only)~~	~~62 (2.5)~~	~~62 (2.5)~~	~~75 (3.0)~~	~~75 (3.0)~~
~~100-121 degrees C (212-250 degrees F)~~ ~~(HPR, MPR, LPS, vent piping from PRV Safety Valves, Condensate receivers and flash tanks)~~	~~Rigid Cellular Phenolic Foam~~	~~50 (2.0)~~	~~50 (2.0)~~	~~75 (3.0)~~	~~75 (3.0)~~
~~38-94 degrees C (100-200 degrees F)~~ ~~(LPR, PC, HWH, HWHR, CH and CHR)~~	~~Mineral Fiber (Above ground piping only)~~	~~38 (1.5)~~	~~38 (1.5)~~	~~50 (2.0)~~	~~50 (2.0)~~
~~38-99 degrees C~~ ~~(100-211 degrees F)~~ ~~(LPR, PC, HWH, HWHR, CH and CHR)~~	~~Rigid Cellular Phenolic Foam~~	~~38 (1.5)~~	~~38 (1.5)~~	~~50 (2.0)~~	~~50 (2.0)~~
~~4-16 degrees C~~ ~~(40-60 degrees F)~~ ~~(CH, CHR, GC, GCR and RS for DX refrigeration)~~	~~Rigid Cellular Phenolic Foam~~	~~38 (1.5)~~	~~38 (1.5)~~	~~38 (1.5)~~	~~38 (1.5)~~

- - - E N D - - -

Summary of changes in revised sheets dated 5/29/2018:

EP101

- Receptacle and homerun for CP-1 was added.
- Reference to SFCCP was removed from sheet.

EP711

- Circuit for CP-1 was added.
- Reference to SFCCP was removed from sheet.

ET102

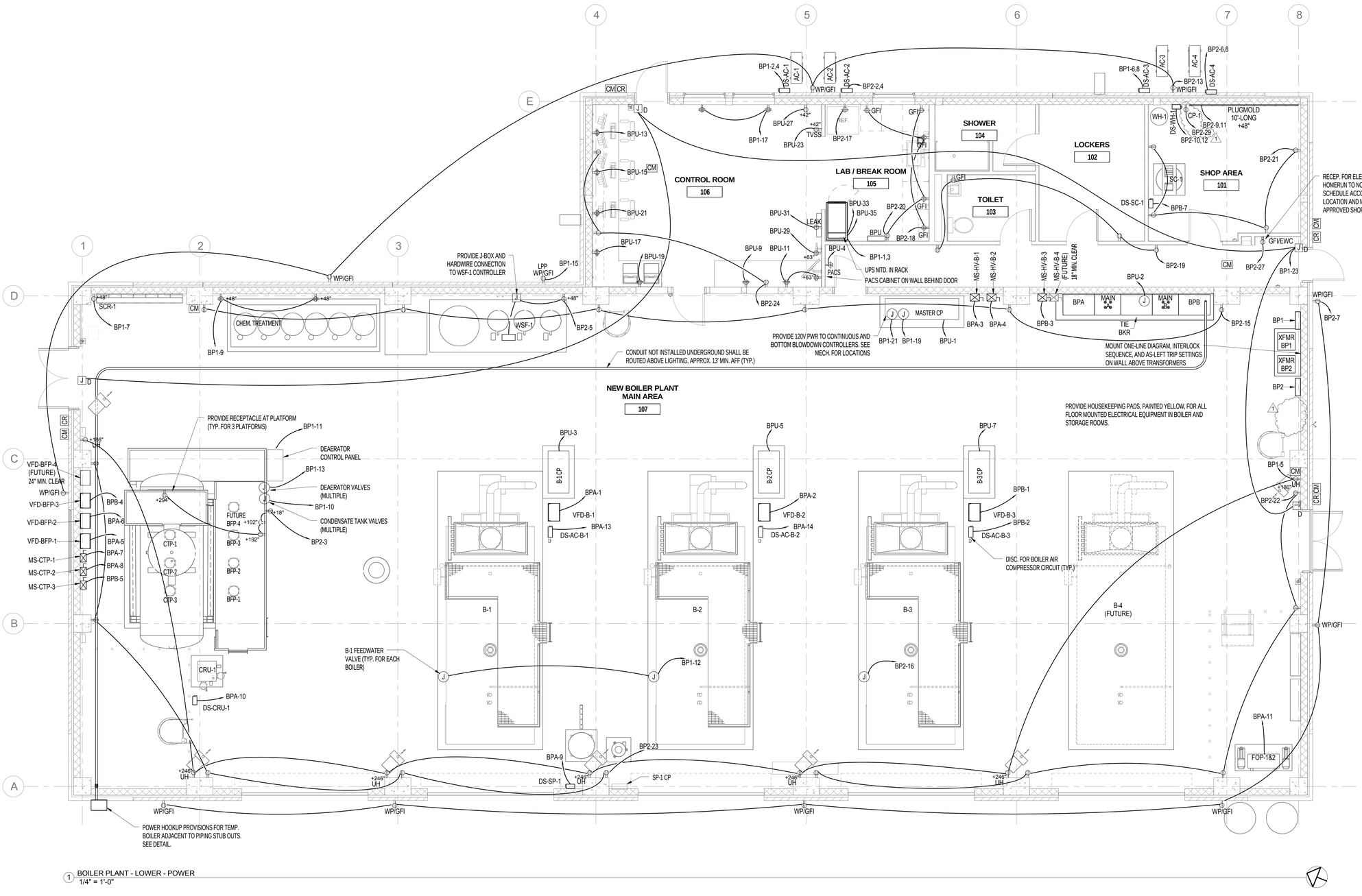
- Life Safety homerun note was added to plan.

