



**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
2100 CLARENDON BOULEVARD, SUITE 500
ARLINGTON, VA 22201
(703) 228-3410**

INVITATION TO BID NO. 21-DES-ITB-564

ELECTRONIC SEALED BIDS WILL BE RECEIVED BY ARLINGTON COUNTY VIA VENDOR REGISTRY UNTIL 4:00 P.M. ON THE 1ST DAY OF APRIL 2021.

FOR THE PROVISION OF CARLIN SPRINGS ROAD BUILDING DE-COUPLING PHASE 1

SEPARATION OF 601 SOUTH CARLIN SPRINGS ROAD AND 611 SOUTH CARLIN SPRNGS ROAD BUILDINGS (DEMOLITION) AND CONSTRUCTION OF EMERGENCY STAIR TOWER FOR BUILDING 611 AND PATHWAY TO 611 GARAGE

VENDORS ARE REQUIRED TO REGISTER ON [VENDOR REGISTRY](#) IN ORDER TO SUBMIT A RESPONSE TO THIS INVITATION TO BID. NO RESPONSES WILL BE ACCEPTED AFTER THE BID DUE DATE AND TIME.

The County will conduct a virtual bid opening via Microsoft Teams Application (APP). Bidders interested in viewing the public bid opening must download the APP and join the meeting via the Microsoft Teams APP and enable audio, video or both. The link to join the virtual bid opening is provided below:

[Click here to join the meeting](#)
[+1 347-973-6905](#) United States, New York City (Toll)
Conference ID: 280 033 105#

Bid Surety in the amount of 5% of the bid must be submitted with the bid. Performance and Payment Bonds in the amount of 100% of the award will be required of the successful bidder.

PREBID CONFERENCE

A virtual prebid conference will be held at 10:00 a.m., March 15, 2021_on Microsoft Teams to allow potential Bidders an opportunity to obtain clarification of the specifications and requirements of the solicitation. To join the meeting, please click the following link [Click here to join the meeting](#), or join by dialing +1 347-973-6905 and enter Conference ID 832 363 034#. ATTENDANCE AT THE PREBID CONFERENCE IS OPTIONAL. Minutes of the prebid conference will be recorded by the County and may be incorporated into the solicitation documents through an Addendum. Interested Bidders are, however, urged to attend.



NOTICE: ANY BIDDER ORGANIZED AS A STOCK OR NONSTOCK CORPORATION, LIMITED LIABILITY COMPANY, BUSINESS TRUST OR LIMITED PARTNERSHIP, OR REGISTERED AS A LIMITED LIABILITY PARTNERSHIP, MUST BE AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH OF VIRGINIA PRIOR TO SUBMITTING A BID (REFER TO AUTHORITY TO TRANSACT BUSINESS SECTION IN THE SOLICITATION FOR FURTHER INFORMATION).

Arlington County reserves the right to reject any and all bids, cancel this solicitation, and waive any informalities or irregularities as defined in the Arlington County Purchasing Resolution.

Arlington County, Virginia
Office of the Purchasing Agent

Kaylin Schreiber
Procurement Officer
kschreiber@arlingtonva.us



TABLE OF CONTENTS

I. INFORMATION FOR BIDDERS **4**

II. AGREEMENT AND CONTRACT TERMS AND CONDITIONS..... **14**

III. INSURANCE REQUIREMENTS **28**

IV. ATTACHMENTS AND FORMS **37**

ATTACHMENT A - PRICING SHEET (INCLUDED AS A SEPARATE ATTACHMENT)

ATTACHMENT B – SPECIAL CONDITIONS

ATTACHMENT C – BID SET DRAWINGS

ATTACHMENT D - BID SPECIFICATIONS



I. INFORMATION FOR BIDDERS

1. QUESTIONS AND ADDENDA

BIDDERS MUST BE REGISTERED IN VENDOR REGISTRY TO SUBMIT A QUESTION FOR THIS INVITATION TO BID.

All communications relating to this solicitation must be submitted online using Vendor Registry. For a question to be considered, the question must be entered in the Question Section of the **ITB No. 21-DES-ITB-564**. Prior to the award of a contract resulting from this solicitation, bidders are prohibited from contacting any County staff other than those assigned to the Office of the Purchasing Agent.

QUESTIONS REGARDING THE ORIGINAL SOLICITATION MUST BE SUBMITTED BY MARCH 17, 2021, AT 5:00 PM EASTERN TIME TO BE CONSIDERED FOR AN ADDENDUM. ALL QUESTIONS RECEIVED BY THE QUESTION DEADLINE WILL BE RESPONDED TO WITHIN VENDOR REGISTRY AND POSTED FOR ALL BIDDERS. THE SYSTEM WILL NOT ACCEPT ANY QUESTIONS AFTER THIS DATE AND TIME.

If any questions or responses require revisions to this solicitation, such revisions will be by formal Addendum only. Bidders are cautioned not to rely on any written, electronic, or oral representations made by any County representative or other person, including the County's technical contact, that appear to change any portion of the solicitation unless the change is ratified by a written Addendum to this solicitation issued by the Office of the Purchasing Agent.

2. INTEREST IN MORE THAN ONE BID AND COLLUSION

Reasonable grounds for believing that a Bidder is interested in more than one bid for a solicitation, including both as a Bidder and as a subcontractor for another Bidder, or that collusion exists between two or more Bidders, will result in rejection of all affected bids. However, an individual or entity acting only as a subcontractor may be included as a subcontractor on bids of two or more different Bidders. Bidders rejected under the above provision will also be disqualified if they respond to a re-solicitation for the same work.

3. TRADE SECRETS OR PROPRIETARY INFORMATION

Trade secrets or proprietary information that a bidder or contractor submits in connection with a procurement transaction may be exempted from public disclosure under the Virginia Freedom of Information Act ("VFOIA"). However, the bidder or contractor must invoke VFOIA protection clearly and in writing on the Bid Form for County review. The Bid Form must include at least the following: (1) the data or other materials sought to be protected and (2) specific reasons why the material is confidential or proprietary. It is the bidder's sole responsibility to defend such exemptions if challenged in a court of competent jurisdiction.

4. DEBARMENT STATUS

The Bidder must indicate on the Bid Form whether it or any of its principals is currently debarred from submitting bids to the County or to any other state or political subdivision and whether the Bidder is an agent of any person or entity that is currently debarred from submitting bids to the County or to any other state or political subdivision. An affirmative response may be considered grounds for rejection of the bid.



5. AUTHORITY TO TRANSACT BUSINESS

Any Bidder organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership must be authorized to transact business in the Commonwealth of Virginia as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia, or as otherwise required by law. The proper and full legal name of the entity and the identification number issued to the Bidder by the Virginia State Corporation Commission must be included on the Bid Form. Any Bidder that is not required to be authorized to transact business in the Commonwealth must include in its bid a statement describing why the Bidder is not required to be so authorized. The County may require a Bidder to provide documentation that 1) clearly identifies the complete name and legal form of the entity and 2) establishes that the entity is authorized by the State Corporation Commission to transact business in the Commonwealth of Virginia. Failure of a Bidder to provide such documentation will be a ground for rejection of the bid or cancellation of any award. For further information refer to the Commonwealth of Virginia State Corporation Commission website at: www.scc.virginia.gov.

6. ARLINGTON COUNTY BUSINESS LICENSES

The successful Bidder must comply with the provisions of Chapter 11 ("Licenses") of the Arlington County Code, if applicable. For information on the provisions of that Chapter and its applicability to this solicitation, contact the Arlington County Business License Division, Office of the Commissioner of the Revenue, at 2100 Clarendon Blvd., Suite 200, Arlington, Virginia, 22201, tel. (703) 228-3060, or e-mail <mailto:business@arlingtonva.us>.

7. VIRGINIA CONTRACTOR LICENSE

For all work that is classified as being performed by "Contractors" as defined by the Virginia State Board for Contractors, a Class A, B, or C License is required.

If a contract for performing or managing construction, removal, repair or improvements is for \$120,000 or more, or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is \$750,000 or more, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS A CONTRACTOR."

If a contract for performing or managing construction, removal, repair or improvements is for \$10,000 or more, but less than \$120,000, or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is \$150,000 or more, but less than \$750,000, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS B CONTRACTOR."

If a contract for performing construction, removal, repair or improvements is for \$1,000 or more, but no more than \$10,000 or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve month period is less than \$150,000, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS C CONTRACTOR." Class C contractors shall not include electrical, plumbing, and heating, ventilation and air conditioning contractors.

For further information, contact the State Board for Contractors, 2 South Ninth Street, Richmond, VA 23219, (804) 367-8511.



8. ESTIMATED QUANTITIES/NON-EXCLUSIVITY OF CONTRACTOR

The contract that will result from this solicitation will not obligate the County to purchase a specific quantity of items or services during the Contract Term. Any quantities that are included in the contract documents are the present expectations the County for the period of the contract, and the County is under no obligation to buy that, or any, amount as a result of having provided this estimate or of having had any normal or otherwise measurable requirement in the past. The County may require more goods and/or services than the estimated annual amount, and any such additional quantities will not give rise to any claim for compensation other than at the unit prices and/or rates specified in the contract.

The items or services covered by this contract may be or become available under other County contract(s), and the County may determine that it is in its best interest to procure the items or services through such other contract(s). The County does not guarantee that the selected contractor will be the exclusive provider of the goods or services covered by the resulting contract.

9. BID FORM SUBMISSION

The submitted Bid Form must be signed and fully executed. The Bid Form must be submitted electronically via Vendor Registry no later than the date and time specified in this solicitation. The Vendor Registry system will not accept bids after the close date and time. The County will not accept emailed or faxed bid

The Bidder name on the electronic bid submittal shall be the same as the Contractor/Vendor name as the registration in Vendor Registry for the upload to be considered a valid bid. **ONLY ELECTRONIC SUBMISSION IS ALLOWED, NO BID SUBMITTED OTHER THAN A VENDOR REGISTRY ELECTRONIC UPLOAD WILL BE ACCEPTED. Arlington County is not responsible for late submissions, missed Addendums, or questions not submitted before the end date and time.**

Timely submission is solely the responsibility of the Bidder. The Vendor Registry System will not accept applications after the publicly posted date and time. A bid may be rejected if the Bid Form is not signed in the designated space by a person authorized to legally bind the Bidder.

Modification of or additions to the Bid Form may be cause for rejection of the bid; however, Arlington County reserves the right to decide, in its sole discretion, whether to reject such a bid as nonresponsive. As a precondition to bid acceptance, Arlington County may request the bidder to withdraw or modify any such modifications or additions, if it does not affect quality, quantity, price, or delivery.

Bids and all documents uploaded/submitted to Arlington County by an Bidder become the property of the County upon receipt.

10. BIDDER CERTIFICATION

Submission of a signed Bid Form is certification by the respective bidder that it is registered with the Virginia State Corporation Commission (SCC), if applicable, it is the legal entity authorized to enter into an agreement with the County, and that it will accept any award made to it as a result of the submission. Entry of a Bidder's SCC number may be required at Vendor Registration.

11. ERRORS IN EXTENSION

If the unit price and the extension price differ, the unit price will prevail.

12. EXCEPTIONS

Conditional or qualified bids containing exceptions, unless specifically allowed in the solicitation, are subject to rejection in whole or in part as nonresponsive.

13. NONCONFORMING TERMS AND CONDITIONS

If a bid contains alternate terms and conditions that do not conform to the terms and conditions in this solicitation, the bid will be subject to rejection for nonresponsiveness. The County reserves the right to permit a bidder to withdraw nonconforming terms and conditions from its bid prior to the County's determination of nonresponsiveness.

14. BIDDERS' RESPONSIBILITY TO INVESTIGATE

Before submitting a bid, each bidder must make all investigations necessary to ascertain all conditions and requirements affecting the full performance of the contract and to verify any representations made by the County upon which the bidder will rely. No pleas of ignorance of such conditions and requirements will relieve the successful bidder from its obligation to comply in every detail with all provisions and requirements of the contract or will be accepted as a basis for any claim for any monetary consideration on the part of the successful bidder.

15. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

Each bidder is responsible for ascertaining the nature and locations of the Work of the solicitation, and for investigating the general and local conditions and factors which can affect the work or its cost, including but not limited to:

- a. conditions bearing upon transportation, disposal, handling, and storage of materials;
- b. the availability of labor, water, electric power, and roads;
- c. uncertainties of weather, river stage, tides, or similar physical conditions at the site;
- d. the conformation and conditions of the ground; and
- e. the character of equipment and facilities needed before and during work performance.

Each bidder is responsible for investigating the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work publicly or otherwise available, as well as from the drawings and specifications made a part of this solicitation.

The locations of existing utilities, including underground utilities, which may affect the work are indicated on the drawings or in the specifications insofar as their existence and location were known at the time of preparation of the drawings. However, nothing in these drawings or specifications shall be construed as a guarantee that such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of operations. The bidder shall make all necessary investigations to determine the existence and locations of such utilities.

The County assumes no responsibility for any conclusions or interpretations made by the bidder based on the information made available by the County. The County assumes no responsibility for any understanding reached or representation made concerning conditions which could affect the work by any of its officers or agents before the execution of the contract, unless that understanding, or representation is expressly stated in the Contract.

16. INCOMPLETE DOCUMENTS

Each bidder is responsible for having determined the accuracy and/or completeness of the solicitation documents upon which it relied in making its bid, and has an affirmative obligation to notify the Arlington County Purchasing Agent immediately upon discovery of an apparent or suspected inaccuracy, error in, or omission of any pages, drawings, sections, or addenda whose omission from the documents was apparent from a reference or page numbering or other indication in the solicitation documents.

If a bidder downloads an electronic version of the solicitation documents, that potential bidder is responsible for determining the accuracy and/or completeness of the electronic documents and ensuring that the electronic documents used in preparing the bid are the most current version of solicitation documents issued by the County.

If the successful bidder proceeds with any activity that may be affected by an inaccuracy, error in, or omission in the solicitation documents of which it is aware but has not notified the Arlington County Purchasing Agent, the bidder hereby agrees to perform any activity described in the missing or incomplete documents at bidder's sole expense and at no additional cost to Arlington County.

17. ERRONEOUS OR INFEASIBLE REQUIREMENTS

Each bidder is responsible for having determined the feasibility of the work required and shall notify the County Purchasing Agent immediately upon discovery of any apparent erroneous, contradictory, incomplete, or infeasible requirements or directions contained in the Solicitation Documents. If a bidder fails to notify the County of such conditions immediately upon discovery, the bidder assumes all responsibility for any and all work required to satisfy the contract requirements at no additional cost to the County and within the Time for Completion.

18. QUALIFICATION OF BIDDERS

In order to be considered responsible and responsive, Bidders shall have the experience described below, and provide the supporting documentation as instructed.

COMPANY QUALIFICATIONS:

1. Bidders shall have ten (10) continuous years of experience conducting public works infrastructure and exterior and interior renovation projects work of 8,000 square feet or more in size and cost in excess of \$500,000. The experience shall be work of similar size and scope, construction, re-construction, and maintenance. The Bidder's obtained project experience shall consist of the following:
 - Building demolition
 - Re-construction
 - Site improvements

Bidders shall provide a list of five (5) (at least two (2) of which must include demolition and re-construction of two (2) or more floors of a multi-story building) similar projects recently completed that involving the same material, equal size, and comparable length. For each project, Bidders shall list the following information:

- Project Name
- Project description and Bidder's scope of work within the project, which shall include number of stories of building, floor numbers in which renovation work was completed, and total renovation area in square feet

- Building owner's name, telephone number and email address
 - Project manager's name, telephone number and email address
 - Work start date, scheduled completion, and actual completion date
 - Initial contract cost and final contract cost
2. Bidders shall have ten (10) continuous years of experience conducting public works infrastructure and exterior and interior renovation projects. The experience shall be work of similar size and scope, construction, re-construction, and maintenance. The Bidder's obtained project experience shall consist of the following:
- Emergency exit towers
 - Sprinkler system
 - Fire alarm
 - Retaining wall
 - Site grading
 - Stormwater management
 - Erosion Control
 - Site work

Bidders shall provide a list of two (2) similar projects recently completed that involving the same material, equal size, and comparable length. For each project, Bidders shall list the following information:

- Project Name
 - Project description and Bidder's scope of work within the project, which shall include number of stories of building, floor numbers in which renovation work was completed, and total renovation area in square feet
 - Building owner's name, telephone number and email address
 - Project manager's name, telephone number and email address
 - Work start date, scheduled completion, and actual completion date
 - Initial contract cost and final contract cost
3. Bidder shall provide a history or good faith assurances of (i) completion by the Bidder and any potential subcontractors of specified safety training programs established by the U.S. Department of Labor, Occupational Safety and Health Administration; (ii) participation by the bidder and any potential subcontractors in apprenticeship training programs approved by state agencies or the U.S. Department of Labor; or (iii) maintenance by the Bidder and any potential subcontractors of records of compliance with applicable local, state, and federal laws, if Bidder is not prequalified by the Virginia Department of Transportation.

The experience of the contractor owner(s) may be imputed to a newly formed company/Contractor provided the Contractor owner(s) has/have at least five (5) years of demonstrated experience of reliability and meets the criteria set forth herein.

STAFFING QUALIFICATIONS:

The Superintendent and Project Manager assigned to this work shall have at least five (5) years of experience each in overseeing projects of similar type and size for Land Disturbance, demolition, reconstruction, building renovation exceeding 8,000 square feet and total construction cost in excess of \$500,000, and at least one (1) project in an area where



traffic/parking controls were needed. Either the Superintendent or Project Manager shall also have a registered Land Disturber certification in Arlington County or State of Virginia, or Bidder must have a licensed P.E. on staff assigned to this project. Bidder shall submit resumes of the proposed Superintendent and Project Manager with their Bids. Bidder shall also submit the following information for both the Project Manager and Superintendent:

- Project description and Bidder's scope of work within the project that the Project Manager/Superintendent was responsible for, which shall include number of stories of building, floor numbers in which renovation work was completed, and total renovation area in square feet
- Building owner's name, telephone number and email address
- Principal/Project Architect name, telephone number and email address
- Project Manager/Superintendent name, telephone number and email address
- Work start date, scheduled completion, and actual completion date
- Initial contract cost and final contract cost
- Land Disturbance Registration number of Project Manager or Superintendent, or P.E. Registration number of staff member assigned to this project.

In addition, the Purchasing Agent may require a bidder to demonstrate that it has the necessary facilities, ability, and financial resources to comply with the contract and furnish the service, material or goods specified herein in a satisfactory manner before the award of any contract. A bidder may also be required to provide past history and references. Failure to qualify according to the foregoing requirements will result in bid rejection.

19. DETERMINATION OF RESPONSIBILITY

In determining "a responsible Bidder", in addition to price and other considerations, the Purchasing Agent shall consider: History or good faith assurances of (i) completion by the Bidder and any potential subcontractors of specified safety training programs established by the U.S. Department of Labor, Occupational Safety and Health Administration; (ii) participation by the bidder and any potential subcontractors in apprenticeship training programs approved by state agencies or the U.S. Department of Labor; or (iii) maintenance by the Bidder and any potential subcontractors of records of compliance with applicable local, state, and federal laws, if Bidder is not prequalified by the Virginia Department of Transportation.

20. ALTERNATE BID

Bidders who have other items they wish to offer in lieu of, or in addition to, what is required by this solicitation shall submit a separate bid clearly marked "ALTERNATE BID". Alternate bids will be automatically deemed nonresponsive.

21. INFORMALITIES

The County reserves the right to waive minor defects or variations from the exact requirements of the solicitation in a bid insofar as those defects or variations do not affect the price, quality, quantity, or delivery schedule of the services being procured. If insufficient information is submitted for Arlington County to properly evaluate a bid or a bidder; the County may request such additional information after bid opening, provided that the information requested does not change the price, quality, quantity, or delivery schedule for the services being procured.

22. NEW MATERIAL

Unless otherwise provided for in this solicitation, all goods, materials, supplies, or components offered to the County under this bid solicitation must be new, not used or reconditioned, and are not of such age or so deteriorated as to impair their usefulness or safety and that the goods, materials, supplies, or components offered are current production models of the respective manufacturer. If a bidder believes that furnishing used or reconditioned goods, materials, supplies or components will be in the County's interest, the bidder shall notify the County Purchasing Agent in writing no later than fifteen (15) calendar days prior to the date set for opening of bids. The notice shall include the reasons for the request and any benefits which may accrue to the County if the Purchasing Agent authorizes the bidding of used or reconditioned goods, materials, supplies or components.

23. BID WITHDRAWAL PRIOR TO BID OPENING

The Bidder may withdraw a bid from Vendor Registry before the opening date and time. It is the sole responsibility of the Bidder to remove and/or resubmit a bid before the bid deadline.

24. WITHDRAWAL OF BID FROM CONSIDERATION AFTER BID OPENING

After the opening of a bid, a bidder may withdraw its bid from consideration if the price of the bid is substantially lower than other bids due solely to a mistake therein, provided the bid is submitted in good faith, the mistake is a clerical mistake as opposed to a judgment mistake, and is actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of the bid, which unintentional error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn. No partial withdrawals of bids will be permitted after the time and date set for the bid opening. The bidder must give an electronic written notice to the Arlington County Purchasing Agent of a claim of right to withdraw a bid and provide all work papers, documents and other materials used in the preparation of the bid sought to be withdrawn, within two (2) business days after the date of bid opening. A bid may also be withdrawn if the County fails to award or issue a notice of intent to award the bid within ninety (90) days after the date fixed for opening bids.

25. METHOD OF AWARD

The County will award to the lowest responsive and responsible bidder. The lowest bidder will be determined by Project Total Cost.

26. NOTICE OF DECISION TO AWARD

When the County has made a decision to award a contract(s), the County will post a Notice of Award or Intent to Award to [Vendor Registry](#).

27. INSURANCE REQUIREMENTS

Each bidder must be able to demonstrate proof of the specific coverage requirements and limits applicable to this solicitation. If the bidder is not able to do so, it may propose alternate insurance coverage for consideration by the County. Written requests for consideration of alternate coverage must be received by the County Purchasing Agent at least 10 working days prior to bid due date. If the County permits alternate coverage, an amendment to the Insurance Checklist will be issued prior to the time and date set for receipt of bids.

28. SURETY REQUIRED

Companies who wish to implement digital signatures during the COVID-19 public health emergency may do so, along with a SURETY BOND SEAL ADDENDUM which contains an electronic corporate seal and states the following:

“Due to logistical issues associated with the use of traditional seals during this COVID-19 pandemic, [Surety Company] has authorized its Attorney-in-Fact to affix [Surety Company’s] corporate seal to any bond executed on behalf of [Surety Company] by any such Attorney-in-Fact by attaching this Addendum to said bond.

To the extent this Addendum is attached to a bond that is executed on behalf of [Surety Company] by its Attorney-in-Facts, [Surety Company] hereby agrees that the seal below shall be deemed affixed to said bond to the same extent as if its raised corporate seal was physically affixed to the face of the bond.”

A. BID SURETY:

A fully completed and properly executed original Bid Bond, cashier's check, certified check, money order, or cash escrow in the amount of 5% of the amount of the bid made payable to the Treasurer of Arlington County shall accompany each bid. The Bid Surety will be retained until after the award to the successful bidder. The Bid Surety of the successful bidder will be retained until completion of the Contract or the posting of a Performance Bond, whichever occurs sooner. A bid submitted without a proper bid surety will be rejected.

B. FAILURE TO EXECUTE:

The failure of a bidder to accept an award and file acceptable Performance and Payment Bonds within ten (10) days after notice of intent to award will cause cancellation of the award and the forfeiture of the Bid Surety to the County.

C. PERFORMANCE SURETY:

A fully completed and properly executed original Performance Bond in the amount of 100% of the amount of the bid will be required of the successful bidder to ensure satisfactory completion of the work. The bond shall be a corporate surety bond issued by a surety company authorized to do business in the Commonwealth of Virginia and acceptable to the County. Where applicable, the Performance Bond shall be renewable annually in the original amount through the completion of the Contract, including all warranty and guarantee periods.

D. PAYMENT BOND:

A fully completed and properly executed original Payment Bond in the amount of 100% of the amount of the bid, will be required of the successful bidder to ensure payment of all persons who have and fulfill contracts for the Contractor for performing labor, providing equipment, or providing material in the performance of the work provided for in the Contract. The Bond shall be a corporate surety bond issued by a surety company authorized to do business in the Commonwealth of Virginia and acceptable to the County. Where applicable, the Payment Bond shall be renewable annually in the original amount for the duration of the Contract.

29. EXECUTION OF CONTRACT

Within three days after the Contract is presented to the successful Bidder for signature, the Contractor must submit to the County Purchasing Agent the original of the executed Agreement. Within ten days the Contractor must submit executed performance and payment bonds and required certificate of insurance. Failure to do so shall constitute a default, and the County may award the Contract to the next lowest responsive and responsible bidder or solicit new bids. The County may then charge against the Contractor the difference between the amount of the Contract award and the amount for which a Contract is subsequently executed, up to the total amount of the Contractor's bid security.

30. EXPENSES INCURRED IN PREPARING BID

All expenses related to a bid are the sole responsibility of the bidder.

31. NEGOTIATIONS WITH LOWEST RESPONSIVE AND RESPONSIBLE BIDDER

If the bid by the lowest responsive and responsible bidder exceeds available funds, the County reserves the right to negotiate with the apparent low bidder to obtain an acceptable price. Negotiations with the apparent low bidder may involve discussions of reduction of quantity, quality, or other cost saving mechanisms. The final negotiated contract shall be subject to final approval of the County, in its sole discretion.

32. ELECTRONIC SIGNATURE

If awarded, the Bidder may be required to accept an agreement and sign electronically through the County's e-signature solution, DocuSign.

FOLLOWING THIS PAGE IS THE AGREEMENT THAT WILL BE ENTERED INTO BETWEEN THE COUNTY AND THE CONTRACTOR. THE AGREEMENT IS PART OF THIS SOLICITATION. THIS AGREEMENT IS SUBJECT TO REVIEW BY THE COUNTY ATTORNEY PRIOR TO BEING SUBMITTED FOR CONTRACTOR'S SIGNATURE.



II. AGREEMENT AND CONTRACT TERMS AND CONDITIONS

**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
SUITE 500, 2100 CLARENDON BOULEVARD
ARLINGTON, VA 22201**

AGREEMENT NO. 21-DES-ITB-564

THIS AGREEMENT is made, on _____, between Contractor's name,
Contractor's address ("Contractor") a name of state type of entity
authorized to do business in the Commonwealth of Virginia, and the County Board of Arlington County,
Virginia. The County and the Contractor, for the consideration hereinafter specified, agree as follows:

1. CONTRACT DOCUMENTS

The Contract Documents consist of:

- Agreement No. 21-DES-ITB-564 and all modifications properly incorporated into the Agreement
- Exhibit A – Arlington County Invitation to Bid No. 21-DES-ITB-564, including DES General Conditions and Special Conditions
- Exhibit B – Specifications, Drawings and Construction Notes
- Exhibit C – Price Bid of Contractor

Where the terms and provisions of this Agreement vary from the terms and provisions of the other Contract Documents, the terms and provisions of this Agreement will prevail over the other Contract Documents, and the remaining Contract Documents will be complementary to each other. If there are any conflicts, the most stringent terms or provisions will prevail.

The Contract Documents set forth the entire agreement between the County and the Contractor. The County and the Contractor agree that no representative or agent of either party has made any representation or promise with respect to the parties' agreement that is not contained in the Contract Documents. The Contract Documents may be referred to below as the "Contract" or the "Agreement".

2. SCOPE OF WORK

The Contractor will furnish all labor, materials, and equipment for the construction of Carlin Springs Road Building De-Coupling Phase 1 (the "Project") and all other work shown, described, and required by the Contract Documents (hereinafter "the Work").

The Work shall be performed according to the standards established by the Contract Documents read together as a single specification. It shall be the Contractor's responsibility, at solely the Contractor's cost, to provide sufficient services to fulfill the purposes of the Work. Nothing in the Contract Documents shall be construed to limit the Contractor's responsibility to manage the details and execution of its Work.



3. PROJECT OFFICER

The performance of the Contractor is subject to the review and approval of the County Project Officer identified in Section 53, Notices, unless the Contractor is otherwise notified in writing.

The County has authorized the consultant identified below to act as the County representative for specific purposes to perform specified duties and responsibilities, and to have the rights and authorities as assigned in connection with completion of the Work in accordance with the Contract Documents until such time as the County may notify the Contractor otherwise:

RRMM Architects

The County will notify the Contractor after contract award of the specific roles and responsibilities of the Consultant(s).

4. TIME FOR COMPLETION

Work under this Agreement shall achieve Substantial Completion no later than one hundred twenty (120) consecutive calendar days after the commencement date given in a Notice to Proceed provided by the County to the Contractor, subject to any modifications made as provided for in the Contract Documents. This one hundred twenty (120) day period shall be the Period of Performance for Substantial Completion. No Work shall be deemed Substantially Complete until it meets the requirements of Substantial Completion set forth in the General Conditions. Final Completion of the Work shall be completed no later than thirty (30) calendar days after the date of acceptance of Substantial Completion by the County Project Officer. Work will not reach Final Completion until it meets the requirements set forth in the General Conditions.

Unless otherwise provided, no claims for early completion are allowed.

5. CONTRACT AMOUNT

The County will pay the Contractor in accordance with the terms of the Progress Payments and Retainage and Payment Terms sections below and at the prices shown in Exhibit C, but not more than \$_____ for the Contractor's completion of the Work as required by the Contract Documents provided the Work is performed to the satisfaction of and is accepted by the Project Officer. The Contractor will complete the Work for the total amount specified in this section ("Contract Amount") unless such amount is modified as provided in this Agreement. The Contract Amount includes all of the Contractor's costs and fees (profit) and is inclusive of all anticipated or known site conditions, anticipated or known materials, labor, and equipment costs, or any other costs which should reasonably have been expected by the Contract Documents.

6. PROGRESS PAYMENTS AND RETAINAGE

The County will make monthly progress payments to the Contractor upon written application by the Contractor, on the basis of a written estimate of the work performed during the preceding calendar month as approved by the Project Officer. However, 5% of each progress payment will be retained by the County until Final Completion and acceptance of all Work covered by the Agreement.

All material and work covered by partial payments will become the property solely of the County at the time the partial payment is made. However, the Contractor will have the sole responsibility, care and custody for all materials and work upon which payments have been made until Substantial Completion.



When calculating payment for materials on-site, the County shall not pay for materials which are not scheduled for incorporation into the Work within sixty (60) days from the date of application for payment.

7. PAYMENT TERMS

The Contractor must submit invoices to the County's Project Officer, who will either approve the invoice or require corrections. Each invoice must certify that the invoice submitted is a true and accurate accounting of the work performed and goods and/or services provided and must be signed and attested to by the Contractor or authorized designee. The County will pay the Contractor within 45 days after approval of an invoice for completed work which is reasonable and allocable to the Contract. The number of the County Purchase Order pursuant to work has been performed must appear on all invoices.

8. PAYMENT OF SUBCONTRACTORS

The Contractor is obligated to take one of the two following actions within seven days after receipt of payment by the County for work performed by any subcontractor under this Contract:

- a. Pay the subcontractor for the proportionate share of the total payment received from the County attributable to the work performed by the subcontractor under this Contract; or
- b. Notify the County and the subcontractor, in writing, of the Contractor's intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment.

The Contractor is obligated to pay interest to the subcontractor on all amounts owed by the Contractor to the subcontractor that remain unpaid after seven days following receipt by the Contractor of payment from the County for work performed by the subcontractor under this Contract, except for amounts withheld as allowed in subsection b., above. Unless otherwise provided under the terms of this Contract, interest will accrue at the rate of 1% per month.

The Contractor must include in each of its subcontracts, if any are permitted, a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.

The Contractor's obligation to pay an interest charge to a subcontractor pursuant to this section may not be construed to be an obligation of the County. A Contract modification may not be made for the purpose of providing reimbursement for such interest charge. A cost reimbursement claim may not include any amount for reimbursement for such interest charge.

9. RELEASE AND REQUEST FOR FINAL PAYMENT

In order to receive final payment upon Final Completion of the Project and before Final Acceptance, the Contractor must submit to the Project Officer a signed original notarized copy of the Arlington County Release and Request for Final Payment form per the General Conditions.

10. LIQUIDATED DAMAGES

Time is of the essence under this Contract. The Work must be completed within the Time for Completion. The County and the Contractor agree that damages for failure to achieve Substantial Completion of the Work by the date specified under Time for Completion are not susceptible to exact determination but that \$1,525.00 per calendar day is in proportion to the actual loss that the County would suffer from such



delay. Therefore, the Contractor will pay the County as liquidated damages \$1,525 per day for each and every day beyond the time for Substantial Completion that the County determines Substantial Completion has not achieved. The County and the Contractor also agree that damages for failure to achieve Final Completion of the Work by the date specified under Time for Completion are not susceptible to exact determination but that \$1,525 per calendar day is in proportion to the actual loss the County would suffer from such delay. Therefore, the Contractor will pay the County as liquidated damages \$1,525 per day for each and every day beyond the time for Final Completion until Final Completion is achieved.

AND

The County will be entitled to deduct liquidated damages against any sums owed by the County to the Contractor under this Contract. The Contractor hereby waives any defense as to the validity of any liquidated damages on grounds that such liquidated damages are void as penalties or are not reasonably related to actual damages.

11. BACKGROUND CHECK

All employees or subcontractors whom the Contractor assigns to work on this Contract must pass a County background check. The background check will include fingerprinting by the County Sheriff's Office and a credit check.

12. NON-APPROPRIATION

All payments by the County to the Contractor pursuant to this Contract are subject to the availability of an annual appropriation for this purpose by the County Board of Arlington County, Virginia ("Board"). In the event that the Board does not appropriate funds for the goods or services provided under this Contract, the County will terminate the Contract, without termination charge or other liability to the County, on the last day of the fiscal year or when the previous appropriation has been spent, whichever occurs first.

13. ESTIMATED QUANTITIES/NON-EXCLUSIVITY OF CONTRACTOR

This Contract does not obligate the County to purchase a specific quantity of items or services during Contract Term. Any quantities that are included in the Contract Documents are the present expectations of the County for the period of the Contract; and the County is under no obligation to buy that or any amount as a result of having provided this estimate or of having had any normal or otherwise measurable requirement in the past. The County may require more goods and/or services than the estimated annual quantities, and any such additional quantities will not give rise to any claim for compensation other than at the unit prices and/or rates in the Contract.

The County does not guarantee that the Contractor will be the exclusive provider of the goods or services covered by this Contract. The items or services covered by this Contract may be or become available under other County contract(s), and the County may determine that it is in its best interest to procure the items or services through those contract(s).

14. COUNTY PURCHASE ORDER REQUIREMENT

County purchases are authorized only if the County issues a Purchase Order in advance of the transaction, indicating that the ordering County agency has sufficient funds available to pay for the purchase. If the Contractor provides goods or services without a signed County Purchase Order, it does so at its own risk



and expense. The County will not be liable for payment for any purchases made by its employees that are not authorized by the County Purchasing Agent.

15. LIEN

It is expressly agreed that after any payment has been made by the County either to the Contractor for work done, or labor or material supplied under the Contract, the County will have a lien upon all material delivered to the site either by the Contractor, or for the Contractor, which is to be used in the performance of the Contract.

16. EMPLOYMENT DISCRIMINATION BY CONTRACTOR PROHIBITED

During the performance of its work pursuant to this Contract:

- A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age or disability or on any other basis prohibited by state law. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- B. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation will be deemed sufficient for meeting the requirements of this section.
- C. The Contractor will state in all solicitations or advertisements for employees that it places or causes to be placed that such Contractor is an Equal Opportunity Employer.
- D. The Contractor will comply with the provisions of the Americans with Disabilities Act of 1990 ("ADA"), which prohibits discrimination against individuals with disabilities in employment and mandates that disabled individuals be provided access to publicly and privately provided services and activities.
- E. The Contractor must include the provisions of the foregoing paragraphs in every subcontract or purchase order of more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

17. EMPLOYMENT OF UNAUTHORIZED ALIENS PROHIBITED

In accordance with §2.2-4311.1 of the Code of Virginia, as amended, the Contractor must not during the performance of this Contract knowingly employ an unauthorized alien, as that term is defined in the federal Immigration Reform and Control Act of 1986.

18. DRUG-FREE WORKPLACE TO BE MAINTAINED BY CONTRACTOR

During the performance of this Contract, the Contractor must: (i) provide a drug-free workplace for its employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violating such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every



subcontract or purchase order of more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "workplace" means the site(s) for the performance of the work required by this Contract.

19. *SEXUAL HARASSMENT POLICY

If the Contractor employs more than five employees, the Contractor shall (i) provide annual training on the Contractor's sexual harassment policy to all supervisors and employees providing services in the Commonwealth, except such supervisors or employees that are required to complete sexual harassment training provided by the Department of Human Resource Management, and (ii) post the Contractor's sexual harassment policy in (a) a conspicuous public place in each building located in the Commonwealth that the Contractor owns or leases for business purposes and (b) the Contractor's employee handbook.

20. PROJECT STAFF

The County has the right to reasonably reject staff or subcontractors whom the Contractor assigns to the Project. The Contractor must then provide replacement staff or subcontractors satisfactory to the County in a timely manner and at no additional cost to the County. The day-to-day supervision and control of the Contractor's employees and its subcontractors is the sole responsibility of the Contractor.

21. FAILURE TO DELIVER

If the Contractor fails to deliver goods or services in accordance with the Contract terms and conditions, the County, after notice to the Contractor, may procure the goods or services from other sources and hold the Contractor responsible for any resulting additional purchase and administrative costs. The County shall be entitled to offset such costs against any sums owed by the County to the Contractor. However, if public necessity requires the use of nonconforming materials or supplies, they may be accepted at a reduction in price to be determined solely by the County.

22. UNSATISFACTORY WORK

If any of the work done, or material, goods, or equipment provided by the Contractor, is unsatisfactory to the County the Contractor must, upon notice from the County, immediately remove at the Contractor's expense such unsatisfactory work, material, goods, or equipment and replace the same with work, material, goods, or equipment satisfactory to the County. If the Contractor fails to do so after fifteen (15) days the County shall have the right to remove or replace the rejected work, material, goods, or equipment at the expense of the Contractor and offset the expense and administrative costs against any sums owed to the Contractor. This provision applies during the Contract term and during any warranty or guarantee period. At the Project Officer's discretion, rather than correction or replacement of the work, an appropriate adjustment to the Contract Amount may be made.

23. TERMINATION

The County may terminate this Contract at any time as follows: (1) for cause, if, as determined by the County, the Contractor is in breach or default or has failed to perform the Work satisfactorily; or (2) for the convenience of the County.

Upon receipt of a notice of termination, the Contractor must not place any further orders or subcontracts for materials, services or facilities; must terminate all vendors and subcontracts, except as are necessary



for the completion of any portion of the Work that the County did not terminate; and must immediately deliver all documents related to the terminated Work to the County.

Any purchases that the Contractor makes after the notice of termination will be the sole responsibility of the Contractor, unless the County has approved the purchases in writing as necessary for completion of any portion of the Work that the County did not terminate.

If any court of competent jurisdiction finds a termination for cause by the County to be improper, then the termination will be deemed a termination for convenience.

A. TERMINATION FOR CAUSE, INCLUDING BREACH AND DEFAULT; CURE

1. Termination for Unsatisfactory Performance. If the County determines that the Contractor has failed to perform satisfactorily, then the County will give the Contractor written notice of such failure(s) and the opportunity to cure them within 15 days or any other period specified by the County ("Cure Period"). If the Contractor fails to cure within the Cure Period, the County may terminate the Contract for failure to provide satisfactory performance by providing written notice with a termination date. Upon such termination, the Contractor may apply for compensation for Contract services that the County previously accepted ("Termination Costs"), unless payment is otherwise barred by the Contract. The Contractor must submit any request for Termination Costs, with all supporting documentation, to the County Project Officer within 30 days after the expiration of the Cure Period. The County may accept or reject the request for Termination Costs, in whole or in part, and may notify the Contractor of its decision within a reasonable time.

In the event of termination by the County for failure to perform satisfactorily, the Contractor must continue to provide its services as previously scheduled through the termination date, and the County must continue to pay all fees and charges incurred through the termination date.

2. Termination for Breach or Default. If the County terminates the Contract for default or breach of any Contract provision or condition, then the termination will be immediate after notice of termination to the Contractor (unless the County provides for an opportunity to cure), and the Contractor will not be permitted to seek Termination Costs.

Upon any termination pursuant to this section, the Contractor will be liable to the County for costs that the County must expend to complete the Work, including costs resulting from any related delays and from unsatisfactory or non-compliant work performed by the Contractor or its subcontractors. The County will deduct such costs from any amount due to the Contractor; or if the County does not owe the Contractor, the Contractor must promptly pay the costs within 15 days of a demand by the County. This section does not limit the County's recovery of any other damages to which it is entitled by law.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt the notice of the termination.

B. TERMINATION FOR THE CONVENIENCE OF THE COUNTY

The County may terminate this Contract in whole or in part whenever the Purchasing Agent determines that termination is in the County's best interest. The County will give the Contractor



at least 15 days' notice in writing. The notice must specify the extent to which the Contract is terminated and the effective termination date. The Contractor will be entitled to Termination Costs, as defined above, plus any other reasonable amounts that the parties might negotiate; but no amount will be allowed for anticipatory profits.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt of the notice of the termination.

24. INDEMNIFICATION

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless and indemnify the County and all of its elected and appointed officials, officers, current and former employees, agents, departments, agencies, boards and commissions (collectively the "County Indemnitees") from and against any and all claims made by third parties for any and all losses, damages, injuries, fines, penalties, costs (including court costs and attorneys' fees), charges, liability, demands or exposure resulting from, arising out of or in any way connected with the Contractor's acts or omissions, including the acts or omissions of its employees, vendors, delivery drivers and/or subcontractors, in performance or nonperformance of the Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys' fees. The Contractor must pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

The Contractor agrees to defend, indemnify, and hold harmless County from any and all damages, costs, claims, expenses, suits, losses, liabilities, or obligations of any kind including without limitation, environmental assessments, evaluations, remediations, fines, penalties, and clean-up costs which may be asserted against or imposed upon, or incurred by County arising from Contractor's discharge or disposal of any hazardous or toxic materials, trash, debris, refuse, waste or other materials ("Materials") related in any way to contractor's operations herein.

25. INTELLECTUAL PROPERTY INDEMNIFICATION

The Contractor warrants and guarantees that in providing services under this Contract neither the Contractor nor any subcontractor is infringing on the intellectual property rights (including, but not limited to, copyright, patent, mask and trademark) of third parties.

If the Contractor or any of its employees or subcontractors uses any design, device, work or material that is covered by patent or copyright, it is understood that the Contract Amount includes all royalties, licensing fees, and any other costs arising from such use in connection with the Work under this Contract.

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless, and indemnify the County Indemnitees, as defined above, from and against any and all claims, losses, damages, injuries, fines, penalties, costs (including court costs and attorneys' fees), charges, liability or exposure for infringement of or on account of any trademark, copyright, patented or unpatented invention, process or article manufactured or used in the performance of this Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys' fees. The Contractor must



pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

26. COPYRIGHT

By this Contract, the Contractor irrevocably transfers, assigns, sets over and conveys to the County all rights, title and interest, including the sole exclusive and complete copyright interest, in any and all copyrightable works created pursuant to this Contract. The Contractor will execute any documents that the County requests to formalize such transfer or assignment.

The rights granted to the County by this section are irrevocable and may not be rescinded or modified, including in connection with or as a result of the termination of or a dispute concerning this Contract.

The Contractor may not use subcontractors or third parties to develop or provide input into any copyrightable materials produced pursuant to this Contract without the County's advance written approval and unless the Contractor includes this Copyright provision in any contract or agreement with such subcontractors or third parties related to this Contract.

27. OWNERSHIP AND RETURN OF RECORDS

This Contract does not confer on the Contractor any ownership rights or rights to use or disclose the County's data or inputs.

All drawings, specifications, blueprints, data, information, findings, memoranda, correspondence, documents or records of any type, whether written, oral or electronic, and all documents generated by the Contractor or its subcontractors as a result of this Contract (collectively "Records") are the exclusive property of the County and must be provided or returned to the County upon completion, termination, or cancellation of this Contract. The Contractor will not use or willingly cause or allow such materials to be used for any purpose other than performance of this Contract without the written consent of the County.

The Records are confidential, and the Contractor will neither release the Records nor share their contents. The Contractor will refer all inquiries regarding the status of any Record to the Project Officer or to his or her designee. At the County's request, the Contractor will deliver all Records, including hard copies of electronic records, to the Project Officer and will destroy all electronic Records.

The Contractor agrees to include the provisions of this section as part of any contract or agreement related to this Contract into which it enters with subcontractors or other third parties.

The provisions of this section will survive any termination or cancellation of this Contract.

28. CONFIDENTIAL INFORMATION

The Contractor and its employees, agents and subcontractors will hold as confidential all County information obtained under this Contract. Confidential information includes, but is not limited to, nonpublic personal information; personal health information (PHI); social security numbers; addresses; dates of birth; other contact information or medical information about a person; and information pertaining to products, operations, systems, customers, prospective customers, techniques, intentions, processes, plans and expertise. The Contractor must take reasonable measures to ensure that all of its employees, agents and subcontractors are informed of and abide by this requirement.

29. ETHICS IN PUBLIC CONTRACTING

This Contract incorporates by reference Article 9 of the Arlington County Purchasing Resolution, as well as all state and federal laws related to ethics, conflicts of interest or bribery, including the State and Local Government Conflict of Interests Act (Code of Virginia § 2.2-3100 et seq.), the Virginia Governmental Frauds Act (Code of Virginia § 18.2-498.1 et seq.) and Articles 2 and 3 of Chapter 10 of Title 18.2 of the Code of Virginia, as amended (§ 18.2-438 et seq.). The Contractor certifies that its bid was made without collusion or fraud; that it has not offered or received any kickbacks or inducements from any other offeror, supplier, manufacturer or subcontractor; and that it has not conferred on any public employee having official responsibility for this procurement any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

30. COUNTY EMPLOYEES

No Arlington County employee may share in any part of this Contract or receive any benefit from the Contract that is not available to the general public.

31. FORCE MAJEURE

Neither party will be held responsible for failure to perform the duties and responsibilities imposed by this Contract if such failure is due to a fire, riot, rebellion, natural disaster, war, act of terrorism or act of God that is beyond the control of the party and that makes performance impossible or illegal, unless otherwise specified in the Contract.

32. AUTHORITY TO TRANSACT BUSINESS

The Contractor must, pursuant to Code of Virginia § 2.2-4311.2, be and remain authorized to transact business in the Commonwealth of Virginia during the entire term of this Contract. Otherwise, the Contract is voidable at the sole option of and with no expense to the County.

33. RELATION TO THE COUNTY

The Contractor is an independent contractor, and neither the Contractor nor its employees or subcontractors will be considered employees, servants or agents of the County. The County will not be responsible for any negligence or other wrongdoing by the Contractor or its employees, servants or agents. The County will not withhold payments to the Contractor for any federal or state unemployment taxes, federal or state income taxes or Social Security tax or for any other benefits. The County will not provide to the Contractor any insurance coverage or other benefits, including workers' compensation.

34. ANTITRUST

The Contractor conveys, sells, assigns and transfers to the County all rights, title and interest in and to all causes of action under state or federal antitrust laws that the Contractor may have relating to this Contract.

35. REPORT STANDARDS

The Contractor must electronically submit all written reports required by this Contract for advance review in PDF format. Reports must be accurate and grammatically correct and should not contain spelling errors. The Contractor will bear the cost of correcting grammatical or spelling errors and inaccurate report data and of other revisions that are required to bring the report(s) into compliance with this section.



Whenever possible, proposals must avoid unnecessary attachments or documents or superfluous use of paper (e.g. separate title sheets or chapter dividers)

36. AUDIT

The Contractor must provide to the County the complete findings and all components of an independent certified public accountant's audit of its finances and program operation within two months after the close of Contractor's fiscal year. If a management letter was not prepared with the audit, the Contractor must so certify in writing as part of the audit report to the County. The Contractor must allow the County to review its records as the County deems necessary for audit purposes within 15 calendar days of the County's receipt of the findings. All accounts of the Contractor are subject to audit.