FA101

- SFCCP and associated tampers and flows were removed from sheet.
- Tamper, Flow and Dual addressable module were added.
- Exterior bell was added.

MP711

- Boiler Gas Detection System control diagram with audible/visual alarm locations.



1 BOILER PLANT - LOWER - POWER
1/4" = 1'-0"

FINAL DESIGN
APPROVED FOR CONSTRUCTION

Revisions:	Date
REV 1 - CP-1 AND SFCCP	5/31/2018

CONSULTANTS:

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AKEA Project No. 083-14

Drawing Title: BOILER PLANT - GROUND FLOOR - POWER

Approved: Project Director

Project Title: REPLACE BOILERS - FCA D, ENERGY AT THE MALCOM RANDALL VAMC

Location: GAINESVILLE, FLORIDA

Date: FEBRUARY 28, 2018 | Checked: CJF | Drawn: CJF

Project Number: 573-14-600

Building Number:

Drawing Number: EP101

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

PANEL: BP1

LOCATION: NEW BOILER PLANT MAIN...
FED FROM: XFMR A
ENCLOSURE: NEMA 1
MOUNTING: SURFACE
VOLTAGE: 120/208 Wye
PHASES: 3
WIRES: 4
A.I.C. RATING: 22KAIC
MAIN BREAKER: 150 A
BUS RATING: 225 A
POLES: 42

Notes:

CKT	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	CKT
1	PNL BPU VIA UPS	100 A	2	6448... 1560...			2	40 A	AC-1	2
3					6448... 1560...					4
5	UNIT HEATER FANS	20 A	1			112 VA 1560...	2	30 A	AC-3	6
7	DED. RECEPTACLE - SCR-1	20 A	1	180 VA 1560...						8
9	DED. RECEPTACLE - CHEM. TREATMENT	20 A	1		360 VA 0 VA		1	20 A	CONDENSATE SURGE TANK VALVES	10
11	DEAERATOR CONTROL PANEL	20 A	1			0 VA 0 VA	1	20 A	B-1 & B-2 FEEDWATER VALVES	12
13	DA VALVES	20 A	1	0 VA 0 VA			1	20 A	SPARE	14
15	PROPANE PILOT	20 A	1		180 VA 0 VA		1	20 A	SPARE	16
17	RECEPTACLES - CTRL ROOM NON-UPS	20 A	1			360 VA 0 VA	1	20 A	SPARE	18
19	BOTTOM BLOWDOWN CTRL PWR	20 A	1	0 VA 0 VA			1	20 A	SPARE	20
21	CONTINUOUS BLOWDOWN CTRL PWR	20 A	1		0 VA 0 VA		1	20 A	SPARE	22
23	DOOR CONTROL AND LOCKS	20 A	1			720 VA 0 VA	1	20 A	SPARE	24
25	SPARE	20 A	1	0 VA 0 VA			1	20 A	SPARE	26
27	SPARE	20 A	1		0 VA 0 VA		1	20 A	SPARE	28
29	SPARE	20 A	1			0 VA 0 VA	1	20 A	SPARE	30
31	SPARE	20 A	1	0 VA 0 VA			1	20 A	SPARE	32
33	SPARE	20 A	1		0 VA 0 VA		1	20 A	SPARE	34
35	SPARE	20 A	1			0 VA 0 VA	1	20 A	SPARE	36
37	SPARE	20 A	1	0 VA 0 VA			1	20 A	SPARE	38
39	SPARE	20 A	1		0 VA 0 VA		3	30 A	SPD	40
41	SPARE	20 A	1			0 VA 0 VA				42
			Total Load:	9748 VA	8548 VA	2752 VA				
			Total Amps:	89 A	79 A	23 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	6240 VA	100.00%	6240 VA		
Other	12896 VA	100.00%	12896 VA	**Total Conn. Load:**	21048 VA
Power	720 VA	100.00%	720 VA	**Total Est. Demand:**	21048 VA
Receptacle	1192 VA	100.00%	1192 VA	**Total Conn.:**	58 A
				Total Est. Demand:	58 A

Notes:

PANEL: BP2

LOCATION: NEW BOILER PLANT MAIN...
FED FROM: XFMR B
ENCLOSURE: NEMA 1
MOUNTING: SURFACE
VOLTAGE: 120/208 Wye
PHASES: 3
WIRES: 4
A.I.C. RATING: TBD
MAIN BREAKER: 150 A
BUS RATING: 225 A
POLES: 42

Notes:

CKT	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	CKT
1	RECEPTACLES - CATWALK	20 A	1	1620... 1560...			2	40 A	AC-2	2
3	RECEPTACLES - DEARATOR PLATFORMS	20 A	1		720 VA 1560...					4
5	DED. RECEPTACLE - WSF-1	20 A	1			360 VA 1560...	2	30 A	AC-4	6
7	RECEPTACLES - EXTERIOR S & W	20 A	1	1080... 1560...						8
9	RECEPTACLES - PLUG STRIP - STORAGE RM	20 A	2		0 VA 2250...		2	30 A	WATER HEATER WH-1	10
11						0 VA 2250...				12
13	RECEPTACLES - EXTERIOR N & E	20 A	1	720 VA 696 VA			1	20 A	EF-1	14
15	RECEPTACLES - GENERAL, E WALL	20 A	1		1080... 0 VA		1	20 A	B-3 FEEDER WATER VALVE	16
17	REFRIGERATOR	20 A	1			180 VA 540 VA	1	20 A	RECEPTACLES - KITCHEN/LAB	18
19	RECEPTACLES - GENERAL AND RESTROOM	20 A	1	720 VA 540 VA			1	20 A	RECEPTACLES - LAB/BREAK ROOM	20
21	RECEPTACLES - SHOP AREA	20 A	1		720 VA 900 VA		1	20 A	RECEPTACLES - W & S WALLS	22
23	RECEPTACLES - W & N WALLS	20 A	1			900 VA 540 VA	1	20 A	RECEPTACLES - CTRL ROOM	24
25	RECEPTACLES - TUNNEL	20 A	1	720 VA 0 VA			2	30 A	SPARE	26
27	RECEPTACLES - EWC - CORRIDOR	20 A	1		180 VA 0 VA					28
29	CP-1 - SHOP AREA	20 A	1			180 VA 0 VA	1	20 A	SPARE	30
31	SPARE	20 A	1	0 VA 0 VA			1	20 A	SPARE	32
33	SPARE	20 A	1		0 VA 0 VA		1	20 A	SPARE	34
35	SPARE	20 A	1			0 VA 0 VA	1	20 A	SPARE	36
37	SPARE	20 A	1	0 VA 0 VA			1	20 A	SPARE	38
39	SPARE	20 A	1		0 VA 0 VA		3	30 A	SPD	40
41	SPARE	20 A	1			0 VA 0 VA				42
			Total Load:	9216 VA	7410 VA	6510 VA				
			Total Amps:	78 A	63 A	54 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	6240 VA	100.00%	6240 VA		
Other	5196 VA	100.00%	5196 VA	**Total Conn. Load:**	23136 VA
Power	180 VA	100.00%	180 VA	**Total Est. Demand:**	22376 VA
Receptacle	11520 VA	93.40%	10760 VA	**Total Conn.:**	64 A
				Total Est. Demand:	62 A

Notes:

PANEL: BPU

LOCATION: LAB / BREAK ROOM 105
FED FROM:
ENCLOSURE: NEMA 1
MOUNTING: Surface
VOLTAGE: 120/208-1PH
PHASES: 1
WIRES: 3
A.I.C. RATING: 22KAIC
MAIN BREAKER: 90
BUS RATING: 100 A
POLES: 42

Notes:
FED FROM UPS IN RACK.