The Contractor must retain all books, records and other documents related to this Contract for at least five years, or such period of time required by the County's funding partner(s), if any, whichever is greater, after the final payment and must allow the County or its authorized agents to examine the documents during this period and during the Contract Term. The Contractor must provide any requested documents to the County for examination within 15 days of the request, at the Contractor's expense. Should the County's examination reveal any overcharging by the Contractor, the Contractor must, within 30 days of County's request, reimburse the County for the overcharges and for the reasonable costs of the County's examination, including, but not limited to, the services of external audit firm and attorney's fees; or the County may deduct the overcharges and examination costs from any amount that the County owes to the Contractor. If the Contractor wishes to destroy or dispose of any records related to this Contract (including confidential records to which the County does not have ready access) within five years after the final payment, or such period of time required by the County's funding partner(s), if any, whichever is greater, the Contractor must give the County at least 30 days' notice and must not dispose of the documents if the County objects.

37. ASSIGNMENT

The Contractor may not assign, transfer, convey or otherwise dispose of any award or any of its rights, obligations or interests under this Contract without the prior written consent of the County.

38. AMENDMENTS

This Contract may not be modified except by written amendment executed by persons duly authorized to bind the Contractor and the County.

39. ARLINGTON COUNTY PURCHASING RESOLUTION AND COUNTY POLICIES

Nothing in this Contract waives any provision of the Arlington County Purchasing Resolution, which is incorporated herein by reference, or any applicable County policy.

40. DISPUTE RESOLUTION

All disputes arising under this Agreement or concerning its interpretation, whether involving law or fact and including but not limited to claims for additional work, compensation or time, and all claims for alleged breach of contract must be submitted in writing to the Project Officer as soon as the basis for the claim arises. In accordance with the Arlington County Purchasing Resolution, claims denied by the Project Officer may be submitted to the County Manager in writing no later than 60 days after the final payment. The time limit for a final written decision by the County Manager is 30 days. Procedures concerning contractual claims, disputes, administrative appeals and protests are contained in the Arlington County



Purchasing Resolution. The Contractor must continue to work as scheduled pending a decision of the Project Officer, County Manager, County Board or a court of law.

41. APPLICABLE LAW, FORUM, VENUE, AND JURISDICTION

This Contract is governed in all respects by the laws of the Commonwealth of Virginia; and the jurisdiction, forum and venue for any litigation concerning the Contract or the Work is in the Circuit Court for Arlington County, Virginia, and in no other court.

42. ARBITRATION

No claim arising under or related to this Contract may be subject to arbitration.

43. NONEXCLUSIVITY OF REMEDIES

All remedies available to the County under this Contract are cumulative, and no remedy will be exclusive of any other at law or in equity.

44. NO WAIVER

The failure to exercise a right provided for in this Contract will not be a subsequent waiver of the same right or of any other right.

45. SEVERABILITY

The sections, paragraphs, clauses, sentences, and phrases of this Contract are severable; and if any section, paragraph, clause, sentence or phrase of this Contract is declared invalid by a court of competent jurisdiction, the rest of the Contract will remain in effect.

52. ATTORNEY'S FEES

In the event that the County prevails in any legal action or proceeding brought by the County to enforce any provision of this Contract, the Contractor will pay the County's reasonable attorney's fees and expenses.

53. SURVIVAL OF TERMS

In addition to any statement that a specific term or paragraph survives the expiration or termination of this Contract, the following sections also survive: INDEMNIFICATION; INTELLECTUAL PROPERTY INDEMNIFICATION; RELATION TO COUNTY; OWNERSHIP AND RETURN OF RECORDS; AUDIT; COPYRIGHT; DISPUTE RESOLUTION; APPLICABLE LAW AND JURISDICTION; ATTORNEY'S FEES, AND CONFIDENTIAL INFORMATION.

54. HEADINGS

The section headings in this Contract are inserted only for convenience and do not affect the substance of the Contract or limit the sections' scope.

55. AMBIGUITIES

The parties and their counsel have participated fully in the drafting of this Agreement; and any rule that ambiguities are to be resolved against the drafting party does not apply. The language in this Agreement is to be interpreted as to its plain meaning and not strictly for or against any party.



56. NOTICES

Unless otherwise provided in writing, all legal notices and other formal communications required by this Contract are deemed to have been given when either (a) delivered in person; (b) delivered by an agent, such as a delivery service; or (c) deposited in the United States mail, postage prepaid, certified or registered and addressed as follows:

TO THE CONTRACTOR:

TO THE COUNTY:

_____, Project Officer

AND

Sharon T. Lewis, LL.M, MPS, VCO, CPPB
Purchasing Agent
Arlington County, Virginia
2100 Clarendon Boulevard, Suite 500
Arlington, Virginia 22201

TO COUNTY MANAGER'S OFFICE (FOR PROJECT CLAIMS):

County Manager
Arlington County, Virginia
2100 Clarendon Boulevard, Suite 318
Arlington, Virginia 22201

57. NON-DISCRIMINATION NOTICE

Arlington County does not discriminate against faith-based organizations.

58. INSURANCE, PAYMENT AND PERFORMANCE BONDS

The Contractor shall maintain the required insurance coverage and payment and performance bonds as set forth in the Invitation to Bid through completion of the Contract, including all warranty and guarantee periods.

59. MATERIAL CHANGES

The Contractor shall notify Purchasing Agent within seven days of any material changes in its operation that relate to any matter attested regarding certifications on its bid form.



60. COUNTERPARTS

This Agreement may be executed in one or more counterparts and all of such counterparts shall together constitute one and the same instrument. Original signatures transmitted and received via facsimile or other electronic transmission (e.g., PDF or similar format) are true and valid signatures for all purposes hereunder and shall be effective as delivery of a manually executed original counterpart.

WITNESS these signatures:

THE COUNTY BOARD OF ARLINGTON
COUNTY, VIRGINIA

CONTRACTOR

AUTHORIZED
SIGNATURE: _____

AUTHORIZED
SIGNATURE: _____

NAME _____

NAME: _____

TITLE: _____

TITLE: _____

DATE: _____

DATE: _____

III. INSURANCE REQUIREMENTS

Review this section carefully with your insurance agent or broker prior to submitting a bid or proposal. See the Insurance Checklist (part of the Bid or Proposal Forms) for specific coverages applicable to this Contract. The term "Contract," as used in this section, shall mean the fully executed Agreement covering the work entered into between the County and the Contractor.

1. General

- 1.1 The Contractor shall provide insurance as specified in the Insurance Checklist found on the last page of the bid or proposal form.
- 1.2 The Contract with the Contractor will not be executed by the County until the Contractor has obtained, at its own expense, all of the insurance called for hereunder and such insurance has been approved by the County; additionally, the Contractor shall not allow any subcontractor to start work on any subcontract until all insurance required of the subcontractor has been so obtained and approved by the Contractor. The Contractor shall submit to the County Purchasing Agent copies of all required endorsements and documentation of coverage consistent with the requirements herein or, alternately, at the County's request, certified copies of the required insurance policies in compliance with the insurance requirements. All endorsements and documentation shall state this Contract's number and title.
- 1.3 The Contractor shall require all subcontractors to maintain during the term of this Agreement, Commercial General Liability insurance, Business Automobile Liability insurance, and Workers' Compensation, Employers' Liability insurance, or any other insurance required by the Contract in the same manner and form as specified for the Contractor. The Contractor shall furnish subcontractors' evidence of insurance and copies of endorsements to the County Purchasing Agent immediately upon request by the County and/or prior to the subcontractor's performance of work related to this Contract.
- 1.4 If there is a material change or reduction in coverage, nonrenewal of any insurance coverage or cancellation of any insurance coverage required by this contract, the Contractor shall notify the Purchasing Agent immediately. It is the Contractor's responsibility to notify the County upon receipt of a notice indicating that the policy will not be renewed or will be materially changed. Any policy on which the Contractor has received notification from an insurer that the policy has or will be cancelled or materially changed or reduced must be immediately replaced with another policy consistent with the terms of this Contract and in such a manner that there is no lapse in coverage, and the County immediately notified of the replacement. Not having the required insurance throughout the Contract is considered a material breach of this Contract and grounds for termination. The Contractor shall also obtain an endorsement providing to the County thirty (30) days advance notice of cancellation or nonrenewal (ten days for nonpayment of premium. A copy of that endorsement shall be provided to the County Purchasing Agent prior to the execution of this Contract or any Contract extension thereafter.
- 1.5 No acceptance and/or approval of any insurance by the County shall be construed as relieving or excusing the Contractor, any surety, or any bond, from any liability or obligation imposed under this Agreement.

- 1.6 Arlington County, and its officers, elected and appointed officials, employees, and agents are to be named as additional insureds under all coverages except Workers' Compensation, Professional Liability, and Automobile Liability, and the endorsement must clearly identify the County as an additional insured permitted to enjoy all the benefits under the applicable policy of insurance. The certified policy, if requested, must so state coverage afforded under this paragraph shall be primary as respects the County, its officers, elected and appointed officials, agents and employees. The following definition of the term "County" applies to all policies issued under the Contract and to all applicable endorsements:

"The County Board of Arlington County and any affiliated or subsidiary Board, Authority, Committee, or Independent Agency (including those newly constituted), provided that such affiliated or subsidiary Board, Authority, Committee, or Independent Agency is either a Body Politic created by the County Board of Arlington County, Virginia, or one in which controlling interest is vested in Arlington County; and Arlington County Constitutional Officers."

- 1.7 The Contractor shall be responsible for the work performed under the Contract Documents and every part thereof, and for all materials, tools, equipment, appliances, and property of any description used in connection with the work. The Contractor assumes all risks for direct and indirect damage or injury to the property or persons used or employed on or in connection with the Work contracted for, and of all damage or injury to any person or property wherever located, resulting from any action, omission, commission or operation under the Contract, or in connection in any way whatsoever with the contracted work.
- 1.8 The insurance coverage required shall remain in force throughout the Contract or as otherwise stated in the Contract Documents or these Insurance Requirements. If the Contractor fails to provide acceptable evidence of current insurance within seven (7) days of written notice at any time during the Contract, the County shall have the absolute right to terminate the Contract without any further obligation to the Contractor.
- 1.9 Contractual and other liability insurance provided under this Contract shall not contain a supervision, inspection or engineering services exclusion that would preclude the County from supervising or inspecting the work as to the end result. The Contractor shall assume all on-the-job responsibilities as to the control of persons directly employed by it and of the subcontractors and any persons employed by the subcontractor and/or carriers delivering and receiving materials from the Project.
- 1.10 If any policy contains a warranty stating that coverage is null and void (or words to that effect) if the Contractor does not comply with the most stringent regulations governing the work, such policy shall be modified so that coverage shall be afforded in all cases except for the Contractor's willful or intentional noncompliance with applicable government regulations.
- 1.11 All policies shall include the following language: "The insolvency or bankruptcy of the insured or of the insured's estate will not relieve the insurance company of its obligations under this policy."

- 1.12 All policy forms must “Pay on behalf of” rather than “Indemnify” the insured.
- 1.13 Nothing contained in these Insurance Requirements or the Contract Documents shall be construed as creating any contractual relationship between any subcontractor and the County. The Contractor shall be as fully responsible to the County for the acts and omissions of its subcontractors and of persons employed by them as it is for acts and omissions of persons directly employed by it.
- 1.14 Precaution shall be exercised by the Contractor at all times for the protection of persons, (including employees) and property. All existing structures, utilities, roads, services, trees and shrubbery shall be protected against damage or interruption of service at all times by the Contractor and its subcontractors during the term of the Contract, and the Contractor shall be held responsible for any damage to property occurring by reason of its work under the Contract whether identified on the Contract Documents or not.
- 1.15 For any claims related to this work, The Contractor’s insurance shall be deemed primary and non-contributory to all other applicable coverage and in particular with respect to Arlington County, its representatives, officials, employees, and agents. Any insurance or self-insurance maintained by Arlington County shall be excess and noncontributory of the Contractor’s insurance. The Contractor shall waive its right of subrogation for all insurance claims.
- 1.16 If the Contractor does not meet the insurance requirements set forth by the Contract Documents, alternate insurance coverage or self-insurance, satisfactory to the Purchasing Agent, may be considered. Written requests for consideration of alternate coverages including the Contractor’s most recent actuarial report and a copy of its self-insurance resolution to determine the adequacy of the insurance funding must be received by the County Purchasing Agent at least ten (10) working days prior to the date set for receipt of bids or proposals. If the County denies the request for alternate coverages, the specified coverages will be required to be submitted. If the County permits alternate coverage, an Addendum to the Insurance Requirements will be prepared and distributed prior to the time and date set for receipt of bids or proposals.
- 1.17 All required insurance coverages must be acquired from insurers authorized to do business in the Commonwealth of Virginia and acceptable to the County. The insurers must also have a policyholders' with a rating of “A-VII” in the latest edition of the A.M. Best Co.’s Insurance Reports, unless the County grants specific approval for an exception, in the same manner as described in 1.16 above.
- 1.18 The Contractor shall be responsible for payment of any deductibles applicable to the coverages.
- 1.19 The Contractor must disclose the amount of any deductible or self-insurance component applicable to the General Liability, Automobile Liability, Professional Liability, Intellectual Property or any other policies, if any. The County reserves the right to request additional information to determine if the Contractor has the financial capacity to meet its obligations under a deductible. Thereafter, at its option, the County may require a lower deductible, funds equal to the deductible be placed in

escrow, a certificate of self-insurance, collateral, or other mechanism in the amount of the deductible to ensure additional protection for the County.

2. Contractor's Insurance:

2.1 The Contractor shall purchase the following insurance coverages, including the terms, provisions and limits shown in the Insurance Checklist.

2.1.1 Commercial General Liability - Such Commercial General Liability policy shall include any or all of the following as indicated on the Checklist:

- i. General aggregate limit is to apply per project;
- ii. Premises/Operations;
- iii. Actions of Independent Contractors;
- iv. Products/Completed Operations to be maintained for five (5) years after completion of the Work;
- v. Contractual Liability, including protection for the Contractor from claims arising out of liability assumed under this Contract;
- vi. Personal Injury Liability including, including but not limited to, coverage for offenses related to employment and copyright infringement;
- vii. Explosion, Collapse, or Underground (XCU) hazards.

2.1.2 Business Automobile Liability, including coverage for any owned, hired, or non-owned motor vehicles, Uninsured Motorists coverage, and automobile contractual liability.

2.1.3 Workers' Compensation - statutory benefits as required by Virginia law or the U.S. Longshoremen's and Harbor Workers' Compensation Act, or other laws as required by labor union agreements, including standard Other States coverage; Employers' Liability coverage. The policy shall not contain any provision or definition which would serve to eliminate third party action over claims, including exclusion for bodily injury to an employee of the insured, employees of the premises owner, or employees of the general contractor to which the insured is subcontracted; or employees of the insured's subcontractor.

2.1.4 General Environmental Remediation Projects

In addition to the Insurance Requirements specified in the general provision or elsewhere in the Contract Documents, the Contractor shall not commence work under this Contract until all insurance as required hereafter has been obtained, and certified copies, naming the County as an additional insured, of such insurance have been submitted and accepted by the Purchasing Agent.

- i. An environmental remediation contractor or subcontractor shall be responsible for purchasing and maintaining Business Automobile Liability insurance and Workers' Compensation insurance as described in 2.1.2 and 2.1.3.
- ii. Acceptance by Arlington County of insurance submitted by the Contractor does not relieve or decrease in any manner the liability of the Contractor for performance of environmental remediation Work under the Contract.
- iii. The Contractor is responsible for any losses, claims, and costs of any kind, which exceed the Contractor's limits of liability, or which may be outside the coverage scope of the policies. The limits and coverage requirements may be revised at the option of the Arlington County Risk Manager. The requirements outlined shall in no way be construed to limit or eliminate the liability of the Contractor, which arises from performance of work under the Contract.

2.1.5 Contractors Pollution Liability (CPL) Policy

- i. Minimum liability limits required shall be \$1,000,000 Per Loss and \$2,000,000 Total All Losses, including, but not limited to, property damage, bodily injury, loss of use, and clean-up costs.
- ii. Limits must be dedicated to work performed under this Contract only, unless prior approval by the Arlington County Risk Manager has been obtained. The policy of insurance shall contain or be endorsed to include the following:
 - a. Pollution coverage as respects asbestos, lead, VOC and PCB's.
 - b. "Covered Operations" designated by the CPL policy must specifically include all work performed under this contract. (This would include and not be limited to excavation, off-site incineration of soils, demolition, asbestos abatement, drum removal and disposal, in-situ vapor extraction, etc.) and exclusions or limitations affecting work performed under this contract must be deleted. (i.e., lead, asbestos, pollution, testing, underground storage tanks, radioactive matter, etc.)
 - c. Contractor must comply with all applicable DOT and EPA requirements.
 - d. Premises/Operations.
 - e. Broad form property damage.
 - f. Products/Completed Operations coverage for a minimum of five (5) years after Final Payment.

- g. Contractual liability coverage in accordance with ISO policy form CG 00 01 11 85. Modifications to the standard provision will not be acceptable if they serve to reduce coverage.
- h. Cross liability/severability of interest.
- i. The scope of work and all related activities under this Contract shall be scheduled as "Covered Operations" under this policy.
- j. Coverage is included on behalf of the insured for covered claims arising out of the actions of independent contractors. If insured is utilizing subcontractors, the CPL policy must use "By or On behalf of" language with regards to coverage.
- k. Loading and unloading exclusions must be amended so as to include coverage for mobile equipment and automobiles.

2.1.6 Asbestos and Lead Based Paint Abatement Projects

- i. Minimum Liability Limits shall be \$1,000,000 Per Occurrence and \$2,000,000 Aggregate. Limits must be dedicated to work performed under this Contract only, unless otherwise approved by the Arlington County Risk Manager. The policy shall be written with a minimum annual aggregate combined single limit for Bodily Injury and Property Damage as shown on the Insurance Checklist. This limit can be inclusive of defense costs.
- ii. The policy of insurance shall contain or be endorsed to include the following:
 - a. Coverage for Asbestos/Lead-Based Paint Abatement operations as described in the contract. Specific lead endorsement evidencing this project must be provided, if applicable.
 - b. Pollution coverage as respects Asbestos/Lead-Based Paint for all phases of the abatement process.
 - c. Transportation coverage for the hauling of ACM/Lead-Based Paint from the project site to the final disposal location, as evidenced by the contractor or applicable waste hauler. Contractor must comply with all applicable D.O.T. regulations.
 - d. Premises/Operations.
 - e. Broad Form Property Damage.
 - f. Products/Completed Operations coverage for a minimum of five (5) years after project completion.

- g. Contractual Liability coverage in accordance with ISO policy form CG 00 01 11 85. Modifications to the standard provision will not be acceptable if they serve to reduce coverage.
- h. Cross Liability. Any “Insured vs. Insured” – type language must be deleted or amended to “Named Insured vs. Named Insured.”
- i. The policy shall not exclude Asbestos/Lead Based Paint bodily injury to employees of Arlington County so long as their designated job duties do not require them to be in the regulated asbestos/lead based paint abatement area.
- j. If the policy or any endorsement contains a provision which limits or eliminates bodily injury or property damage coverage based on final air fiber clearance levels, the policy shall be modified so that it is consistent with the clearing level (FCC) and the appropriate analytical testing protocol contained in the project specifications.
- k. Personal Injury.
- l. Independent Contractors.
- m. Hostile fire coverage is to be provided.

2.1.7 Environmental Impairment Liability, including coverage of insureds’ on-site clean up, with the following minimum limits of liability:

Bodily Injury and Property	3,000,000 each occurrence
Damage Liability	6,000,000 annual aggregate

The County Board of Arlington County, Virginia, is to be named in Additional Name Insured or a Broad Form Contractual Endorsement may be added to the policy as respects any liability that may arise out of or result from the handling of Work on this Project including specifically but without limitation thereto, the indemnity provisions in the Agreement. Such policies will be endorsed to provide that they are primary to an insurance carried by the County Board of Arlington County, Virginia.

2.1.8 Should any of the Work hereunder involve the cleanup, remediation and/or removal of bio-solids, bio-hazards waste, or any hazardous or toxic materials, trash, debris, refuse, or waste, the Contractor shall provide, or shall require its subcontractor performing the work to provide, the following coverage in addition to the above requirements:

- a) Environmental Liability and Cleanup Coverage – with limits of not less than \$2,000,000 per occurrence.
- b) Business Automobile Liability – for transportation or regulated and/or hazardous waste, products, or materials with limits of not less than \$1,000,000, per occurrence. Said coverage shall include County as an additional insured and shall

include both the MCS-90 and CA 9948 (or equivalent) endorsements, which shall be specifically referenced on the certificate of insurance.

- 2.2 The Contractor shall take reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to, its employees on the job, and others. The Contractor shall comply with all applicable provisions of federal, state and municipal safety laws, insurance requirements, standard industry practices, the requirements of the operations and this contract, the Contractor, directly through its subcontractors, shall effect and properly maintain at all times, as required by the conditions and progress of the work, necessary safeguards for safety and protection of the public, including securing areas, posting danger signs, placarding, labeling or posting other forms of warning against hazards.
3. Commercial General or other Liability Insurance - Claims-made Basis:
- 3.1 If Commercial General or other liability insurance purchased by the Contractor has been issued on a claims-made basis, the Contractor must comply with the following additional conditions. The limits of liability and the extensions to be included as described in the Insurance Checklist remain the same. The Contractor must either:
- i. Agree to provide insurance, copies of the endorsement and certified documentation evidencing the above coverages and naming the County as an additional insured for a period of five (5) years after final payment under the Contract. Such documentation shall evidence a retroactive date, no later than the beginning of the Contractors or subcontractors' work under this Contract, or
 - ii. Purchase an extended (minimum five [5] years) reporting period endorsement for the policy or policies in force during the term of this Contract and evidence the purchase of this extended reporting period endorsement by means of a copy of the endorsement itself. The extended reporting period will begin upon final payment under the Contract.
4. Builder's Risk Insurance
- 4.1 The Contractor shall purchase and maintain builders risk insurance with a limit equal to the initial Contract Amount and any amendments to the Contract which affect the project cost on a replacement cost basis. Builder's risk insurance shall be maintained until Final Payment under the Contract has been made or until no person or entity other than the County has an insurable interest in the covered property, whichever is earlier. The builders risk insurance shall include the County as defined in Section 1.6, Contractor, subcontractors and sub-subcontractors as named insureds.
- 4.2 Insurance shall be on an all-risks policy form including the perils of fire, theft, vandalism, malicious mischief, lightning, wind, force majeure, collapse, and earthquake. Coverage is to apply for demolition occasioned by enforcement of any applicable legal requirements, and Architect's fees. Coverage for the peril of flood shall not be required unless otherwise required in the Contract Documents.

- 4.3 Unless otherwise provided in the Contract Documents, the builders risk insurance shall also cover materials to be incorporated into the project which are stored off the site.
- 4.4 The Contractor shall purchase and maintain Boiler and Machinery insurance, if required by the contract documents or by law, with a limit satisfactory to the County. The Boiler and Machinery insurance shall cover objects during installation and until Final Acceptance by the County. The County shall be included as a named insured.
- 4.5 Any loss under builder's risk insurance shall be payable to the County as fiduciary for the insureds, as their interests may appear, subject to any mortgagee clause. The Contractor shall pay subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to make payments to their sub-subcontractors in similar manner. The County, as fiduciary, shall have the right to adjust and settle a loss with insurers.
- 4.6 The insurance company providing the builders risk coverage shall grant permission for the County to partially occupy or use the premises under construction prior to final acceptance without removing or affecting the coverage.



IV. ATTACHMENTS AND FORMS



ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT

INVITATION TO BID NO. 21-DES-ITB-564

BID FORM

ELECTRONIC BIDS WILL BE RECEIVED BY THE COUNTY VIA VENDOR REGISTRY NOT LATER THAN 4:00 P.M., APRIL 1, 2021.

FOR PROVIDING CARLIN SPRINGS ROAD BUILDING DE-COUPLING PHASE 1 IDENTIFIED HEREIN IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS, TERMS AND CONDITIONS OF THIS SOLICITATION

THE FULL LEGAL NAME OF THE ENTITY SUBMITTING THIS BID MUST BE WRITTEN IN THE SPACE BELOW. THIS BID FORM AND ALL OTHER DOCUMENTS THAT REQUIRE A SIGNATURE MUST BE FULLY AND ACCURATELY COMPLETED AND SIGNED BY A PERSON WHO IS AUTHORIZED TO BIND THE BIDDER, OR THE BID MAY BE REJECTED.

SUBMITTED BY:

(legal name of entity)

AUTHORIZED SIGNATURE:

PRINT NAME AND TITLE:

ADDRESS:

CITY/STATE/ZIP:

TELEPHONE NO.:

E-MAIL

ADDRESS:

THIS ENTITY IS INCORPORATED IN:

THIS ENTITY IS A:

(check the applicable option)

CORPORATION

LIMITED PARTNERSHIP

GENERAL PARTNERSHIP

UNINCORPORATED ASSOCIATION

LIMITED LIABILITY COMPANY

SOLE PROPRIETORSHIP

IS BIDDER AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH OF VIRGINIA?

YES

NO

IDENTIFICATION NO. ISSUED TO THE ENTITY BY THE SCC:

Any Bidder exempt from Virginia State Corporation Commission (SCC) authorization requirement must include a statement with its bid explaining why it is not required to be so authorized.

VIRGINIA CONTRACTOR'S LICENSE NUMBER:



ENTITY'S DUN & BRADSTREET D-U-N-S NUMBER: (if available)

HAS YOUR FIRM OR ANY OF ITS PRINCIPALS BEEN DEBARRED FROM SUBMITTING BIDS TO ARLINGTON COUNTY, VIRGINIA, OR ANY OTHER STATE OR POLITICAL SUBDIVISION WITHIN THE PAST THREE YEARS?

YES NO

HAS YOUR FIRM DEFAULTED ON ANY PROJECT IN THE LAST THREE YEARS?

YES NO

HAS YOUR FIRM HAD ANY TYPE OF BUSINESS, CONTRACTING OR TRADE LICENSE, REGISTRATION OR CERTIFICATION REVOKED OR SUSPENDED IN THE PAST THREE YEARS?

YES NO

HAS YOUR FIRM AND ITS PRINCIPALS/OWNERS BEEN CONVICTED OF ANY CRIME RELATING TO ITS CONTRACTING BUSINESS IN THE PAST TEN YEARS?

YES NO

HAS YOUR FIRM BEEN FOUND IN VIOLATION OF ANY LAW APPLICABLE TO ITS CONTRACTING BUSINESS (LICENSING LAWS, TAX LAWS, WAGE AND HOUR LAWS, PREVAILING WAGE LAWS, ENVIRONMENTAL) WHERE THE RESULT OF SUCH VIOLATION WAS THE PAYMENT OF A FINE, BACK PAY DAMAGES, OR ANY OTHER PENALTY IN THE AMOUNT OF \$5000 OR MORE?

YES NO

BIDDER STATUS: MINORITY OWNED: WOMAN OWNED: NEITHER:

The undersigned certifies that (Bidder Name)_____ is currently registered with the Virginia State Board of Contractors as required by the Code of Virginia. Certificate Number _____ for a Class ____ License was issued on the _____ day of _____, 20____. The undersigned further certifies that the registration fee and all renewal fees required under law have been paid.

TIME LIMIT FOR PROJECT: SUBSTANTIAL COMPLETION – ONE HUNDRED TWENTY (120) CALENDAR DAYS FINAL COMPLETION – THIRTY (30) CALENDAR DAYS FROM SUBSTANTIAL COMPLETION

LIQUIDATED DAMAGES: SUBSTANTIAL COMPLETION - \$1,525.00 PER DAY FINAL COMPLETION - \$1,525.00 PER DAY



MINIMUM BIDDER QUALIFICATIONS/BID SUBMISSION REQUIREMENTS:

In a separate attachment(s), Bidders shall provide the following documentation in order to be deemed responsive:

1. Bidders shall provide proof of having ten (10) continuous years of experience conducting public works infrastructure and exterior and interior renovation projects work of 8,000 square feet or more in size and cost in excess of \$500,000. The experience shall be work of similar size and scope, construction, re-construction, and maintenance. The Bidder's obtained project experience shall consist of the following:
 - Building demolition
 - Re-construction
 - Site improvements

Bidders shall provide a list of five (5) (at least two (2) of which must include demolition and re-construction of two (2) or more floors of a multi-story building) similar projects recently completed that involving the same material, equal size, and comparable length. For each project, Bidders shall list the following information:

- Project Name
 - Project description and Bidder's scope of work within the project, which shall include number of stories of building, floor numbers in which renovation work was completed, and total renovation area in square feet
 - Building owner's name, telephone number and email address
 - Project manager's name, telephone number and email address
 - Work start date, scheduled completion, and actual completion date
 - Initial contract cost and final contract cost
2. Bidders shall provide proof of having ten (10) continuous years of experience conducting public works infrastructure and exterior and interior renovation projects. The experience shall be work of similar size and scope, construction, re-construction, and maintenance. The Bidder's obtained project experience shall consist of the following:
 - Emergency exit towers
 - Sprinkler system
 - Fire alarm
 - Retaining wall
 - Site grading
 - Stormwater management
 - Erosion Control
 - Site work

Bidders shall provide a list of two (2) similar projects recently completed that involving the same material, equal size, and comparable length. For each project, Bidders shall list the following information:

- Project Name

- Project description and Bidder's scope of work within the project, which shall include number of stories of building, floor numbers in which renovation work was completed, and total renovation area in square feet
 - Building owner's name, telephone number and email address
 - Project manager's name, telephone number and email address
 - Work start date, scheduled completion, and actual completion date
 - Initial contract cost and final contract cost
3. Bidder shall provide a history or good faith assurances of (i) completion by the Bidder and any potential subcontractors of specified safety training programs established by the U.S. Department of Labor, Occupational Safety and Health Administration; (ii) participation by the bidder and any potential subcontractors in apprenticeship training programs approved by state agencies or the U.S. Department of Labor; or (iii) maintenance by the Bidder and any potential subcontractors of records of compliance with applicable local, state, and federal laws, if Bidder is not prequalified by the Virginia Department of Transportation.
 4. Bidder shall provide proof that the Superintendent and Project Manager assigned to this work have at least five (5) years of experience each in overseeing projects of similar type and size for Land Disturbance, demolition, reconstruction, building renovation exceeding 8,000 square feet and total construction cost in excess of \$500,000, and at least one (1) project in an area where traffic/parking controls were needed.
 5. Bidder shall provide proof that either the Superintendent or Project Manager have a registered Land Disturber certification in Arlington County or State of Virginia, or Bidder must provide proof of having a licensed P.E. on staff assigned to this project.
 6. Bidder shall submit resumes of the proposed Superintendent and Project Manager with their Bids. Bidder shall also submit the following information for both the Project Manager and Superintendent:
 - Project description and Bidder's scope of work within the project that the Project Manager/Superintendent was responsible for, which shall include number of stories of building, floor numbers in which renovation work was completed, and total renovation area in square feet
 - Building owner's name, telephone number and email address
 - Principal/Project Architect name, telephone number and email address
 - Project Manager/Superintendent name, telephone number and email address
 - Work start date, scheduled completion, and actual completion date
 - Initial contract cost and final contract cost
 - Land Disturbance Registration number of Project Manager or Superintendent, or P.E. Registration number of staff member assigned to this project.
 7. Bidder shall provide a Bid Surety in the amount of 5% of the bid
 8. Bidder shall provide a construction schedule in Microsoft Projects format 11" x 17" size based on target dates (provided in Attachment B)



COMPLETE THE PRICING SHEET PROVIDED WITH THE BID DOCUMENTS AS ATTACHMENT A TO ITB NO. 21-DES-ITB-564 AND SUBMIT IT WITH YOUR BID.

FAILURE TO SUBMIT THE PRICING SHEET WITH THE BID WILL DEEM THE BIDDER NONRESPONSIVE.

THE UNDERSIGNED UNDERSTANDS AND ACKNOWLEDGES THE FOLLOWING:

THE OFFICIAL COPY OF THE SOLICITATION DOCUMENTS, WHICH INCLUDES ANY ADDENDA, IS THE ELECTRONIC COPY THAT IS AVAILABLE FROM THE VENDOR REGISTRY WEBSITE AT: [HTTPS://VRAPP.VENDORREGISTRY.COM/BIDS/VIEW/BIDSLST?BUYERID=A596C7C4-0123-4202-BF15-3583300EE088](https://vrapp.vendorregistry.com/bids/view/bidslst?buyerid=A596C7C4-0123-4202-BF15-3583300EE088).

VENDORS ARE REQUIRED TO REGISTER ON [VENDOR REGISTRY](#) IN ORDER TO SUBMIT A RESPONSE TO THIS INVITATION TO BID. **NO RESPONSES WILL BE ACCEPTED AFTER THE BID DUE DATE AND TIME.**

POTENTIAL BIDDERS ARE RESPONSIBLE FOR DETERMINING THE ACCURACY AND COMPLETENESS OF ALL SOLICITATION DOCUMENTS THEY RECEIVE FROM ANY SOURCE, INCLUDING THE COUNTY.

The undersigned acknowledges receipt of the following Addenda:

ADDENDUM NO. 1 DATE: _____ INITIAL: _____

ADDENDUM NO. 2 DATE: _____ INITIAL: _____

ADDENDUM NO. 3 DATE: _____ INITIAL: _____

TRADE SECRETS OR PROPRIETARY INFORMATION:

Trade secrets or proprietary information submitted by a Bidder in connection with a procurement transaction will not be subject to public disclosure under the Virginia Freedom of Information Act. Pursuant to Section 4-111 of the Arlington County Purchasing Resolution, however, a Bidder seeking to protect submitted data or materials from disclosure must, before or upon submission of the data or materials, identify the data or materials to be protected and state the reasons why protection is necessary.

Please mark one:

- No, the bid that I have submitted does not contain any trade secrets and/or proprietary information.
- Yes, the bid that I have submitted does contain trade secrets and/or proprietary information.

If Yes, you must clearly identify below the exact data or materials to be protected and list all applicable page numbers, sections, and paragraphs of the bid that contain such data or materials:

State the specific reason(s) why protection is necessary and why the identified information constitutes a trade secret or is proprietary:

If you fail above to identify the data or materials to be protected or to state the reason(s) why protection is necessary, you will not have invoked the protection of Section 4-111 of the Purchasing Resolution. Accordingly, upon the award of a contract, the bid will be open for public inspection consistent with applicable law.

CERTIFICATION OF NON-COLLUSION: The undersigned certifies that this bid is not the result of or affected by (1) any act of collusion with another person engaged in the same line of business or commerce (as defined in Virginia Code §§ 59.1-68.6 *et seq.*) or (2) any act of fraud punishable under the Virginia Governmental Frauds Act (Virginia Code §§ 18.2-498.1 *et seq.*).

CONTACT PERSON AND MAILING ADDRESS FOR DELIVERY OF NOTICES

Provide the name and address of the person who is designated to receive notices and other communications regarding this solicitation. Refer to the "Notices" section in the draft Contract Terms and Conditions for information regarding delivery of notices.

NAME: _____

ADDRESS: _____

E-MAIL: _____

INSURANCE CHECKLIST

CERTIFICATE OF INSURANCE MUST SHOW ALL COVERAGE AND ENDORSEMENTS MARKED "X".

COVERAGES REQUIRED

COVERAGE MINIMUM(S)

- X1. Workers' Compensation Statutory limits of Virginia
- X2. Employer's Liability \$100,000 accident, \$100,000 disease, \$500,000 disease policy limit
- X3. Commercial General Liability \$1,000,000 CSL BI/PD each occurrence, \$2 Million annual aggregate
- X4. Premises/Operations \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- X5. Automobile Liability \$1 Million BI/PD each accident, Uninsured Motorist
- X6. Owned/Hired/Non-Owned Vehicles \$1 Million BI/PD each accident, Uninsured Motorist
- X7. Independent Contractors \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- X8. Products Liability \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- X9. Completed Operations \$500,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- X10. Contractual Liability (Must be shown on Certificate) \$500,000 CSL BI/PD each occurrence,
\$1 Million annual aggregate
- X11. Personal and Advertising Injury Liability. \$1 Million each offense, \$1 Million annual aggregate
- X12. Umbrella Liability \$1 Million Bodily Injury, Property Damage and Personal Injury
- X13. Per Project Aggregate
- X14. Professional Liability
 - a. Architects and Engineers \$1 Million per occurrence/claim
 - b. Asbestos Removal Liability \$2 Million per occurrence/claim
 - c. Medical Malpractice \$1 Million per occurrence/claim
 - d. Medical Professional Liability \$ Limits as set forth in Virginia Code 8.01.581.15
- X15. Miscellaneous E&O \$1 Million per occurrence/claim
- X16. Motor Carrier Act End. (MCS-90) \$1 Million BI/PD each accident, Uninsured Motorist
- X17. Motor Cargo Insurance
- X18. Garage Liability \$1 Million Bodily Injury, Property Damage per occurrence
- X19. Garagekeepers Liability \$500,000 Comprehensive, \$500,000 Collision
- X20. Inland Marine-Bailee's Insurance \$ _____
- X21. Moving and Rigging Floater Endorsement to CGL
- X22. Crime and Employee Dishonesty Coverage \$ _____
- X23. Builder's Risk Provide Coverage in the full amount of Contract, including any amendments
- X24. XCU Coverage Endorsement to CGL
- X25. USL&H Federal Statutory Limits
- X26. Carrier Rating shall be A.M. Best Co.'s Rating of A-VII or better or equivalent
- X27. Notice of Cancellation, nonrenewal or material change in coverage shall be provided to County at least 30 days prior to action.
- X28. The County shall be an Additional Insured on all policies except Workers Compensation and Auto and Professional Liability.
- X29. Certificate of Insurance shall show Bid Number and Bid Title.
- X30. OTHER INSURANCE REQUIRED: Environmental Liability Insurance with a \$3,000,000 per occurrence or \$6,000,000 annual aggregate combined single limit to injuries to or death of person(s) and/or damage to property

INSURANCE AGENT'S STATEMENT:

I have reviewed the above requirements with the bidder named below and have advised the bidder of required coverages not provided through this agency.

AGENCY NAME: _____

AUTH. SIGNATURE: _____

BIDDER'S STATEMENT:

If awarded the Contract, I will comply with all Contract insurance requirements.

BIDDER NAME: _____

AUTH. SIGNATURE: _____

ATTACHMENT B - SPECIAL CONDITIONS

The items listed represent the project and contract Special Conditions and shall be apply to the 610 S. Carlin Springs Road Phase 1 decoupling Project.

GENERAL PROJECT DESCRIPTION

The Work consists of decoupling of the former Virginia Hospital building annex and a five (5) story doctors' condo office building, demolition, and re-construction of emergency stair tower located at 601 and 611 S. Carlin Springs Road, Arlington, Virginia.

PROJECT DESCRIPTION

The former Virginia Hospital Center annex building is a two (2) story with connecting corridor to a five (5) story doctors' condo office building. The demolition project is divided in two (2) phases. For Phase 1, Contractor shall decouple the 2 buildings to create a 30' fire separation, demo the existing emergency tower that exits through the hospital building, and re-construct a new emergency stair tower to serve the 4th and 5th floors of the doctors' condo office building.

This Work includes Land Disturbance Area certification and includes extensive erosion control provisions.

PROJECT SUMMARY

The work shall consist of Construction services for: (i) demolition; (ii) construction; (iii) reconstruction of new emergency stair tower; (iv) Land Disturbance; (v) erosion control/stormwater management; (vi) new electrical wiring and lighting; (vii) new HVAC distribution; (viii) new sprinkler system; (ix) addition to fire alarm (x) site-work; and (xi) site work.

The corridor connector to be demolished has fire alarms, sprinkler systems, and some electrical systems which are extensions and connected to the doctors' condo office building.

Electrical work shall include fire alarm in new emergency stair tower.

OTHER REQUIREMENTS:

1. **PERMITS BY COUNTY:**

The County will obtain and pay fees for the Building Construction Permit, Certificate of Occupancy. All other permits, including trade permits, shall be obtained and paid for by Contractor.

2. **WORK HOURS:**

The Contractor shall limit exterior construction activities, except worker arrival at the site to hours between 7:00 AM and 9:00 PM on weekdays, and between 10:00 AM and 9:00 PM on weekends and County legal holidays.

Interior work shall be limited to weekdays (Mon-Fri) from 6:00 AM to 3:00 PM. Same work hours apply during weekends and County legal holidays. These work hours also apply to Contractor performing work in the construction staging areas.

3. SECURITY:
The Contractor Project Manager, Superintendent, GC foremen and sub-contractors' foreman(s) shall apply and obtain County security clearance, and County Identification badge. The Project Officer will make arrangements for this with the Sheriff's Office after award.
4. PROJECT RECORDS DOCUMENTATION:
The Contractor shall establish and maintain an electronic system for reporting status and distribution of Contractor-developed documents. The reporting system shall list submittals, requests for information (RFI's), proposed change orders (PCO's), construction schedules and approved change orders. The reporting system shall be revised to show current status and provided at each construction progress meeting, listing applicable details for each schedule change, submittal, RFI and PCO. The Contractor shall provide continuous access to the reporting system through an internet connection available to the County, Architect and other parties designated by the Project Officer.
5. CONSTRUCTION CONTRACTOR AND SUBCONTRACTOR PARKING
There are on-site parking spaces allowed for vehicles belonging to the Contractor and their sub-Contractors. However, the Contractor and their subcontractors must park in the property in designated construction parking areas. The Contractor shall maintain and keep clean the parking lot.
6. DELIVERY OF BUILDING MATERIAL AND REMOVAL OF TRASH
The Contractor shall not obstruct the main entry to S. 611 and 601 S. Carlin Springs Road, or obstruct the entrance and parking spaces to 611 S. Carlin Springs. All deliveries shall be made to 601 S. Carlin Springs Road. The Contractor shall remove from site all refuse, rubbish, scrap materials and debris. The Contractor shall use designated areas for loading, delivery and removal of debris/trash.
7. STAGING OF BUILDING MATERIAL
The Contractor will be allowed to stage delivery of supplies and equipment and other material on existing parking spaces in rear of the building alongside S. Carlin Springs Road by the loading dock. The Contractor shall provide space for refuse container and shall not block access by County. The Contractor shall submit for approval a plan for material and supplies storage within 30 days after award and shall be responsible for securing the storage area. No material shall be staged on the sidewalks, other areas around the building and adjacent buildings or surface/garage parking (611 S. Carlin Spring) in the property.
8. PERIMETER SECURITY PROTECTION
The Contractor shall provide chain link fence (outside) and barricades (inside) around work areas for protection and to prevent unauthorized personal in the construction area. Before leaving the site at the end of the day, the Contractor shall replace any/and all sections of the security fence or barricade moved or removed during work hours.

The Contractor shall provide continuous cleaning of the work areas, corridors, building entrances, sidewalk and parking spaces to remove debris, other construction residue and to minimize dust and debris in the work area near or adjacent to the other County parking spaces and building 611 S. Carlin Springs.

The Contractor shall maintain the roadways, parking lot, parking lot aisles, and sidewalk they use to access the construction area in first-class condition. Contractor shall clean and repair damaged floors, roads and sidewalks caused by installation or by use of temporary protection. All damage to existing roadways, sidewalks and surface inside the building caused by the Contractor and their subcontractors shall be repaired by the Contractor at their expense.

9. CONSTRUCTION SCHEDULE:

The Contractor shall provide with their bid submission a construction schedule in Microsoft Projects format 11" x 17" size based on target dates provided below, the Contractor shall provide their own schedule for review and approval.

Bid Opening: April --, 2021

Bid Award: May --, 2021

Notice To Proceed: May --, 2021

Mobilization: June --, 2021

Submittals: June --, 2021 to July --, 2021

ISD Building Permit: March 31, 2021

Substantial Completion: September --, 2021

Final Completion: October --, 2021

10. E-Builder CONSTRUCTION PROGRAM MANAGEMENT SYSTEM (OPTIONAL)

The County uses the e-Builder Construction Program Management System and should the County decide to use e-Builder for this project will provide sufficient licenses to the Contractor to use e-Builder to manage the Carlin Springs Phase 1 project. The Contractor shall attend training to be provided by the County. The Contractor shall use e-Builder at the County's discretion, whenever appropriate for submittals including but not limited to: RFI; progress agenda and minutes; schedules; construction photographs; reports; and invoices. Or the Contractor can utilize another approved management system such as Constructware by Autodesk, Prolog, Procure, Oracle, etc. with prior Project Officer approval.

11. PROGRESS MEETING

Progress meetings shall be held bi-weekly and shall be attended by the Contractor and their sub-contractors when required. The Contractor shall provide schedule updates as well as discuss issues that will impact work and complete schedule. The Contractor shall be responsible for maintaining and distribution of the meeting minutes.

12. RESTROOMS

The former Virginia Hospital Center annex building interior is completely abandoned, and all utilities disconnected. There is no operational restroom in the building. Due to security, privacy and **COVID** concerns of owner of 611 S. Carlin Springs building, Contractor shall not use the office building restrooms. The Contractor shall provide their own outside portable toilets. The Contractor shall be responsible and provide daily cleaning and maintenance of their portable toilets including daily disinfection/sanitations.

13. PROJECT SIGN

The Contractor shall provide, apply for building permit and install the project sign per specifications.

14. SUBCONTRACTOR ACCEPTANCE
As required by General Conditions, Paragraph 15, the Contractor shall provide the names of proposed subcontractors for review by the Project Officer. The Project Officer may object for cause if a proposed subcontractor is deemed unfit or incompetent.
15. TRAFFIC CONTROL
The Contractor shall provide a traffic control plan and devices including qualified flagman during delivery of material and equipment or during performance of roof work and minor site work. Refer to Specifications.
16. SAFETY
The Contractor shall ensure that all personnel working and visiting any construction site and areas are issued and wear the appropriate safety equipment (hard hat, safety vest and harness when applicable), including mask or face covering.
17. CRANES
The Contractor shall secure all permitting and control of crane arrival, set up, operation, and departure from site. Crane size, number, and positions shall be determined as required to permit erection without damage to structures, roadways, and surroundings. The Contractor shall not swing the crane(s) over any occupied adjacent buildings nor playground areas/roads/streets that are not closed. Crane operation shall not impact the regular occupancy availability of the Recreation Center and the adjacent garage nor make streets impassable. Emergency vehicle access to all locations within the Recreation Center shall not be hindered.
18. POWER/WATER/HVAC OUTAGES (if and when occupied by owner)
The Contractor shall provide a plan and schedule for interruption of utilities including short power interruptions (**for building 611 S. Carlin Springs Road**). Connections and transfer of power shall be performed only when arrangements are made and approved in the evenings during weekdays or weekends. The Contractor must take all necessary steps to minimize interruption of utilities and services that will affect occupied adjacent buildings. Power (with advance written request and county written approval), service interruptions and/or switchover schedules must only be performed when adjacent affected buildings will be unoccupied. Contractor must obtain permission from 611 building property manager seventy-two (72) hours before scheduling power outage.
- Unoccupied hours:
Weekdays from 8:30 PM - 4:00 AM
Saturdays from 8:30 PM - 4:00 AM
Sunday from 8:30 PM - 4:00 AM
19. POWER/WATER/SEWER BILLING
Upon issuance of the Notice to Proceed (NTP) and before the Contractor is allowed to officially access building, the Contractor shall apply to Dominion Power and to Arlington, Water, Sewer, Street to transfer the electric meter to their company name and shall be responsible for payments of the monthly utility invoices for duration of the project until substantial completion or when County

takes beneficial occupancy of the building. In addition, in the event it is necessary and required to have a site Contractor Trailer as an Office, Contractor shall also apply for separate utility meter for the trailer as well as apply for Building Permit for the site trailer. The Contractor may use a generator to power its site trailer and power tools

20. **PROJECT TEAM BUILDING WORKSHOP-CANCELLED DUE TO COVID**

.