CKT	Circuit Description	Trip	Poles	A	B	Poles	Trip	Circuit Description	CKT
1	MASTER CP	20 A	1	1200 VA 0 VA		1	20 A	BPA & BPB POWER METERS	2
3	CP-1	20 A	1		1200 VA 180 VA	1	20 A	PACS CONTROLLER	4
5	CP-2	20 A	1	1200 VA 0 VA		1	20 A	SPARE	6
7	CP-3	20 A	1		1200 VA 0 VA	1	20 A	SPARE	8
9	DEDICATED RECP. - BOILER WORKSTATION	20 A	1	180 VA 0 VA		1	20 A	SPARE	10
11	DEDICATED RECP. - BOILER WORKSTATION	20 A	1		360 VA 0 VA	1	20 A	SPARE	12
13	DEDICATED RECEP. - BAS	20 A	1	180 VA 0 VA		1	20 A	SPARE	14
15	DEDICATED RECEP. - BAS	20 A	1		180 VA 0 VA	1	20 A	SPARE	16
17	RECEP. - CTRL ROOM	20 A	1	180 VA 0 VA		1	20 A	SPARE	18
19	DEDICATED RECEP. - PRINTERS	20 A	1		180 VA 0 VA	1	20 A	SPARE	20
21	DEDICATED RECEP. - FA WORKSTATION	20 A	1	180 VA 0 VA		1	20 A	SPARE	22
23	FACP	20 A	1		180 VA 0 VA	1	20 A	SPARE	24
25	SPARE	20 A	1	0 VA 0 VA		1	20 A	SPARE	26
27	VOICE EVAC	20 A	1		180 VA 0 VA	1	20 A	SPARE	28
29	GENERATOR ANNUNCIATION HMI	20 A	1	180 VA 0 VA		1	20 A	SPARE	30
31	DEDICATED RECEP. - LEAK DETECTION	20 A	1		180 VA 0 VA	1	20 A	SPARE	32
33	DATA RACK - CKT 1	20 A	1	0 VA 0 VA		1	20 A	SPARE	34
35	DATA RACK - CKT 2	20 A	1		0 VA 0 VA	1	20 A	SPARE	36
37	SPARE	20 A	1	0 VA 0 VA		1	20 A	SPARE	38
39	SPARE	20 A	1		0 VA 0 VA	1	20 A	SPARE	40
41	SPARE	20 A	1	0 VA 0 VA		1	20 A	SPARE	42
			Total Load:	3300 VA	3840 VA				
			Total Amps:	32 A	36 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	4800 VA	100.00%	4800 VA		
Receptacle	2340 VA	100.00%	2340 VA	**Total Conn. Load:**	7140 VA
				Total Est. Demand:	7140 VA
				Total Conn.:	34 A
				Total Est. Demand:	34 A

Notes:

FINAL DESIGN
APPROVED FOR CONSTRUCTION

Revisions:	Date
1 REV 1 - CP-1 AND SFCCP	5/31/2018

CONSULTANTS:

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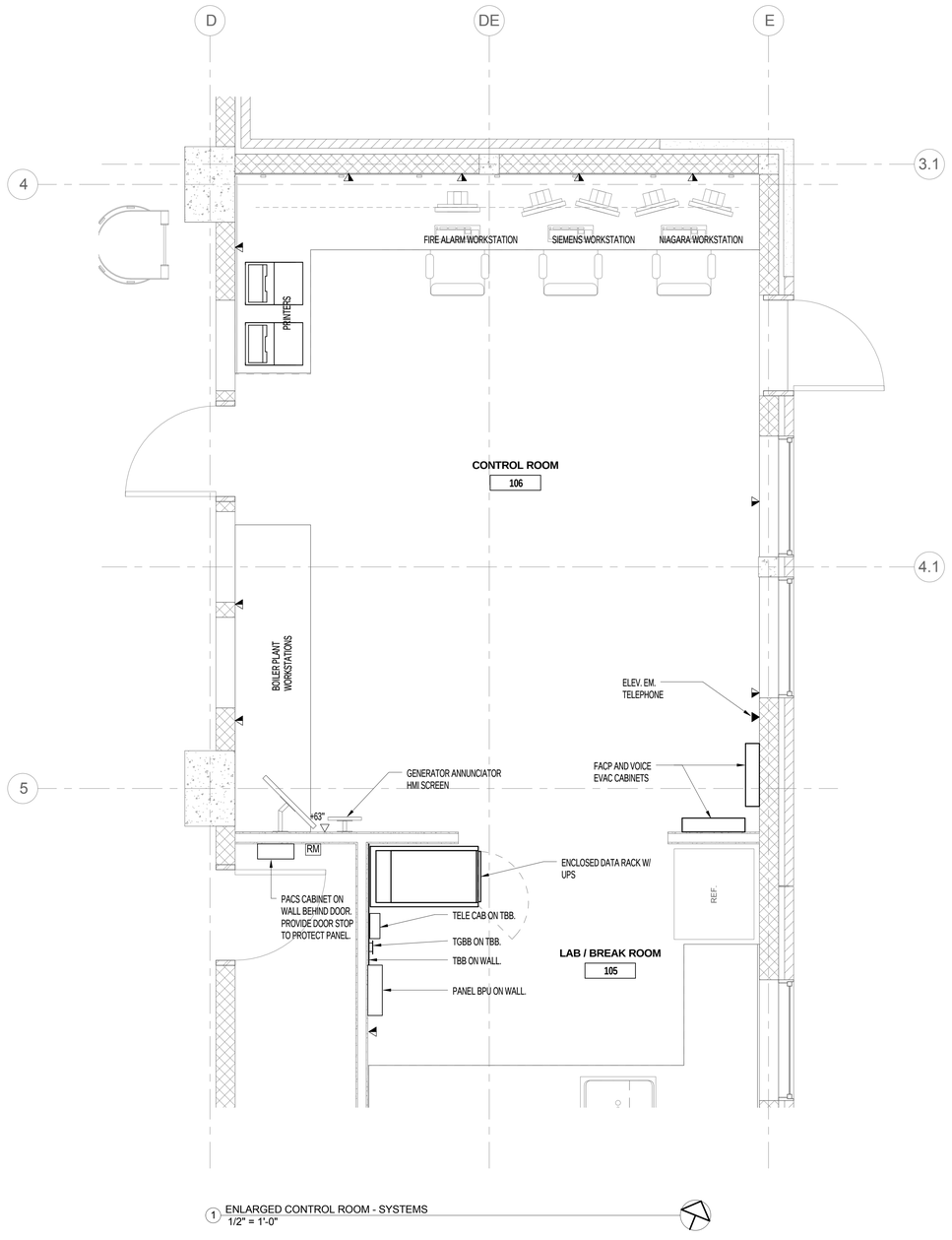
AKEA Project No. 083-14

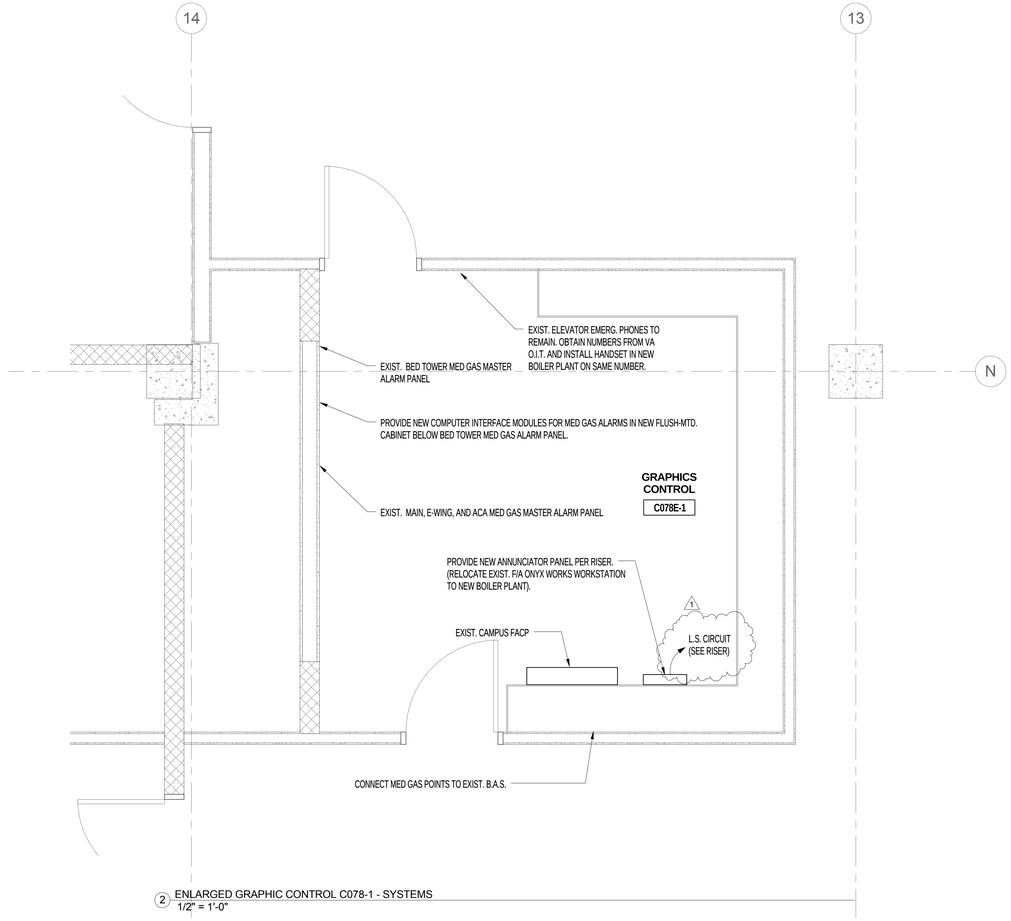
Drawing Title: PANEL SCHEDULES
Approved: Project Director
Project Title: REPLACE BOILERS - FCA D, ENERGY AT THE MALCOM RANDALL VAMC
Location: GAINESVILLE, FLORIDA
Date: FEBRUARY 28, 2018
Checked: CJF
Drawn: CJF
Project Number: 573-14-600
Building Number:
Drawing Number: EP711