VIRGINIA HOSPITAL CENTER DEMOLITION

PHASE 1 - BID SET - December 11, 2020

ATTACHMENT C

ARLINGTON, VA

RRMM ARCHITECTS, PC

ARCHITECTURE / PLANNING / INTERIORS

2900 South Quincy Street, Suite 710
Arlington, VA 22206
(703) 998-0101

115 South 15th Street, Suite 202
Richmond, VA 23219
(804) 277-8987

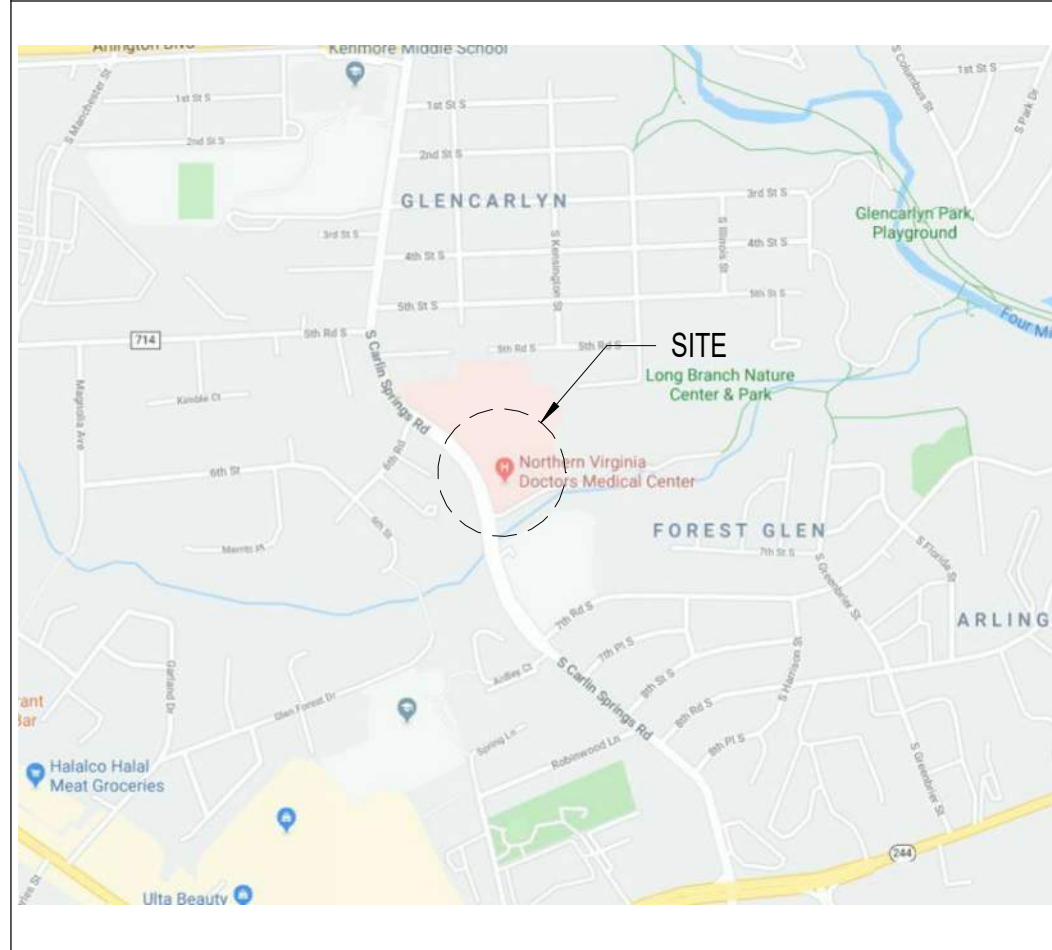
1317 Executive Boulevard, Suite 200
Chesapeake, VA 23320
(757) 622-2828

28 Church Avenue SW
Roanoke, VA 24011
(540) 344-1212

3737 Glenwood Avenue, Suite 100
Raleigh, NC 27612
(919) 827-0151

1 Research Court, Suite 450
Rockville, MD 20850
(240) 403-4101

VICINITY MAP



CONSULTANTS

AMT ENGINEERING
CIVIL ENGINEERING
800 KING FARM BLVD
ROCKVILLE, MD 20850
(301) 881-2545

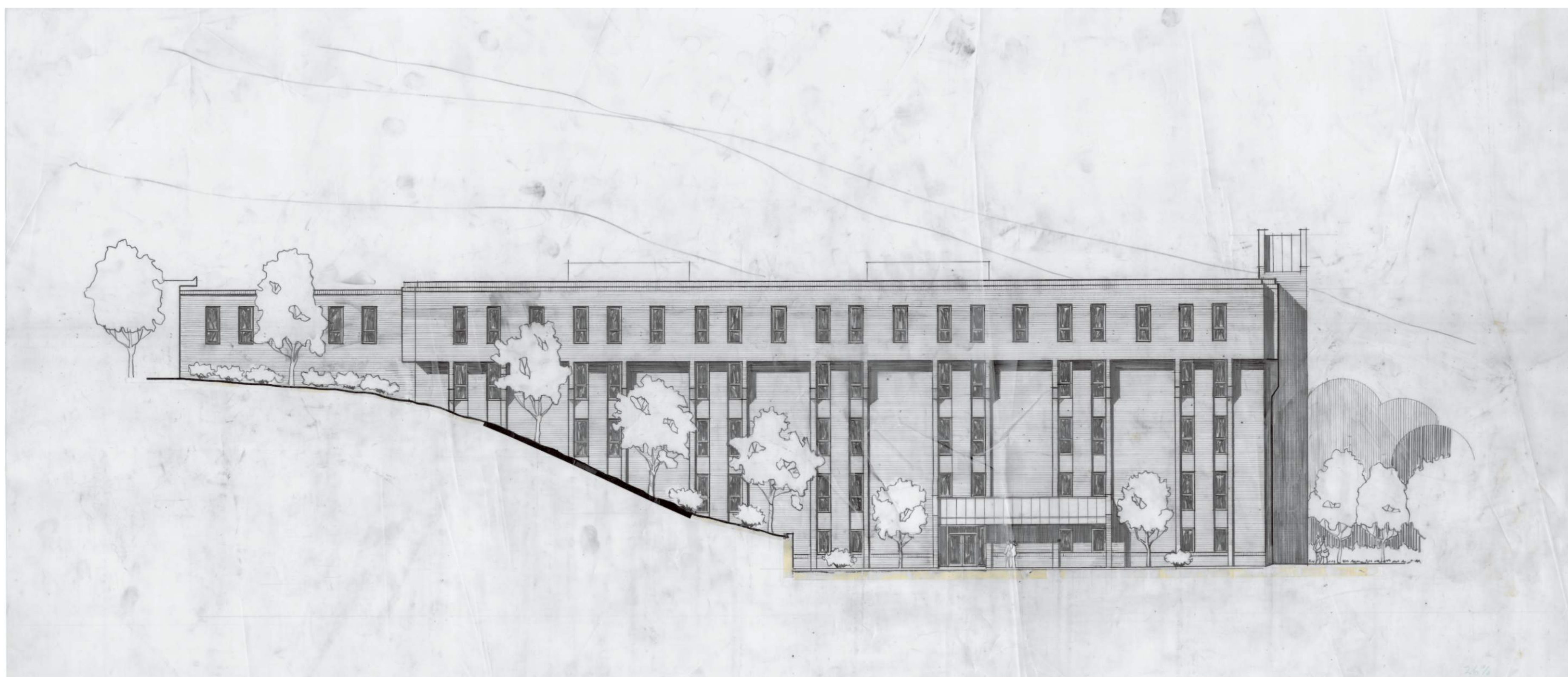
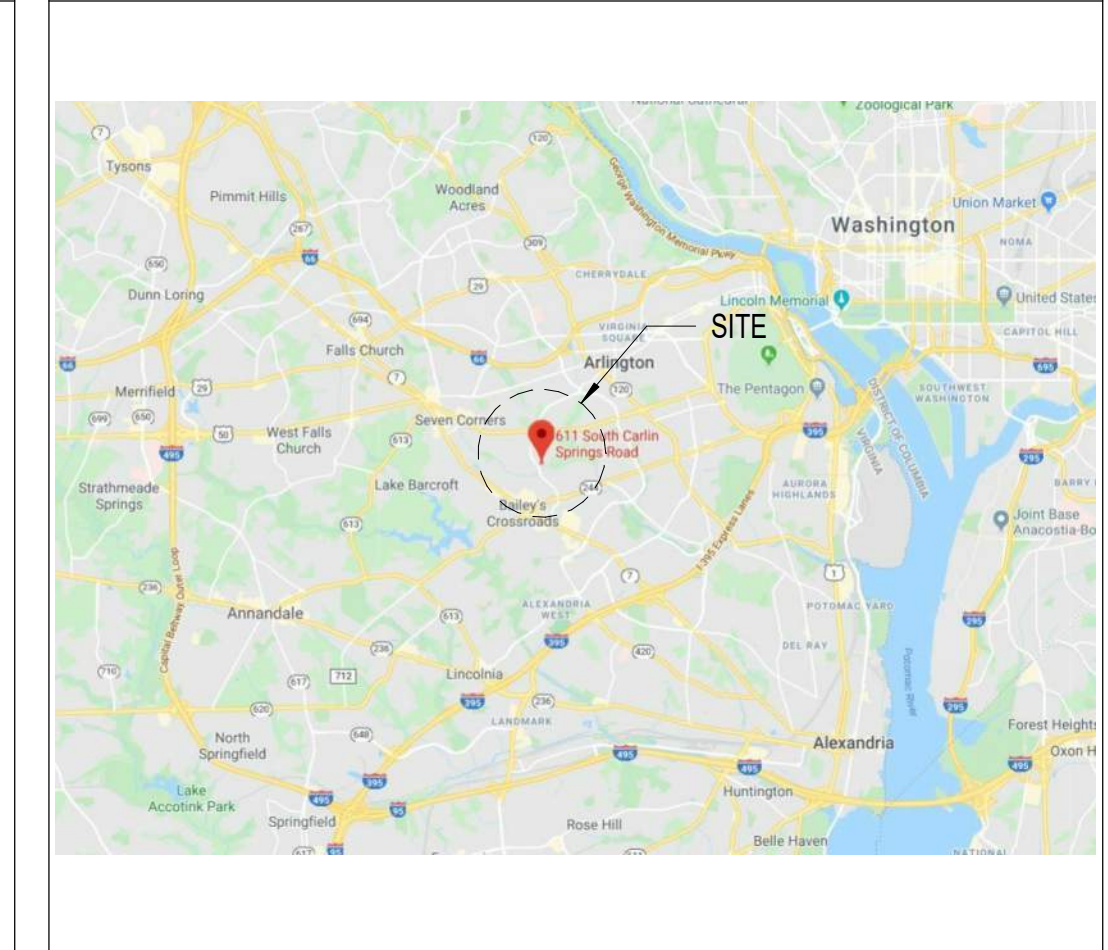
GPI ENGINEERING
STRUCTURAL AND MEP ENGINEERING
8001 BRADDOCK ROAD, SUITE 200
SPRINGFIELD, VA 22151
(703) 978-0100

DOWNEY & SCOTT
COST ESTIMATING
6799 KENNEDY ROAD, UNIT F
WARRENTON, VA 20187
(540) 347-5001

OWNER

ARLINGTON COUNTY, FACILITIES
DESIGN & CONSTRUCTION
1400 N UHLE ST.
ARLINGTON, VA 22201
P: 703.228.4509
F: 703.228.3903

LOCATION MAP



SHEET INDEX - PHASE 1

Sheet Number	Sheet Title
GENERAL	
1-G-001	COVER SHEET
1-G-101	ARCHITECTURAL GENERAL INFORMATION
1-G-102	CODE ANALYSIS
002	
Unnamed	
CIVIL	
1-C-100	COVER SHEET
1-C-101	SIGNED TOPOGRAPHIC SURVEY PAGE 1
1-C-102	SIGNED TOPOGRAPHIC SURVEY PAGE 2
1-C-103	EXISTING CONDITIONS PLAN
1-C-104	TREE PRESERVATION PLAN - PHASE 1
1-C-105	NOT USED
1-C-106	TREE PRESERVATION DETAILS
1-C-107	EXISTING TREE TABLE - TREE CONDITION SUMMARY
1-C-108	DEMOLITION PLAN
1-C-109	EROSION AND SEDIMENT CONTROL PLAN - PHASE 1
1-C-110	EROSION AND SEDIMENT CONTROL PLAN - PHASE 2
1-C-111	EROSION AND SEDIMENT CONTROL NOTES
1-C-112	EROSION AND SEDIMENT CONTROL DETAILS
1-C-113	SITE & GRADING AND UTILITY PLAN
1-C-501	SITE DETAILS
1-C-701	PRE-DEVELOPMENT WATER QUALITY MAP
1-C-702	POST-DEVELOPMENT WATER QUALITY MAP
1-C-703	STORMWATER MANAGEMENT NARRATIVES & CALCULATIONS AND POLLUTION PREVENTION PLAN
1-C-704	WATER QUALITY IMPACT ASSESSMENT
1-L-101	LANDSCAPE CONSERVATION PLAN
1-L-501	LANDSCAPE NOTES & DETAILS
ARCHITECTURAL	
1-A-101	FOURTH FLOOR DEMOLITION AND NEW WORK PLANS
1-A-102	FIFTH FLOOR AND ROOF DEMOLITION AND NEW WORK PLANS
1-A-103	REFLECTED CEILING DEMOLITION AND NEW WORK PLANS
1-A-201	EAST AND WEST ELEVATIONS - DEMOLITION AND NEW WORK
1-A-202	NORTH ELEVATION - DEMOLITION AND NEW WORK
1-A-301	WALL SECTIONS
1-A-302	WALL SECTIONS
1-A-303	WALL SECTIONS
1-A-304	WALL SECTIONS

SHEET INDEX - PHASE 1

Sheet Number	Sheet Title
STRUCTURAL	
1-S-001	STRUCTURAL GENERAL NOTES
1-S-101	FOURTH FLOOR FRAMING - DEMOLITION & NEW WORK
1-S-102	FIFTH FLOOR FRAMING - DEMOLITION & NEW WORK
1-S-103	ROOF FRAMING - DEMOLITION & NEW WORK
1-S-301	SECTIONS
MECHANICAL	
1-M-001	COVER SHEET
1-M-102	FOURTH FLOOR DEMOLITION & NEW WORK PLANS
1-M-103	FIFTH FLOOR DEMOLITION & NEW WORK PLANS
PLUMBING	
1-P-001	COVER SHEET
1-P-102	FOURTH FLOOR DEMOLITION PLAN
1-P-103	FIFTH FLOOR DEMOLITION PLAN
ELECTRICAL	
1-E-001	COVER SHEET - ELECTRICAL
1-E-101	SITE PLAN - ELECTRICAL
1-E-102	FOURTH FLOOR DEMOLITION & NEW WORK - ELECTRICAL
1-E-103	FIFTH FLOOR DEMOLITION & NEW WORK - ELECTRICAL
1-E-104	FOURTH & FIFTH FLOOR - NEW WORK - FIRE ALARM
1-E-701	DETAILS & SCHEDULES

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	MARK	DATE	BY	DES
12.11.2020	13356.28	KDL	DWH	KDL				

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	MARK	DATE	BY	DES
05.15.2020								



PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING COVER SHEET

SHEET
1-G-001

ABBREVIATIONS

#	NUMBER	DIA	DIAMETER	HWH	HOT WATER HEATER	PTD	PAINTED
& +	AND	DIAG	DIAGONAL	PTN	PARTITION	QTY	QUANTITY
+/-	PLUS OR MINUS	DIM	DIMENSION	ID	INSIDE DIAMETER	R	RISER, RIDGE
@	AT	DIV	DIVISION	IN	INCH	RA	RETURN AIR
°	DEGREES	DL	DEAD LOAD	INFO	INFORMATION	RAD	RADIUS
∅	DIAMETER	DN	DOWN	INST	INSTALLATION	RCP	REFLECTED CEILING PLAN
Ω	ARC LENGTH	DPG	DAMPPOOFING	INT	INTERIOR	RD	ROOF DRAIN
AB	ANCHOR BOLT	DS	DOWNSPOUT	INSUL	INSULATE, INSULATED, INSULATION	REC	RECEPTACLE
ABV	ABOVE	DWG	DRAWING	INV	INVERT	REF	REFERENCE
ACM	ASBESTOS CONTAINING MATERIAL	DWR	DRAWER	JAN	JANITOR	REIN	REINFORCE, REINFORCED, REINFORCING
ACM	ASBESTOS CONTAINING MATERIAL	E	EAST	JCB	JUNCTION BOX	REMO	REMOVE
ADDN	ADDITION	EA	EACH	JC	JANITOR CLOSET	REQD	REQUIRED
ADJ	ADJUSTABLE	EF	EXHAUST FAN	JT	JOINT	RET	RETURN
AFF	ABOVE FINISH FLOOR	EFS	EXTERIOR INSULATION FINISH SYSTEM	KO	KNOCKOUT	REV	REVISION, REVISIONS, REVISED
AHU	AIR HANDLING UNIT	EJ	EXPANSION JOINT	KV	KILOVOLT	RH	RIGHT HAND
AL	ALUMINUM	ELEC	ELECTRICAL	KVA	KILOVOLT AMPERE	RL	RAIN LEADER
ALT	ALTERNATE	ELEV	ELEVATION, ELEVATOR	KW	KILOWATT	RO	ROUGH OPENING
AMP, A	AMPERE	EMER	EMERGENCY	L	LENGTH, LONG, LOW	RTU	ROOF TOP UNIT
ANCH	ANCHOR, ANCHORAGE	ENCL	ENCLOSE, ENCLOSURE	LAV	LAVATORY	S	SOUTH
ANOD	ANODIZED	EPDM	ETHYLENE PROPYLENE DIENE MONOMER	LB	POUND	S/S	STAINLESS STEEL, SERVICE SINK
APC	ARCHITECTURAL PRECAST CONCRETE	EQ	EQUAL	LF	LINEAR FEET	SAN	SANITARY SEWER
APPROX	APPROXIMATE	EQUIP	EQUIPMENT	LH	LEFT HAND	SAPC	SUSPENDED ACOUSTIC PANEL CEILING
ARCH	ARCHITECT, ARCHITECTURAL	EST	ESTIMATE	LN	LINEAR	SC	SOLID CORE, SEALED CONCRETE
ASB	ASBESTOS	EWC	ELECTRIC WATER COOLER	LLH	LONG LEG HORIZONTAL	SCHED	SCHEDULE
ASPH	ASPHALT	EXH	EXHAUST	LLV	LONG LEG VERTICAL	SCW	SOLID CORE WOOD
ATTEN	ATTENUATION	EXIST	EXISTING	LP	LOW POINT	SF	SQUARE FEET
AUTO	AUTOMATIC	EXP	EXPOSED / EXPANSION	LTG	LIGHTING	SHT	SHEET
AVB	AIR VAPOR BARRIER	EXT	EXTERIOR	LTL	LINTEL	SIM	SIMILAR
AVG	AVERAGE	FAB	FABRICATE	LVR	LOUVER	SPEC	SPECIFICATION, SPECIFICATIONS
BC	BOTTOM OF CURB	FAS	FASTEN, FASTENER	LW	LIGHTWEIGHT	SO	SQUARE
BD	BOARD	FD	FLOOR DRAIN, FIRE DAMPER	MAINT	MAINTENANCE	STC	SOUND TRANSMISSION CLASS
BEJ	BUILDING EXPANSION JOINT	FDN	FOUNDATION	MANUF	MANUFACTURE, MANUFACTURER	STD	STANDARD
BETW	BETWEEN	FE	FIRE EXTINGUISHER	MAS	MASONRY	STL	STEEL
BIT	BITUMINOUS	FEC	FIRE EXTINGUISHER CABINET	MATL	MATERIAL	STOR	STORAGE
BLDG	BUILDING	FF	FINISH FLOOR	MAX	MAXIMUM	STRUC	STRUCTURAL
BLK	BLOCK	FGL	FIBERGLASS	MECH	MECHANIC, MECHANICAL	SUSP	SUSPENDED
BLKG	BLOCKING	FH	FIRE HYDRANT	MED	MEDIUM	SYM	SYMMETRICAL, SYMMETRY
BM	BEAM	FIN	FINISH, FINISHED	MH	MAN-HOLE	SYS	SYSTEM
BO	BOTTOM OF	FIX	FIXTURE	MIN	MINIMUM	T	TREAD
BRG	BEARING	FLEX	FLEXIBLE	FLR	FLOOR	T&B	TOP & BOTTOM
BRK	BRICK	FLR	FLOOR	FOC	FACE OF CONCRETE	TEMP	TEMPORARY, TEMPERED
BTWN	BETWEEN	FOM	FACE OF MASONRY	FOM	FACE OF MASONRY	THK	THICK, THICKNESS
BW	BUILT-UP ROOFING	FP	FIREPROOF	FR	FIRE RATED	THRU	THROUGH
C	CARPET	FR	FIRE RATED	FRT	FIRE RETARDANT TREATED	TO	TOP OF
CAB	CABINET	FT	FOOT, FEET	FT	FOOT, FEET	TOC	TOP OF CURB
CAP	CAPACITY	FTG	FOOTING	FUR	FURRED, FURRING	TOM	TOP OF MASONRY
CEM	CEMENT	FURR	FURRING	CI	CAST IRON	TOS	TOP OF STEEL
CER	CERAMIC	G	GAS	CF	CUBIC FOOT	TOW	TOP OF WALL
CF	CUBIC FOOT	GALV	GALVANIZED	CFMF	COLD FORMED METAL FRAMING	TYP	TYPICAL
CFMF	COLD FORMED METAL FRAMING	GC	GENERAL CONTRACT, CONTRACTOR	CI	CAST IN PLACE	UC	UNDERCUT
CI	CAST IRON	GC	GENERAL CONTRACT, CONTRACTOR	CIP	CAST IN PLACE	UG	UNDER GROUND
CIP	CAST IN PLACE	GEN	GENERAL	CJ	CONTROL JOINT	UON	UNLESS OTHERWISE NOTED
CJ	CONTROL JOINT	GL	GLASS, GLAZING	CLG	CEILING	V	VOLT, VALLEY
CLG	CEILING	GPM	GALLONS PER MINUTE	CLR	CLEAR	VCT	VINYL COMPOSITION TILE
CLR	CLEAR	GWB	GYPSPUM WALLBOARD	CMP	CORRUGATED METAL PIPE	VERT	VERTICAL
CMP	CORRUGATED METAL PIPE	GYP	GYPSPUM	CMU	CONCRETE MASONRY UNIT	VEST	VESTIBULE
CMU	CONCRETE MASONRY UNIT	H	HIGH	CO	CLEAN OUT	VR	VAPOR RETARDER
CO	CLEAN OUT	H/C	HANDICAPPED	COL	COLUMN	VT	VINYL TILE
COL	COLUMN	HB	HOSE BIB	COMP	COMPOSITE	VTR	VENT THRU ROOF
COMP	COMPOSITE	HC	HOLLOW CORE	CONC	CONCRETE	W	WEST, WIDE, WIDTH
CONC	CONCRETE	HDWR	HARDWARE	CONST	CONSTRUCTION	WI	WITH
CONST	CONSTRUCTION	HGT	HEIGHT	CONT	CONTINUOUS	W/O	WITHOUT
CONT	CONTINUOUS	HM	HOLLOW METAL	CPT	CARPET	WDW	WINDOW
CPT	CARPET	HORIZ	HORIZONTAL	CRS	COURSE, COURSES	WH	WATER HEATER
CRS	COURSE, COURSES	HP	HIGH POINT	CSMT	CASEMENT	WP	WATERPROOFING
CSMT	CASEMENT	HR	HOUR	CSWK	CASEWORK	WPT	WORKING POINT
CSWK	CASEWORK	HTG	HEATING	CU FT	CUBIC FEET	WT	WEIGHT
CU FT	CUBIC FEET	HVAC	HEATING, VENTILATION AND AIR CONDITIONING	CU YD	CUBIC YARD	WWF	WELDED WIRE FABRIC
CU YD	CUBIC YARD	HW	HOT WATER	CUH	CABINET UNIT HEATER	WWM	WELDED WIRE MESH
CUH	CABINET UNIT HEATER			CW	COLD WATER		
CW	COLD WATER			DBL	DOUBLE		
DBL	DOUBLE			DEMO	DEMOLITION		
DEMO	DEMOLITION			DET/DTL	DETAIL		
DET/DTL	DETAIL						

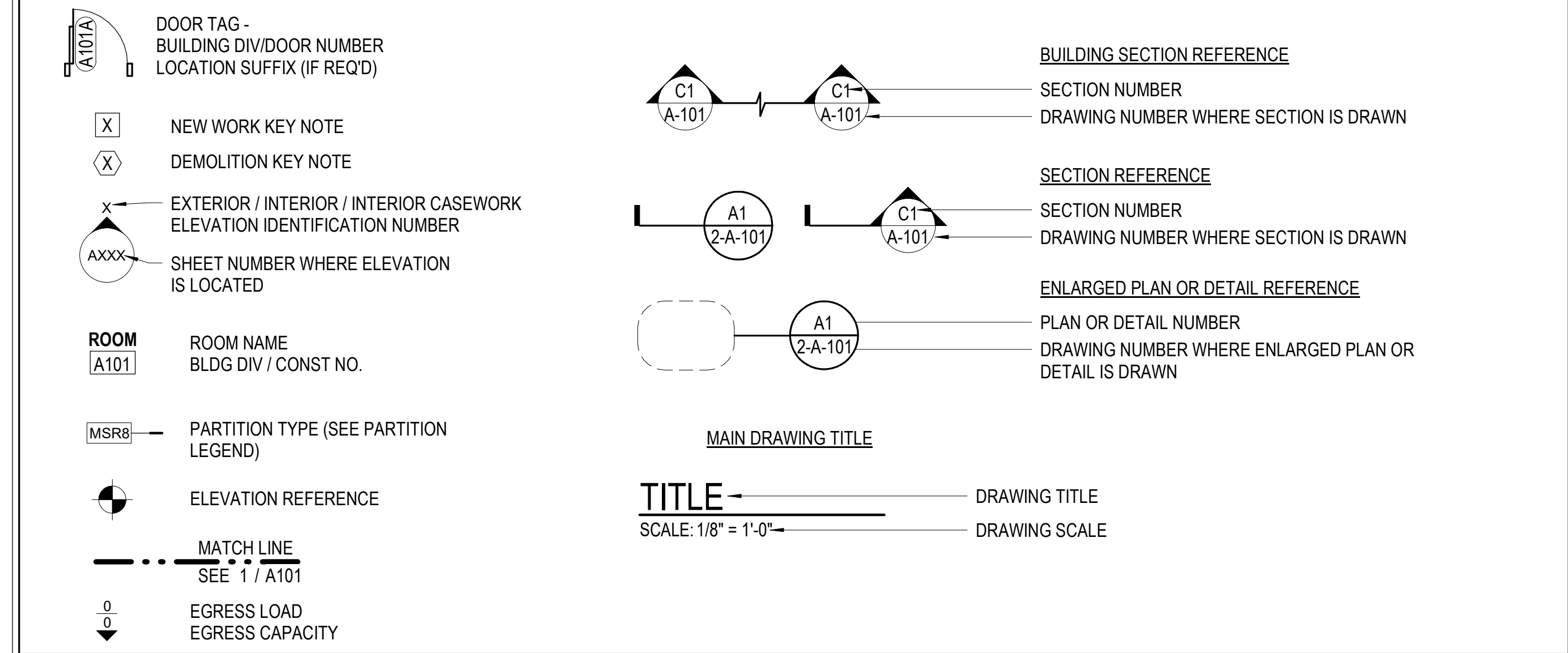
GENERAL NOTES

- DO NOT SCALE DRAWINGS. ALL DIMENSIONS ARE TO FINISH FACE OF WALL TO BOTH EXISTING AND NEW CONSTRUCTION. ALL DIMENSIONS NOTED AS "CLEAR" SHALL MAINTAIN THE FULL SPACE INDICATED WITHOUT ENCROACHMENTS, INCLUDING WALL FINISHES. ALL VERTICAL HEIGHTS INDICATED ARE FROM THE FINISH FLOOR ELEVATION AT THE BASE OF THE ITEM INDICATED, UNLESS NOTED OTHERWISE. WHERE WALLS, JAMBS, OR OTHER ITEMS ARE NOTED TO "ALIGN", THE FACE OF ITEMS INDICATED SHALL BE IN LINE WITH EACH OTHER TO FORM A STRAIGHT LINE, FREE OF OFFSETS OR DEVIATIONS. FIELD VERIFY ALL DIMENSIONS.
- EXISTING CONSTRUCTION (PARTITIONS, DOORS, PLUMBING FIXTURES, CASEWORK, EQUIPMENT, ETC.) IS INDICATED ON THE FLOOR PLANS WITH LINES IN A LIGHTER SHADE (SCREENED), WITH EXISTING WALLS TO REMAIN SOLID POCHED. NEW CONSTRUCTION IS INDICATED BY FULL INTENSITY (SOLID) LINES. ITEMS TO BE DEMOLISHED ARE INDICATED IN LIGHT DASHED LINES.
- THE CONTRACTOR SHALL INVESTIGATE AND VERIFY ALL EXISTING CONDITIONS AND TAKE FIELD MEASUREMENTS AND SHALL CAREFULLY COMPARE SUCH FIELD MEASUREMENTS, CONDITIONS, AND OTHER INFORMATION KNOWN TO THE CONTRACTOR WITH THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THE WORK. IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES.
- THE EXISTING CONDITIONS INFORMATION INDICATED IN THE CONTRACT DOCUMENTS IS BASED ON EXISTING DOCUMENTATION AND FIELD OBSERVATIONS, BUT IS NOT A WARRANTY OF EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION. ALL NEW CONSTRUCTION IS INDICATED RELATIVE TO THE EXISTING BUILDING AND SHALL BE COORDINATED WITH THE ACTUAL FIELD CONDITIONS FOUND. THE CONTRACTOR SHALL ASSUME FULL AND UNDIVIDED RESPONSIBILITY FOR THE ACCURACY, FIT, AND STABILITY OF ALL PARTS OF THE WORK.
- ALL REMOVALS AND SALVAGE, UNLESS SPECIFICALLY NOTED OR REQUESTED BY THE OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR.
- THE CONTRACTOR SHALL REPAIR AND RESTORE TO ITS ORIGINAL CONDITION ALL WORK AND ITEMS DAMAGED AS A RESULT OF CONSTRUCTION OPERATIONS. ANY DISTURBANCE OR DAMAGE TO THE EXISTING FACILITY RESULTING EITHER DIRECTLY OR INDIRECTLY FROM THE OPERATION OF THIS CONTRACT SHALL BE PROMPTLY REPAIRED, RESTORED, OR REPLACED AT NO ADDITIONAL COST.
- ALL TRANSITIONS OF NEW WORK TO EXISTING CONSTRUCTION, INCLUDING AT FLOORS, WALL AND CEILINGS, SHALL BE CAREFULLY EXECUTED. EXISTING CONSTRUCTION SHALL BE REPAIRED AND PATCHED AS NEEDED TO PROVIDE A SMOOTH TRANSITION.

GENERAL NOTES

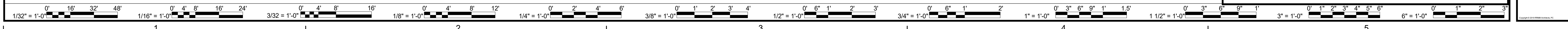
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING DEFECTIVE WORK IN EXISTING CONSTRUCTION WITHIN THE LIMITS OF THE CONSTRUCTION AREA. THIS INCLUDES, BUT IS NOT LIMITED TO, UNEVEN SURFACES AND FINISHES AT PLASTER OR GYPSUM BOARD. THE CONTRACTOR SHALL PATCH AND REPAIR SURFACES TO MATCH NEW ADJACENT SURFACES.
- ALL NEW AND EXISTING TO REMAIN SUBSTRATES SHALL BE PROPERLY PREPARED BEFORE APPLICATION OF FINISHES. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR SUBSTRATE CONDITIONS WHERE FINISHES ARE APPLIED.
- WHERE ITEMS ARE INDICATED TO BE REMOVED, DEMOLISH IN THEIR ENTIRETY, INCLUDING ALL APPURTENANCES, ANCHORS, AND INTERNAL STRUCTURES. DOORS: REMOVE DOOR PANEL AND ALL HARDWARE. MAINTAIN INTEGRITY OF FRAMES AND ANCHORAGE FOR THE INSTALLATION OF NEW DOOR PANELS AND HARDWARE. REPAIR AS NECESSARY EXISTING DOOR FRAMES TO REMAIN TO LIKE NEW CONDITION. DOORS & FRAMES: REMOVE DOOR PANEL, HARDWARE, FRAMES, ANCHORS, AND ADJACENT SIDELIGHTS AND TRANSOMS WHERE INDICATED. PREPARE WALL OPENING FOR INFILL OF NEW WALL CONSTRUCTION OR PATCH WALLS TO MATCH ADJACENT FINISHES AS INDICATED. WALLS: REMOVE ENTIRE WALL STRUCTURE, FROM FLOOR LINE TO TOP OF WALL TO THE EXTENT SHOWN OR REQUIRED. REMOVE ALL EMBEDDED MECHANICAL AND ELECTRICAL DEVICES, CONDUITS, ETC. WHERE WALLS EXTEND THROUGH THE SLAB ON GRADE, REMOVE WALL TO MINIMUM 4" BELOW SLAB SURFACE. PATCH SLAB AS PER SPECIFICATIONS.
- WHERE EXISTING MASONRY WALLS ARE EXTENDED WITH NEW MASONRY CONSTRUCTION OF SIMILAR MASONRY UNITS, CUT EXISTING WALLS ALONG THE MASONRY JOINTS, REMOVE EXISTING MORTAR BACK TO THE EXISTING UNIT TO REMAIN, AND TOOTH IN NEW MASONRY UNITS TO MAINTAIN THE BOND PATTERN AND INTEGRITY OF THE WALL. WHERE EXISTING MASONRY WALLS ARE EXTENDED WITH NEW MASONRY CONSTRUCTION OF DISSIMILAR MASONRY UNITS, SAW CUT END OF EXISTING WALLS PLUMB AND STRAIGHT. ABUT NEW CONSTRUCTION ALIGNED WITH THE FACE OF THE EXISTING WALL. PROVIDE BACKER ROD & SEALANT IN THE JOINT.
- REFER TO THE PROJECT SPECIFICATIONS SECTION 024119 "SELECTIVE DEMOLITION" FOR ADDITIONAL REQUIREMENTS.

ARCHITECTURAL GRAPHIC SYMBOLS



ARCHITECTURAL MATERIAL LEGEND

	CONTINUOUS WOOD BLOCKING		ALUMINUM
	CONCRETE MASONRY UNIT		FINISHED WOOD
	CAST-IN-PLACE CONCRETE		WOOD BLOCKING
	STEEL		BRICK
	EARTH / COMPACT FILL		GLASS
	BATT INSULATION		ACOUSTICAL TILE
	POROUS FILL / GRAVEL		PLYWOOD
	RIGID INSULATION		CERAMIC TILE - LARGE SCALE
	GYPSUM BOARD		SAND / MORTAR / PLASTER
	RESILIENT FLOORING / PLASTIC LAMINATE		GRAVEL



DATE	12.11.2020	PROJECT	13356.28	KDL		DES	
DESIGNED		DRAWN		DWH		BY	
CHECKED				KDL		REVISIONS	

RRMM ARCHITECTS, PC
 2900 South Quincy Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204

DRAWING ARCHITECTURAL GENERAL INFORMATION

SHEET
1-G-101

CODE ANALYSIS

A. APPLICABLE CODES:

- 2015 Virginia Uniform Statewide Building Code (VUSBC).
- 2015 Virginia Energy Conservation Code.
- 2010 ADA Standards for Accessible Design.

B. GENERAL INFORMATION:

- The project is submitted under the 2015 Virginia Existing Building Code - VUSBC, Part II, referred to as the "VEBC". The VEBC incorporates by reference Chapters 2 - 16 of the 2015 International Existing Building Code (IEBC) per section 101.2.
- The project is an Alteration as defined by IEBC Section 202.
- The project is submitted under the IEBC WORK AREA compliance method per section 301.1.2.
- Classification of Work: Total WORK AREA does not exceed 50% of the aggregate area of the building. Per VEBC Chapter 5, alterations of the existing building shall meet Level 2 requirements.
- The Work will not require a change of occupancy.
- This project is the first phase of a two-phase project. Phase one includes partial demolition of the structure which connects the building to the existing Virginia Hospital Center. The intent is to provide for egress from the building in preparation for Phase 2 which includes full demolition of the hospital.
- The drawings on this sheet illustrate the occupant load and egress methods that will exist when the separation of the buildings is complete at the end of Phase 1.

C. EXISTING CONDITIONS:

- The existing structure to remain is a medical office building constructed in 1979 and consists of five levels set on a sloping site with the first floor level at grade on the south end and the fourth floor level at grade on the north end.
- Construction consists primarily of steel framing members, steel bar joist floor and roof framing, and 3" thick concrete floors on a 9/16" corrugated metal deck. Exterior walls are brick masonry on metal stud framing.
- The building is partially sprinklered, utility and storage rooms only.

D. ACCESSIBILITY:

- The five building levels are connected by elevator providing an accessible route.

E. USE GROUP CLASSIFICATION:

- The building is a medical office building, Use Group Business B.

F. CONSTRUCTION TYPE:

- Existing documentation indicates the following assembly ratings:

BUILDING ELEMENT	Rating Req'd	Rating Provided
Primary structural frame	1	UL X526 - 1 HR
Bearing walls		
Exterior	1	12" Concrete- 4 HR
Interior	1	NA
Nonbearing walls and partitions		
Exterior		
Interior	0	
Floor construction and associated secondary members	1	UL G229 - 1 HR
Roof construction and associated secondary members	1	UL P214 - 1 HR

- Based on the above the building is submitted as Construction Type 2A in accordance with IBC Table 601.

G. BUILDING HEIGHT:

- Allowable Building Height in Feet = 65 ft.
- Actual building height = 58 ft. from the midpoint of the stair roof to the grade plane calculated at elevation 222.0'.
- Allowable Number of Stories Above Grade per table 504.4 = 5.
- Actual Number of Stories = 5.

H. BUILDING AREA:

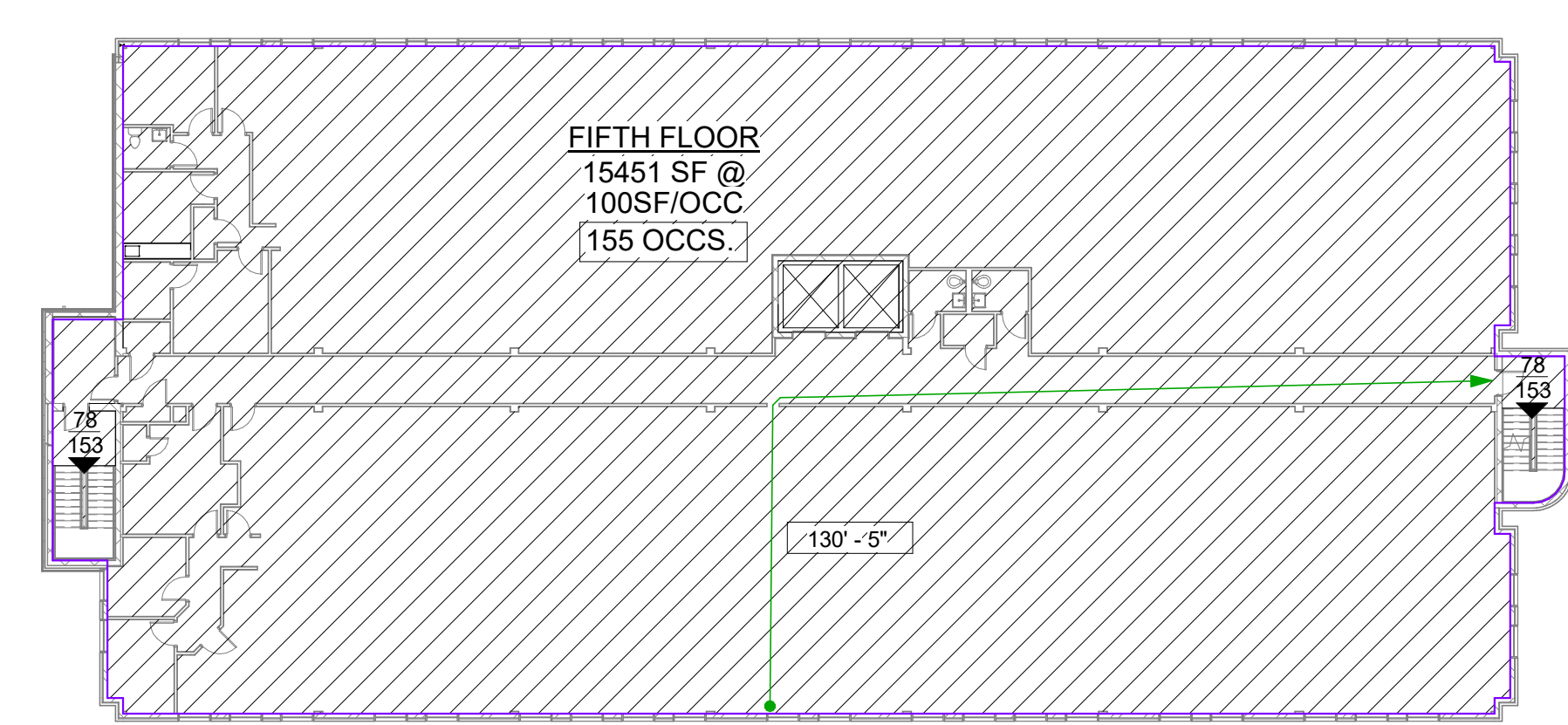
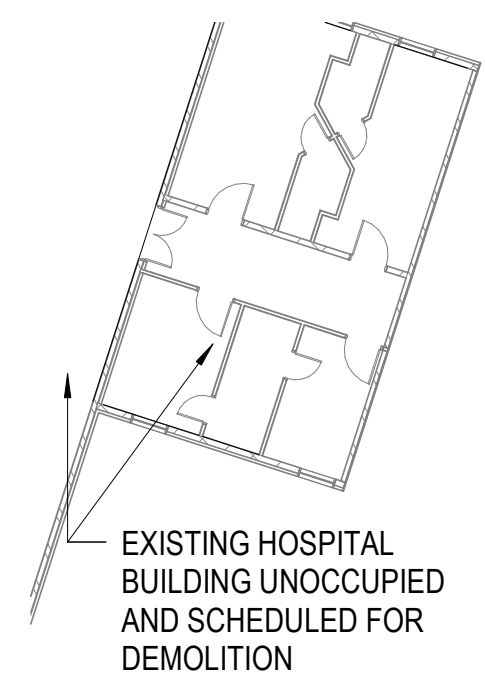
- The Allowable Area for Construction Type 2A non-sprinklered, multi-story Use Group B building, per table 506.2 and Equation 5-2 is: 37500 (3) = 112500 sf. (frontage increase is disregarded).
- Actual building area = 64301 sf. - refer to the occupancy schedule for areas by floor.

I. MEANS OF EGRESS:

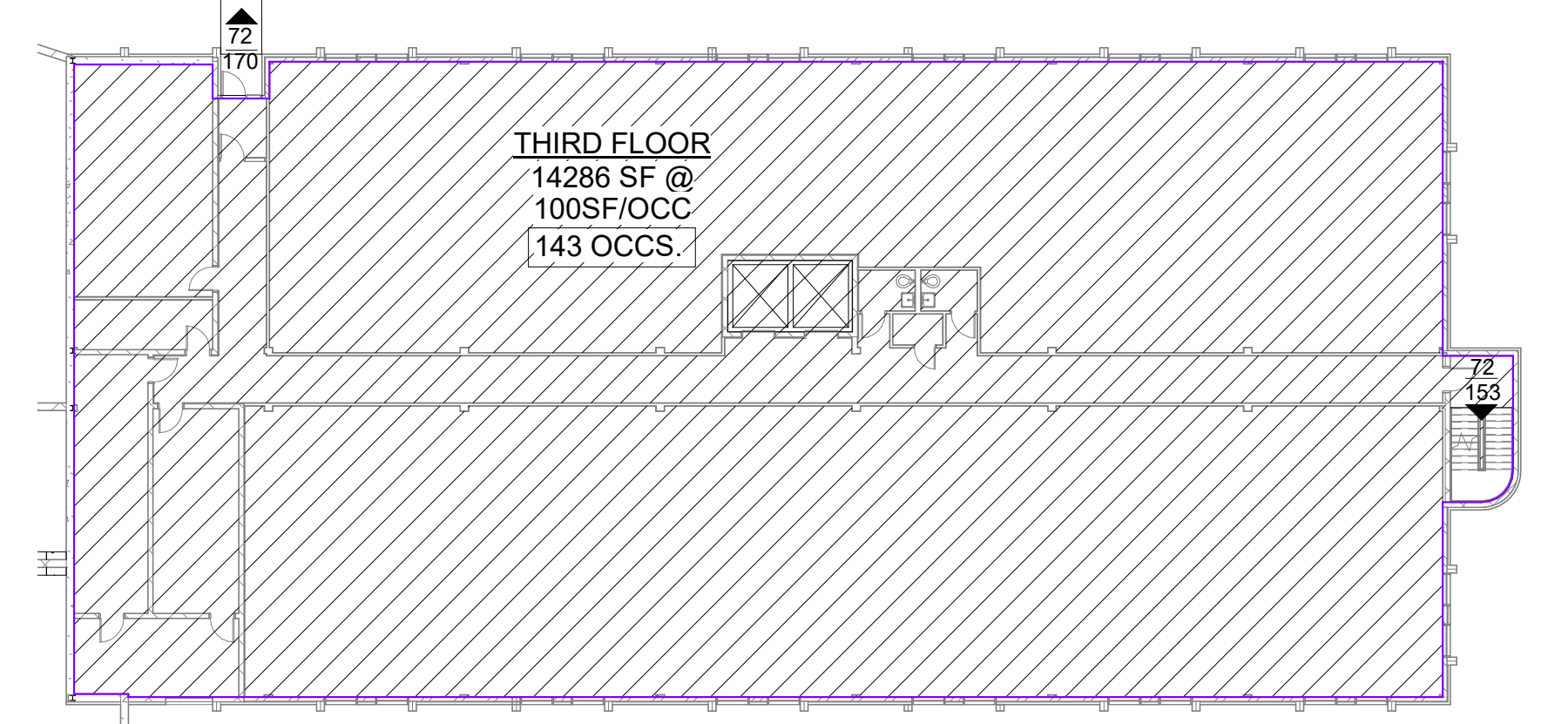
- Number of Exits:
 - Two exits required from each floor level - two exits provided.
 - Three exits required from the building - six exits provided.
- Egress Capacity:
 - 34" clear width at exit doors at 0.2" per occupant = 170.
 - 46" width of stairs at 0.3" per occupant = 153.
 - Stair width governs egress capacity. See plans for egress load at each exit.
- Egress Length:
 - Exit Access Travel Distance allowed = 200 lf. Maximum travel distance provided = 130 lf.

CONSTRUCTION SEQUENCE:

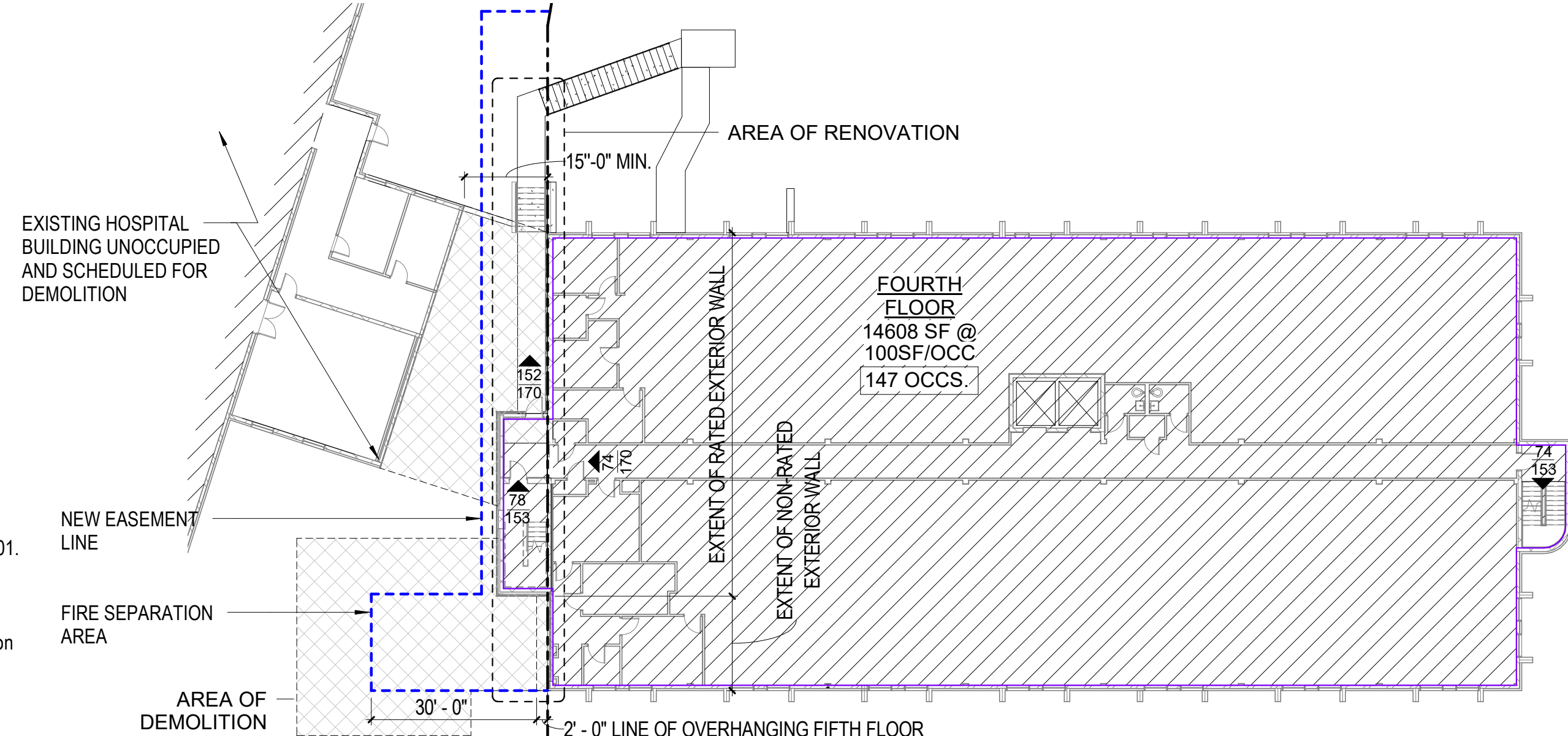
- Step 1: Separate initial demolition from occupied building. Maintain protected egress path through fourth floor level stair to existing egress door until the new egress door and exit discharge path are complete and operational.
 - Install temporary one-hour rated wall at fourth and fifth floors. Extend tight to floors, wall & roof with perimeter joint firestopping.
 - Install covered pedestrian protection - extend out to a point clear of the construction area and maintain open at all times.
 - Demolish MRI addition as indicated.
- Step 2: Demolition of two story connector.
 - Construct new exterior infill wall and soffit at Fourth Floor.
 - Realign pedestrian egress protection to allow access to the two story connector for demolition.
 - Demolish connecting structure and site paving & steps to the extent shown.
- Step 3: Construct stair vestibule, exit door, and new concrete sidewalk and steps.
 - Maintain egress and pedestrian protection throughout demolition & new construction.
 - Install new end wall to secure the existing to remain building.
 - Construct new vestibule extension, wall cladding and paving.
 - Demolish interior door & refinish opening, and install MEP systems in the existing structure when the building is unoccupied.
 - Construct new concrete steps and connect new egress path to existing steps.
 - Provide a complete exit discharge route before proceeding with step four.
- Step 4: Complete new construction as shown.
 - Remove temporary separation wall after new work is in place.
 - Demolish stair exit door and infill wall opening. Maintain egress path through stair to new exit door and protect building occupants.
 - Demolish existing concrete steps and all temporary construction.
 - Complete new wall cladding.



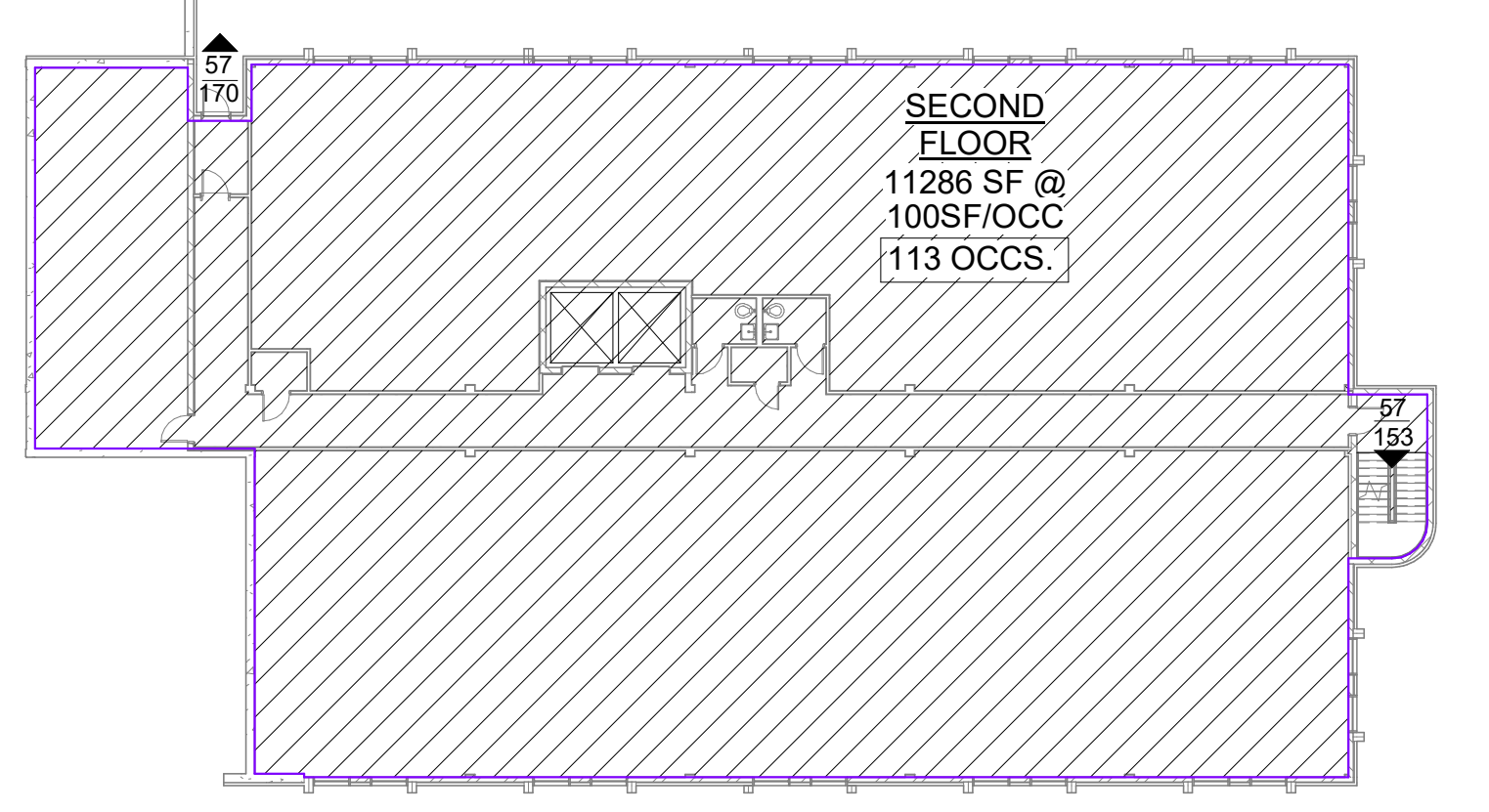
FIFTH FLOOR
SCALE: 3/64" = 1'-0"



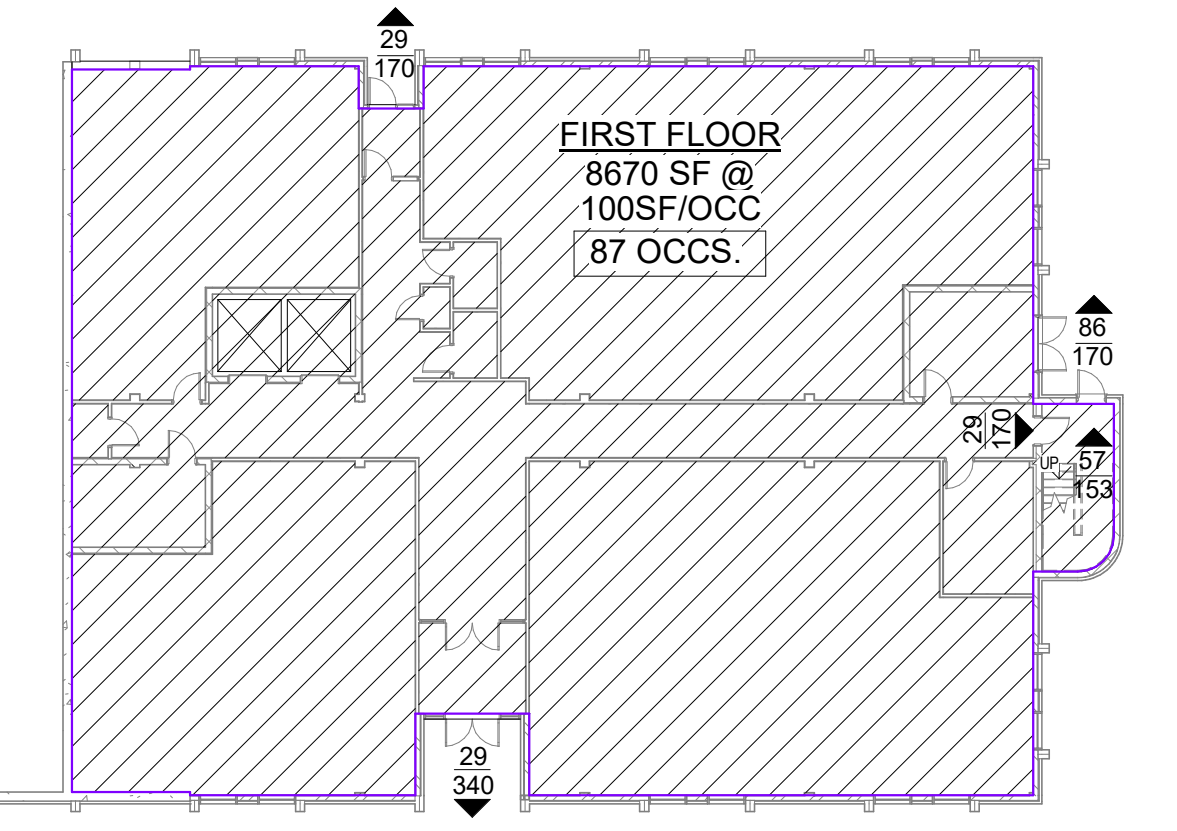
THIRD FLOOR (NO WORK AT THIS LEVEL IN THE PROJECT SCOPE)
SCALE: 3/64" = 1'-0"



FOURTH FLOOR
SCALE: 3/64" = 1'-0"

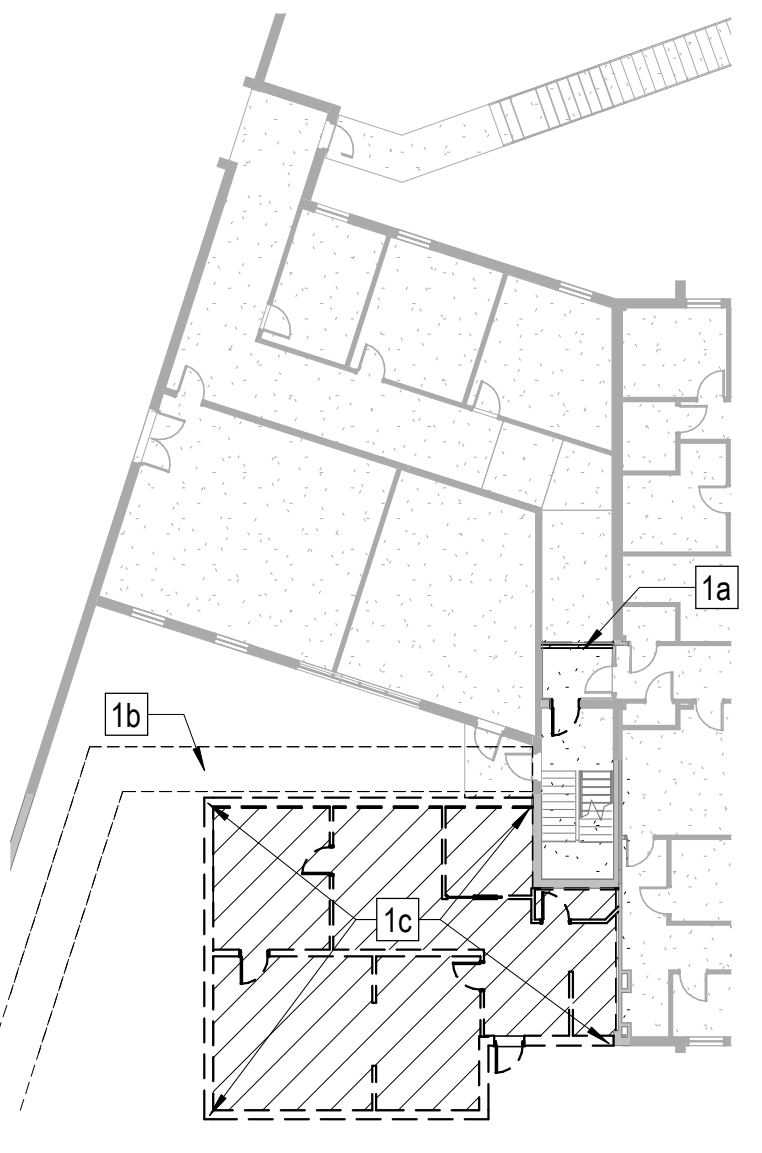


SECOND FLOOR (NO WORK AT THIS LEVEL IN THE PROJECT SCOPE)
SCALE: 3/64" = 1'-0"

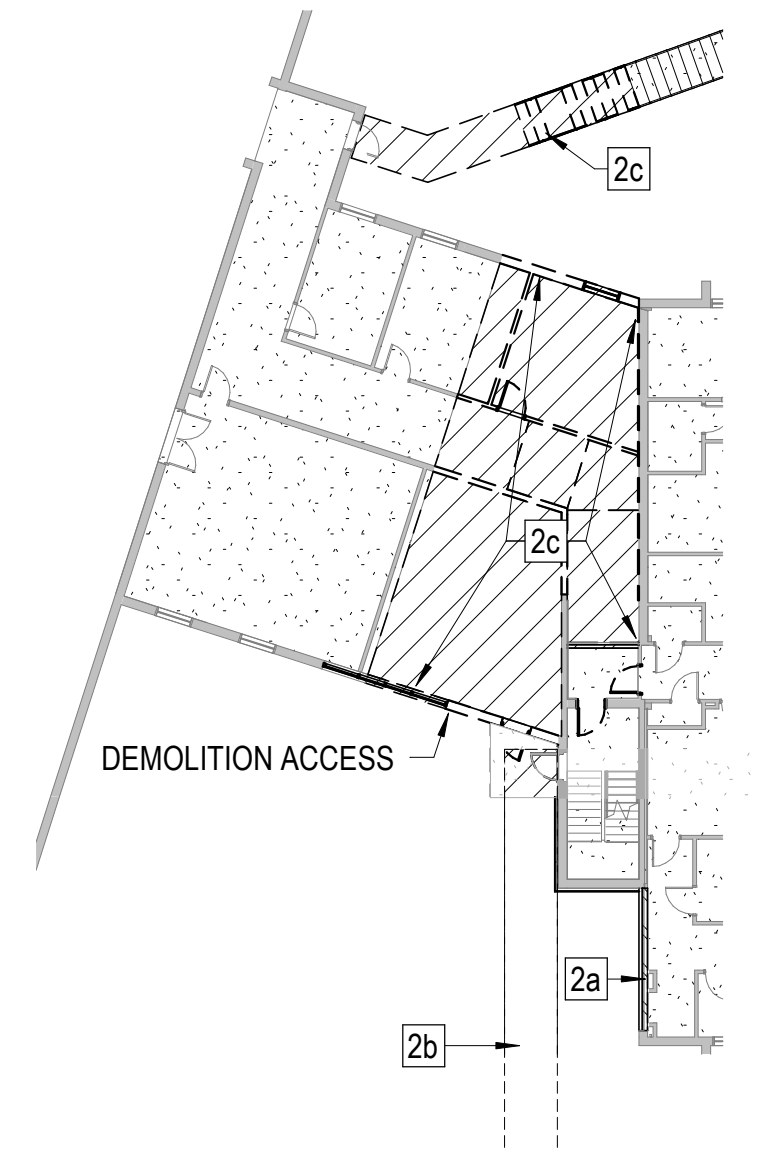


FIRST FLOOR (NO WORK AT THIS LEVEL IN THE PROJECT SCOPE)
SCALE: 3/64" = 1'-0"

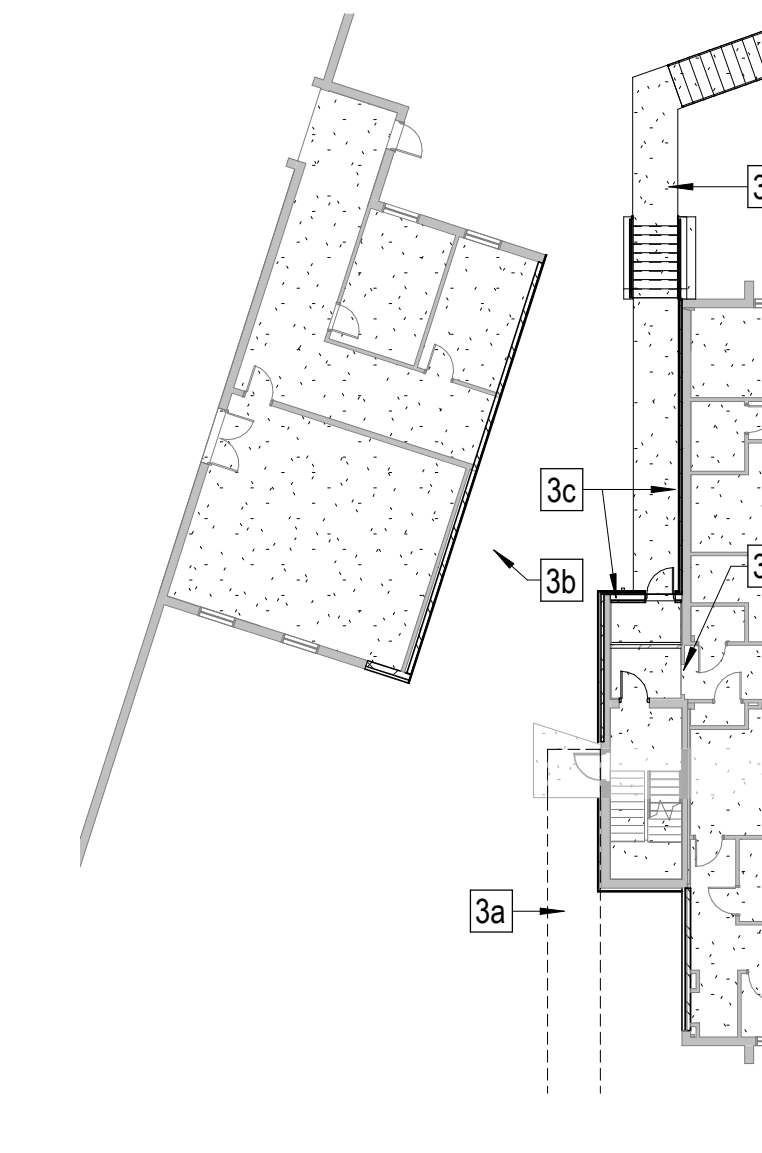
OCCUPANCY SCHEDULE				
LEVEL	FUNCTION OF SPACE PER IBC	AREA (SF)	SF/OCC.	OCCUPANT LOAD
FIRST FLOOR	Business Areas	8670 SF	100 SF	87
SECOND FLOOR	Business Areas	11286 SF	100 SF	113
THIRD FLOOR	Business Areas	14286 SF	100 SF	143
FOURTH FLOOR	Business Areas	14608 SF	100 SF	147
FIFTH FLOOR	Business Areas	15451 SF	100 SF	155
TOTAL BUILDING OCCUPANT LOAD		64301 SF		645



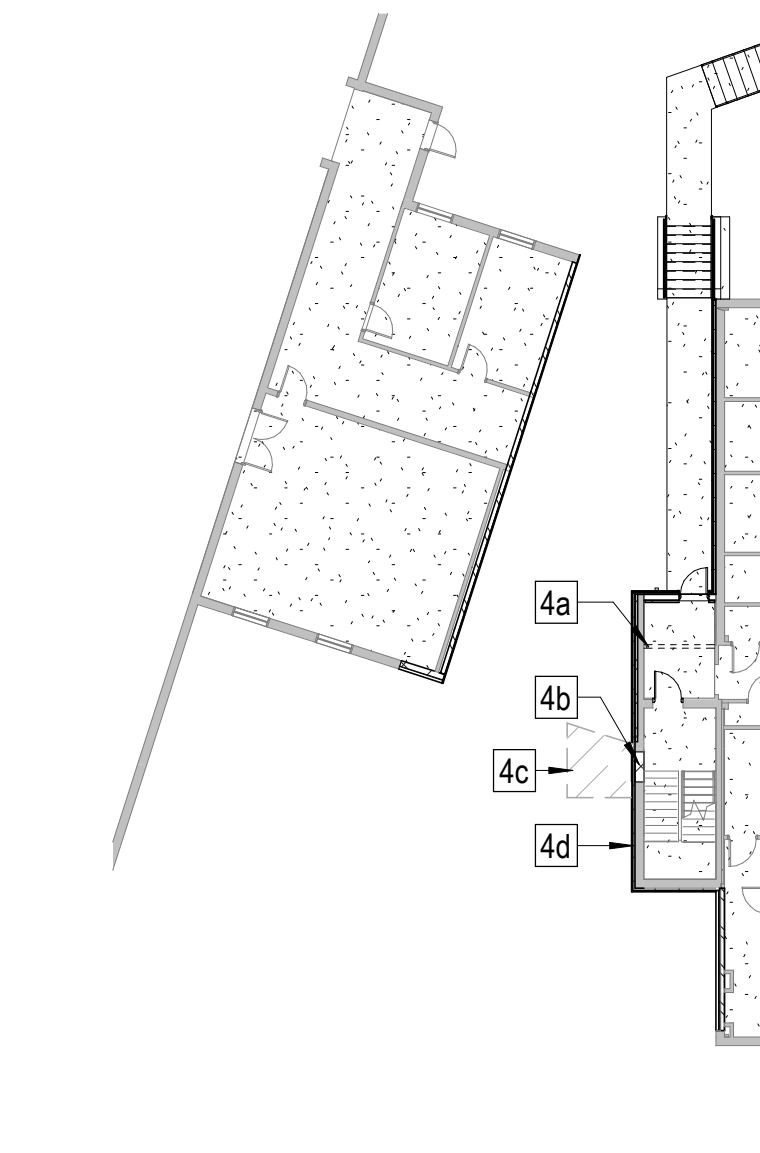
SEQUENCING STEP 1
SCALE: 3/64" = 1'-0"



SEQUENCING STEP 2
SCALE: 3/64" = 1'-0"



SEQUENCING STEP 3
SCALE: 3/64" = 1'-0"



SEQUENCING STEP 4
SCALE: 3/64" = 1'-0"

CD Revisions	Permit Revisions	DES
05.15.2020	07.30.2020	
1	2	

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	MARK	DATE	REVISIONS
12.11.2020	13356.28	KDL	DWH	KDL			

RRMM ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING CODE ANALYSIS

SHEET
1-G-102

12/11/2020 9:11:17 AM BIN 360:/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.rvt

601 SOUTH CARLIN SPRINGS ROAD

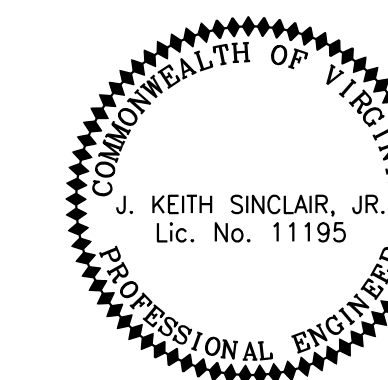
DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

ARLINGTON COUNTY, VIRGINIA



A. MORTON THOMAS AND ASSOCIATES, INC.
CONSULTING ENGINEERS
14555 AVION PARKWAY SUITE 150
CHANTILLY, VA 20151
PHONE (703) 817-1373
EMAIL: AMT1@AMTENGINEERING.COM

CONSULTANTS



SHEET INDEX

1-C-100	COVER SHEET
1-C-101	SIGNED TOPOGRAPHIC SURVEY PAGE 1
1-C-102	SIGNED TOPOGRAPHIC SURVEY PAGE 2
1-C-103	EXISTING CONDITIONS PLAN
1-C-104	TREE PRESERVATION PLAN
1-C-105	NOT USED
1-C-106	TREE PRESERVATION DETAILS
1-C-107	EXISTING TREE TABLE - TREE CONDITION SUMMARY
1-C-108	DEMOLITION PLAN
1-C-109	EROSION AND SEDIMENT CONTROL PLAN - PHASE 1
1-C-110	EROSION AND SEDIMENT CONTROL PLAN - PHASE 2
1-C-111	EROSION AND SEDIMENT CONTROL NOTES
1-C-112	EROSION AND SEDIMENT CONTROL DETAILS
1-C-113	SITE, GRADING & UTILITY PLAN
1-C-501	SITE DETAILS
1-C-701	PRE-DEVELOPMENT WATER QUALITY MAP
1-C-702	POST-DEVELOPMENT WATER QUALITY MAP
1-C-703	STORMWATER MANAGEMENT NARRATIVES, CALCULATIONS AND POLLUTION PREVENTION PLAN
1-C-704	WATER QUALITY IMPACT ASSESSMENT
1-L-101	LANDSCAPE CONSERVATION PLAN
1-L-501	LANDSCAPE NOTES & DETAILS

DATUM NOTES:

HORIZONTAL DATUM: THE SITE SHOWN HEREON IS REFERENCED TO THE VIRGINIA COORDINATE SYSTEM OF 1983 AS COMPUTED FROM A FIELD RUN TOPOGRAPHIC SURVEY.

VERTICAL DATUM: THE SITE SHOWN HEREON IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 AS COMPUTED FROM A FIELD RUN VERTICAL CONTROL SURVEY.

OWNER

NAME: THE COUNTY BOARD OF ARLINGTON
ADDRESS: 2100 CLARENDON BLVD, SUITE 300
ARLINGTON, VA 22201
TELEPHONE #: (703) 228-3130

DEVELOPER

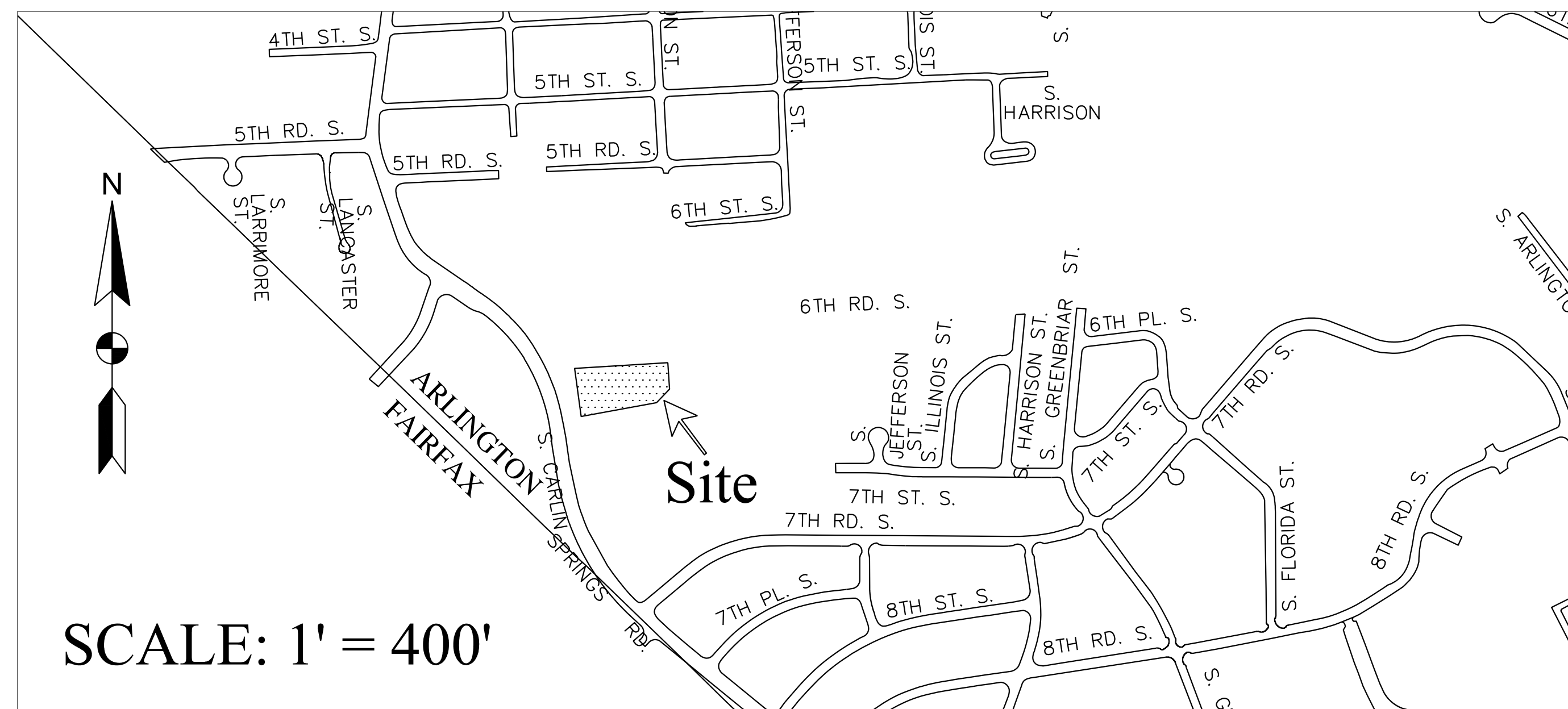
NAME: ARLINGTON COUNTY GOVERNMENT - D.E.S.
FACILITIES DESIGN & CONSTRUCTION
ADDRESS: 1400 N UHLE ST., SUITE 403
ARLINGTON, VA 22201
TELEPHONE #: (703) 226-3626
EMAIL: JALMARIO@ARLINGTONVA.US

ENGINEER

NAME: A. MORTON THOMAS & ASSOCIATES, INC.
ADDRESS: 14555 AVION PARKWAY, SUITE 150
CHANTILLY, VA 20151
TELEPHONE #: (703) 817-1373

CONTRACTOR

NAME: TO BE DETERMINED
ADDRESS: TO BE DETERMINED
TELEPHONE #: TO BE DETERMINED



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
ARLINGTON, VA 22204

GENERAL NOTES

- THE CONTRACTOR SHALL FULLY ACQUAINT HIMSELF WITH THE CONDITIONS OF THE SITE. THE CONTRACTOR SHALL THOROUGHLY EXAMINE AND BE FAMILIAR WITH THE DRAWINGS AND SPECIFICATIONS. SHOULD THE CONTRACTOR FIND ANY DISCREPANCIES, OMISSIONS, AMBIGUITIES, OR CONFLICTS IN OR AMONG THE CONTRACT DOCUMENTS OR BE IN DOUBT AS TO THEIR MEANING, HE SHALL BRING THESE ITEMS TO THE ATTENTION OF THE PROJECT OFFICER FOR DIRECTION BEFORE PROCEEDING WITH WORK.
- THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND BE RESPONSIBLE FOR ADHERENCE TO ALL ORDINANCES, REGULATIONS, LAWS AND CODES HAVING JURISDICTION OVER THE PROPERTY.
- THE CONTRACTOR SHALL SUBMIT A REQUIRED "RESPONSIBLE LAND DISTURBER" CERTIFICATION LETTER AS PART OF OBTAINING A BUILDING (OR DISTURBANCE) PERMIT.
- THE CONTRACTOR IS RESPONSIBLE FOR LICENSING AS REQUIRED BY APPLICABLE REGULATORY AGENCIES.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL SALES, USE AND CAPITAL GAINS TAXES.
- UTILITY LOCATIONS SHOWN ON THIS PLAN ARE APPROXIMATE LOCATIONS DETERMINED FROM VISIBLE EVIDENCE AND AVAILABLE RECORDS. ADDITIONAL UNDERGROUND UTILITY LINES MAY BE PRESENT THAT ARE NOT SHOWN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND PRESERVE EXISTING UTILITIES.
- CONTRACTOR SHALL NOT SUBSTITUTE PRODUCTS OR MATERIALS WITHOUT PRIOR APPROVAL BY THE PROJECT OFFICER.
- THE CONTRACTOR SHALL IDENTIFY ALL STAGING AREAS AND LIMITS OF WORK FOR APPROVAL BY THE PROJECT OFFICER PRIOR TO THE START OF WORK. AREAS OUTSIDE LIMITS OF WORK SHALL NOT BE USED FOR STORAGE OR MOVEMENT OF MATERIALS, MACHINERY OR DEBRIS.
- THE CONTRACTOR SHALL OBTAIN THE PROJECT OFFICER'S APPROVAL FOR TIMES OF DAY DURING WHICH CONSTRUCTION OPERATIONS MAY OCCUR. ALL CONSTRUCTION OPERATIONS SHALL OCCUR WITHIN TIMES SPECIFIED BY LOCAL ORDINANCES.
- THE CONTRACTOR SHALL BE ON SITE AT TIME OF ALL MATERIALS DELIVERIES.
- THE CONTRACTOR SHALL KEEP THE SITE CLEAN AND FREE OF TRASH AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE A TRASH RECEPTACLE TO BE USED ON SITE DURING CONSTRUCTION AND SHALL REMOVE TRASH FROM THE SITE ON A DAILY BASIS.
- THE CONTRACTOR SHALL KEEP VEHICULAR ACCESS AREAS CLEAN DURING CONSTRUCTION. VEHICULAR AND OTHER PAVED AREAS SHALL BE WASHED FREE OF MUD ON A WEEKLY BASIS DURING CONSTRUCTION.
- THE CONTRACTOR SHALL SECURE THE CONSTRUCTION AREA WITH FENCING AT END OF WORKDAY AND WHEN CONTRACTOR IS NOT ON SITE.
- THE CONTRACTOR SHALL DISTRIBUTE ALL PROJECT MATERIALS AND EQUIPMENT AND DISTRIBUTE ANY STOCKPILES IN SUCH A MANNER AS TO PROTECT EXISTING CONDITIONS, SUCH AS UTILITIES, PAVING, VEGETATION, ETC. THE CONTRACTOR SHALL NOT STOCKPILE SOIL OR CONSTRUCTION MATERIALS, OR DRIVE VEHICLES WITHIN THE CRITICAL ROOT ZONE OF EXISTING TREES TO REMAIN. THE CONTRACTOR SHALL OBTAIN THE PROJECT OFFICER'S APPROVAL FOR ALL CONSTRUCTION ACCESS AREAS, STAGING AND STOCKPILE AREAS PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL NOT BLOCK STREETS, PARKING AREAS, HOUSE OR DRIVEWAY ENTRANCES DURING CONSTRUCTION WITHOUT THE PROJECT OFFICER'S PERMISSION AND APPROVAL OF ANY RIGHT-OF-WAY PERMITS IF REQUIRED.
- THE CONTRACTOR SHALL STAKE THE ALIGNMENT OF ALL PAVEMENT, WALLS, CURBING, SAFETY SURFACING AND SITE FEATURES IN THE FIELD FOR APPROVAL BY THE PROJECT OFFICER PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL PROMPTLY REPAIR ALL DAMAGE TO EXISTING PAVEMENT, DRIVEWAYS, AND ADJACENT FACILITIES CAUSED BY CONSTRUCTION OPERATIONS. COST OF REPAIRS SHALL BE AT CONTRACTOR'S EXPENSE.
- CONTRACTOR SHALL REMOVE ALL EXCESS SOIL, TEMPORARY FENCING, EROSION CONTROL MEASURES, STABILIZATION MATERIALS, AND OTHER DEBRIS AND SHALL DISPOSE LEGALLY UPON COMPLETION OF THE PROJECT. CONTRACTOR SHALL THOROUGHLY WASH AND CLEAN ALL PAVED AREAS, WALLS, SITE FURNISHINGS AND FEATURES, ETC. UPON COMPLETION OF THE PROJECT.
- THE SITE SHOWN HEREON IS REFERENCED TO THE VIRGINIA COORDINATE SYSTEM OF 1983 AS COMPUTED FROM A FIELD RUN TOPOGRAPHIC SURVEY.
- THE SITE SHOWN HEREON IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 AS COMPUTED FROM A FIELD RUN VERTICAL CONTROL SURVEY.
- REFER TO INDIVIDUAL DRAWINGS FOR ADDITIONAL NOTES.

MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	N/A
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS

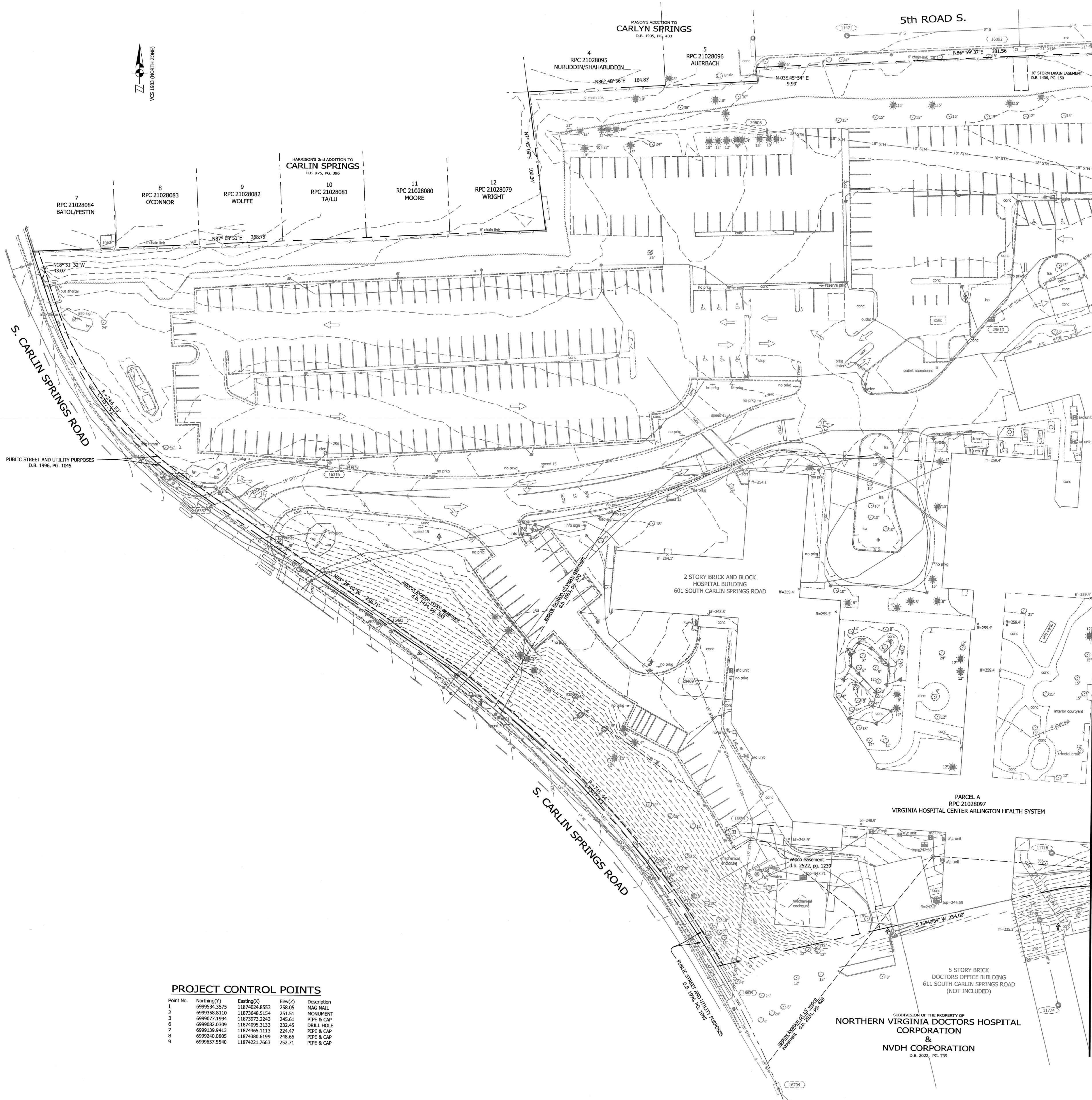
SHEET TITLE

COVER SHEET

1-C-100

SHEET 01 OF 20

SWM# 20-0148



PROJECT CONTROL POINTS

Point No.	Northing(Y)	Easting(X)	Elev(Z)	Description
1	6999534.3575	11874024.8553	258.05	IRIG MALL
2	6999358.8110	11873648.5154	251.51	MONUMENT
3	6999077.1994	11873973.2243	245.61	PIPE & CAP
6	6999082.0309	11874005.1133	232.45	DRILL HOLE
7	6999139.9413	11874365.1113	224.47	PIPE & CAP
8	6999240.0805	11874380.0199	240.66	PIPE & CAP
9	6999257.5540	11874221.7663	252.71	PIPE & CAP

MATCHLINE SHEET 2 OF 2

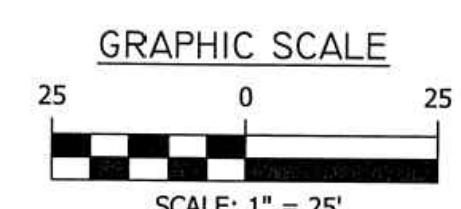
ARLINGTON
 VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL SERVICES
 Engineering Bureau - Survey Section
 2100 Clarendon Boulevard, Suite 813
 Arlington, VA 22201

THIS TOPOGRAPHIC SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF STEVEN J. LEARNARD, L.S. FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION; THAT THE INSTRUMENTS AND/OR ORIGINAL DATA WAS OBTAINED FROM 9/2019 TO 10/2019; AND THAT THIS PLAN, MAP OR DIGITAL GEOSPATIAL DATA INCLUDING METADATA MEETS MINIMUM ACCURACY STANDARDS, UNLESS OTHERWISE NOTED.

HORIZONTAL DATUM: VIRGINIA COORDINATE SYSTEM 1983.
 VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM 1988.
 CONTOUR INTERVAL: 1'
 UNIT OF MEASURE: U.S. SURVEY FOOT
 SCALE: 1" = 25'
 PREPARED FOR: ARLINGTON COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES
 THE DIMENSIONS OF THE INTERIOR COURTYARDS AND BOILER ROOM ARE APPROXIMATE.
 BOUNDARY INFORMATION SHOWN HEREON IS FROM AN EXISTING ALTA/NPS LAND TITLE SURVEY PREPARED BY ARLINGTON COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES DATED APRIL 4, 2016.

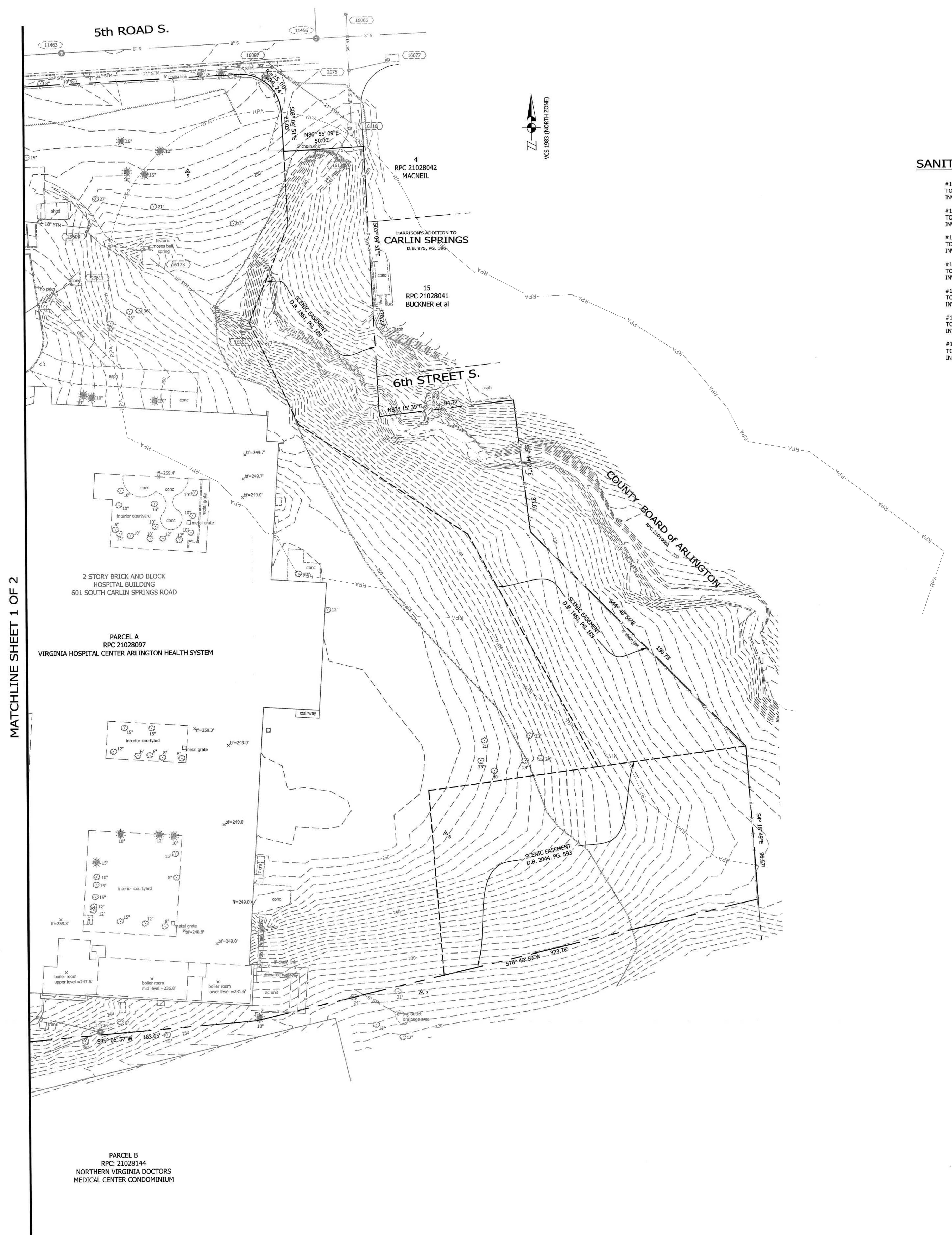
PARTY CHIEF: SHRADER PROJECT:
 SURVEY PM: LEARNARD 7027/CS20

TOPOGRAPHIC SURVEY
 OF
 PARCEL 'A'
 SUBDIVISION OF THE PROPERTIES OF
 NORTHERN VIRGINIA DOCTORS HOSPITAL
 AND
 NVDH CORPORATION
 D.B. 2022, PG. 739
 ARLINGTON COUNTY, VIRGINIA



1-C-101
 SHEET 1 OF 2

MATCHLINE SHEET 1 OF 2



SANITARY TABLE

#11456	TOP = 253.15
	INV = 248.54
#11463	TOP = 255.81
	INV = 249.42
#11471	TOP = 255.26
	INV = 250.57
#11718	TOP = 248.34
	INV = 241.00
#11726	TOP = 237.73
	INV = 229.43
#11745	TOP = 234.64
	INV = 227.49
#11774	TOP = 212.76
	INV = 204.36

STORM TABLE

**REFERENCES INFORMATION FROM EXISTING PLANS

#2075	TOP = 252.54	#16431	TOP = 235.91
	15" RCP IN = 248.12** (16077)		15" RCP IN = 232.63** (16357)
	24" RCP IN = 245.09** (16066)		15" RCP OUT = 232.09 (16560)
	24" RCP OUT = 244.99* (16116)	#16560	TOP = 228.76
#16066	TOP = 252.98		15" RCP IN = 222.96 (16431)
	24" RCP OUT = 245.88 (2075)		15" RCP OUT = 222.86 (16560)
#16077	TOP = 252.17	#16599	TOP = 248.06
	15" RCP OUT = 247.34 (2075)		10" CMP IN = 244.91 (ROOF DRAIN)
#16087	TOP = 254.16		15" RCP IN = 241.18 (28469)
	21" RCP IN = 246.73 (16092)		15" RCP OUT = 241.16 (16639)
	21" RCP OUT = 246.66 (16116)	#16639	TOP = 222.71
#16092	TOP = 254.79		15" RCP IN = 216.64** (16560)
	21" RCP IN = 247.14 (16073)		15" RCP IN = 218.03** (16599)
	21" RCP OUT = 247.04 (16087)		18" RCP OUT = 216.11 (16704)
#16116	TOP = 249.91	#16704	TOP = 218.37
	21" RCP IN = 243.68** (16087)		18" RCP IN = 211.60 (16639)
	24" RCP IN = 242.96** (2075)		18" RCP OUT = 211.03 (16744)
	36" RCP OUT = 241.55** (16128)	#16744	TOP = 211.40
#16128	INV. 36" RCP = 239.44 (16116)		18" RCP OUT = 205.25 (16704)
#16173	TOP = 245.41	#28469	TOP = 245.41
	INV. 10" CMP = 232.04 (16173)		15" RCP OUT = 243.26 (16599)
#16201	TOP = 249.53	#29608	TOP = 252.36 (29609)
	15" RCP IN = 245.03 (EAST)		INV. 18" CMP = 248.93 (29608)
	15" RCP OUT = 244.98 (16357)	#29610	TOP = 257.71
#16337	TOP = 249.12		10" PVC OUT = 254.84 (29611)
	15" RCP OUT = 246.07 (16357)	#29611	INV. 10" PVC = 252.49 (29610)
#16357	TOP = 247.66		
	15" RCP IN = 243.84 (16337)		
	15" RCP IN = 244.16 (16316)		
	15" RCP OUT = 243.31 (16431)		

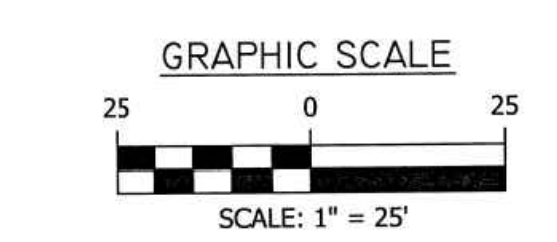
DEPARTMENT OF ENVIRONMENTAL SERVICES
Engineering Bureau - Survey Section
2100 Clarendon Boulevard, Suite 813
Arlington, VA 22201

THIS TOPOGRAPHIC SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF STEVEN J. LEARNARD, L.S. FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION. THAT THE IMAGERY AND/OR ORIGINAL DATA WAS OBTAINED FROM 9/2019 TO 10/2019; AND THAT THIS PLAN, MAP OR DIGITAL GEOSPATIAL DATA INCLUDING METADATA MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.