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



1 ENLARGED CONTROL ROOM - SYSTEMS
1/2" = 1'-0"



2 ENLARGED GRAPHIC CONTROL C078-1 - SYSTEMS
1/2" = 1'-0"

FINAL DESIGN
APPROVED FOR CONSTRUCTION

⚠	Revisions:	Date
1	REV 1 - L.S. CIRCUIT	5/31/2018

CONSULTANTS:

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AKEA Project No. 083-14

Drawing Title: ENLARGED CONTROL ROOM PLANS

Approved: Project Director

Project Title: REPLACE BOILERS - FCA D, ENERGY AT THE MALCOM RANDALL VAMC

Location: GAINESVILLE, FLORIDA

Date: FEBRUARY 28, 2018 | Checked: CJF | Drawn: CJF

Project Number: 573-14-600

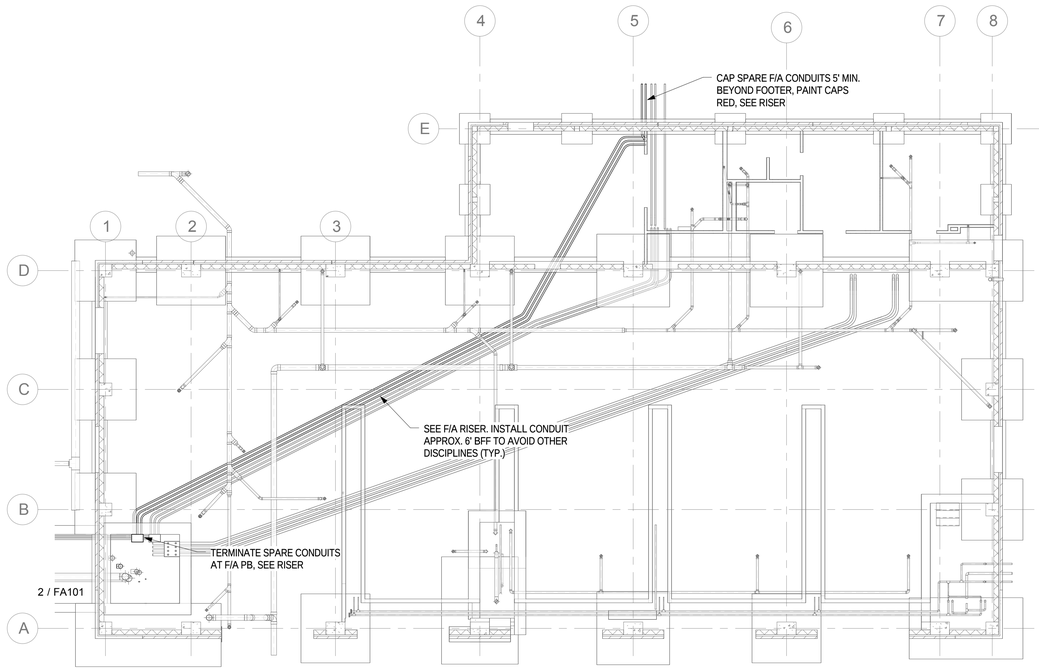
Building Number:

Drawing Number: ET102

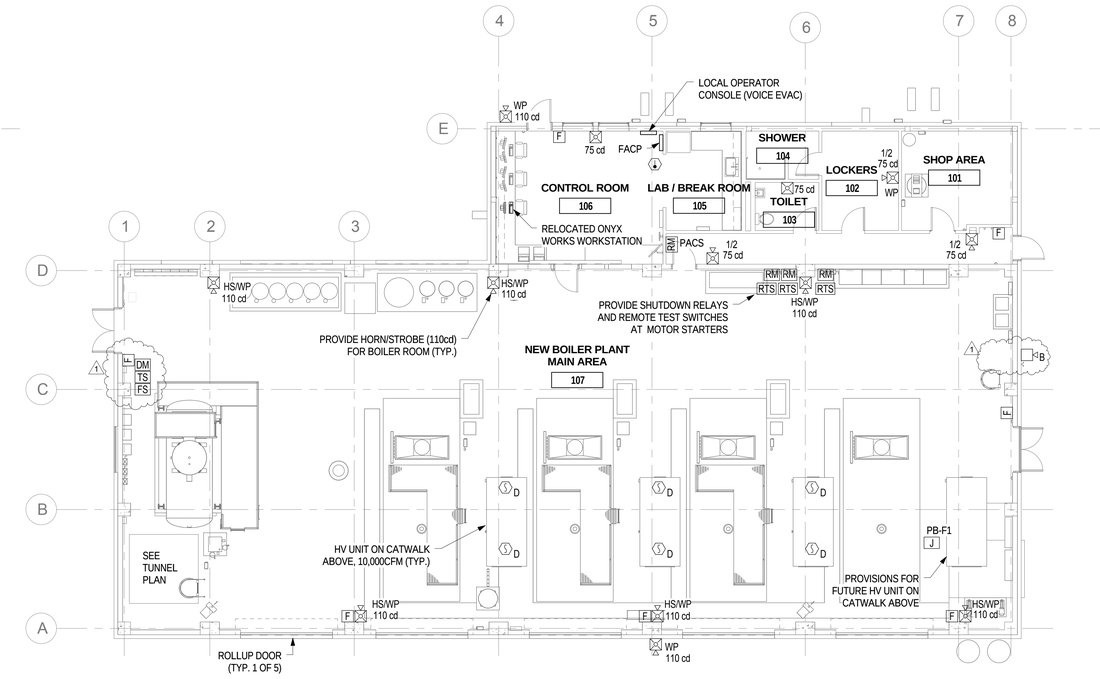
Office of Construction and Facilities Management

Department of Veterans Affairs

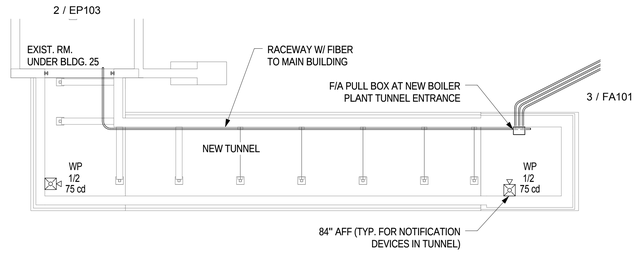
VA FORM 08-6231



3 BOILER PLANT - BELOW GRADE - FIRE ALARM
1/8" = 1'-0"



1 BOILER PLANT - FIRE ALARM
1/8" = 1'-0"



2 NEW TUNNEL - FIRE ALARM
1/8" = 1'-0"

FULLY SPRINKLERED BUILDING

FINAL DESIGN

APPROVED FOR CONSTRUCTION

Revisions:	Date
REV 1 - SFCCP	5/31/2018

CONSULTANTS:

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AKEA Project No. 083-14

Drawing Title: FIRE ALARM FLOOR PLANS

Approved: Project Director

Project Title: REPLACE BOILERS - FCA D, ENERGY AT THE MALCOM RANDALL VAMC

Location: GAINESVILLE, FLORIDA

Date: FEBRUARY 28, 2018 | Checked: CJF | Drawn: CJF

Project Number: 573-14-600

Building Number:

Drawing Number: FA101

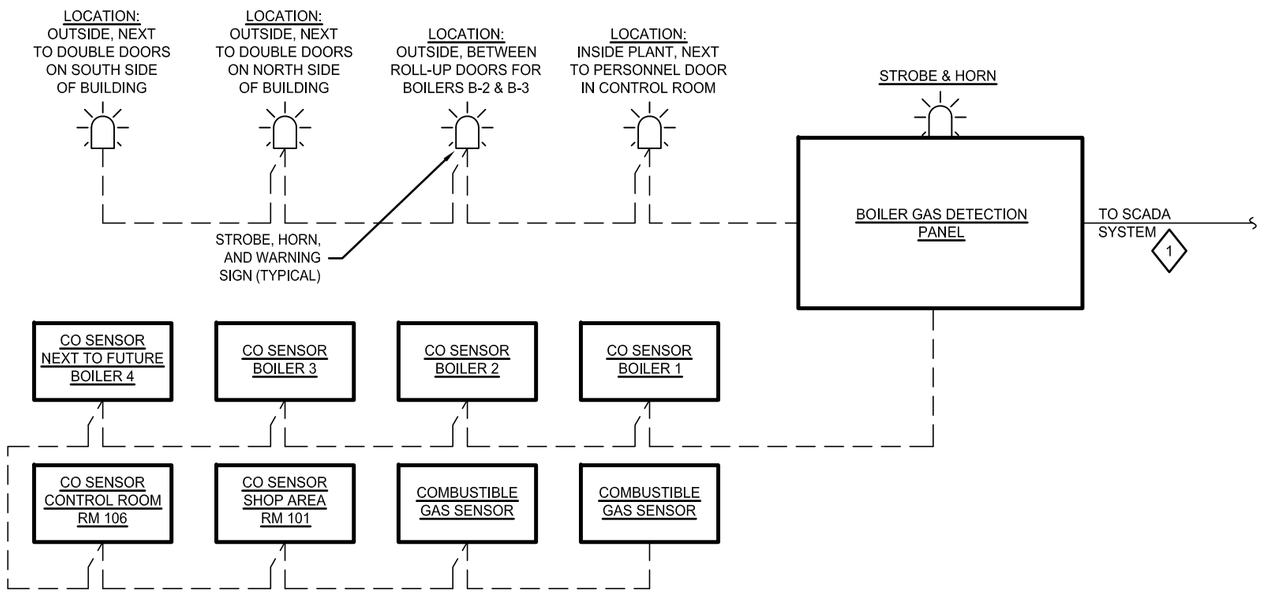
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

SHEET KEYNOTES

1. PROVIDE GATEWAY AS REQUIRED TO BRING IN ALARM POINTS TO SCADA SYSTEM.



WORKSTATION			USER INFORMATION						
			POINT TYPE				ALARM CONDITION		
TAG	POINT DESCRIPTION	UNITS	ANALOG	DIGITAL	INTEGRATED	SETPOINT VALUE	HIGH LIMIT	LOW LIMIT	ALARM DELAY (MIN)
INTEGRATION									
SDP	CARBON MONOXIDE GAS LEVEL - IN FRONT OF BOILER 1	PPM			X				
SDP	CARBON MONOXIDE GAS LEVEL - IN FRONT OF BOILER 2	PPM			X				
SDP	CARBON MONOXIDE GAS LEVEL - IN FRONT OF BOILER 3	PPM			X				
SDP	CARBON MONOXIDE GAS LEVEL - NEXT TO FUTURE BOILER 4	PPM			X				
SDP	CARBON MONOXIDE GAS LEVEL - IN CONTROL RM 106	PPM			X				
SDP	CARBON MONOXIDE GAS LEVEL - IN SHOP AREA RM 101	PPM			X				
SDP	COMBUSTIBLE GAS LEVEL - UPPER LEVEL MEZZANINE	PPM			X				
SDP	COMBUSTIBLE GAS LEVEL - UPPER LEVEL MEZZAZINE	PPM			X				
SDP	CARBON MONOXIDE ALARM STATE	(1)			X				
SDP	COMBUSTIBLE GAS ALARM STATE	(1)			X				

NOTES:
(1) PROVIDE SCADA FEEDBACK FOR ALL ALARM STATE LEVELS SUCH AS: NO GAS DETECTED, LOW LEVEL ALARM, HIGH LEVEL ALARM, ETC.

2 BOILER GAS DETECTION SYSTEM CONTROL DIAGRAM

SCALE: NONE

Project No. 14089-00
06/04/18

REPLACE BOILERS - FAC D, ENERGY
AT THE MALCOM RANDALL VAMC

MP711-SK1

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