HORIZONTAL DATUM: VIRGINIA COORDINATE SYSTEM 1983.
VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM 1988.
CONTOUR INTERVAL: 1'
UNIT OF MEASURE: U.S. SURVEY FOOT
SCALE: 1" = 25'
PREPARED FOR: ARLINGTON COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES
THE DIMENSIONS OF THE INTERIOR COURTYARDS AND BOILER ROOM ARE APPROXIMATE.
BOUNDARY INFORMATION SHOWN HEREON IS FROM AN EXISTING ALTA/NSPS LAND TITLE SURVEY PREPARED BY ARLINGTON COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES DATED APRIL 4, 2016.

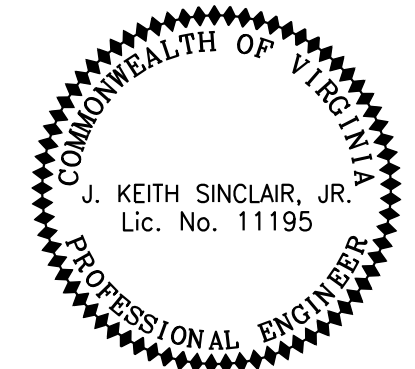
PARTY CHIEF: SHRADER PROJECT: 7027/CS20
SURVEY PM: LEARNARD

TOPOGRAPHIC SURVEY
OF
PARCEL 'A'
SUBDIVISION OF THE PROPERTIES OF
NORTHERN VIRGINIA DOCTORS HOSPITAL
AND
NVDH CORPORATION
D.B. 2022, PG. 739
ARLINGTON COUNTY, VIRGINIA

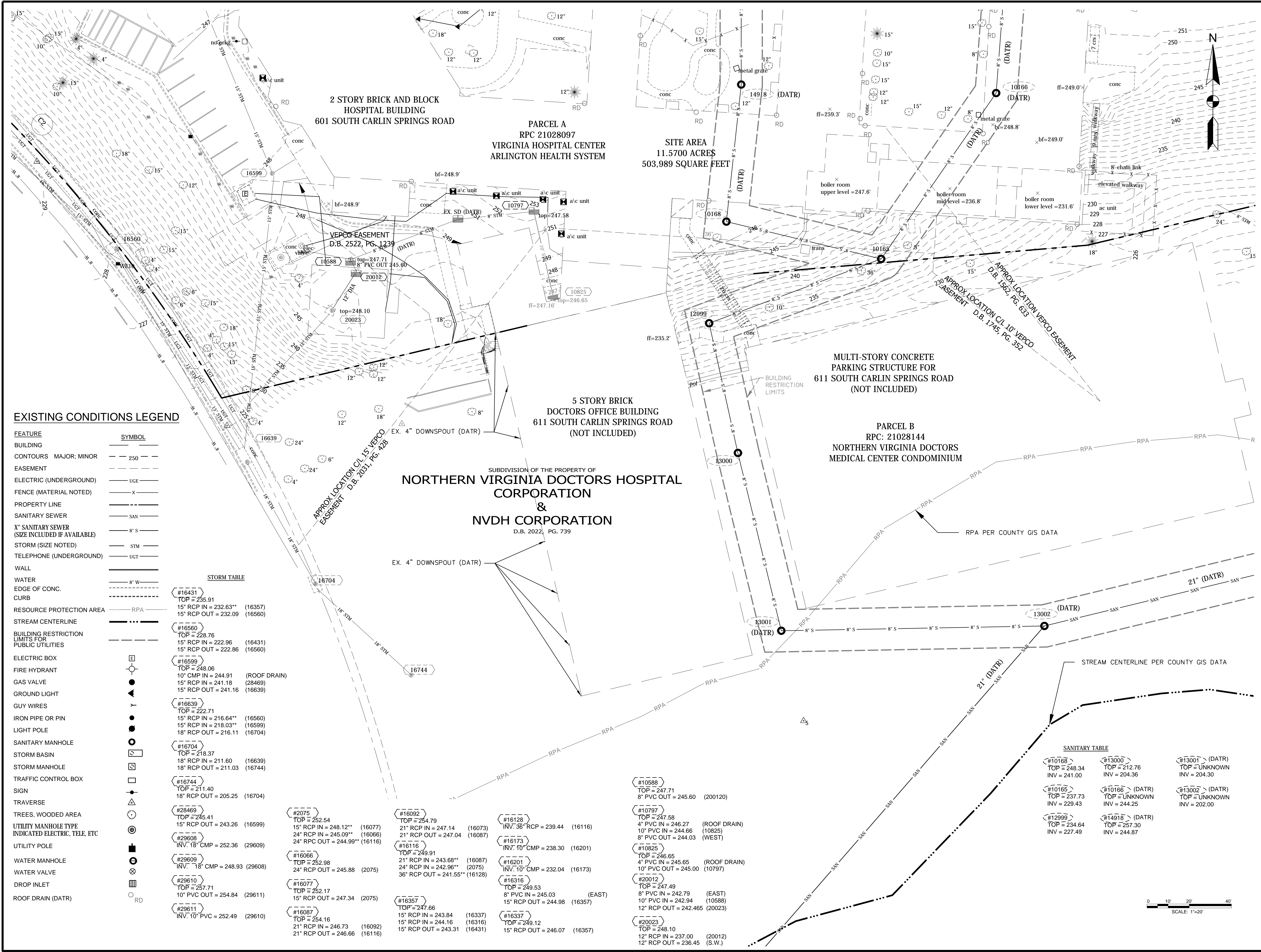


1-C-102
SHEET 2 OF 2

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1
 601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204



EXISTING CONDITIONS LEGEND

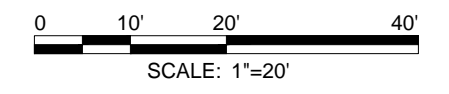
FEATURE	SYMBOL
BUILDING	[Solid black shape]
CONTOURS MAJOR: MINOR	--- 250 ---
EASEMENT	--- (dashed line)
ELECTRIC (UNDERGROUND)	--- UGE ---
FENCE (MATERIAL NOTED)	--- X ---
PROPERTY LINE	--- (dashed line)
SANITARY SEWER	--- SAN ---
X" SANITARY SEWER (SIZE INCLUDED IF AVAILABLE)	--- 8" S ---
STORM (SIZE NOTED)	--- STM ---
TELEPHONE (UNDERGROUND)	--- UGT ---
WALL	--- (dashed line)
WATER	--- 8" W ---
EDGE OF CONC. CURB	--- (dashed line)
RESOURCE PROTECTION AREA	--- RPA ---
STREAM CENTERLINE	--- (dotted line)
BUILDING RESTRICTION LIMITS FOR PUBLIC UTILITIES	--- (dashed line)
ELECTRIC BOX	[Square symbol]
FIRE HYDRANT	[Circle with cross symbol]
GAS VALVE	[Circle with dot symbol]
GROUND LIGHT	[Triangle symbol]
GUY WIRES	--- Y ---
IRON PIPE OR PIN	[Circle with dot symbol]
LIGHT POLE	[Circle with cross symbol]
SANITARY MANHOLE	[Circle with dot symbol]
STORM BASIN	[Square symbol]
STORM MANHOLE	[Square symbol]
TRAFFIC CONTROL BOX	[Square symbol]
SIGN	[Square symbol]
TRAVERSE	[Triangle symbol]
TREES, WOODED AREA	[Circle with cross symbol]
UTILITY MANHOLE TYPE INDICATED ELECTRIC, TELE, ETC	[Circle with cross symbol]
UTILITY POLE	[Square symbol]
WATER MANHOLE	[Circle with cross symbol]
WATER VALVE	[Circle with cross symbol]
DROP INLET	[Circle with cross symbol]
ROOF DRAIN (DATR)	[Circle with cross symbol]

STORM TABLE

#16431	TOP = 235.91	15" RCP IN = 232.63** (16357)	15" RCP OUT = 232.09 (16560)
#16560	TOP = 228.76	15" RCP IN = 222.96 (16431)	15" RCP OUT = 222.86 (16560)
#16599	TOP = 248.06	10" CMP IN = 244.91 (ROOF DRAIN)	15" RCP IN = 241.18 (28469)
		15" RCP OUT = 241.16 (16639)	
#16639	TOP = 222.71	15" RCP IN = 216.64** (16560)	15" RCP IN = 218.03** (16599)
		18" RCP OUT = 216.11 (16704)	
#16704	TOP = 218.37	18" RCP IN = 211.60 (16639)	18" RCP OUT = 211.03 (16744)
#16744	TOP = 211.40	18" RCP OUT = 205.25 (16704)	
#28469	TOP = 245.41	15" RCP OUT = 243.26 (16599)	
#29608	INV. 18" CMP = 252.36 (29609)		
#29609	INV. 18" CMP = 248.93 (29608)		
#29610	TOP = 257.71	10" PVC OUT = 254.84 (29611)	
#29611	INV. 10" PVC = 252.49 (29610)		
#2075	TOP = 252.54	15" RCP IN = 248.12** (16077)	24" RCP IN = 245.09** (16066)
		24" RCP OUT = 244.99** (16116)	
#16092	TOP = 254.79	21" RCP IN = 247.14 (16073)	21" RCP OUT = 247.04 (16087)
#16116	TOP = 249.91	21" RCP IN = 243.68** (16087)	24" RCP IN = 242.96** (2075)
		36" RCP OUT = 241.55** (16128)	
#16086	TOP = 252.98	24" RCP IN = 245.88 (2075)	
#16077	TOP = 252.17	15" RCP OUT = 247.34 (2075)	
#16087	TOP = 254.16	21" RCP IN = 246.73 (16092)	21" RCP OUT = 246.66 (16116)
#16357	TOP = 247.66	15" RCP IN = 243.84 (16337)	15" RCP IN = 244.16 (16316)
		15" RCP OUT = 243.31 (16431)	
#16128	INV. 36" RCP = 239.44 (16116)		
#16173	INV. 10" CMP = 238.30 (16201)		
#16201	INV. 10" CMP = 232.04 (16173)		
#16316	TOP = 249.53	8" PVC IN = 245.03 (EAST)	15" RCP OUT = 244.98 (16357)
#16337	TOP = 249.12	15" RCP OUT = 246.07 (16357)	
#10588	TOP = 247.71	8" PVC OUT = 245.60 (200120)	
#10797	TOP = 247.58	4" PVC IN = 246.27 (ROOF DRAIN)	10" PVC IN = 244.66 (10825)
		8" PVC OUT = 244.03 (WEST)	
#10825	TOP = 246.65	4" PVC IN = 245.65 (ROOF DRAIN)	10" PVC OUT = 245.00 (10797)
#20012	TOP = 247.49	8" PVC IN = 242.79 (EAST)	10" PVC IN = 242.94 (10588)
		12" RCP OUT = 242.465 (20023)	
#20023	TOP = 248.10	12" RCP IN = 237.00 (20012)	12" RCP OUT = 236.45 (S.W.)

SANITARY TABLE

#10168	TOP = 248.34	INV = 241.00	#13000	TOP = 212.76	INV = 204.36	#13001	(DATR)	TOP = UNKNOWN	INV = 204.30
#10165	TOP = 237.73	INV = 229.43	#10166	(DATR)	TOP = UNKNOWN	INV = 244.25	#13002	(DATR)	TOP = UNKNOWN
#12999	TOP = 234.64	INV = 227.49	#14918	(DATR)	TOP = 257.30	INV = 244.87			



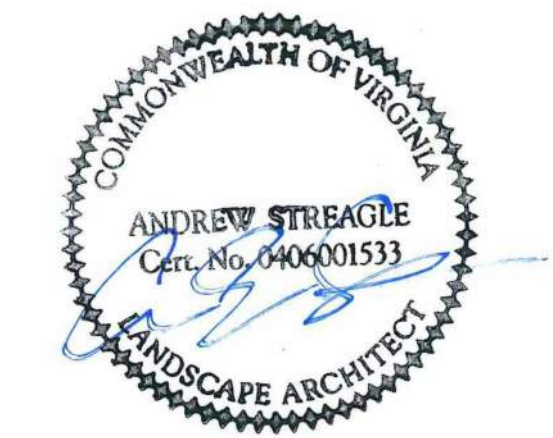
MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

EXISTING CONDITIONS PLAN

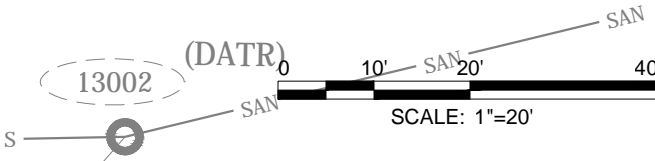
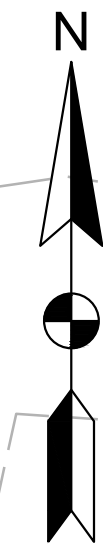
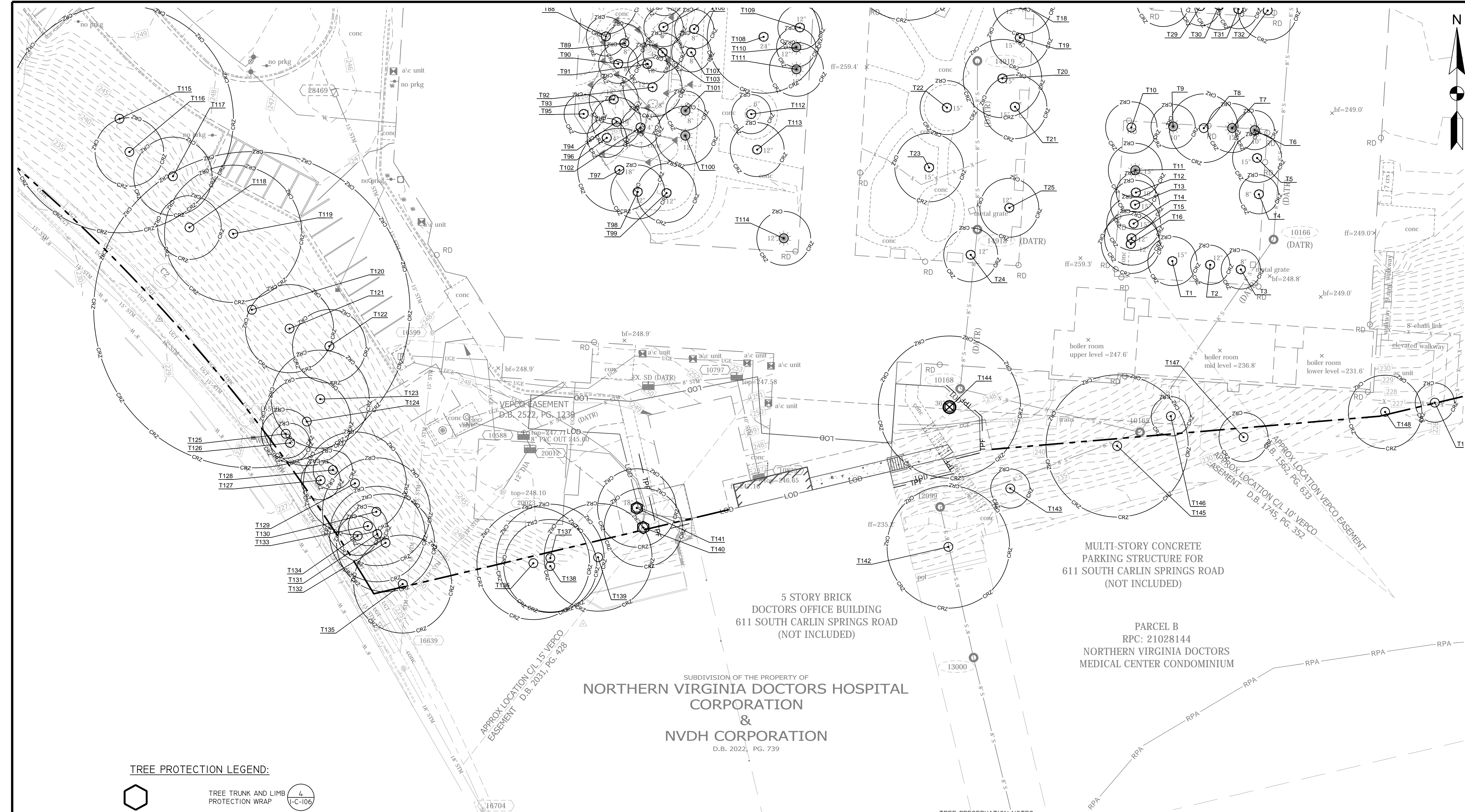
1-C-103

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204



TREE PROTECTION LEGEND:

- TREE TRUNK AND LIMB PROTECTION WRAP (1-C-106)
- TREE TO BE REMOVED, CONTRACTOR TO GRIND STUMPS
- 6' CHAIN LINK TREE PROTECTION (1-C-106)
- ROOT PRUNING (1-C-106)
- CRZ CRZ CRZ CRITICAL ROOT ZONE

TREE PRESERVATION NOTES:

1. PRESERVE ALL EXISTING TREES.
2. IF THE TREE PRESERVATION MEASURES PROVIDED ON THE PLANS AND SPECIFICATIONS ARE NOT FOLLOWED DURING ANY PART OF THE CONSTRUCTION PROCESS, THE URBAN FORESTER MAY ASK FOR THE REMOVAL AND REPLACEMENT OF ANY DAMAGED TREES AT THE CONTRACTOR'S EXPENSE. THIS WILL BE COORDINATED WITH THE PROJECT OFFICER AND LANDSCAPE ARCHITECT.
3. CONTRACTOR SHALL COORDINATE TREATMENT (I.E., RADIAL TRENCHING, SUPERSONIC AIR TOOL DECOMPACTION, SOIL COMPOST AMENDMENT, ROOT PRUNING) OF EXISTING TREES WITH COUNTY AS DEEMED NECESSARY.
4. SEE TREE SCHEDULE AND PRESERVATION SUMMARY ON I-C-107 FOR TREE-BY-TREE LIST OF PROPOSED TREE PRESERVATION MEASURES.
5. SEE TREE PROTECTION DETAILS ON I-C-106.
6. SEE DEMOLITION PLAN FOR ADDITIONAL INFORMATION.
7. ARLINGTON COUNTY URBAN FORESTER RESERVES THE RIGHT TO MAKE ADJUSTMENTS TO TREE PROTECTION MEASURES BASED ON CONDITIONS ENCOUNTERED IN THE FIELD.
8. ALL ADJUSTMENTS TO THIS PLAN SHALL BE APPROVED BY URBAN FORESTER PRIOR TO SITE WORK.
9. AN INDEPENDENT ARBORIST, HIRED BY THE GENERAL CONTRACTOR, SHALL BE ON-SITE DURING DEMOLITION OF EXISTING PLAYGROUND TO MONITOR TREE PRESERVATION MEASURES. INDEPENDENT ARBORIST SHALL OVERSEE DEMOLITION WITHIN CRITICAL ROOT ZONES AND REPORT TO DPR FORESTRY STAFF WITH REGULAR COMMUNICATION AND WEEKLY WRITTEN REPORT, INCLUDING PHOTOGRAPHS, NOTES, PRESERVATION UPDATES AND CONSTRUCTION PROGRESS.
10. CONTRACTOR TO NOTIFY URBAN FORESTER 72 HOURS PRIOR TO INSTALLATION OF ANY TREE PRESERVATION MEASURES SHOWN ON PLANS AND URBAN FORESTER SHALL APPROVE THE LAYOUT OF TREE PRESERVATION MEASURES.

ADDITIONAL TREE PRESERVATION NOTES:

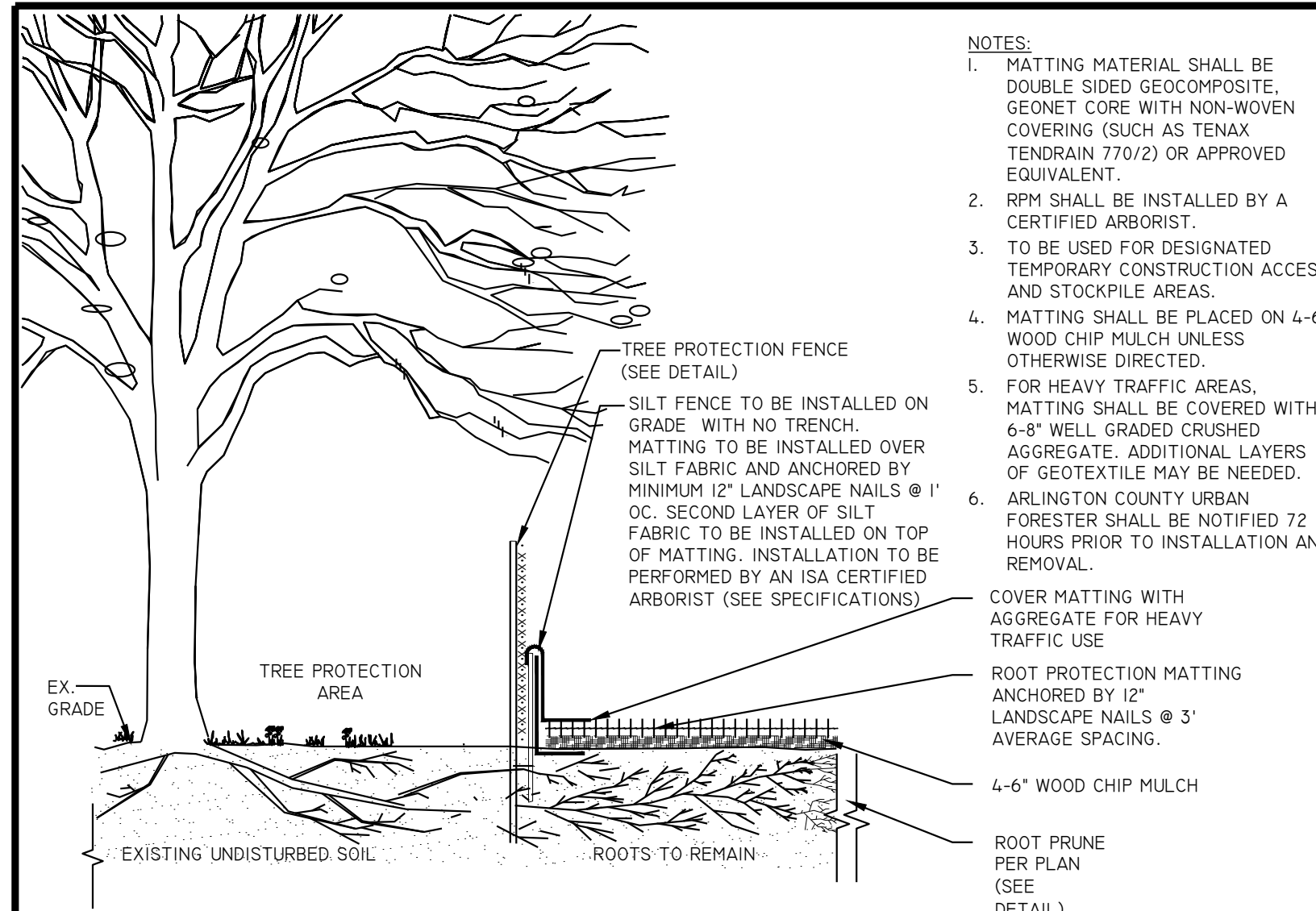
- A. GENERALLY, TREE PROTECTION FENCE IS LOCATED AT THE LIMIT OF DISTURBANCE. THEREFORE, THE LAYOUT OF LINES DEPICTING TREE PROTECTION FENCE IS DIAGRAMMATIC, AND FOR REFERENCE ONLY. PLEASE REFER TO THE TREE PRESERVATION DETAILS FOR MORE INFORMATION.
- B. BEFORE ANY GRADING, DEMOLITION, SITE IMPROVEMENTS, OR OTHER DISTURBANCE (ASIDE FROM THE INSTALLATION OF TREE PROTECTION AND EROSION/SEDIMENT CONTROL DEVICES) IS PERFORMED, TREE PROTECTION MEASURES SHALL BE INSTALLED PER THE PLAN BY THE CONTRACTOR AND INSPECTED/APPROVED BY AN ARLINGTON COUNTY ARBORIST.
- C. THIS PLAN IS FOR TREE PROTECTION/FOREST CONSERVATION PURPOSES ONLY.
- D. IF TREE PROTECTION MEASURES PROVIDED ON THE PLANS AND SPECIFICATIONS ARE NOT FOLLOWED DURING ANY PART OF THE CONSTRUCTION PROCESS, THE URBAN FORESTER MAY ASK FOR THE REMOVAL AND REPLACEMENT OF TREES AT THE CONTRACTOR'S EXPENSE. THIS WILL BE COORDINATED WITH THE PROJECT OFFICER.
- E. SEE THE FOLLOWING FOR ADDITIONAL TREE PRESERVATION NOTES, INFORMATION AND REQUIREMENTS:
 - E.A. TREE PRESERVATION SPECIFICATION
 - E.B. DEMOLITION PLAN

MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

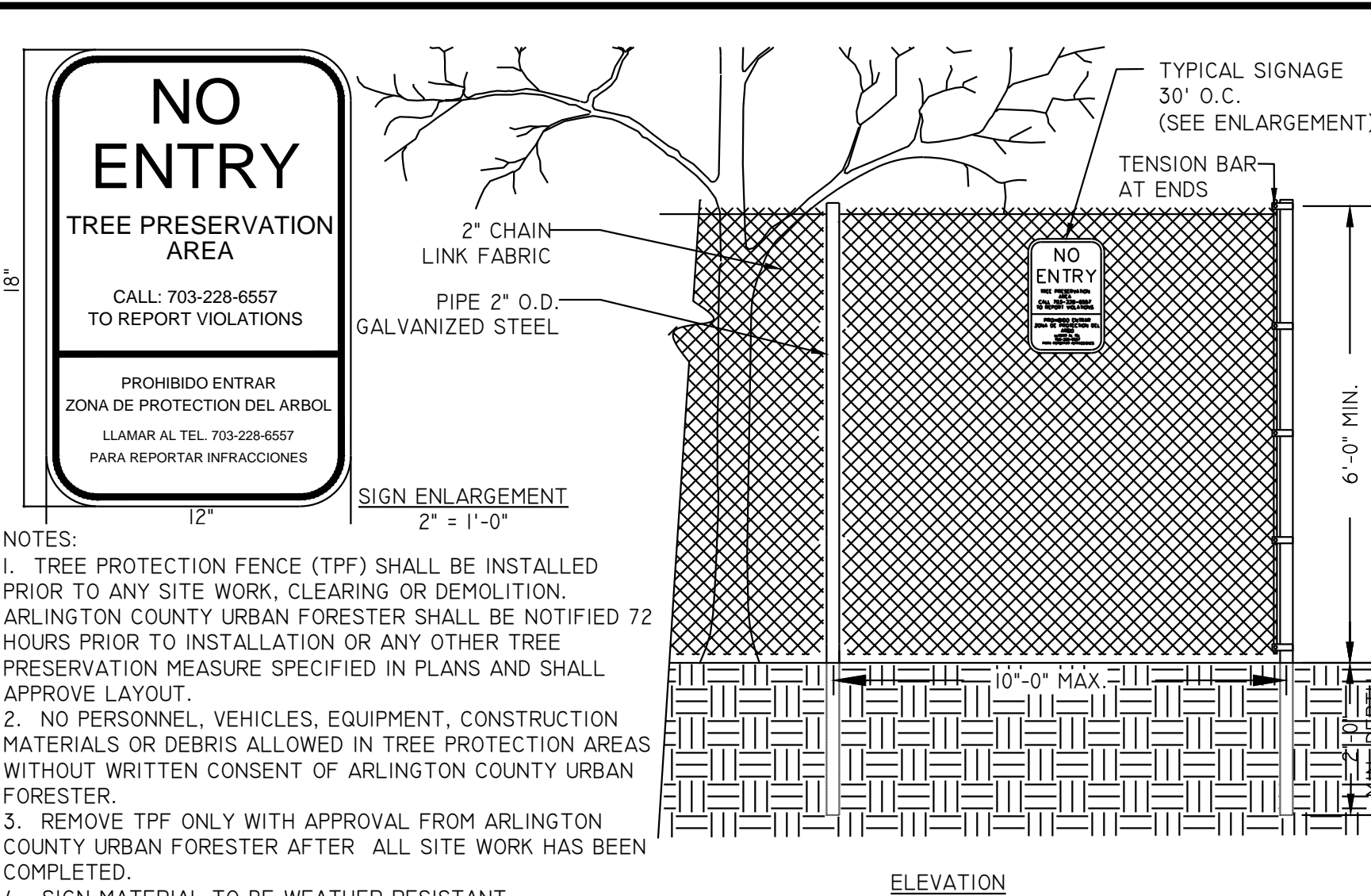
TREE PRESERVATION PLAN

1-C-104



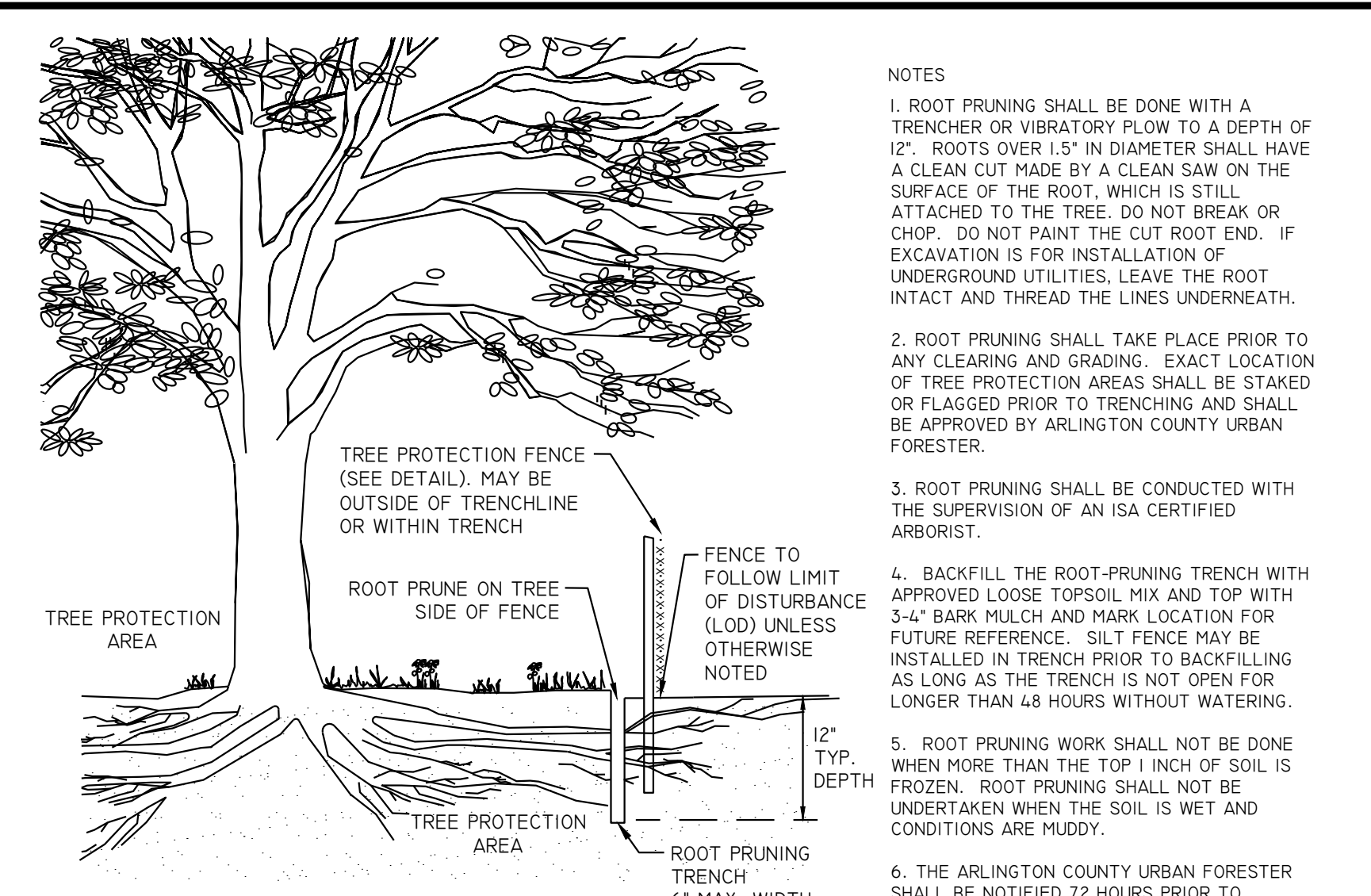
- NOTES:**
- MATTING MATERIAL SHALL BE DOUBLE SIDED GEOCOMPOSITE, GEONET CORE WITH NON-WOVEN COVERING (SUCH AS TENAX TENDRAIN 770/2) OR APPROVED EQUIVALENT.
 - RPM SHALL BE INSTALLED BY A CERTIFIED ARBORIST.
 - TO BE USED FOR DESIGNATED TEMPORARY CONSTRUCTION ACCESS AND STOCKPILE AREAS.
 - MATTING SHALL BE PLACED ON 4-6\"/>

1 TEMPORARY ROOT PROTECTION MATTING WITHIN CRZ
NOT TO SCALE



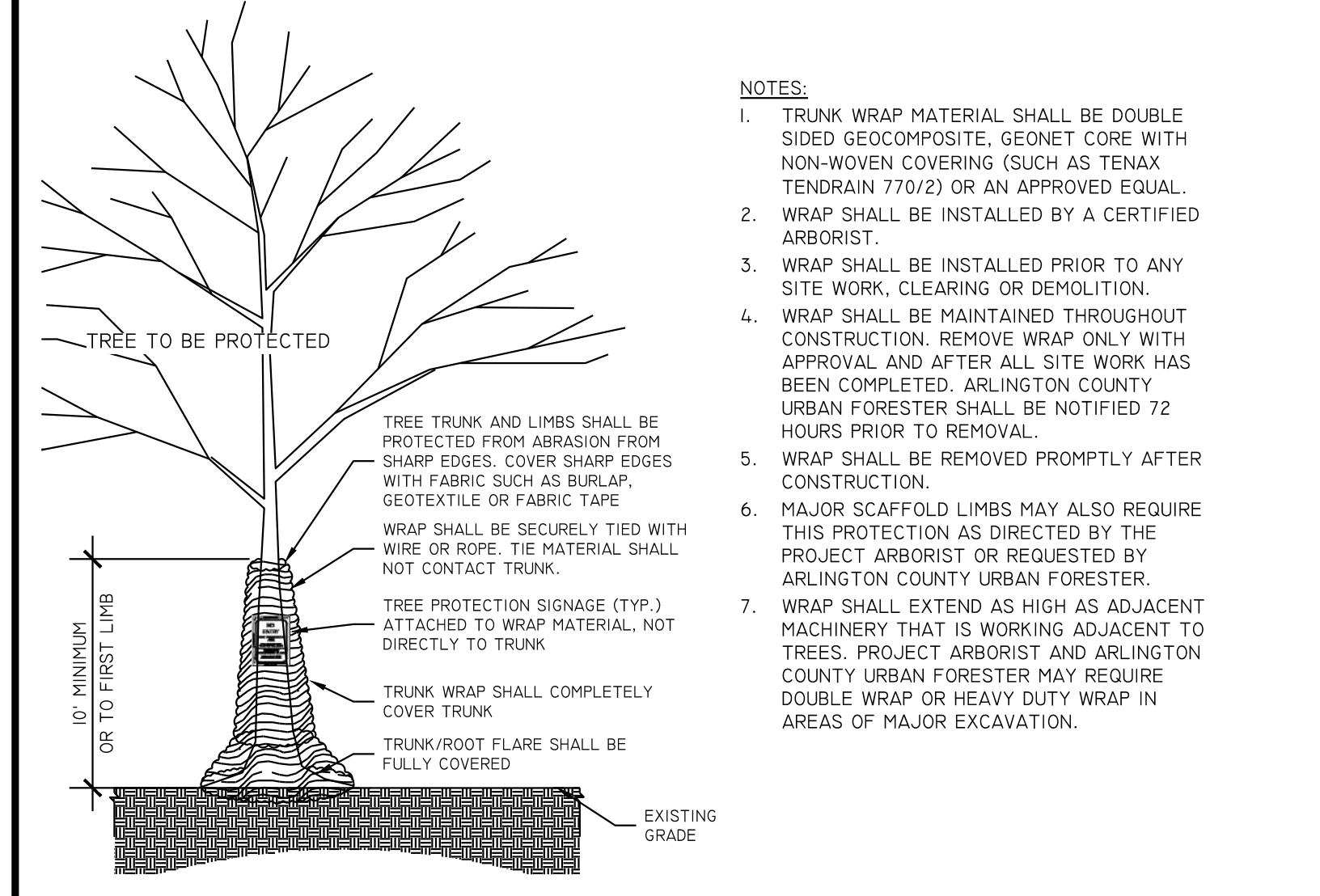
- NOTES:**
- TREE PROTECTION FENCE (TPF) SHALL BE INSTALLED PRIOR TO ANY SITE WORK, CLEARING OR DEMOLITION. ARLINGTON COUNTY URBAN FORESTER SHALL BE NOTIFIED 72 HOURS PRIOR TO INSTALLATION OR ANY OTHER TREE PRESERVATION MEASURE SPECIFIED IN PLANS AND SHALL APPROVE LAYOUT.
 - NO PERSONNEL, VEHICLES, EQUIPMENT, CONSTRUCTION MATERIALS OR DEBRIS ALLOWED IN TREE PROTECTION AREAS WITHOUT WRITTEN CONSENT OF ARLINGTON COUNTY URBAN FORESTER.
 - REMOVE TPF ONLY WITH APPROVAL FROM ARLINGTON COUNTY URBAN FORESTER AFTER ALL SITE WORK HAS BEEN COMPLETED.
 - SIGN MATERIAL TO BE WEATHER RESISTANT.

2 6" CHAIN LINK TREE PROTECTION FENCE



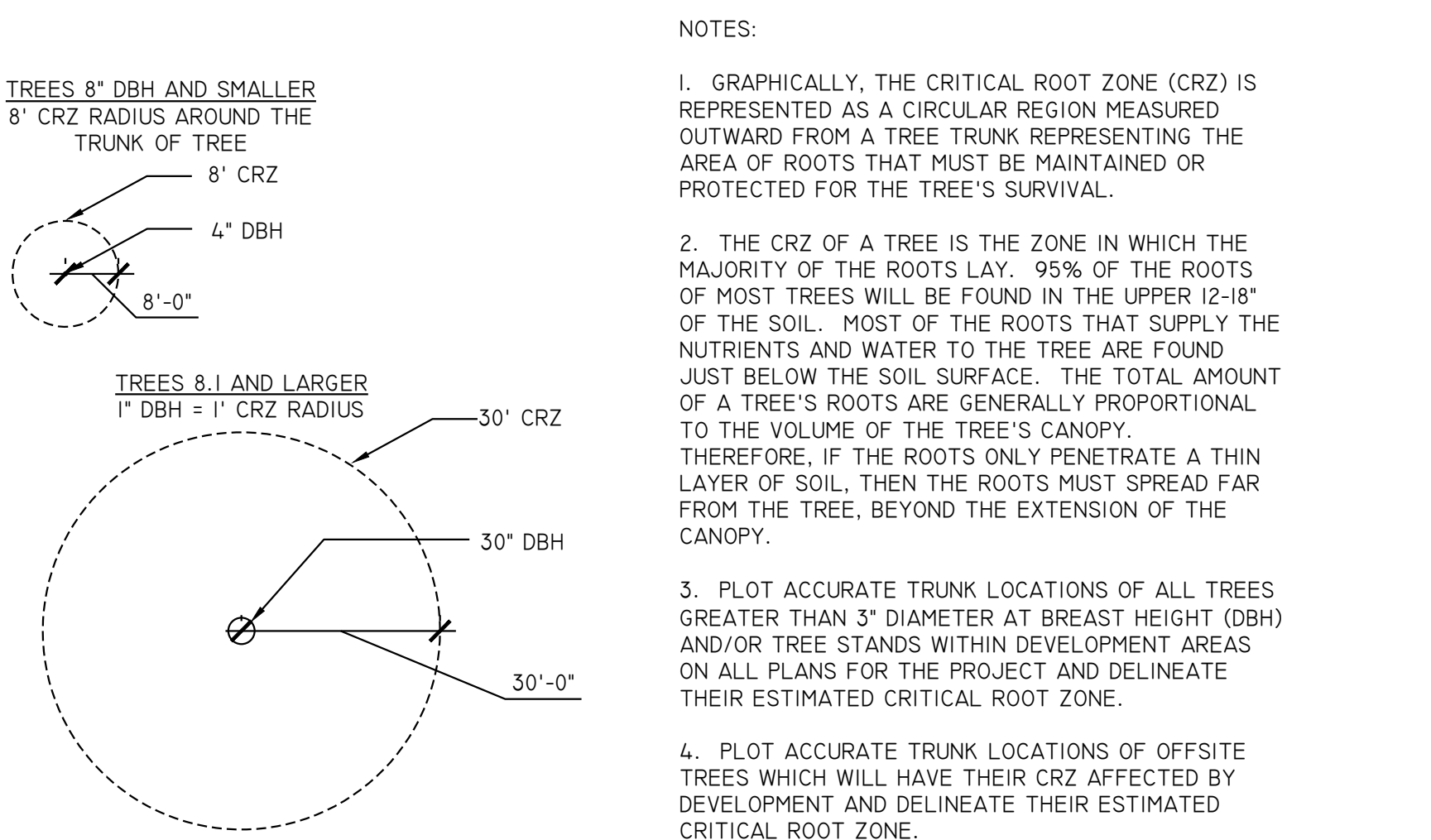
- NOTES:**
- ROOT PRUNING SHALL BE DONE WITH A TRENCHER OR VIBRATORY FLOW TO A DEPTH OF 12\"/>

3 ROOT PRUNING
N.T.S.



- NOTES:**
- TRUNK WRAP MATERIAL SHALL BE DOUBLE SIDED GEOCOMPOSITE, GEONET CORE WITH NON-WOVEN COVERING (SUCH AS TENAX TENDRAIN 770/2) OR AN APPROVED EQUAL.
 - WRAP SHALL BE INSTALLED BY A CERTIFIED ARBORIST.
 - WRAP SHALL BE INSTALLED PRIOR TO ANY SITE WORK, CLEARING OR DEMOLITION.
 - WRAP SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION. REMOVE WRAP ONLY WITH APPROVAL AND AFTER ALL SITE WORK HAS BEEN COMPLETED. ARLINGTON COUNTY URBAN FORESTER SHALL BE NOTIFIED 72 HOURS PRIOR TO REMOVAL.
 - WRAP SHALL BE REMOVED PROMPTLY AFTER CONSTRUCTION.
 - MAJOR SCAFFOLD LIMBS MAY ALSO REQUIRE THIS PROTECTION AS DIRECTED BY THE PROJECT ARBORIST OR REQUESTED BY ARLINGTON COUNTY URBAN FORESTER.
 - WRAP SHALL EXTEND AS HIGH AS ADJACENT MACHINERY THAT IS WORKING ADJACENT TO TREES. PROJECT ARBORIST AND ARLINGTON COUNTY URBAN FORESTER MAY REQUIRE DOUBLE WRAP OR HEAVY DUTY WRAP IN AREAS OF MAJOR EXCAVATION.

4 TREE TRUNK AND LIMB PROTECTION WRAP
N.T.S.



- NOTES:**
- GRAPHICALLY, THE CRITICAL ROOT ZONE (CRZ) IS REPRESENTED AS A CIRCULAR REGION MEASURED OUTWARD FROM A TREE TRUNK REPRESENTING THE AREA OF ROOTS THAT MUST BE MAINTAINED OR PROTECTED FOR THE TREE'S SURVIVAL.
 - THE CRZ OF A TREE IS THE ZONE IN WHICH THE MAJORITY OF THE ROOTS LAY. 95% OF THE ROOTS OF MOST TREES WILL BE FOUND IN THE UPPER 12-18\"/>

5 TREE PROTECTION DETAIL FOR DETERMINING CRITICAL ROOT ZONE
N.T.S.

AMT
A. MORTON THOMAS AND ASSOCIATES, INC.
CONSULTING ENGINEERS
14555 AVON PARKWAY SUITE 150
CHANTILLY, VA 20151
PHONE (703) 817-1373
EMAIL: AMT1@AMTENGINEERING.COM

CONSULTANTS

DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1
601 SOUTH CARLIN SPRINGS ROAD
ARLINGTON, VA 22204

MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

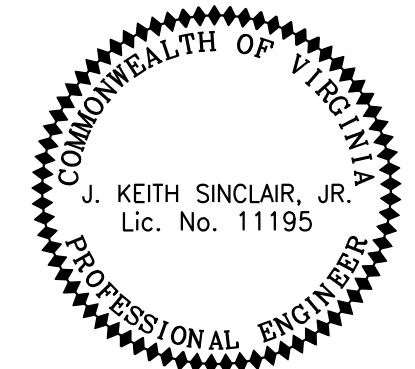
PROJECT NO:	19-0679.001
SCALE:	N/A
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS

SHEET TITLE
TREE PRESERVATION DETAILS

Tree Condition Summary

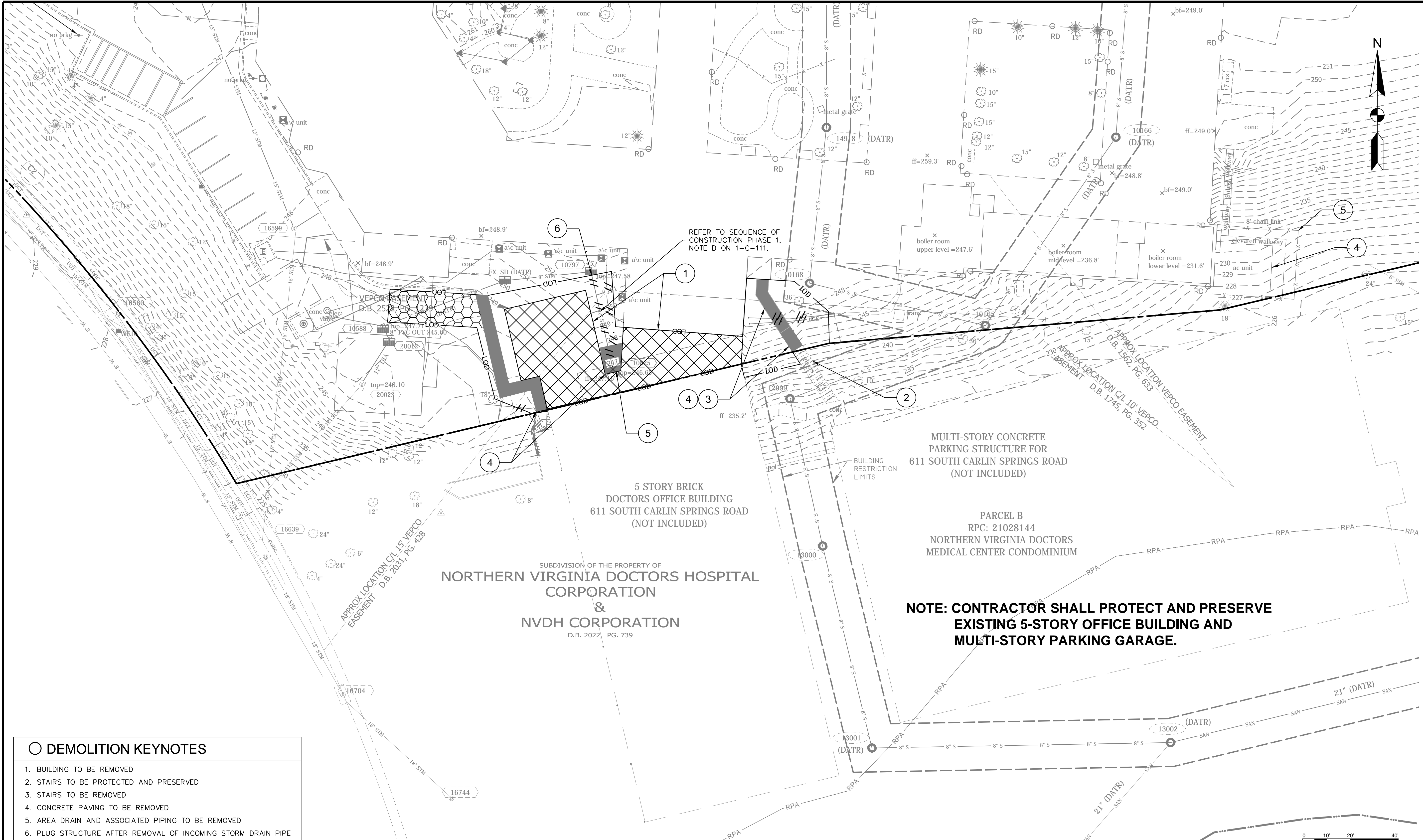
Tree #	Scientific Name	Common Name	D.B.H	Critical Root Zone	AMT Tree Condition Rating	COR Tree Condition Rating	Comments
	(see note 1)		(inches)	(Sq. Ft.)			(see note 2)
T1	<i>Ilex cornuta 'Burfordii'</i>	Burford holly	10.0	707	88		Multi-trunk (4, 2, 2, 6, 4, 4, 2, 2), growing on slope
T2	<i>Ilex x attenuata 'Fosteri'</i>	Foster's holly	8.0	452	88		Multi-trunk (5, 3, 3, 4), growing on slope
T3	<i>Ilex cornuta 'Burfordii'</i>	Burford holly	4.0	113	73		Multi-trunk (2, 2.5, 3), broken limbs
T4	<i>Pyracantha coccinea</i>	Firethorn	6.0	254	84		Multi-trunk (1, 1, 3, 3, 2.5, 3), growing on slope
T5	<i>Pyracantha coccinea</i>	Firethorn	10.0	707	84		Multi-trunk (7, 3, 5, 3, 3)
T6	<i>Chamaecyparis pisifera</i>	False cypress	5.0	177	78		Multi-trunk (3, 3, 3)
T7	<i>Chamaecyparis pisifera</i>	False cypress	10.0	707	78		Multi-trunk (5, 4, 4, 7)
T8	<i>Cupressus x leylandii</i>	Leyland cypress	14.0	1385	78		
T9	<i>Cupressus x leylandii</i>	Leyland cypress	9.0	573	78		
T10	<i>Ilex cornuta 'Burfordii'</i>	Burford holly	10.5	779	59		wounds on trunk
T11	<i>Chamaecyparis pisifera</i>	False cypress	11.0	855	78		Multi-trunk (5, 7, 4, 3, 4)
T12	<i>Chamaecyparis pisifera</i>	False cypress	7.0	346	78		Multi-trunk (5, 5)
T13	<i>Chamaecyparis pisifera</i>	False cypress	10.0	707	78		Multi-trunk (3, 8, 4, 3)
T14	<i>Chamaecyparis pisifera</i>	False cypress	11.0	855	78		Multi-trunk (5, 7, 5, 4, 3)
T15	<i>Chamaecyparis pisifera</i>	False cypress	11.0	855	78		Multi-trunk (6, 8, 5)
T16	<i>Cupressus x leylandii</i>	Leyland cypress	12.0	1018	80		broken limbs
T17	<i>Prunus yedoensis</i>	Yoshino cherry	24.0	4072	67		compacted root zone
T18	<i>Juniperus virginiana</i>	Eastern red cedar	12.0	1018	78		
T19	<i>Juniperus virginiana</i>	Eastern red cedar	12.0	1018	73		leaning
T20	<i>Juniperus virginiana</i>	Eastern red cedar	16.0	1810	73		Multi-trunk (12, 10), leaning
T21	<i>Juniperus virginiana</i>	Eastern red cedar	13.0	1195	73		leaning
T22	<i>Lagerstroemia indica</i>	Crape myrtle	11.0	855	94		Multi-trunk (4, 4, 5, 6, 6)
T23	<i>Fraxinus pennsylvanica</i>	Green ash	14.0	1385	83		broken limbs
T24	<i>Cupressus x leylandii</i>	Leyland cypress	11.0	855	78		
T25	<i>Juniperus virginiana</i>	Eastern red cedar	12.0	1018	78		
T26	<i>Pyracantha coccinea</i>	Firethorn	14.0	1385	81		Multi-trunk (3, 3, 4, 1, 5, 6, 1, 3, 1, 7, 1, 6, 1)
T27	<i>Pyracantha coccinea</i>	Firethorn	13.0	1195	81		Multi-trunk (2, 4, 2, 1, 1, 7, 5, 4, 4, 3, 1, 4)
T28	<i>Ilex opaca</i>	American holly	11.0	855	77		Multi-trunk (7, 9), wound in trunk
T29	<i>Cupressus x leylandii</i>	Leyland cypress	8.0	452	69		Multi-trunk (2, 2, 7), broken limbs
T30	<i>Cupressus x leylandii</i>	Leyland cypress	10.0	707	72		cut limbs
T31	<i>Cupressus x leylandii</i>	Leyland cypress	8.0	452	69		multi-trunk (1, 8), broken limbs
T32	<i>Cupressus x leylandii</i>	Leyland cypress	12.0	1018	69		multi-trunk (5, 7, 7, 5), cut limbs
T33	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	14.0	1385	89		
T34	<i>Lagerstroemia indica</i>	Crape myrtle	9.0	573	84		multi-trunk (4, 5, 6, 3)
T35	<i>Lagerstroemia indica</i>	Crape myrtle	5.0	177	81		multi-trunk (3, 4)
T36	<i>Prunus yedoensis</i>	Yoshino cherry	4.0	113	89		
T37	<i>Lagerstroemia indica</i>	Crape myrtle	7.0	346	84		multi-trunk (2, 2, 3, 4, 4)
T38	<i>Lagerstroemia indica</i>	Crape myrtle	6.0	254	84		multi-trunk (4, 4)
T39	<i>Lagerstroemia indica</i>	Crape myrtle	4.0	113	84		multi-trunk (1, 1, 2, 3)
T40	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	10.0	707	84		broken limbs
T41	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	9.0	573	84		
T42	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	8.5	511	84		
T43	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	11.0	855	84		
T44	<i>Lagerstroemia indica</i>	Crape myrtle	6.0	254	83		multi-trunk (3, 3, 4)
T45	<i>Lagerstroemia indica</i>	Crape myrtle	8.0	452	83		multi-trunk (5, 5, 4)
T46	<i>Acer saccharinum</i>	Silver maple	14.5	1486	81		
T47	<i>Acer saccharinum</i>	Silver maple	16.0	1810	81		
T48	<i>Acer saccharinum</i>	Silver maple	13.0	1195	81		
T49	<i>Acer saccharinum</i>	Silver maple	14.0	1385	81		
T50	<i>Acer saccharinum</i>	Silver maple	13.5	1288	81		
T51	<i>Acer saccharinum</i>	Silver maple	14.0	1385	81		
T52	<i>Acer saccharinum</i>	Silver maple	16.5	1924	81		
T53	<i>Acer saccharum</i>	Silver maple	17.0	2043	81		
T54	<i>Juniperus virginiana</i>	Eastern red cedar	16.0	1810	78		ivy on trunk, broken limbs
T55	<i>Pinus virginiana</i>	Virginia pine	18.0	2290	77		browning needles, broken limbs, ivy on trunk
T56	<i>Pinus virginiana</i>	Virginia pine	15.0	1590	73		no needles, ivy on trunk, broken limbs
T57	<i>Pinus virginiana</i>	Virginia pine	4.0	113	75		ivy on trunk, broken limbs, browning needles
T58	<i>Juniperus virginiana</i>	Eastern red cedar	24.0	4072	78		multi-trunk (16, 18), ivy on trunk, broken limbs
T59	<i>Pinus virginiana</i>	Virginia pine	9.0	573	70		no needles, ivy on trunk, wound on trunk
T60	<i>Pinus virginiana</i>	Virginia pine	9.0	573	75		ivy on trunk, broken limbs, browning needles
T61	<i>Pinus virginiana</i>	Virginia pine	17.0	2043	75		ivy on trunk, broken limbs, browning needles
T62	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	24.0	4072	84		multi-trunk (12, 11, 18), broken limbs
T63	<i>Pinus virginiana</i>	Virginia pine	14.0	1385	83		broken limbs
T64	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	24.0	4072	78		wound in trunk, broken limbs
T65	<i>Pinus virginiana</i>	Virginia pine	10.0	707	80		broken limbs
T66	<i>Pinus virginiana</i>	Virginia pine	14.0	1385	80		broken limbs, ivy on trunk
T67	Quercus rubra	Red oak	30.0	6362	88		
T68	<i>Acer saccharinum</i>	Silver maple	22.0	3421	84		compacted root zone
T69	Quercus rubra	Red oak	38.0	10207	80		compacted root zone, broken limbs
T70	<i>Acer rubrum</i>	Red maple	10.0	707	81		
T71	<i>Acer rubrum</i>	Red maple	16.0	1810	77		compacted root zone
T72	<i>Acer rubrum</i>	Red maple	19.0	2552	80		
T73	<i>Ilex cornuta 'Burfordii'</i>	Burford holly	9.0	573	86		multi-trunk (7, 5), ivy at base
T74	<i>Ilex x 'Nellie R. Stevens'</i>	Nellie Stevens holly	10.0	707	100		
T75	<i>Ilex x 'Nellie R. Stevens'</i>	Nellie Stevens holly	10.0	707	100		
T76	<i>Ilex x 'Nellie R. Stevens'</i>	Nellie Stevens holly	10.0	707	100		
T77	<i>Ilex x 'Nellie R. Stevens'</i>	Nellie Stevens holly	10.0	707	100		
T78	<i>Juniperus virginiana</i>	Eastern red cedar	10.0	707	100		
T79	<i>Prunus serrulata</i>	Flowering cherry	11.0	855	91		ivy at base
T80	<i>Ilex crenata</i>	Japanese holly	6.0	254	83		cut limbs, ivy at base
T81	<i>Ilex crenata</i>	Japanese holly	5.0	177	83		cut limbs, ivy at base
T82	<i>Prunus serrulata</i>	Flowering cherry	7.0	346	86		ivy at base, wound in trunk
T83	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	8.0	452	89		ivy at base
T84	<i>Juniperus virginiana</i>	Eastern red cedar	10.0	707	80		ivy on trunk
T85	<i>Juniperus virginiana</i>	Eastern red cedar	10.0	707	80		ivy on trunk
T86	<i>Ilex crenata</i>	Japanese holly	10.0	707	86		multi-trunk (4, 7, 6)
T87	<i>Quercus palustris</i>	Pin oak	14.0	1385	88		
T88	<i>Cercis canadensis</i>	Redbud	8.0	452	88		multi-trunk (4, 4, 5)
T89	<i>Betula nigra</i>	River birch	7.0	346	88		multi-trunk (6, 3)
T90	<i>Cercis canadensis</i>	Redbud	7.0	346	88		multi-trunk (6, 4)
T91	<i>Betula nigra</i>	River birch	6.0	254	88		multi-trunk (4, 5)
T92	<i>Betula nigra</i>	River birch	12.0	1018	92		multi-trunk (11, 5)
T93	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	10.0	707	88		wound in trunk
T94	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	10.0	707	89		
T95	<i>Cornus florida</i>	Flowering dogwood	5.0	177	88		multi-trunk (3, 3, 5)
T96	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	5.0	177	86		
T97	<i>Cercis canadensis</i>	Redbud	17.0	2043	88		multi-trunk (8, 8, 7, 11)
T98	<i>Robinia pseudoacacia</i>	Black locust	11.0	855	86		epicormic growth
T99	<i>Robinia pseudoacacia</i>	Black locust	12.0	1018	88		
T100	<i>Robinia pseudoacacia</i>	Black locust	12.0	1018	88		
T101	<i>Cornus kousa</i>	Kousa dogwood	7.0	346	88		multi-trunk (2.5, 3.5, 6)
T102	<i>Acer rubrum</i>	Red maple	4.0	113	88		
T103	<i>Cercis canadensis</i>	Redbud	3.0	64	88		
T104	<i>Quercus palustris</i>	Pin oak	7.0	346	88		
T105	<i>Acer rubrum</i>	Red maple	7.0	346	86		wound in trunk
T106	<i>Acer rubrum</i>	Red maple	7.0	346	86		wound in trunk
T107	<i>Pyrus calleryana 'Bradford'</i>	Bradford pear	7.0	346	88		
T108	<i>Lagerstroemia indica</i>	Crape myrtle	23.0	3739	100		multi-trunk (3, 5, 7, 7, 5, 7, 7, 10, 7, 6, 6)
T109	<i>Juniperus virginiana</i>	Eastern red cedar	9.0	573	78		multi-trunk (2, 4, 6, 5)
T110	<i>Juniperus virginiana</i>	Eastern red cedar	7.0	346	78		multi-trunk (5, 5), broken limbs
T111	<i>Juniperus virginiana</i>	Eastern red cedar	11.0	855	78		multi-trunk (3, 5, 7, 7), broken limbs
T112	<i>Ilex crenata</i>	Japanese holly	5.0	177	80		cut limbs
T113	<i>Robinia pseudoacacia</i>	Black locust	11.0	855	83		
T114	<i>Juniperus virginiana</i>	Eastern red cedar	11.0	855	80		
T115	Prunus serotina	Black cherry	31.0	6793	88		growing on slope
T116	<i>Prunus serotina</i>	Black cherry	14.0	1385	78		broken limbs, growing on slope
T117	<i>Prunus serotina</i>	Black cherry	16.0	1810	78		multi-trunk (10,12), leaning, broken limbs, growing on slope
T118	<i>Ilex opaca</i>	American holly	13.0	1195	84		growing on slope
T119	<i>Liriodendron tulipifera</i>	Tulip poplar	28.0	5542	88		growing on slope
T120	Liriodendron tulipifera	Tulip poplar	43.0	13070	88		growing on slope
T121	<i>Prunus serotina</i>	Black cherry	18.0	2290	83		growing on slope
T122	<i>Ilex opaca</i>	American holly	15.0	1590	88		growing on slope
T123	<i>Prunus serotina</i>	Black cherry	20.0	2827	88		
T124	<i>Prunus serotina</i>	Black cherry	18.0	2290	45		pruned for power lines
T125	<i>Prunus serotina</i>	Black cherry	10.0	707	44		multi-trunk (7, 7), pruned for power lines
T126	<i>Prunus serotina</i>	Black cherry	7.0	346	44		pruned for power lines
T127	<i>Prunus serotina</i>	Black cherry	6.0	254	44		pruned for power lines
T128	<i>Carya tomentosa</i>	Mockernut hickory	8.0	452	88		growing on slope
T129	<i>Carya tomentosa</i>	Mockernut hickory	21.0	3117	88		growing on slope
T130	<i>Liriodendron tulipifera</i>	Tulip poplar	22.0	3421	88		growing on slope
T131	<i>Liriodendron tulipifera</i>	Tulip poplar	19.5	2688	88		growing on slope
T132	<i>Liriodendron tulipifera</i>	Tulip poplar	20.0	2827	88		growing on slope
T133	<i>Prunus serotina</i>	Black cherry	8.0	452	44		pruned for power lines
T134	<i>Prunus serotina</i>	Black cherry	8.0	452	44		pruned for power lines
T135	<i>Prunus serotina</i>	Black cherry	20.0	2827	44		pruned for power lines
T136	<i>Prunus serotina</i>	Black cherry	23.0	3739	50		multi-trunk (15,18), leaning, covered in ivy, growing on slope
T137	<i>Prunus serotina</i>	Black cherry	22.0	3421	50		leaning, covered in ivy, growing on slope
T138	<i>Prunus serotina</i>	Black cherry	19.0	2552	50		leaning, covered in ivy, growing on slope
T139	<i>Liriodendron tulipifera</i>	Tulip poplar	22.0	3421	50		covered in ivy
T140	<i>Prunus serotina</i>	Black cherry	16.0	1810	50		covered in ivy
T141	<i>Pinus virginiana</i>	Virginia pine	16.0	1810	59		covered in ivy
T142	<i>Prunus yedoensis</i>	Yoshino cherry	25.0	4418	78		girdled roots, stripped bark
T143	<i>Cornus florida</i>	Flowering dogwood	8.0	452	75		on slope
T144	<i>Cornus kousa</i>	Kousa dogwood	29.0	5945	77		leaning, compacted root zone
T145	<i>Cornus kousa</i>	Kousa dogwood	29.0	5945	75		covered in ivy
T146	<i>Ailanthus altissima</i>	Tree of heaven	5.0	177	75		multi-trunk (3, 2, 4), leaning, ivy on trunk
T147	<i>Cornus florida</i>	Flowering dogwood	10.0	707	77		multi-trunk (1, 6, 8), ivy on trunk
T148	<i>Pinus virginiana</i>	Virginia pine	15.0	1590	88		broken limbs
T149	<i>Morus alba</i>	Mulberry	5.0	177	88		ivy at base
T150	<i>Quercus palustris</i>	Pin oak	24.0	4072	83		ivy on trunk, broken limbs
T151	<i>Quercus palustris</i>	Pin oak	16.0	1810	83		broken limbs
T152	Carya tomentosa	Mockernut hickory	36.0	9161	84		ivy on trunk, broken limbs
T153	<i>Quercus palustris</i>	Pin oak	38.0	10207	80		broken limbs
T154	<i>Quercus rubra</i>	Red oak	16.0	1810	83		broken limbs
T155	<i>Quercus rubra</i>	Red oak	20.0	2827	83		broken limbs
T156	<i>Quercus rubra</i>	Red oak	20.0	2827	80		vines on trunk, broken limbs
T157	<i>Quercus alba</i>	White oak	20.0	2827	80		broken limbs
T158	<i>Morus alba</i>	Mulberry	9.0	573	77		multi-trunk (7, 4, 5)
T159	<i>Catalpa speciosa</i>	Catalpa	15.0	1590	58		multi-trunk (8, 9, 9), growing in concrete, girdled roots
T160	<i>Quercus alba</i>	White oak	23.0	3739	78		leaning, growing on slope
T161	<i>Liriodendron tulipifera</i>	Tulip poplar	25.0	4418	88		multi-trunk (18,18), growing on slope
T162							

CONSULTANTS

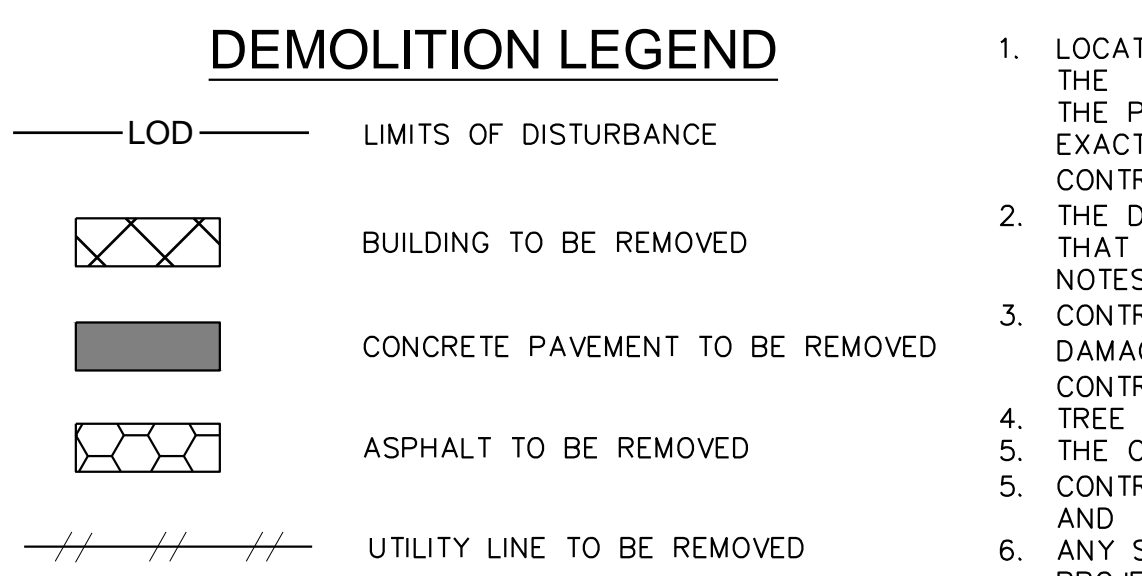


DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204



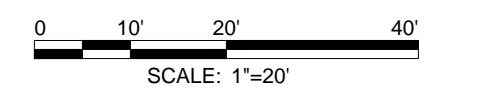
- DEMOLITION KEYNOTES**
- 1. BUILDING TO BE REMOVED
 - 2. STAIRS TO BE PROTECTED AND PRESERVED
 - 3. STAIRS TO BE REMOVED
 - 4. CONCRETE PAVING TO BE REMOVED
 - 5. AREA DRAIN AND ASSOCIATED PIPING TO BE REMOVED
 - 6. PLUG STRUCTURE AFTER REMOVAL OF INCOMING STORM DRAIN PIPE



DEMOLITION NOTES

1. LOCATION OF ALL UTILITIES SHOWN ARE APPROXIMATE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY AND DETERMINE THE EXACT LOCATION AND DEPTH OF ALL UTILITIES WITHIN THE LIMIT OF DISTURBANCE PRIOR TO COMMENCING WORK. REPORT ANY DISCREPANCY TO THE PROJECT OFFICER. THE CONTRACTOR SHALL CONTACT MISS UTILITY AT 811 A MINIMUM OF 72 HOURS PRIOR TO ANY EXCAVATION TO DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MAY BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES.
2. THE DEMOLITION PLAN IS A GENERAL GUIDE OF WHAT ITEMS NEED TO BE DEMOLISHED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY ALL ITEMS THAT REQUIRED DEMOLITION TO COMPLETE THE PROPOSED CONSTRUCTION. REFER TO THE SEQUENCE OF CONSTRUCTION ON SHEET 1-C-111 FOR ADDITIONAL NOTES RELATED TO DEMOLITION.
3. CONTRACTOR SHALL PROTECT AND PRESERVE ALL EXISTING SITE STRUCTURES AND FEATURES NOT SCHEDULED FOR DEMOLITION AND/ OR CONSTRUCTION FROM DAMAGE DUE TO DEMOLITION PROCEDURES. ANY RESULTING DAMAGE SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE RESTORED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE PROJECT OFFICER.
4. TREE PROTECTION AND CONSTRUCTION FENCE SHALL BE THE SAME WHEREVER THEY OVERLAP.
5. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR SAFETY AND SECURITY AT THE PROJECT SITE FOR THE DURATION OF THE CONTRACT.
5. CONTRACTOR SHALL COORDINATE WITH THE PROJECT OFFICER TO IDENTIFY ANY NECESSARY STAGING/STORAGE AREAS. PROPOSED STAGING AND STORAGE AREAS SHALL BE REVIEWED AND APPROVED BY THE PROJECT OFFICER, AND THE LIMITS OF WORK WILL BE ADJUSTED ACCORDINGLY.
6. ANY STOCKPILING, REGARDLESS OF LOCATION ON SITE, SHALL BE STABILIZED IMMEDIATELY AFTER ITS ESTABLISHMENT AND FOR THE DURATION OF THE PROJECT. STOCKPILES SHALL BE CONTAINED BY STRAW BALES OR EROSION CONTROL FENCING AND COVERED WITH PLASTIC OR CANVAS AT THE END OF EACH WORK DAY FOR THE DURATION OF THE PROJECT.
7. TEMPORARY CONSTRUCTION FENCING SHALL BE ERECTED AS SHOWN ON THE PLANS PRIOR TO BEGINNING CONSTRUCTION OPERATIONS AND MAINTAINED UNTIL COMPLETION OF PROJECT.
8. WHERE ITEMS TO BE REMOVED OCCUR WITHIN TREE PROTECTION ZONES, THE CONTRACTOR SHALL REMOVE THE ITEMS WORKING WITH A COUNTY ARBORIST (PROVIDED BY COUNTY) ON-SITE TO OBSERVE AND MINIMIZE TREE DAMAGE. CONTRACTOR SHALL NOTIFY THE PROJECT OFFICER FIVE BUSINESS DAYS PRIOR TO THESE REMOVALS.
9. CARE SHALL BE TAKEN TO PRESERVE EXISTING TREES AND THEIR ROOT SYSTEMS. TREES INCURRING ROOT DAMAGE DUE TO CONSTRUCTION SHALL BE PRUNED AND FERTILIZED PER THE SPECIFICATIONS.
10. NO MATERIALS OR EQUIPMENT SHALL BE PERMITTED WITHIN THE TREE PROTECTION AREA.

NOTE: CONTRACTOR SHALL PROTECT AND PRESERVE EXISTING 5-STORY OFFICE BUILDING AND MULTI-STORY PARKING GARAGE.



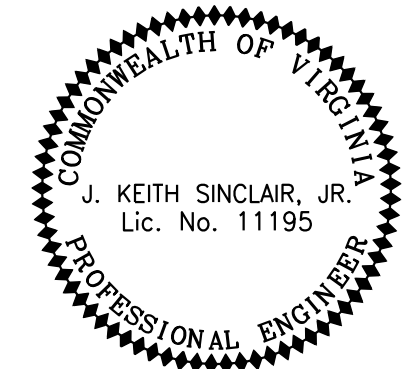
MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

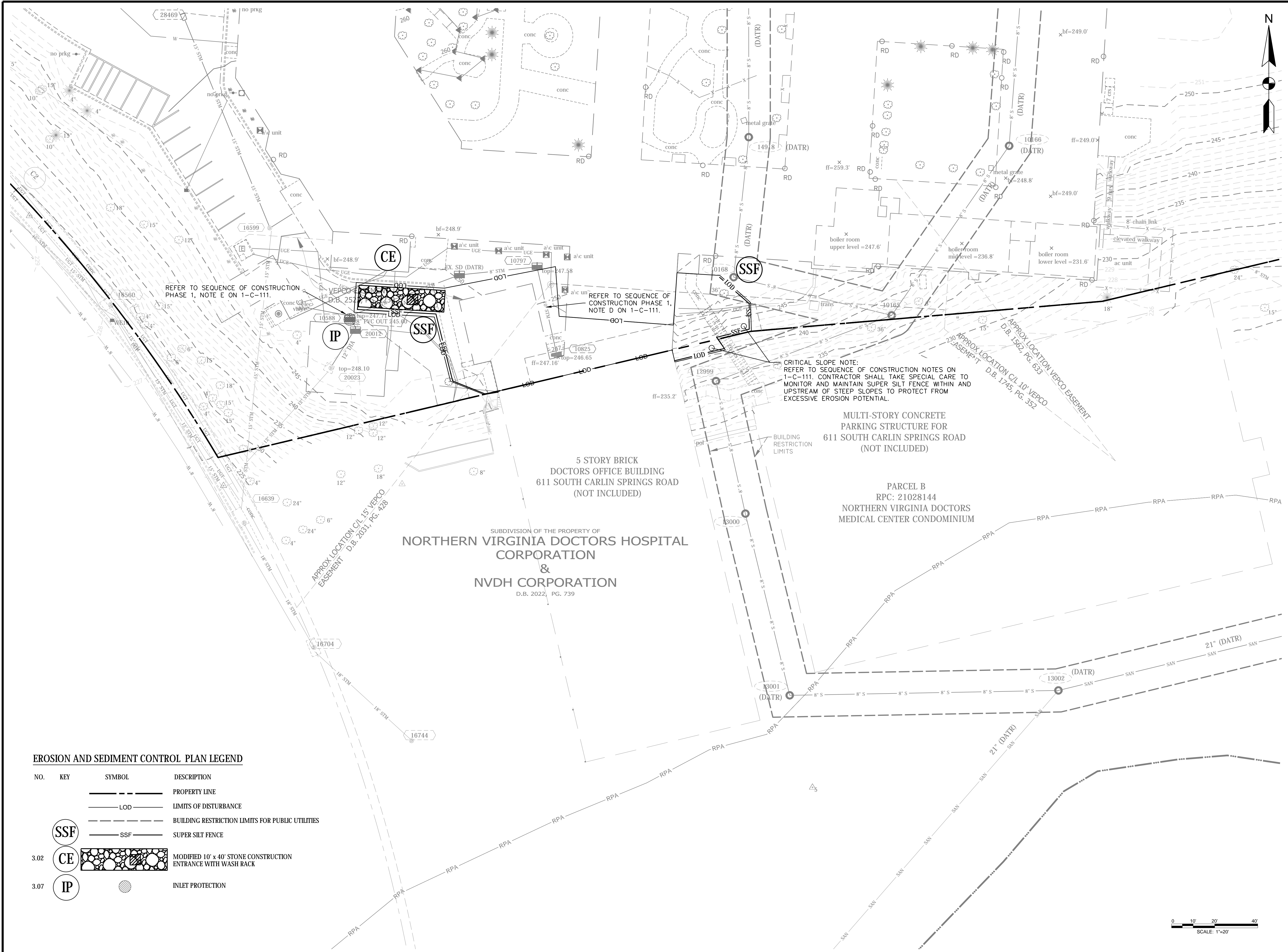
DEMOLITION PLAN

1-C-108

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1
 601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204



REFER TO SEQUENCE OF CONSTRUCTION PHASE 1, NOTE E ON 1-C-111.

REFER TO SEQUENCE OF CONSTRUCTION PHASE 1, NOTE D ON 1-C-111.

CRITICAL SLOPE NOTE:
 REFER TO SEQUENCE OF CONSTRUCTION NOTES ON 1-C-111. CONTRACTOR SHALL TAKE SPECIAL CARE TO MONITOR AND MAINTAIN SUPER SILT FENCE WITHIN AND UPSTREAM OF STEEP SLOPES TO PROTECT FROM EXCESSIVE EROSION POTENTIAL.

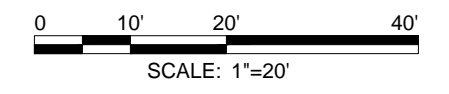
MULTI-STORY CONCRETE PARKING STRUCTURE FOR 611 SOUTH CARLIN SPRINGS ROAD (NOT INCLUDED)

5 STORY BRICK DOCTORS OFFICE BUILDING 611 SOUTH CARLIN SPRINGS ROAD (NOT INCLUDED)

SUBDIVISION OF THE PROPERTY OF
NORTHERN VIRGINIA DOCTORS HOSPITAL CORPORATION & NVDH CORPORATION
 D.B. 2022, PG. 739

EROSION AND SEDIMENT CONTROL PLAN LEGEND

NO.	KEY	SYMBOL	DESCRIPTION
		---	PROPERTY LINE
		---	LIMITS OF DISTURBANCE
		---	BUILDING RESTRICTION LIMITS FOR PUBLIC UTILITIES
		---	SUPER SILT FENCE
3.02	CE	[Patterned Box]	MODIFIED 10' x 40' STONE CONSTRUCTION ENTRANCE WITH WASH RACK
3.07	IP	[Circle with Diagonal Lines]	INLET PROTECTION



MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

EROSION & SEDIMENT CONTROL PLAN - PHASE I

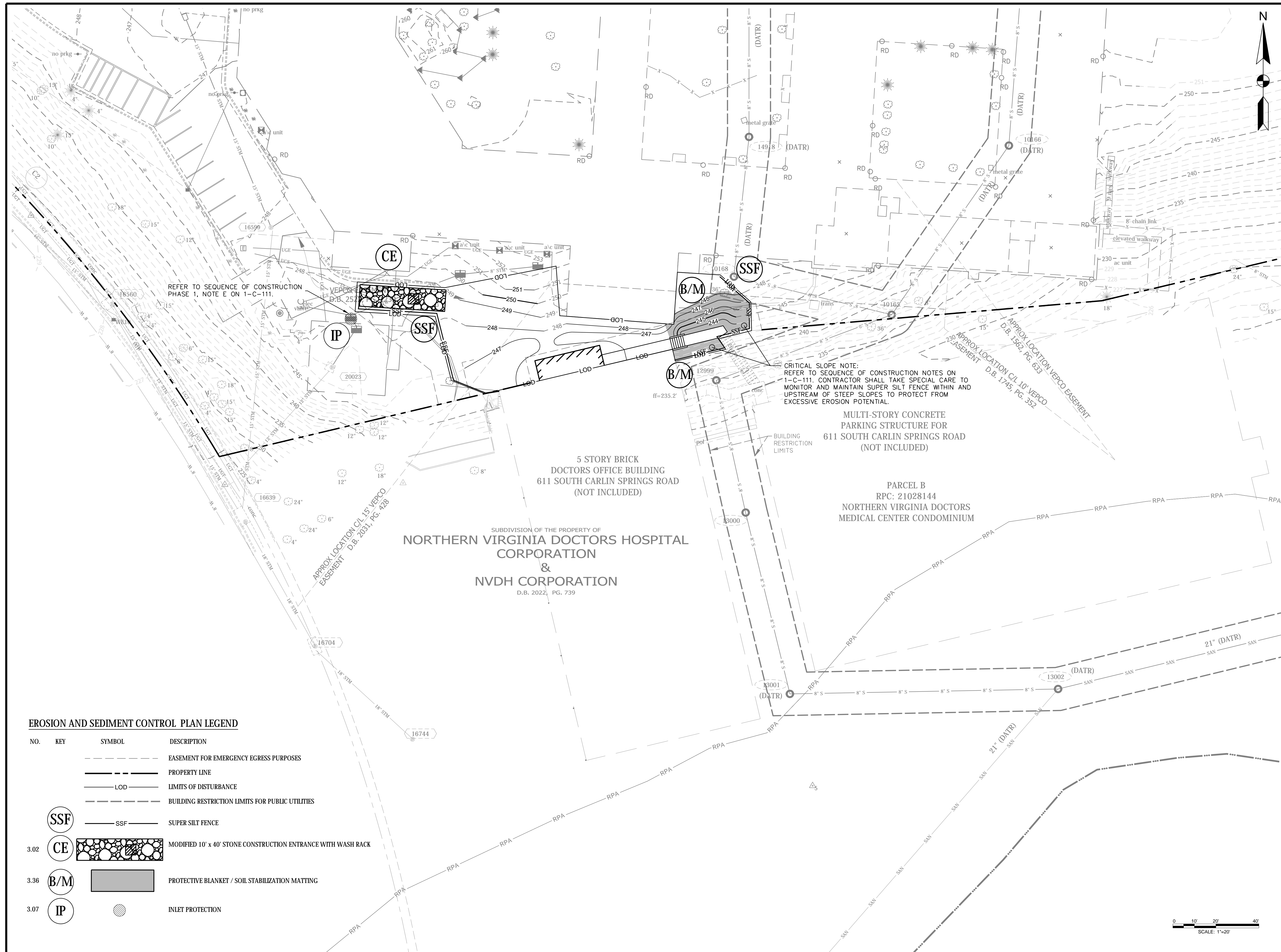
1-C-109

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204



REFER TO SEQUENCE OF CONSTRUCTION PHASE 1, NOTE E ON 1-C-111.

CRITICAL SLOPE NOTE:
 REFER TO SEQUENCE OF CONSTRUCTION NOTES ON 1-C-111. CONTRACTOR SHALL TAKE SPECIAL CARE TO MONITOR AND MAINTAIN SUPER SILT FENCE WITHIN AND UPSTREAM OF STEEP SLOPES TO PROTECT FROM EXCESSIVE EROSION POTENTIAL.

MULTI-STORY CONCRETE PARKING STRUCTURE FOR 611 SOUTH CARLIN SPRINGS ROAD (NOT INCLUDED)

5 STORY BRICK DOCTORS OFFICE BUILDING 611 SOUTH CARLIN SPRINGS ROAD (NOT INCLUDED)

PARCEL B
 RPC: 21028144
 NORTHERN VIRGINIA DOCTORS MEDICAL CENTER CONDOMINIUM

SUBDIVISION OF THE PROPERTY OF
NORTHERN VIRGINIA DOCTORS HOSPITAL CORPORATION & NVDH CORPORATION
 D.B. 2022, PG. 739

EROSION AND SEDIMENT CONTROL PLAN LEGEND

NO.	KEY	SYMBOL	DESCRIPTION
		- - - - -	EASEMENT FOR EMERGENCY EGRESS PURPOSES
		—————	PROPERTY LINE
		— LOD —	LIMITS OF DISTURBANCE
		- - - - -	BUILDING RESTRICTION LIMITS FOR PUBLIC UTILITIES
		— SSF —	SUPER SILT FENCE
3.02	CE		MODIFIED 10' x 40' STONE CONSTRUCTION ENTRANCE WITH WASH RACK
3.36	B/M		PROTECTIVE BLANKET / SOIL STABILIZATION MATTING
3.07	IP		INLET PROTECTION

MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

EROSION & SEDIMENT CONTROL PLAN - PHASE II

1-C-110

EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION

LIMITED DEMOLITION OF THE 2-STORY HOSPITAL CENTER COMPLEX AND ASSOCIATED UTILITIES. SITE IMPROVEMENTS INCLUDE A NEW EGRESS STAIRWELL TO SERVE THE 5-STORY PHYSICIAN'S OFFICE BUILDING WITH NEW PEDESTRIAN SIDEWALK, STAIRS AND RETAINING WALLS TO CONNECT TO THE EXISTING ON-SITE STAIRS.

TOTAL SITE AREA: 11.5700 ACRES (503,989 SF)
 AREA OF DISTURBANCE: 0.1248 ACRES (5,436 SF)

EXISTING SITE CONDITIONS

EXISTING SLOPES: 2-40%

ADJACENT PROPERTIES

NORTH: PRIVATE RESIDENCES
 EAST: GLEN CARLYN PARK
 SOUTH: NORTHERN VIRGINIA DOCTORS MEDICAL CENTER
 WEST: SOUTH CARLIN SPRINGS RD.

OFF-SITE AREAS

THERE IS NO PROPOSED OFF-SITE WORK.

SOILS

URBAN LAND--UDORTHTENTS COMPLEX, 2% TO 15% SLOPES AND GLENELG--MANOR COMPLEX, 15% TO 35% SLOPES.

URBAN LAND--UDORTHTENTS COMPLEX SOIL (12), AND GLENELG--MANOR COMPLEX (6D) ARE HYDROLOGIC GROUP D AND B SOILS, RESPECTFULLY.

CRITICAL EROSION AREAS

THERE IS NO RESOURCE PROTECTION AREA (RPA) PRESENT WITHIN THE LIMITS OF DISTURBANCE, BUT THERE IS RPA DOWNSTREAM OF THE LIMITS OF DISTURBANCE. SEE SHEET 1-C-704 FOR THE WATER QUALITY IMPACT ANALYSIS. THERE ARE CRITICAL SLOPES (UP TO 50%) PRESENT ALONG THE SOUTH, EAST, AND SOUTHWESTERN SIDES OF THE LIMITS OF DISTURBANCE.

THE CONTRACTOR SHALL FOLLOW THE GENERAL CONSTRUCTION PHASING SEQUENCE PROVIDED ON 1-C-102 AND REFER TO THE SEQUENCE OF CONSTRUCTION ON THIS SHEET TO LIMIT DISTURBANCE WITHIN OR ADJACENT TO CRITICAL SLOPES.

EROSION AND SEDIMENT CONTROL MEASURES

PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST BE APPLIED WITHIN 7 DAYS TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. ANY STOCKPILES MUST BE MULCHED AND SEEDED IMMEDIATELY AS DIRECTED BY THE COUNTY INSPECTOR. THERE ARE NO CRITICAL AREAS WITHIN THE LIMITS OF DISTURBANCE.

SEDIMENT CONTROL WILL BE EXECUTED THROUGH THE INSTALLATION OF SUPER SILT FENCE, INLET PROTECTION AND CONSTRUCTION ENTRANCE WITHIN THE DRAINAGE AREA OF THE LIMITS OF DISTURBANCE.

ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER TEMPORARY MEASURES ARE NO LONGER NEEDED.

STRUCTURAL PRACTICES

CONSTRUCTION ENTRANCE - 3.02

INSTALL A TEMPORARY CONSTRUCTION ENTRANCE WITH A WASH RACK IN THE PARKING LOT AS SHOWN. WASH ALL CONSTRUCTION VEHICLES EGRESSING FROM THE SITE AS NECESSARY TO ENSURE THAT SEDIMENT WILL NOT LEAVE THE SITE. DIRECT WASH WATER TO NEAREST SEDIMENT CONTROL DEVICE.

SUPER SILT FENCE

INSTALL SUPER SILT FENCE BARRIER DOWNSLOPE OF AREAS WITH HIGHER GRADES TO FILTER SEDIMENT--LADEN RUNOFF FROM SHEET FLOW.

INLET PROTECTION - 3.07

INSTALL SEDIMENT FILTER OR AN EXCAVATED IMPOUNDING AREA AROUND A STORM DRAIN DROP INLET OR CURB INLET.

DEWATERING STRUCTURE - 3.26

A TEMPORARY SETTLING AND FILTERING DEVICE TO FILTER SEDIMENT--LADEN WATER DISCHARGED FROM DEWATERING ACTIVITIES PRIOR TO BEING DISCHARGED OFF--SITE.

SOIL STABILIZATION BLANKETS & MATTING - 3.36

INSTALL A PROTECTIVE BLANKET COVERING OR A SOIL STABILIZATION MAT ON A PREPARED PLANTING AREA OF A STEEP SLOPE.

VEGETATIVE MEASURES

1. TOPSOILING (STOCKPILE)

TOPSOIL WILL BE STRIPPED FROM AREAS TO BE GRADED AND STOCKPILED FOR LATER USE. STOCKPILE LOCATIONS ARE TO BE STABILIZED WITH TEMPORARY VEGETATION WITHIN 14 DAYS.

2. TEMPORARY SEEDING

DISTURBED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE WITHIN A PERIOD OF 30 DAYS WILL HAVE TEMPORARY VEGETATION ESTABLISHED. TEMPORARY VEGETATION WILL REDUCE DAMAGE FROM SEDIMENT AND RUNOFF TO DOWNSTREAM AND OFF-SITE AREAS. TEMPORARY SEEDING PLANT MATERIAL SHALL BE RAPIDLY GROWING PLANTS SELECTED FROM VESCH STANDARD AND SPEC. 3.31 AND TABLE 3.31--A&B. AREAS WHICH FAIL TO ESTABLISH VEGETATIVE COVER ADEQUATE TO PREVENT RILL EROSION ARE TO BE RESEED AS SOON AS POSSIBLE. FERTILIZER SHALL BE APPLIED AT A RATE OF 600 LBS. PER ACRE. FERTILIZER SHALL BE INCORPORATED INTO TOP 51-102mm OF SOIL. SEED SHALL BE EVENLY APPLIED AND SMALL GRAINS SHALL BE PLANTED NO MORE THAN 38mm DEEP. SEEDING MADE IN FALL FOR WINTER COVER AND DURING SUMMER MONTHS SHALL BE MULCHED.

3. PERMANENT SEEDING

ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISHED GRADING. SEEDING SHALL BE DONE WITH KENTUCKY 31 TALL FESCUE ACCORDING TO MINIMUM STANDARD #3, VESCH SPEC. 3.32--A&B. EROSION CONTROL BLANKETS ARE TO BE INSTALLED OVER FILL SLOPES, WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDED. THIS WILL PROTECT THE SLOPES FROM RILL AND GULLY EROSION AND ALLOW THE SEED TO GERMINATE PROPERLY. MULCH (STRAW OR FIBER) WILL BE USED ON RELATIVELY FLAT AREAS. IN ALL SEEDING OPERATIONS, SEED, FERTILIZER AND LIME WILL BE APPLIED PRIOR TO MULCHING. THE PLANTING SOIL MUST HAVE ENOUGH FINE GRAINED SOIL, SUFFICIENT PORE SPACE, SUFFICIENT DEPTH AND BE FROM FROM TOXIC OR EXCESSIVE QUANTITIES OF ROOTS AND SHALL BE APPLIED IN ACCORDANCE WITH STD. 3.30.

4. SODDING

AREAS THAT ARE TO BE SODDED SHALL BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE PLANS. SOIL TESTS SHOULD BE DETERMINE THE EXACT REQUIREMENTS FOR LIME AND FERTILIZER. PRIOR TO LAYING SOD, SOIL SURFACE SHALL BE CLEAR OF TRASH, DEBRIS, AND LARGE OBJECTS. QUALITY OF SOD SHALL BE STATE CERTIFIED AND ENSURE GENETIC PURITY AND HIGH QUALITY. SOD SHALL NOT BE LAID IN EXCESSIVELY WET OR DRY WEATHER AND BE DELIVERED AND INSTALLED WITHIN 36 HOURS. SOD SHOULD NOT BE LAID ON FROZEN SOIL SURFACE AND SHALL BE INSTALLED PER PLATE 3.33-1 OF THE VESCH.

5. DUST CONTROL

DUST SHALL BE MINIMIZED AS MUCH AS POSSIBLE.

SEDIMENT CONTROL - SEQUENCE OF CONSTRUCTION NARRATIVE

SEQUENCE OF CONSTRUCTION - PHASE 1, SEE SHEET 1-C-109

- HOLD A PRE-CONSTRUCTION MEETING WITH ARLINGTON COUNTY INSPECTOR AND URBAN FORESTER.
- INSTALL SUPER SILT FENCE (SSF), INLET PROTECTION (IP), AND CONSTRUCTION ENTRANCE (CE).
- CONTRACTOR TO HAVE CONSTRUCTION WORKER PARKING, HAUL ROUTE, AND EXCAVATION PROTECTION PLAN APPROVED BY ARLINGTON COUNTY.
- CONTRACTOR TO SUBMIT SEDIMENT DISPOSAL PLAN TO ARLINGTON COUNTY INSPECTOR FOR APPROVAL.
- REMOVE AREA DRAIN AND ASSOCIATED STORM DRAIN PIPE AND PLUG DOWNSTREAM STRUCTURE AS SHOWN ON SHEET C-1-108.
- CONTRACTOR SHALL TAKE SPECIAL CARE TO ENSURE INLET ADJACENT TO CONSTRUCTION ENTRANCE IS PROTECTED. CONTRACTOR SHALL PREVENT SEDIMENT FROM LEAVING THE LOD TO THE EXTENT POSSIBLE, BUT ANY SEDIMENT TRACKED BEYOND THE LOD SHALL BE CLEANED EVERY DAY.
- DEMOLISH AND REMOVE EXISTING PAVEMENT, VEGETATION AND BUILDING ONLY WITHIN THE IMMEDIATE VICINITY OF THE STAIRWELL ADDITION AS SHOWN ON SHEET C-1-108.
- COMPLETE THE FINAL BUILDING IMPROVEMENTS AND IMMEDIATELY STABILIZE THE SURROUNDING VEGETATIVE AREAS PRIOR TO INITIATING DEMOLITION AND GRADING ACTIVITIES FOR THE NEW SIDEWALK, STAIRS AND RETAINING WALLS AS DESCRIBED IN PHASE 2.

SEQUENCE OF CONSTRUCTION - PHASE 2, SEE SHEET 1-C-110

- ALL SEDIMENT AND EROSION CONTROL DEVICES INSTALLED AS PART OF PHASE 1 SHALL REMAIN IN PLACE AND FUNCTIONING, UNLESS OTHERWISE DIRECTED BY THE INSPECTOR.
- ROUGH GRADE REMAINING SITE AREA WITHIN THE LIMITS OF DISTURBANCE AS SHOWN ON SHEET ON SHEET 1-C-113 AND IMMEDIATELY STABILIZE. CONTRACTOR TO INSTALL SOIL STABILIZATION BLANKET OR MATTING IN THE AREAS INDICATED ON SHEET 1-C-110.
- EXCAVATE ALL AREAS TO BE PAVED TO A SUITABLE SUBGRADE. INSTALL STONE SUBBASE, RETAINING WALLS, STAIRS AND PROPOSED PAVING.
- UPON FINAL STABILIZATION OF THE SITE WITH ESTABLISHED VEGETATION AND WITH THE PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE THE REMAINING SEDIMENT CONTROL MEASURES AND STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS.

MAINTENANCE

- ALL CONTROLS ARE TO BE INSPECTED ON A DAILY BASIS BY THE SITE SUPERINTENDENT OR HIS REPRESENTATIVE, ANY DAMAGED CONTROLS ARE TO BE REPAIRED BY THE END OF THE WORKING DAY.
- ALL CONSTRUCTION VEHICLES EGRESSING FROM THE SITE SHALL BE WASHED AS NECESSARY TO INSURE THAT SEDIMENT WILL NOT BE REMOVED FROM THE SITE. WASH WATER TO BE TRUCKED INTO THE SITE OR OBTAINED FROM A METERED WATER CONNECTION. WASH WATER TO BE DIRECTED TO A SEDIMENT TRAPPING DEVICE.
- TO PREVENT CLOGGING, AREA DRAINS & TRENCH DRAINS ARE TO BE PROTECTED FROM DEBRIS AND CONSTRUCTION MATERIAL. CONTRACTOR TO COORDINATE WITH SITE INSPECTOR TO DETERMINE METHODOLOGY OF PROTECTION.

PRE-STORM EROSION AND SEDIMENT CONTROL CHECKLIST

PER EROSION AND SEDIMENT CONTROL GENERAL NOTE 6, THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ANY ADDITIONAL EROSION AND SEDIMENT CONTROL (ESC) MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE COUNTY. THESE SUPPLEMENTARY PRACTICES ARE IN ADDITION TO THOSE SHOWN IN AN ESC PLAN. ESC PRACTICES SHALL BE MODIFIED AS NEEDED TO ENSURE ONLY CLEAR WATER IS DISCHARGED FROM THE SITE.

THE FOLLOWING ACTIONS SHALL BE TAKEN PRIOR TO STORM EVENTS WITH PREDICTED HEAVY AND/OR LARGE VOLUME RAINFALL TO PREVENT SEDIMENT DISCHARGES FROM A CONSTRUCTION SITE. A TYPICAL SUMMER THUNDERSTORM IS AN EXAMPLE OF A STORM EVENT WITH PREDICTED HEAVY AND/OR LARGE VOLUME RAINFALL.

PERIMETER CONTROLS

- SILT FENCE SHALL BE CHECKED FOR UNDERMINING, HOLES, OR DETERIORATION OF THE FABRIC. FENCING SHALL BE REPLACED IMMEDIATELY IF THE FABRIC IS DAMAGED OR WORN. SILT FENCE MUST BE TRENCHED INTO THE GROUND PER STATE SPECIFICATIONS (STD & SPEC 3.09).
- WOODEN STAKES OR STEEL POSTS SHALL BE PROPERLY SECURED UPRIGHT INTO THE GROUND. DAMAGED POSTS OR STAKES MUST BE REPLACED.
- SEDIMENT THAT HAS ACCUMULATED AGAINST THE SILT FENCE SHOULD BE REMOVED. ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE LEVEL REACHES ONE-HALF THE HEIGHT OF THE FENCING.
- HAY BALES OR A STONE BERM SHOULD BE PLACED ACROSS THE CONSTRUCTION ENTRANCE TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION SITE.

EXPOSED SLOPES AND SOIL

- EXPOSED SLOPES NOT AT THE FINAL STABILIZATION PHASE SHALL BE COVERED WITH TARPS, PLASTIC SHEETING, OR EROSION CONTROL MATTING. COVERING MATERIAL SHALL BE PROPERLY SECURED/ANCHORED.
- CONTROLS SHALL BE INSTALLED TO PREVENT CONCENTRATED FLOW DOWN AN EXPOSED SLOPE. BERMS OR DIVERSION DIKES SHALL BE INSTALLED AT THE TOP OF CUT / EXPOSED SLOPES TO DIRECT STORM FLOW AROUND THE DISTURBED AREA.
- EXPOSED SLOPES AT THE FINAL STABILIZATION PHASE SHALL BE STABILIZED USING SLOPE STABILIZATION PRACTICES SUCH AS SOIL STABILIZATION BLANKETS OR MATTING AS SPECIFIED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH) STD & SPEC 3.36. BLANKETS OR MATS MUST BE PROPERLY SECURED AND ANCHORED TO THE SLOPE USING STAPLES, PINS, OR STAKES
- SEEDED AREAS SHALL BE CHECKED AND RESEED AS NECESSARY TO COVER EXPOSED SOIL. RECENTLY SEEDED AREAS SHALL BE PROTECTED BY STRAW OR SOIL STABILIZATION BLANKETS TO PREVENT SEEDING FROM BEING WASHED AWAY.

STOCKPILES

- STOCKPILED SOIL AND OTHER LOOSE MATERIALS THAT CAN BE WASHED AWAY SHALL BE COVERED WITH A TARP, PLASTIC SHEETING, OR OTHER STABILIZATION MATTING. THE COVER MUST BE PROPERLY SECURED/ANCHORED TO PREVENT IT FROM BEING BLOWN OFF AND EXPOSING MATERIALS TO RAIN. CONTROLS SUCH AS HAY BALES OR BOOMS SHOULD BE PLACED ALONG THE PERIMETER OF THE STOCK PILE (DOWNHILL SIDE).

INLET PROTECTION

- INLET PROTECTION CONTROLS SHALL BE INSPECTED TO ENSURE THEY ARE FUNCTIONING PROPERLY AND FLOODING WILL NOT OCCUR. CLOGGED OR DAMAGED CONTROLS MUST BE REPLACED IMMEDIATELY. ENSURE CONTROLS ALLOW FOR OVERFLOW / BYPASS OF STORMWATER RUNOFF DURING SIGNIFICANT STORM EVENTS.
- IN ADDITION TO THESE PRE-STORM ACTIONS, ALL EROSION AND SEDIMENT CONTROL (ESC) MEASURES MUST BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL.

GENERAL LAND CONSERVATION NOTES

- NO DISTURBED AREA WILL REMAIN DENUDED FOR MORE THAN 7 CALENDAR DAYS UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR OR HIS AGENT.
- ALL EROSION CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING. FIRST AREAS TO BE CLEARED ARE TO BE THOSE REQUIRED FOR THE PERIMETER CONTROLS.
- ALL STORM AND SANITARY SEWER LINES NOT IN STREET ARE TO BE MULCHED AND SEEDED WITHIN 5 DAYS AFTER BACKFILL. NO MORE THAN 500 FEET ARE TO BE OPEN AT ANY ONE TIME
- ELECTRIC POWER, TELEPHONE AND GAS SUPPLY TRENCHED ARE TO BE COMPACTED, SEEDED AND MULCH WITHIN 5 DAYS OF BACKFILL.
- ALL TEMPORARY BERMS, DIVERSION AND SEDIMENT CONTROL DAMS ARE TO BE MULCHED AND SEEDED FOR TEMPORARY VEGETATIVE COVER IMMEDIATELY AFTER GRADING. STRAW OR HAY MULCH IS REQUIRED. THE SAME APPLIES TO ALL SOIL STOCKPILE
- DURING CONSTRUCTION, ALL STORM INLETS WILL BE PROTECTED BY INLET PROTECTION DEVICES, MAINTAINED AND MODIFIED AS REQUIRED BY CONSTRUCTION PROGRESS.
- ANY DISTURBED AREA NOT COVERED IN NOTE # 1 ABOVE AND NOT PAVED, SODDED OR BUILT UPON BY NOVEMBER 1ST, OR DISTURBED AFTER THAT DATE, SHALL BE MULCHED WITH HAY OR STRAW AT THE RATE OF 2 TONS PER ACRE AND OVER--SEEDED NO LATER THAN MAY 15TH.
- AT THE COMPLETION OF THE CONSTRUCTION PROJECT AND PRIOR TO BOND RELEASE, ALL TEMPORARY SEDIMENT CONTROLS SHALL BE REMOVED AND ALL DENUDED AREAS SHALL BE STABILIZED. ARLINGTON COUNTY INSPECTOR TO APPROVE REMOVAL OF ALL TEMPORARY SILTATION MEASURES.

EROSION AND SEDIMENT CONTROL NOTES

- ES-1: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA'S REGULATIONS 4VAC50-30 EROSION AND SEDIMENT CONTROL REGULATIONS.
- ES-2: THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.
- ES-3: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.
- ES-4: A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
- ES-5: PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.
- ES-6: THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
- ES-7: ALL DISTURBED AREA ARE TO BE DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAS STABILIZATION IS ACHIEVED.
- ES-8: DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.
- ES-9: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF--PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

NON-STORMWATER DISCHARGE PER ARLINGTON COUNTY

ONLY THE FOLLOWING NON-STORMWATER DISCHARGES ARE AUTHORIZED BY ARLINGTON COUNTY'S M54 PERMIT, UNLESS THE STATE WATER CONTROL BOARD, THE VIRGINIA SOIL AND WATER CONSERVATION BOARD (BOARD), OR ARLINGTON COUNTY DETERMINES THE DISCHARGE TO BE A SIGNIFICANT SOURCE OF POLLUTANTS TO SURFACE WATERS:

WATER LINE FLUSHING; LANDSCAPE IRRIGATION; DIVERTED STREAM FLOWS; RISING GROUND WATERS; UNCONTAMINATED GROUND WATER INFILTRATION (AS DEFINED AT 40 CFR 35.2005(20)); UNCONTAMINATED PUMPED GROUND WATER; DISCHARGES FROM POTABLE WATER SOURCES; FOUNDATION DRAINS; AIR CONDITIONING CONDENSATION; IRRIGATION WATER; SPRINGS; WATER FROM CRAWL SPACE PUMPS; FOOTING DRAINS; LAWN WATERING; INDIVIDUAL RESIDENTIAL CAR WASHING; FLOWS FROM RIPARIAN HABITATS AND WETLANDS; DECHLORINATED SWIMMING POOL DISCHARGES; DISCHARGES OR FLOWS FROM FIRE FIGHTING; AND, OTHER ACTIVITIES GENERATING DISCHARGES IDENTIFIED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY AS NOT REQUIRING VPDES AUTHORIZATION.

APPROPRIATE CONTROLS MUST BE IMPLEMENTED TO PREVENT ANY NON-STORMWATER DISCHARGES NOT INCLUDED ON THE ABOVE LIST (E.G., CONCRETE WASH WATER, PAINT WASH WATER, VEHICLE WASH WATER, DETERGENT WASH WATER, ETC.) FROM BEING DISCHARGED INTO ARLINGTON COUNTY'S M54 SYSTEM, WHICH INCLUDES THE CURB AND GUTTER SYSTEM, AS WELL AS CATCH BASINS AND OTHER STORM DRAIN INLETS, OR STREAM NETWORK.

PER CHAPTER 26 OF THE ARLINGTON COUNTY CODE, IT SHALL BE UNLAWFUL FOR ANY PERSON TO DISCHARGE DIRECTLY OR INDIRECTLY INTO THE STORM SEWER SYSTEM OR STATE WATERS, ANY SUBSTANCE LIKELY, IN THE OPINION OF THE COUNTY MANAGER, TO HAVE AN ADVERSE EFFECT ON THE STORM SEWER SYSTEM OR STATE WATERS.

TABLE 3.31-B
(Revised June 2003)
TEMPORARY SEEDING SPECIFICATIONS
QUICK REFERENCE FOR ALL REGIONS

SEED		
APPLICATION DATES	SPECIES	APPLICATION RATES
Sept. 1 - Feb. 15	50/50 Mix of Annual Ryegrass (lolium multi-florum) & Cereal (Winter) Rye (Secale cereale)	50 - 100 (lbs/acre)
Feb. 16 - Apr. 30	Annual Ryegrass (lolium multi-florum)	60 - 100 (lbs/acre)
May 1 - Aug. 31	German Millet	50 (lbs/acre)

FERTILIZER & LIME

- Apply 10-10-10 fertilizer at a rate of 450 lbs. / acre (or 10 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4-6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in [Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites](#) at <http://www.dcr.state.va.us/sw/e&s.htm#pubs>

TABLE 3.32-D
(Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR PIEDMONT AREA

SEED		
LAND USE	SPECIES	APPLICATION PER ACRE
Minimum Care Lawn (Commercial or Residential)	Tall Fescue ¹	95-100%
	Perennial Ryegrass	0-5%
	Kentucky Bluegrass ¹	0-5%
		TOTAL: 175-200 lbs.
High-Maintenance Lawn	Tall Fescue ¹	TOTAL: 200-250 lbs.
General Slope (3:1 or less)	Tall Fescue ¹	128 lbs.
	Red Top Grass or Creeping Red Fescue	2 lbs.
	Seasonal Nurse Crop ²	20 lbs.
		TOTAL: 150 lbs.
Low-Maintenance Slope (Steeper than 3:1)	Tall Fescue ¹	108 lbs.
	Red Top Grass or Creeping Red Fescue	2 lbs.
	Seasonal Nurse Crop ²	20 lbs.
	Crownvetch ³	20 lbs.
		TOTAL: 150 lbs.

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at <http://sudan.cses.vt.edu/html/Turf/turfpublications/publications2.html>

2 - Use seasonal nurse crop in accordance with seeding dates as stated below:

February 16 th - April	Annual Rye
May 1 st - August 15 th	Foxtail Millet
August 16 th - October	Annual Rye
November - February 15 th	Winter Rye

3- SUBSTITUTE SERICEA LESPEDEZA FOR CROWNVECH EAST OF FARMVILLE, VA (MAY THROUGH SEPTEMBER USE HULLED SERICEA, ALL OTHER PERIODS, USE UNHULLED SERICEA). IF FLAT PEA IS USED IN LIEU OF CROWN VETCH, INCREASE RATE TO 30LBS./ACRE. ALL LEGUME SEED MUST BE PROPERLY INOCULATED. WEEPING LOVEGRASS MAY BE ADDED TO ANY SLOPE OR LOW-MAINTENANCE MIX DURING WARMER SEEDING PERIODS; ADD 10-20 LBS./ACRE IN MIXES.

FERTILIZER & LIME

- Apply 10-20-10 fertilizer at a rate of 500 lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

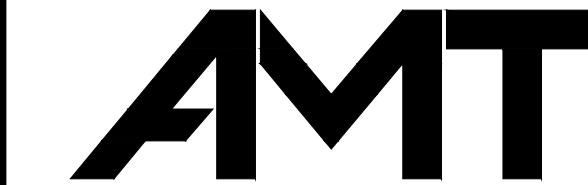
- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4-6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in [Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites](#) at <http://www.dcr.state.va.us/sw/e&s.htm#pubs>

TABLE 3.35-A

ORGANIC MULCH MATERIALS AND APPLICATION RATES

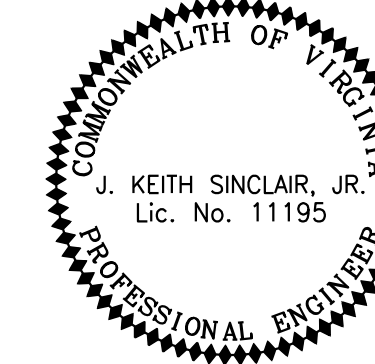
MULCHES:	RATES:		NOTES:
	Per Acre	Per 1000 sq. ft.	
Straw or Hay	1½ - 2 tons (Minimum 2 tons for winter cover)	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	Minimum 1500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods.* Apply as slurry.
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 - 275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 - 70 cu. yds.	1-2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. or 45 lbs./1000 sq. ft.



A. MORTON THOMAS AND ASSOCIATES, INC.
 CONSULTING ENGINEERS
 14555 AVON PARKWAY SUITE 150
 CHANTILLY, VA 20151
 PHONE (703) 817-1373
 EMAIL: AMT1@AMTENGINEERING.COM

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204

12/11/2020 ISSUED FOR BID

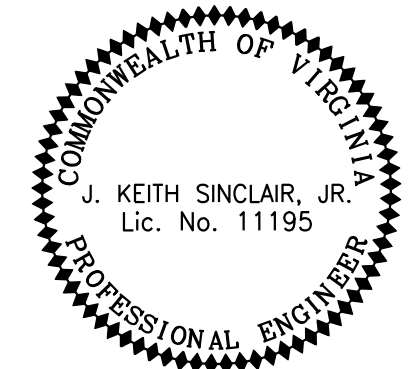
MARK DATE DESCRIPTION

PROJECT NO: 19-0679.001
 SCALE: N/A
 DESIGNED BY: CMB
 DRAWN BY: JES
 CHECKED BY: JKS
 SHEET TITLE

EROSION & SEDIMENT CONTROL NOTES

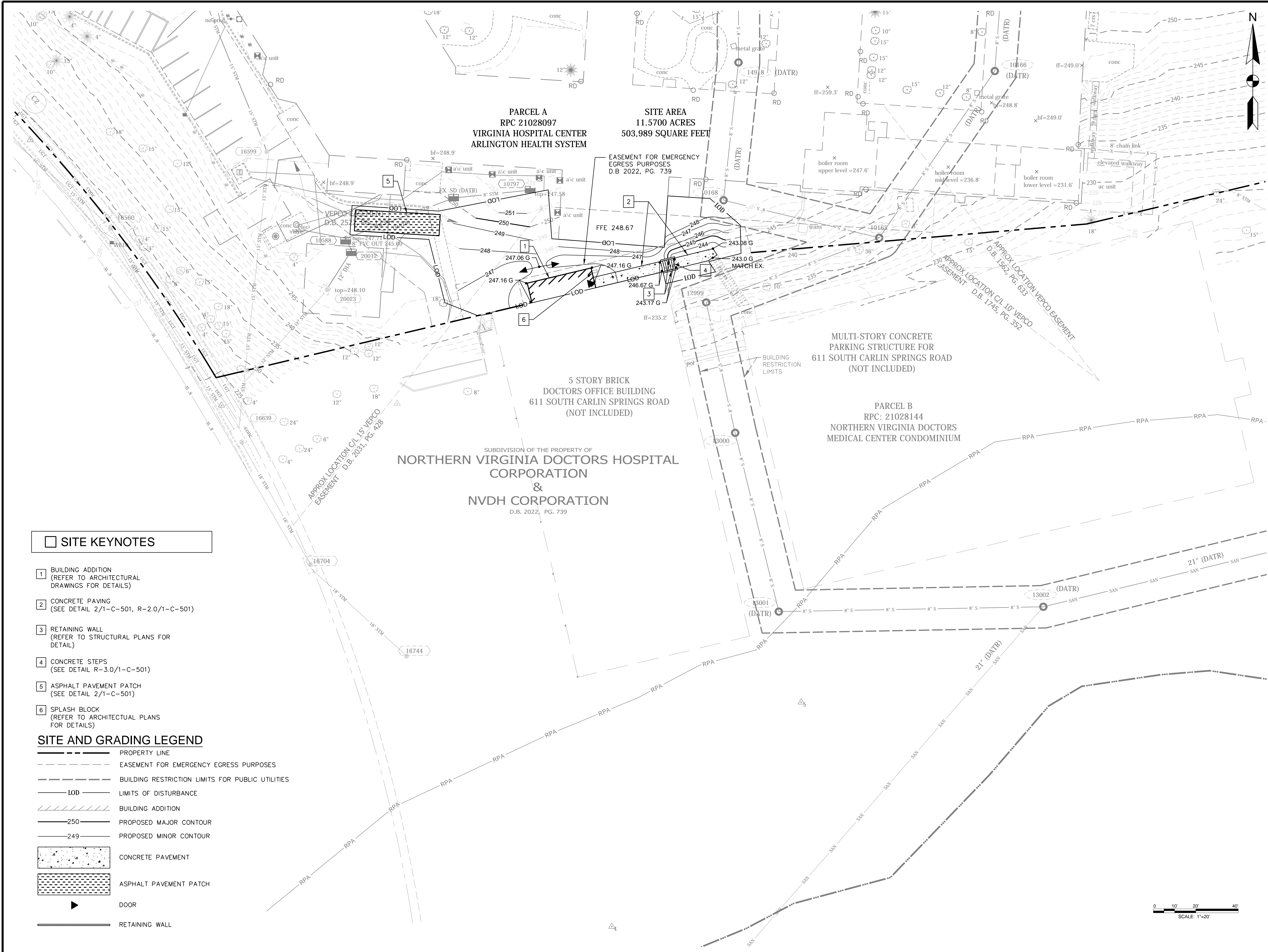
1-C-111

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204

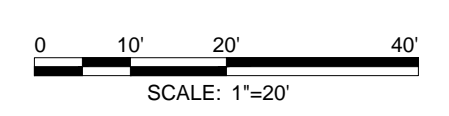


SITE KEYNOTES

- 1 BUILDING ADDITION
(REFER TO ARCHITECTURAL DRAWINGS FOR DETAILS)
- 2 CONCRETE PAVING
(SEE DETAIL 2/1-C-501, R-2.0/1-C-501)
- 3 RETAINING WALL
(REFER TO STRUCTURAL PLANS FOR DETAIL)
- 4 CONCRETE STEPS
(SEE DETAIL R-3.0/1-C-501)
- 5 ASPHALT PAVEMENT PATCH
(SEE DETAIL 2/1-C-501)
- 6 SPLASH BLOCK
(REFER TO ARCHITECTURAL PLANS FOR DETAILS)

SITE AND GRADING LEGEND

- PROPERTY LINE
- - - EASEMENT FOR EMERGENCY EGRESS PURPOSES
- - - BUILDING RESTRICTION LIMITS FOR PUBLIC UTILITIES
- LOD LIMITS OF DISTURBANCE
- /// BUILDING ADDITION
- 250 PROPOSED MAJOR CONTOUR
- 249 PROPOSED MINOR CONTOUR
- [Pattern] CONCRETE PAVEMENT
- [Pattern] ASPHALT PAVEMENT PATCH
- ▶ DOOR
- RETAINING WALL

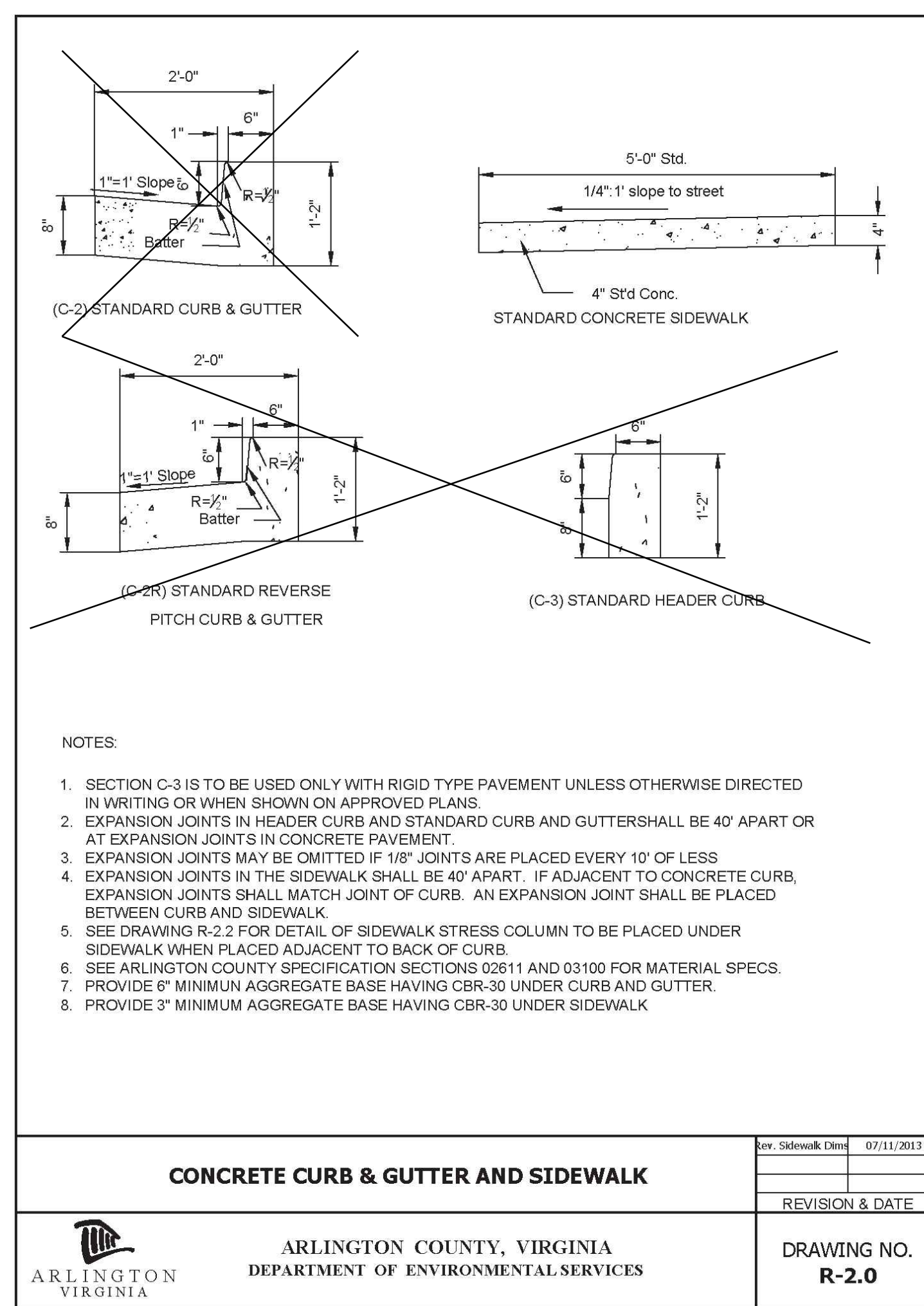
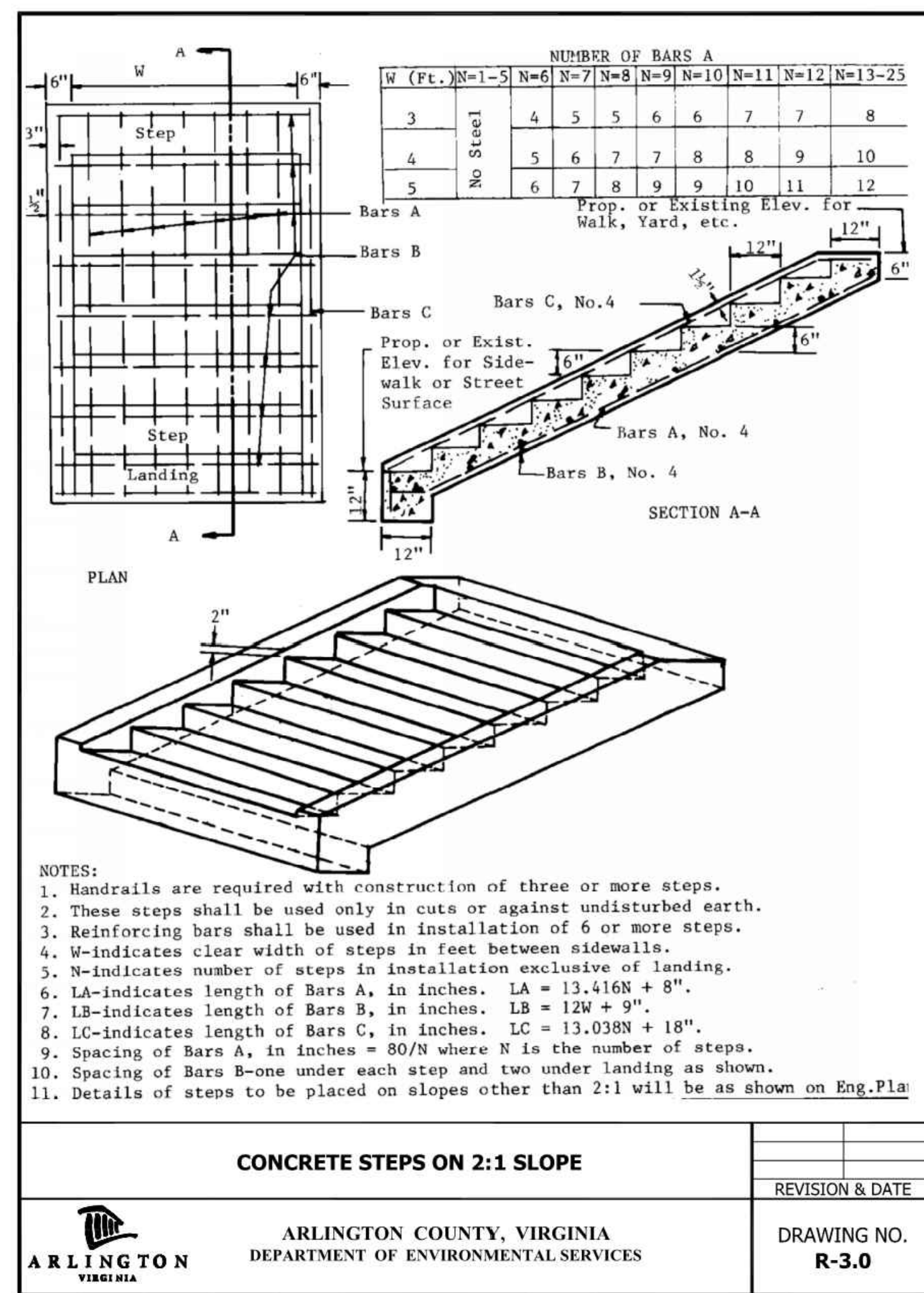
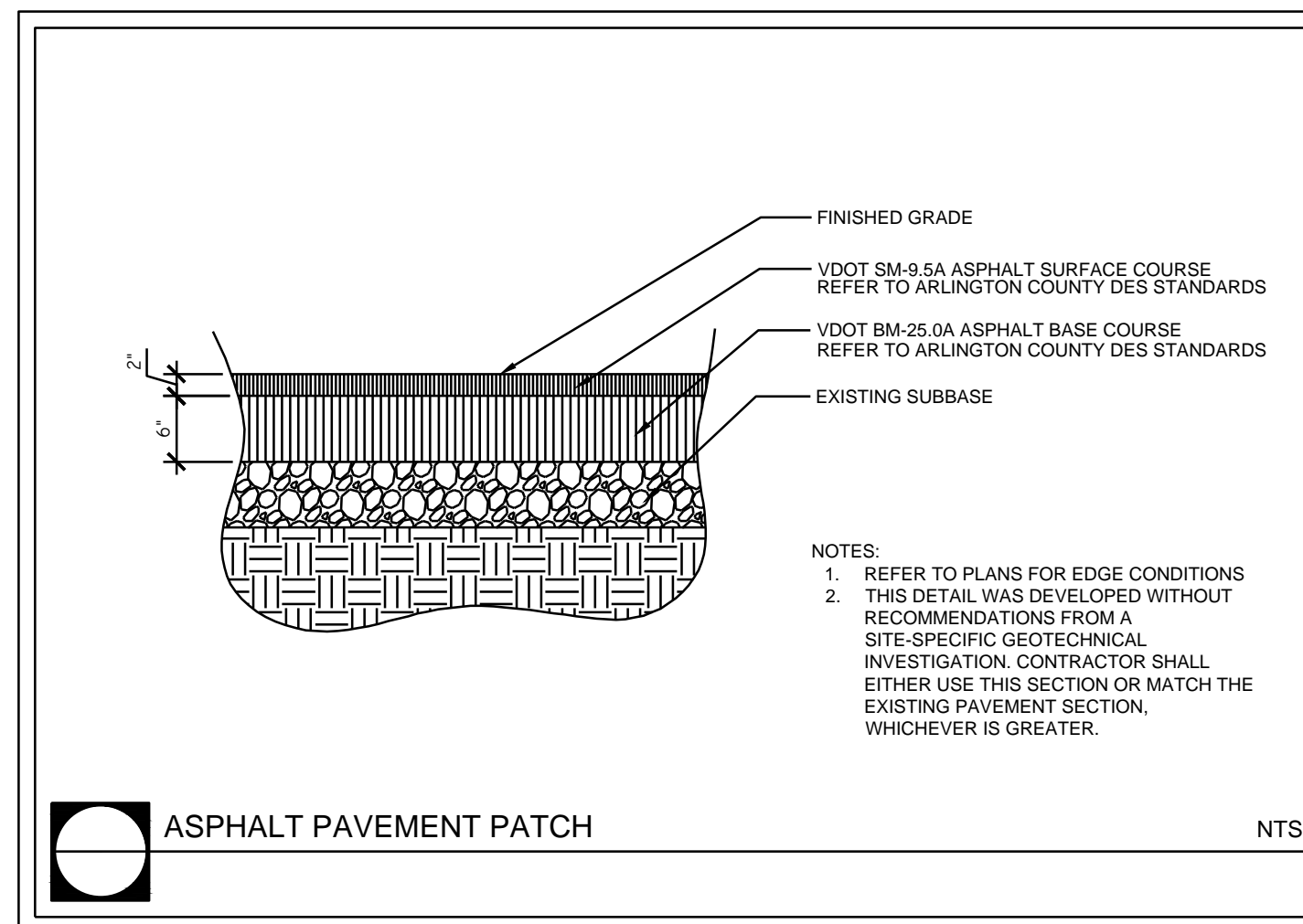
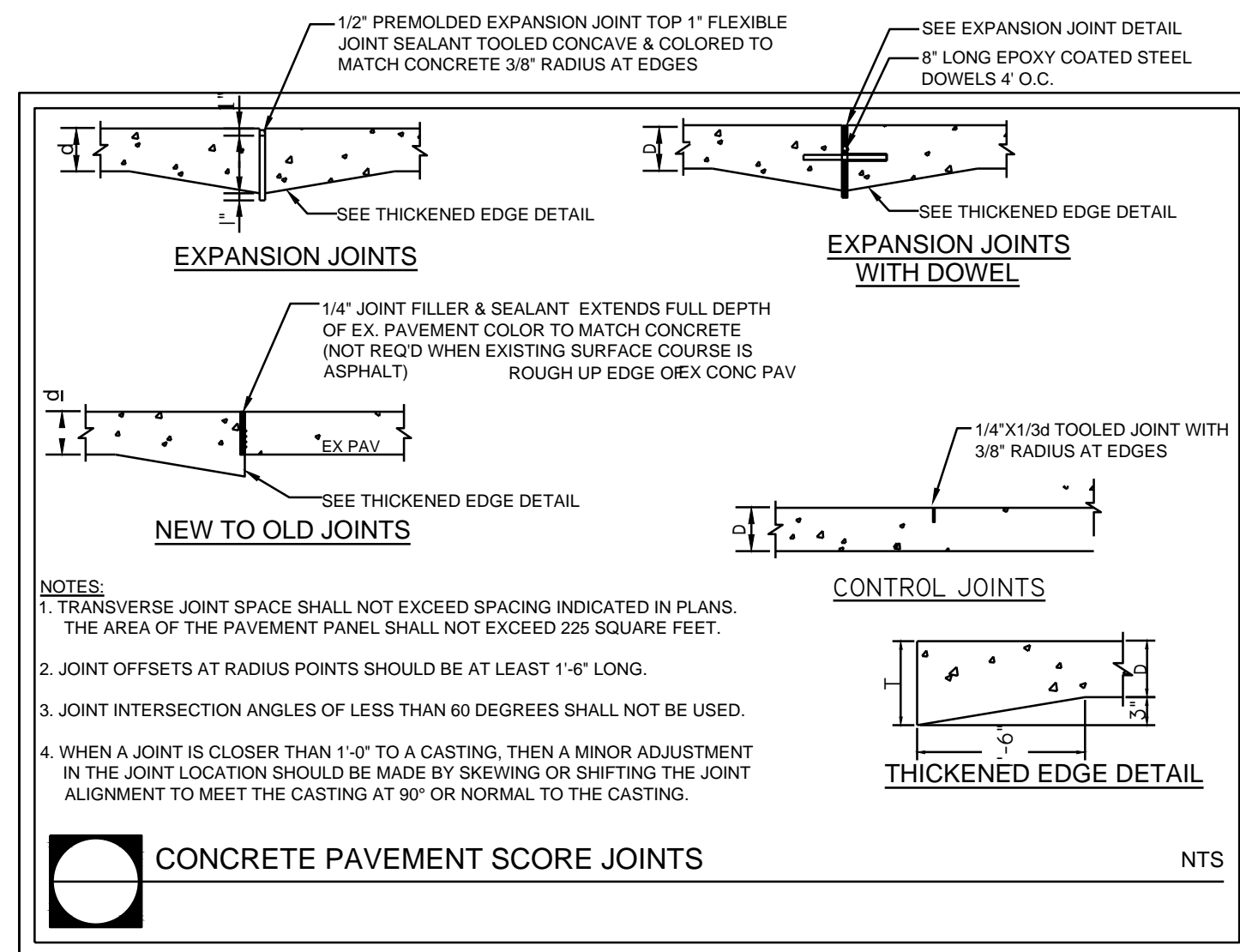


MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

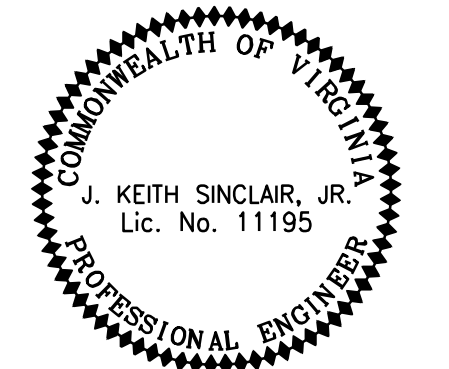
PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

SITE, GRADING & UTILITY PLAN

1-C-113



CONSULTANTS



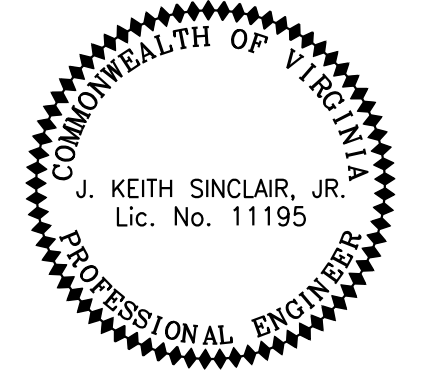
DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1
 601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204

MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	N/A
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

SITE DETAILS

CONSULTANTS



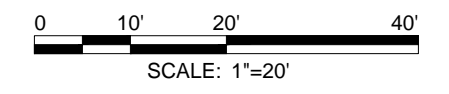
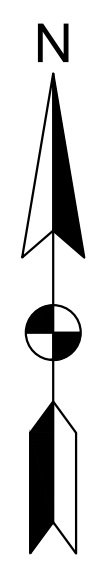
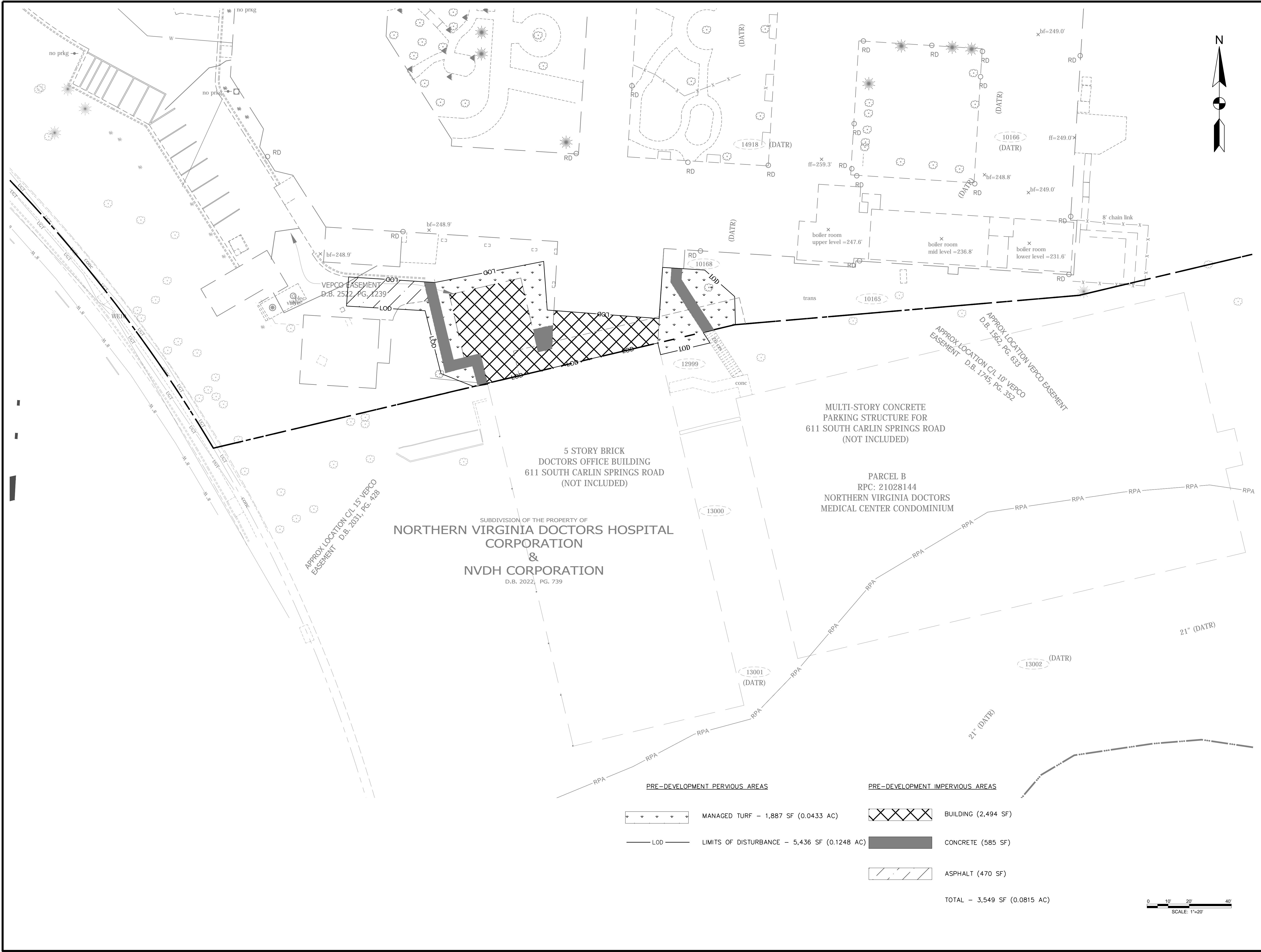
DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1
 601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204

MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS

SHEET TITLE
PRE-DEVELOPMENT WATER QUALITY MAP

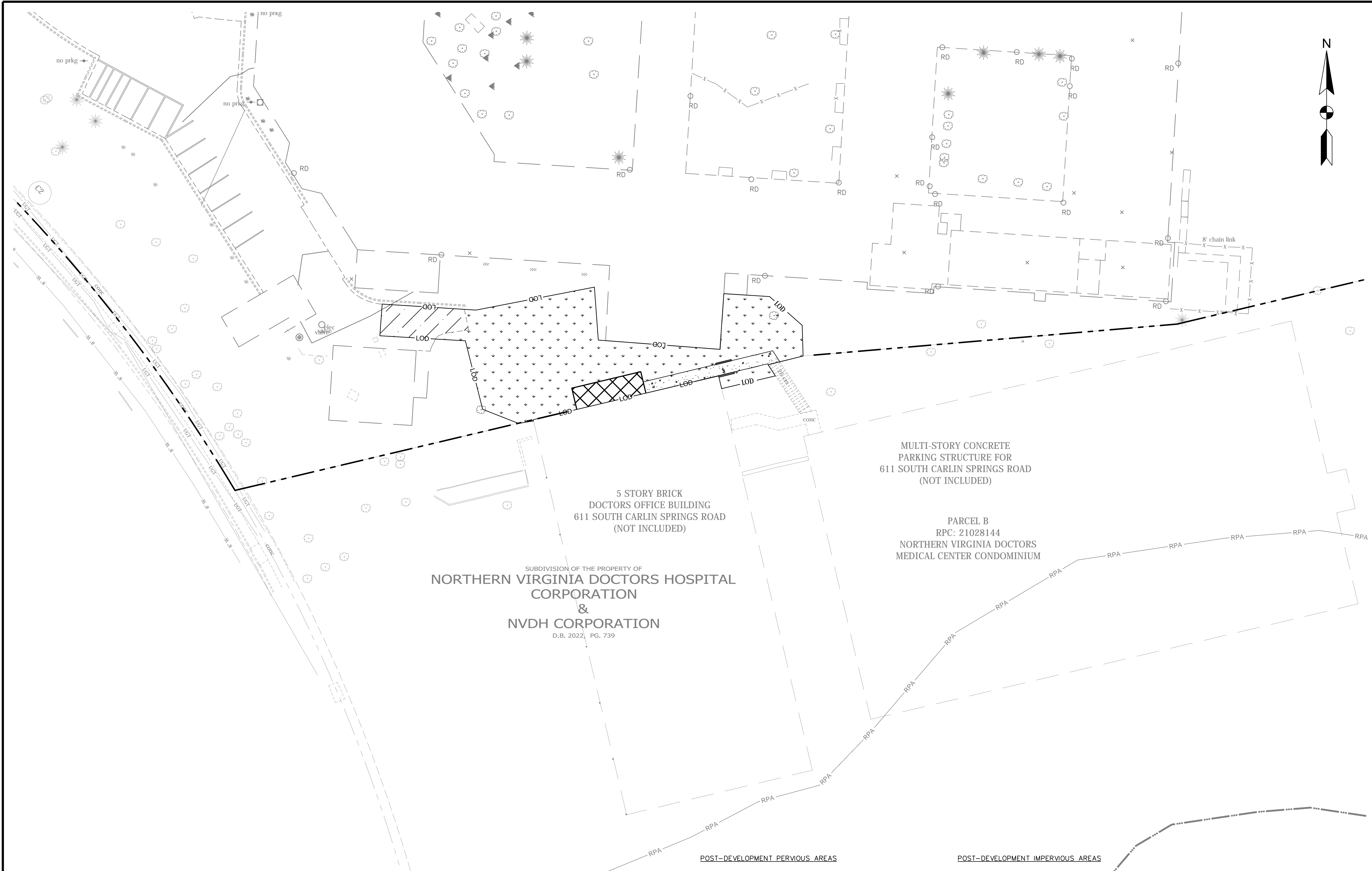
1-C-701



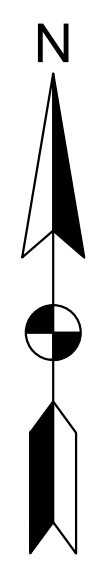
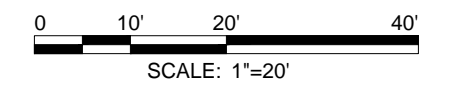
CONSULTANTS



**DECONSTRUCTION OF
 VIRGINIA HOSPITAL
 CENTER COMPLEX
 - PHASE 1**
 601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204



- POST-DEVELOPMENT PERVIOUS AREAS**
- MANAGED TURF - 4,365 SF (0.1002 AC)
 - LIMITS OF DISTURBANCE - 5,436 SF (0.1248 AC)
- POST-DEVELOPMENT IMPERVIOUS AREAS**
- BUILDING (295 SF)
 - CONCRETE (297 SF)
 - RETAINING WALL (9 SF)
 - ASPHALT (470 SF)
 - TOTAL - 1,071 SF (0.0246 AC)



MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

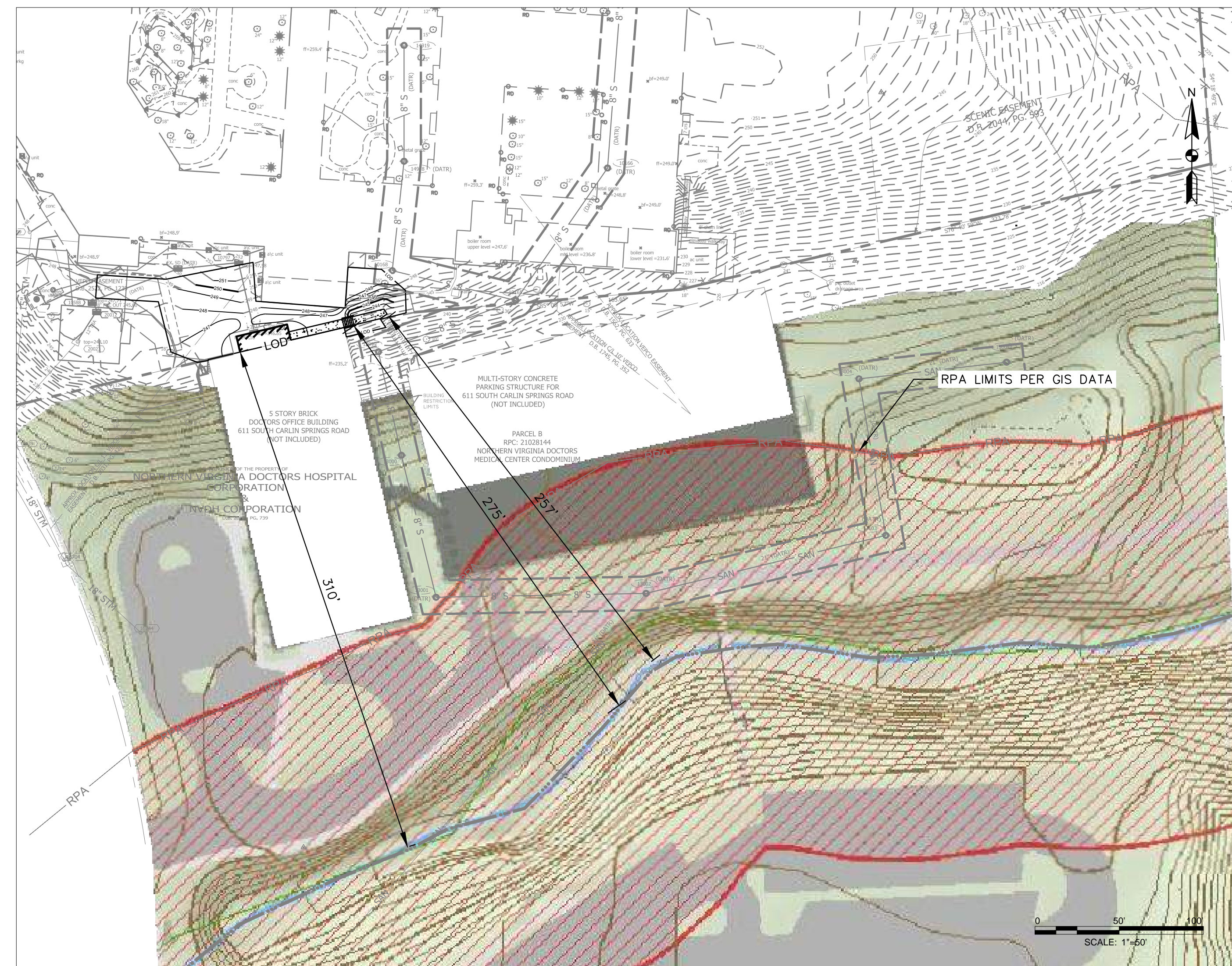
PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS

**POST-DEVELOPMENT
 WATER QUALITY MAP**

1-C-702

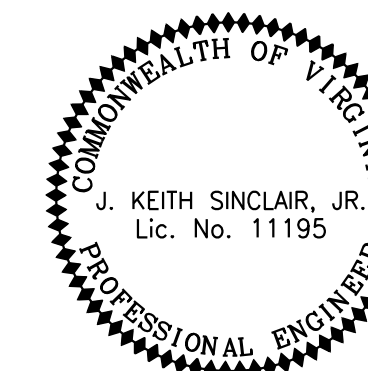


EXISTING RPA ENCROACHMENT MAP



PROPOSED RPA ENCROACHMENT MAP

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1
 601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204

Appendix C. Water Quality Impact Assessment Data Sheet

Project Address: 601 S CARLIN SPRINGS ROAD		Date: 06/18/2020
Applicant Name/Title: Jesus Almarino - Department of Environmental Services, Facilities, Design & Construction		Applicant Contact Information (phone and email): 703-228-4509; jalmarino@arlingtonva.us
Owner/Client Name: THE COUNTY BOARD OF ARLINGTON COUNTY VIRGINIA		Owner/Client Contact Information (phone and email): 703-228-3130; county.board@arlingtonva.us
Section 1: Type of activity proposed		
Activity type (check all that apply):		
<input checked="" type="checkbox"/> New construction (residential, commercial, public, etc.)	<input checked="" type="checkbox"/> Landscaping (includes tree removal)	
<input checked="" type="checkbox"/> Alteration of non-residential structure	<input type="checkbox"/> Utility work	
<input type="checkbox"/> Residential addition	<input type="checkbox"/> Fence	
<input type="checkbox"/> Detached residential structure	<input checked="" type="checkbox"/> Other (please describe): Grading	
Section 2: Key details of the proposed activity		
Complete all that apply		
Total area of disturbance on parcel (sf)	5,436 SF	Includes building footprint plus a 10 foot buffer. Also includes all soil disturbance, ingress/egress areas, stockpiling areas, etc.
Area of disturbance within RPA (sf)	0 SF	Includes removal of trees > 3" in diameter
Area of disturbance on slopes greater than or equal to 15 percent located adjacent to landward RPA boundary (sf)	0 SF	Does not apply to RPA parcels along Chain Bridge Road (15 percent and greater slopes are included as part of RPA)
Complete all fields		
	Existing condition	Proposed condition
RPA encroachment (ft)	310	310
	275	275
	257	257
Total development footprint in RPA (sf)	0	0
Impervious footprint in RPA (sf)	0	0
(OVER)		
STAFF USE ONLY		
Building/demolition/DA/Fence permit number(s):		
Major WQIA required? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Date WQIA/Exception request information complete:		
Date Chesapeake Bay Preservation Ordinance and E/S ordinance (if applicable) approvals issued in Permits Plus:		

Section 3: Plan and Narrative

Provide a plan showing the location of the proposed activity, along with the RPA boundary. Briefly describe the proposed project, including any potential water quality impacts and mitigation measures proposed. The narrative must address three impact categories: 1. Tree/vegetation impacts, 2. Stormwater and runoff, 3. Erosion and sediment control. Please refer to the WQIA plan/narrative checklist for additional information.

- Refer to sheets 1-C-104, 1-C-106 and 1-C-107 for Tree Preservation Plans, Details and Existing Tree Inventory.
- Refer to Sheet 1-C-703 for stormwater Management Plan and Sheet runoff information.
- Refer to sheets 1-C-109, 1-C-110, 1-C-111 and 1-C-112 for erosion and sediment control plan, narrative, notes and details.

PROJECT NARRATIVE:

PROJECT CONSISTS OF PARTIAL DEMOLITION LOCATED AT 601 S CARLIN SPRINGS ROAD TO SEPARATE THE HOSPITAL COMPLEX FROM THE 5-STORY OFFICE BUILDING WHICH INCLUDES REMOVAL OF AN AREA DRAIN ASSOCIATED WITH THE BUILDING TO BE REMOVED. IMPROVEMENTS INCLUDE AN EMERGENCY EGRESS STAIRWELL ADDITION, SIDEWALK, STAIRS AND RETAINING WALL AND GRADING. NO TREES ARE TO BE REMOVED WITHIN THE RESOURCE PROTECTION AREA (RPA) AND NO GRADING IS PROPOSED AROUND THEM, THEREFORE, THERE WILL BE NO IMPACTS TO TREES OR CRITICAL ROOT ZONES (CRZS) WITHIN THE RPA. CRZ PROTECTION MEASURES FOR TREES OUTSIDE OF THE RPA LIMITS INCLUDE TREE TRUNK AND LIMB PROTECTING MATTING. TREE PROTECTION NOTES HAVE BEEN INCLUDED ON THE TREE PRESERVATION PLAN TO FURTHER HIGHLIGHT THE IMPORTANCE OF PROTECTING THE EXISTING TREES. SITE RESTORATION INCLUDES PLANTING OF NEW TREES AS SHOWN ON SHEET 14-101. STORMWATER RUNOFF FROM THE SITE IS IN THE FORM OF SHEET FLOW TO THE SOUTH. STORMWATER QUALITY AND QUANTITY CONTROL TREATMENT REQUIREMENTS ARE MET BY THE REDUCTION OF IMPERVIOUS AREA. EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN PROVIDED FOR BOTH THE DEMOLITION AND PROPOSED PHASES OF WORK.

Additional Water Quality Impact Assessment Information

The information supplied on this form satisfies the minimum requirements for a Minor Water Quality Impact Assessment. For projects that disturb over 2500 square feet, elements of a Major Water Quality Impact Assessment may also be required, depending on the nature and extent of the proposed RPA encroachment, as outlined in Section 61-12 of the ordinance.

Appendix D. Exception Request Form

Applicant: JESUS ALMARIO	Project address: 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
Section 1: Brief description of exception request	
N/A	
Section 2: Parcel, structure, and ownership information	
Date parcel ownership began: 7/15/2019	Date(s) of construction of any prior work by current owner (alterations, additions, decks, patios, etc.)—list individually:
Date existing principal structure built: 1959	Date: _____ Type of prior work: _____
Will existing principal structure remain intact? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1. _____ 2. _____ 3. _____ 4. _____
STAFF USE ONLY	
<input type="checkbox"/> Allowable development in RPA (§ 61-7 A)	<input type="checkbox"/> New development in the RPA, redevelopment that increases impervious area in the RPA or encroaches further into the RPA, or any other proposed disturbance of any RPA component (exception request required)
<input type="checkbox"/> Allowable modification in RPA (§ 61-7 B)	<input type="checkbox"/> Exempted activity in RPA (§ 61-15)
<input type="checkbox"/> Allowable encroachment in RPA (§ 61-7 C)	<input type="checkbox"/> Expansion of nonconforming structure or use in RPA (§ 61-14) (exception request required)
<input type="checkbox"/> Expansion of nonconforming structure or use in RPA (§ 61-14) (exception request required)	<input type="checkbox"/> Other RMA activity: _____
CBORC hearing required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Date public notification sent certified mail: _____	
Hearing date: _____	
CBORC decision: <input type="checkbox"/> Approved <input type="checkbox"/> Not approved	
Date of final approval letter: _____	

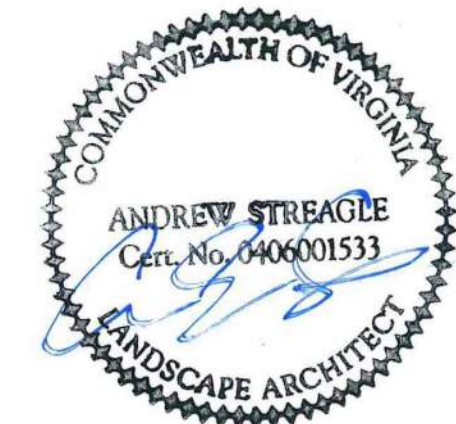
MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

WATER QUALITY IMPACT ASSESSMENT

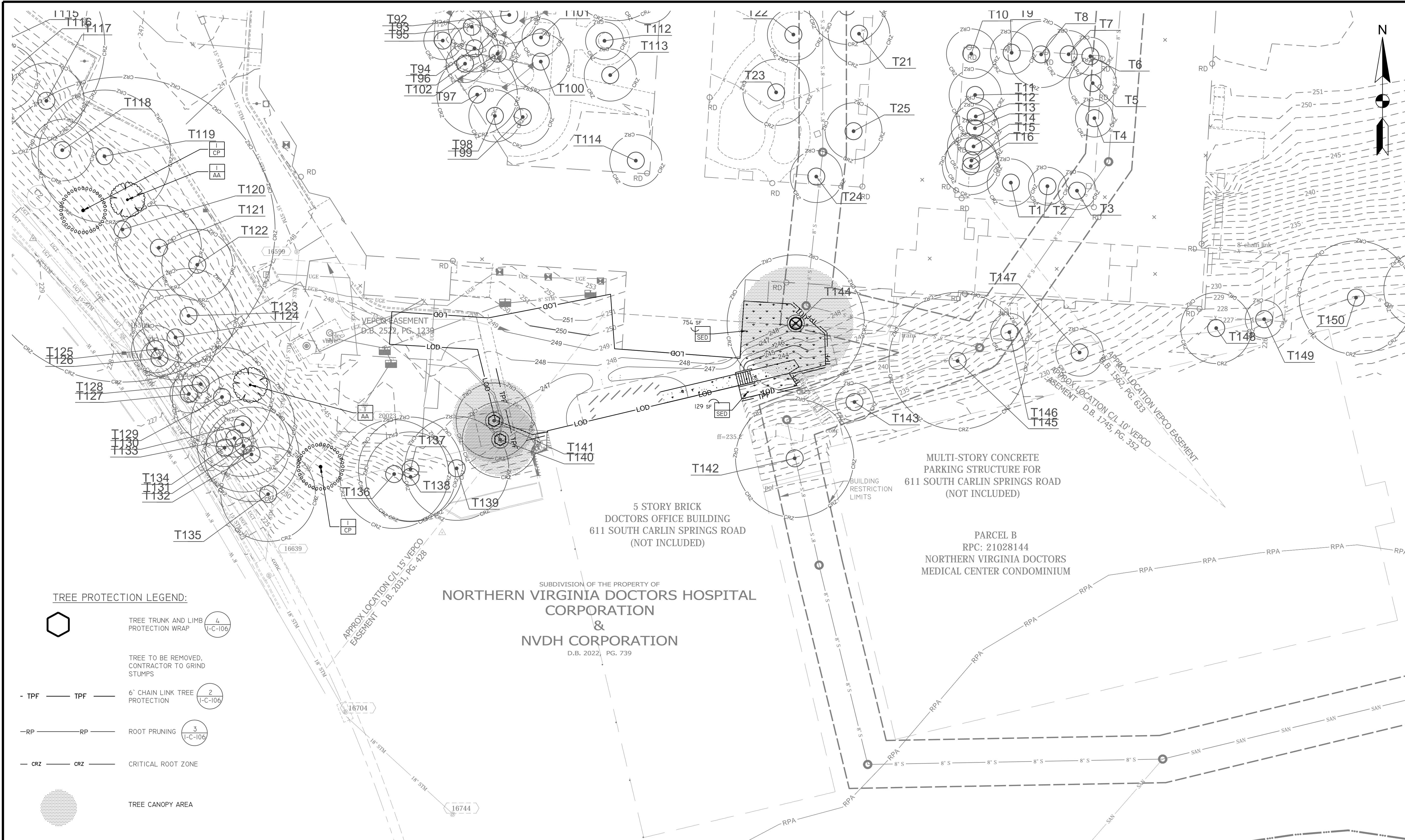
1-C-704

CONSULTANTS



DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204



TREE PROTECTION LEGEND:

- TREE TRUNK AND LIMB PROTECTION WRAP (1-C-106)
- TREE TO BE REMOVED, CONTRACTOR TO GRIND STUMPS
- 6' CHAIN LINK TREE PROTECTION (2 1-C-106)
- ROOT PRUNING (3 1-C-106)
- CRITICAL ROOT ZONE
- TREE CANOPY AREA

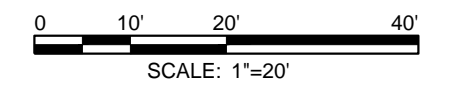
IMPACTED TREES								
TREE #	BOTANICAL NAME	COMMON NAME	SIZE (DBH)	CONDITION	ACTION	CRZ IMPACTED	CANOPY PRESERVED	NOTES
T140	PRUNUS SEROTINA	BLACK CHERRY	16	50	PRESERVE	13%	719	TO BE PROTECTED
T141	PINUS VIRGINIANA	VIRGINIA PINE	16	59	PRESERVE	19%	970	TO BE PROTECTED
T144	CORNUS KOUSA	KOUSA DOGWOOD	29	77	REMOVE	100%	0	TO BE REMOVED, CONTRACTOR TO GRIND STUMPS

PLANT SCHEDULE					
TREES	CODE	QTY	BOTANICAL / COMMON NAME	CONT	SIZE
	AA	2	AMELANCHIER CANADENSIS / SERVICEBERRY	B & B	8'-10" H
	CP	2	CELTIS OCCIDENTALIS / HACKBERRY	B & B	2-2.5' CAL.
GROUND COVERS	CODE	QTY	BOTANICAL / COMMON NAME	CONT	SPACING
	SED	883 SF	SEED TURF GRASS DROUGHT TOLERANT FESCUE BLEND	AREA	

CANOPY CALCULATIONS (SQUARE FEET)	
PARCEL SIZE	503,996
TREE CANOPY REQUIRED (10%)	50,400
EXISTING FOREST CANOPY	51,549
LARGE CANOPY TREE CANOPY CONSERVED (2X BONUS)	N/A
SMALL CANOPY TREE CANOPY CONSERVED	N/A
TREE CANOPY REMAINING TO PLANT	N/A
TREE CANOPY PLANTED	0

TREE REPLACEMENTS							
TREE NUMBER	SPECIES	NUMBER TREES REMOVED	D.B.H. (INCHES)	CONDITION	SPECIES RATING	TOTAL SCORE	REPLACEMENTS REQUIRED
T144	KOUSA DOGWOOD	1	29.00	0.77	0.80	17.86	4
TOTAL							4

*SHADED CELLS INDICATE TREES WITH 10" DBH AND SMALLER, WHICH ARE AUTOMATICALLY REPLACED AT A RATE OF ONE-FOR-ONE ACCORDING TO THE POLICY



MARK	DATE	DESCRIPTION
	12/11/2020	ISSUED FOR BID

PROJECT NO:	19-0679.001
SCALE:	1"=20'
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS
SHEET TITLE	

LANDSCAPE CONSERVATION PLAN

1-L-101

CONSULTANTS

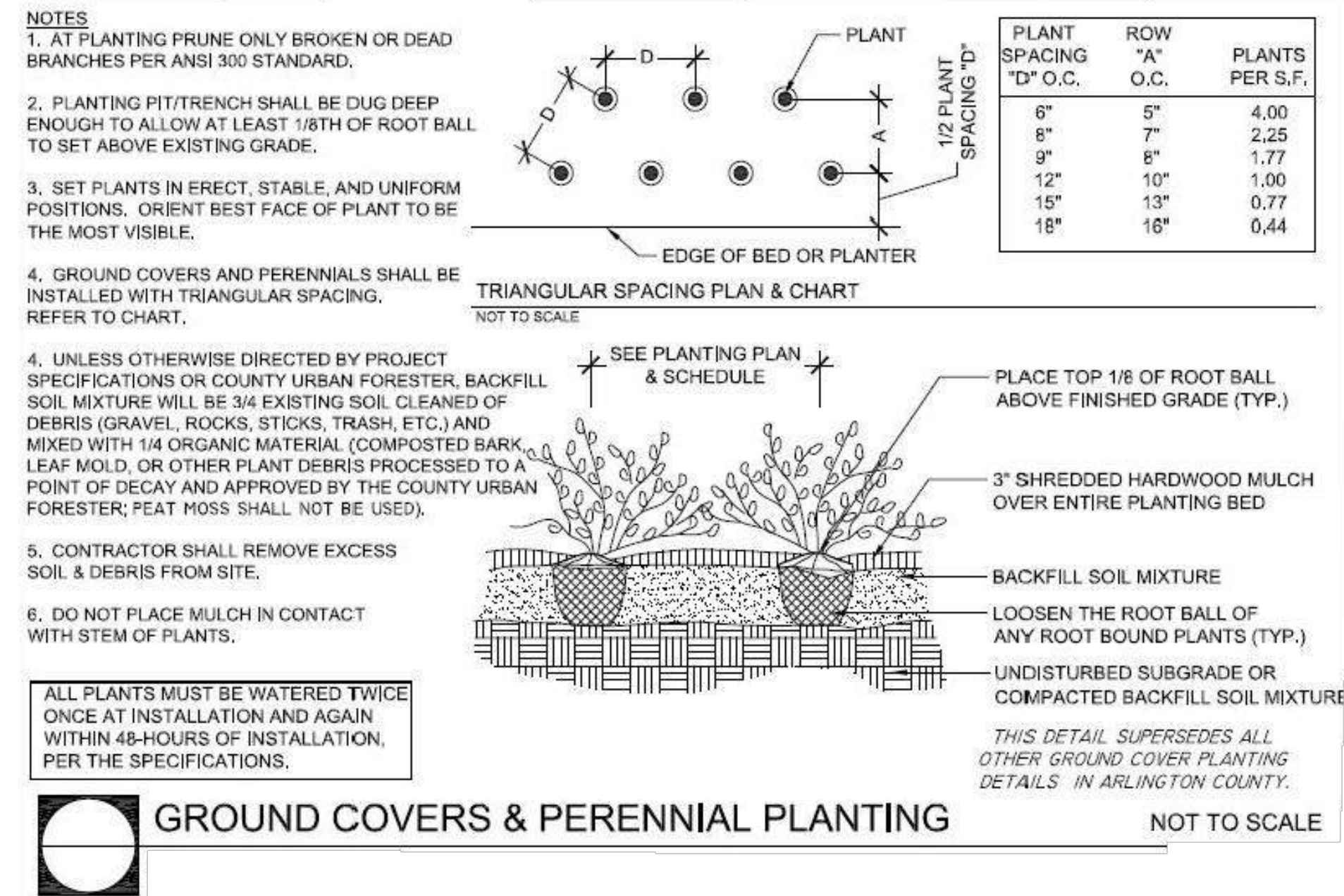
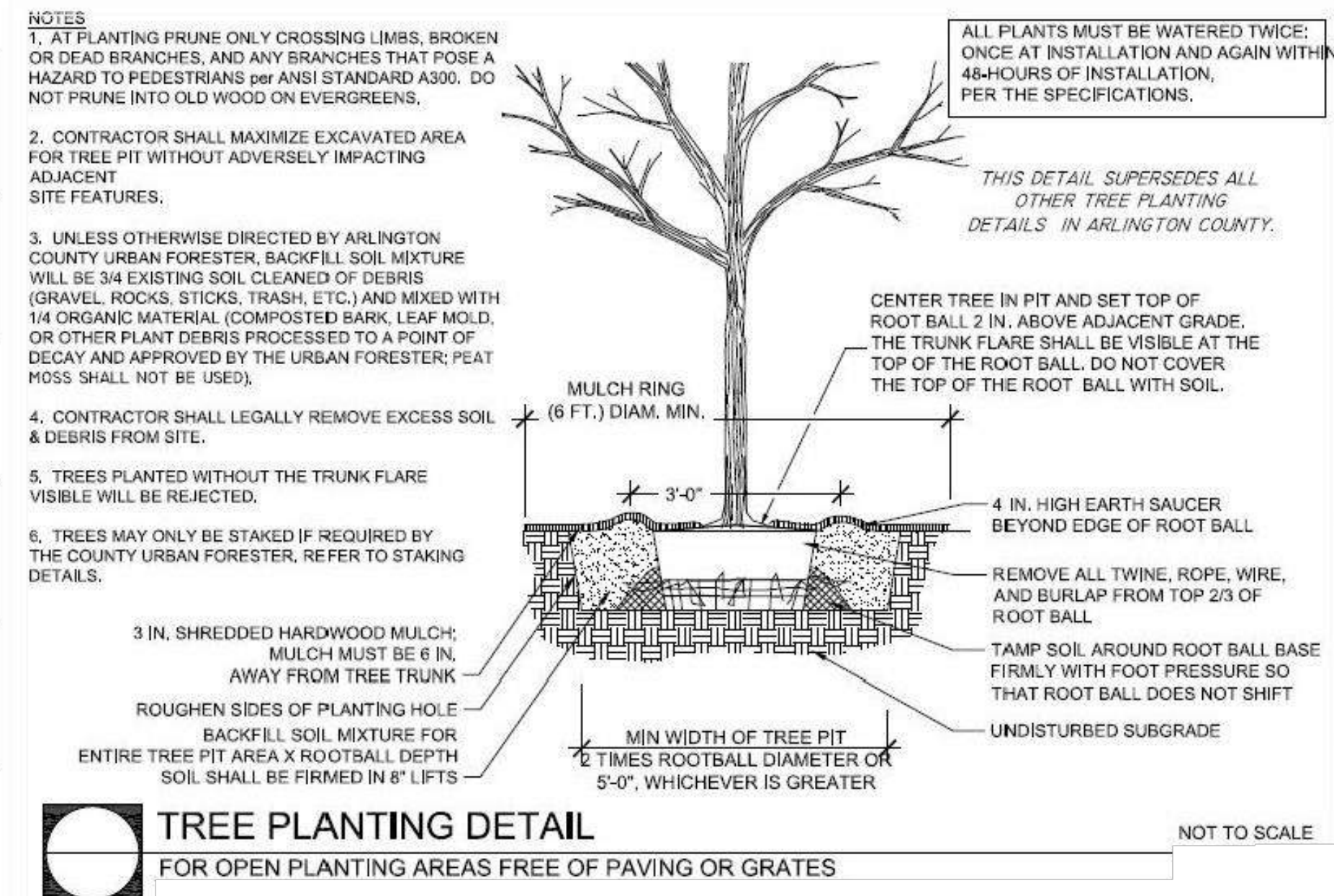


DECONSTRUCTION OF VIRGINIA HOSPITAL CENTER COMPLEX - PHASE 1

601 SOUTH CARLIN SPRINGS ROAD
 ARLINGTON, VA 22204

PLANTING GENERAL NOTES

- THIS PLAN IS FOR PLANTING PURPOSES ONLY, AND ANY OTHER INFORMATION SHOWN IS FOR REFERENCE ONLY. SEE SITE PLAN FOR INFORMATION ABOUT ALL LAYOUT, GRADING AND OTHER SITE IMPROVEMENTS.
- CALL MISS UTILITY AT 811 OR 1-800-257-7777 TO MARK UTILITIES AT LEAST 48 HOURS BEFORE DIGGING.
- ALL MATERIALS AND PLANTING PROCEDURES EXCEPT AS OTHERWISE NOTED SHALL CONFORM TO THE LATEST EDITION OF "LANDSCAPE SPECIFICATION GUIDELINES" BY THE LANDSCAPE CONTRACTORS ASSOCIATION MD-DC-VA.
- PLANTS SHALL CONFORM TO THE CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, (ANSI Z60.1)
- PLANT NAMES SHALL BE THOSE GIVEN IN THE LATEST EDITION OF STANDARD PLANT NAMES, AMERICAN COMMITTEE ON HORTICULTURAL NOMENCLATURE.
- TOPSOIL SHALL MEET SPECIFICATIONS AS PER THE DEQ VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
- THE CONTRACTOR SHALL SUBMIT REPRESENTATIVE SOIL SAMPLES FROM BOTH IN-SITU SOILS AND SOILS BROUGHT IN FROM OFF-SITE TO A STATE LICENSED TESTING LABORATORY. THE CONTRACTOR SHALL INCORPORATE OR APPLY SOIL AMENDMENTS AND FERTILIZATION BASED UPON RESULTS OF THE SOIL TESTS AND RECOMMENDATIONS BY THE TEST LAB.
- THE CONTRACTOR SHALL APPLY GRASS ACCORDING TO THE DEQ VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. DO NOT USE KENTUCKY 31 TALL FESCUE.
- THE CONTRACTOR SHALL STAKE OUT ALL PLANTING BEDS AND TREE LOCATIONS AND THESE MUST BE APPROVED BY THE LANDSCAPE ARCHITECT OR OWNER BEFORE DIGGING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND COORDINATE PLANTINGS WITH ALL EXISTING UTILITIES. IF DISCREPANCIES OCCUR BECAUSE OF UTILITY LOCATIONS OR OTHER EXISTING CONDITIONS THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT IMMEDIATELY TO COORDINATE ANY NECESSARY ADJUSTMENTS.
- ALL PLANT MATERIAL SHALL BE LABELED BY THE NURSERY AND DELIVERED WITH LABELS IN PLACE FOR INSPECTION. SUBSTITUTIONS IN PLANT SPECIES OR SIZE WILL NOT BE PERMITTED EXCEPT WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT OR OWNER. PRUNING IS NOT TO OCCUR UNTIL MATERIAL HAS BEEN PLANTED. CONTRACTOR SHALL PRUNE PLANT MATERIAL AS SOON THEREAFTER AS IS ADVISABLE UNDER STANDARD HORTICULTURAL PRACTICES.
- IT IS OF UTMOST IMPORTANCE THAT ALL PLANT MATERIAL BE SET SLIGHTLY HIGHER IN RELATION TO GRADE THAN IT WAS GROWN IN THE NURSERY AND WITH GOOD EARTH TO ROOT CONTACT. ANY MATERIALS OR WORK MAY BE REJECTED BY THE LANDSCAPE ARCHITECT IF IT DOES NOT MEET THIS OR ANY OTHER REQUIREMENT OF THE SPECIFICATIONS, AND REJECTED MATERIALS SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AT CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL MULCH AND WATER ALL PLANTS WELL ON THE DAY THEY ARE PLANTED. THE SURFACE MULCH LAYER SHALL CONSIST OF STANDARD FINE SHREDDED AGED HARDWOOD MULCH. THE CONTRACTOR SHALL APPLY THE MULCH UNIFORMLY TO A 2 TO 3 INCH DEPTH. BARK SHALL BE KEPT 3 TO 4 INCHES AWAY FROM ALL TRUNKS AND WOODY STEMS.
- IN CASE OF DISCREPANCIES BETWEEN QUANTITIES ON THE PLANT LIST AND THE PLAN, THE PLAN SHALL GOVERN.
- SEED OR SOO BARE AREAS AS DIRECTED BY OWNER FOR ALL DISTURBED AREAS TO BE STABILIZED THAT ARE NOT LANDSCAPED OR COVERED.
- ANY PLANTING WITHIN A FOREST RETENTION AREA, AS DESIGNATED ON THE FOREST CONSERVATION PLAN AND SHOWN ON THIS PLAN, MUST BE DONE TO AVOID ANY ADVERSE IMPACT TO THE ROOTS OF EXISTING TREES. THE CONTRACTORS PERFORMING WORK ON THE SITE ARE RESPONSIBLE FOR PROTECTING EXISTING NATIVE AND NON-INVASIVE PLANTINGS DURING CONSTRUCTION.



12/11/2020 ISSUED FOR BID

MARK	DATE	DESCRIPTION

PROJECT NO:	19-0679.001
SCALE:	N/A
DESIGNED BY:	CMB
DRAWN BY:	JES
CHECKED BY:	JKS

SHEET TITLE

LANDSCAPE NOTES & DETAILS

1-L-501

DEMOLITION KEYNOTES - FOURTH FLOOR LEVEL	
NO.	NOTE
1	LIMIT OF DEMOLITION TO BE DETERMINED IN THE FIELD. DEMOLISH ALL OF THE STRUCTURE TO THIS POINT INCLUDING BELOW GRADE STRUCTURES TO AN ELEVATION OF APPROXIMATELY 242.00'. SAWCUT FLOOR, ROOF, AND WALLS CLEANLY. MAINTAIN STABILITY OF STRUCTURE TO REMAIN.
2	DEMOLISH ENTIRE MRI ADDITION INCLUDING ALL ABOVE & BELOW GRADE CONSTRUCTION.
3	TEMPORARY 1-HR. RATED STUD WALL TO SEPARATE NEW WORK FROM EXISTING EGRESS PATH.
4	DEMOLISH EXISTING EXTERIOR DOOR & FRAME.
5	DEMOLISH EXISTING STOREFRONT & GLAZING.
6	SAWCUT SLAB ALONG BASE OF EXISTING RAMP.
7	DEMOLISH EXISTING DOOR & FRAME.
8	MAINTAIN EXISTING CONSTRUCTION IN BUILDING TO REMAIN - DEMOLISH ONLY TO THE EXTENT NECESSARY FOR NEW MECHANICAL AND ELECTRICAL WORK. PATCH ALL FINISHES TO MATCH EXISTING.
9	DEMOLISH BRICK AT CORNER WITHOUT DAMAGE TO BRICK TO REMAIN. CLEAN ALL MORTAR OR SEALANT FROM ORIGINAL JOINT. REPLACE DAMAGED BRICK WITH NEW BRICK TO MATCH FOR A CLEAN MASONRY EDGE.
10	DEMOLISH ALL FINISHES BACK TO FACE OF MASONRY.
11	DEMOLISH CONCRETE STEPS & SIDEWALK TO THE EXTENT SHOWN - REFER TO CIVIL DRAWINGS.
12	DEMOLISH EXISTING INTERIOR DOOR & FRAME. PREPARE OPENING FOR REPLACEMENT DOOR & FRAME.

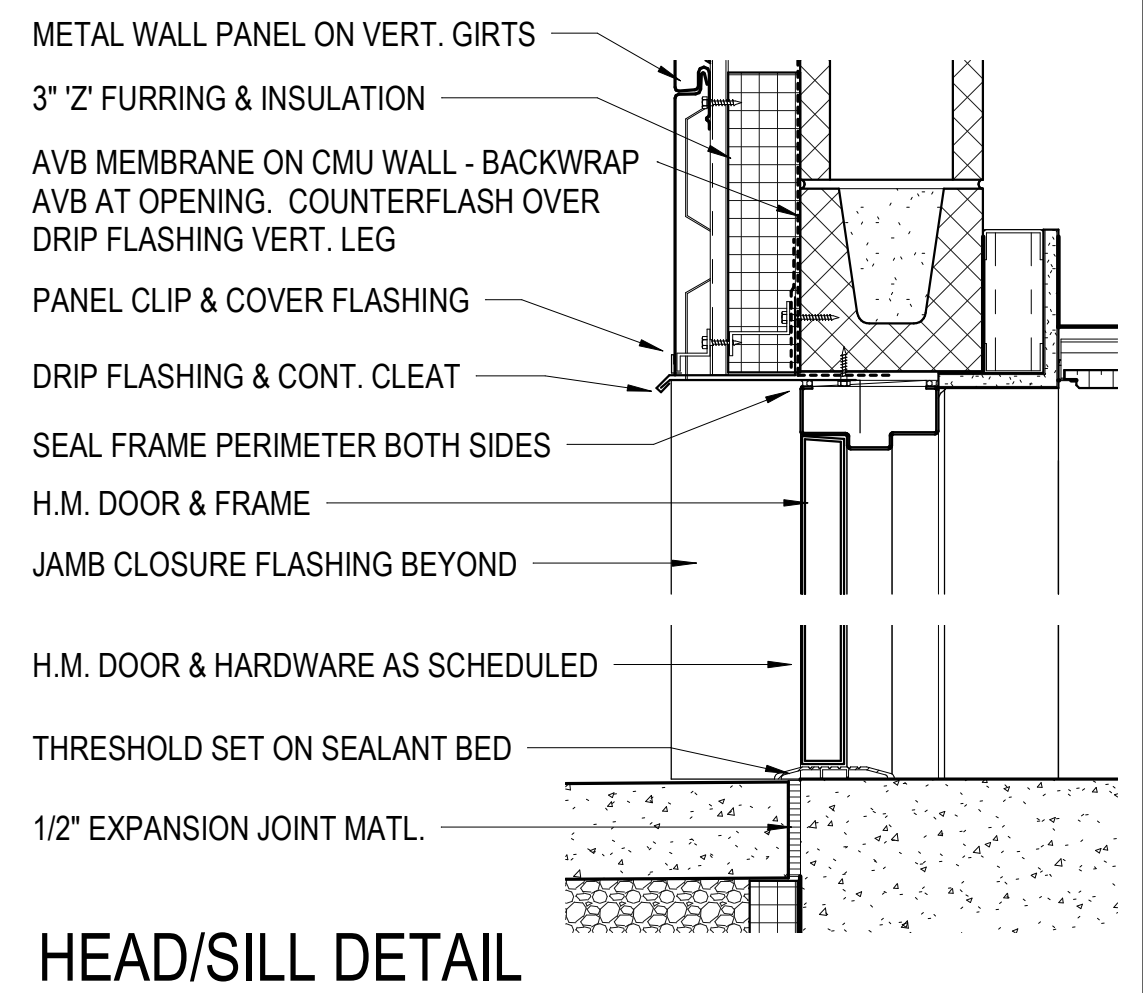
FINISH SCHEDULE								
ROOM NUMBER	ROOM NAME	FLOOR	WALL BASE	WALLS			CEILING	
				N	S	E		W
401	NEW VESTIBULE	VCT	RBR	PAINT	PAINT	PAINT	PAINT	SAT
501	NEW VESTIBULE	VCT	RBR	PAINT	PAINT	PAINT	PAINT	SAT

DOOR SCHEDULE								
NUMBER	MAT'L	DOOR			FRAME		Door Fire Rating	
		WIDTH	HEIGHT	THICKNESS	MAT	TYPE		
01	H.M.	3'-0"	7'-10"	1 3/4"	H.M.	1	1	
02	H.M.	3'-0"	6'-8"	1 3/4"	H.M.	1	2	

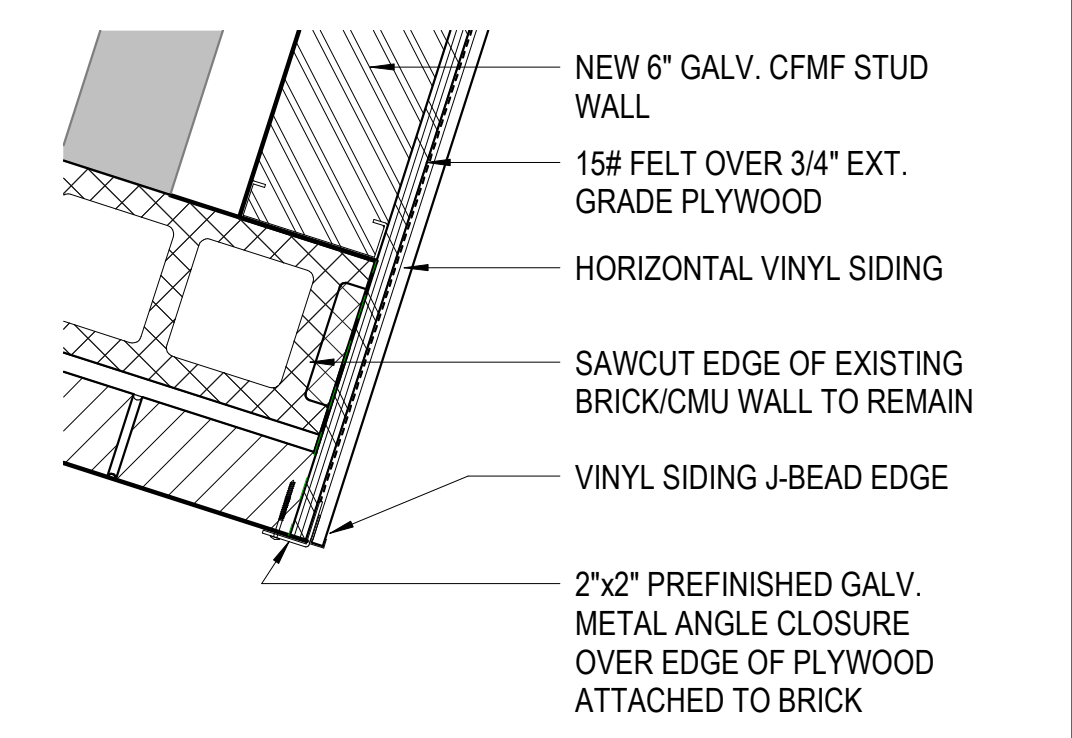
- DOOR HARDWARE NOTES:**
1. HDW 1 INCLUDES PANIC DEVICE AND CLOSER.
 2. HDW 2 INCLUDES PASSAGE SET AND CLOSER.
 3. REFER TO SPECIFICATIONS FOR FULL HARDWARE SET DESCRIPTIONS.

DOOR & FRAME TYPE 1
SCALE: 1/4" = 1'-0"

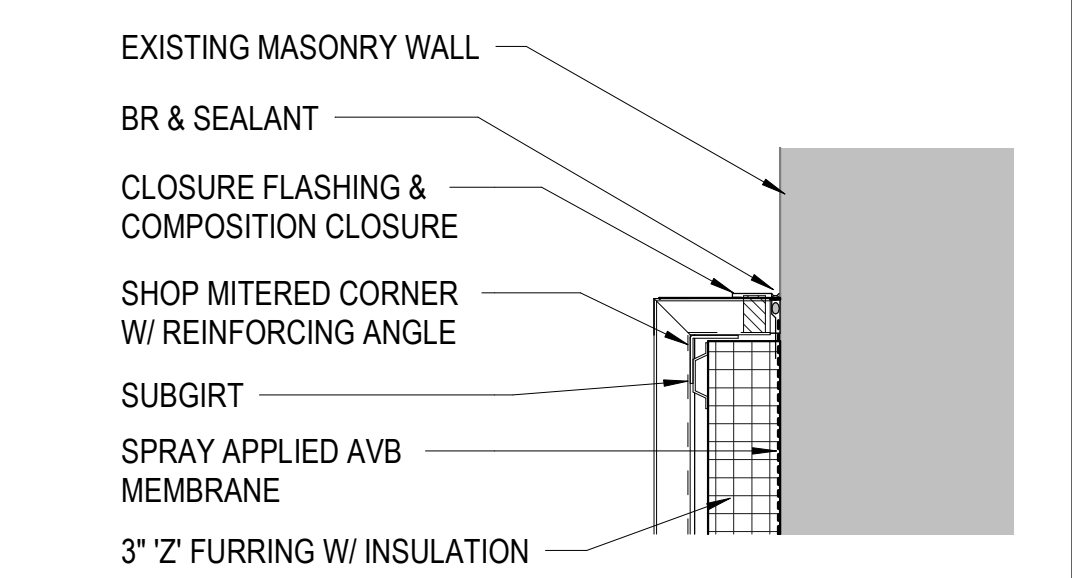
DOOR JAMB DETAIL
SCALE: 1 1/2" = 1'-0"



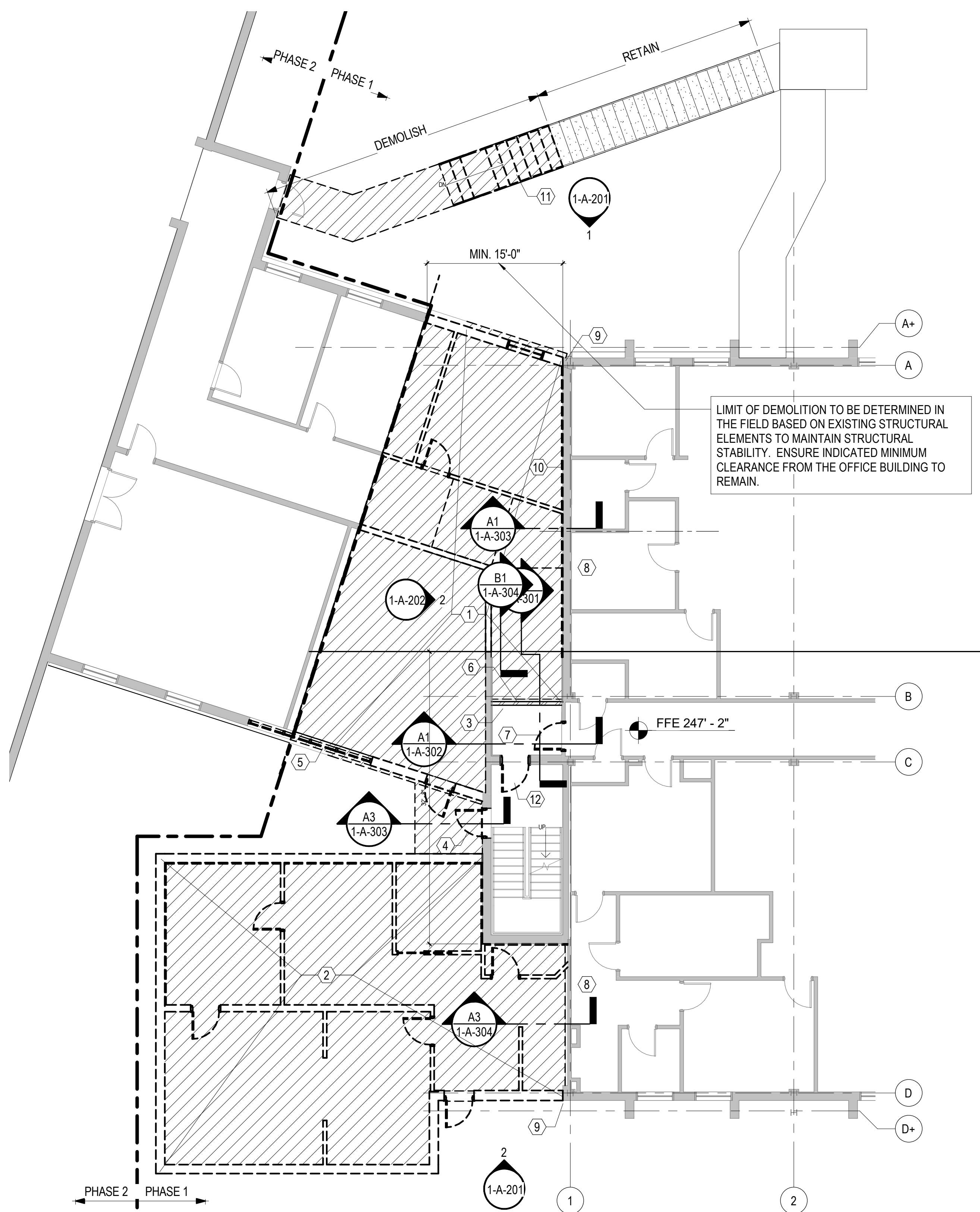
HEAD/SILL DETAIL
SCALE: 1 1/2" = 1'-0"



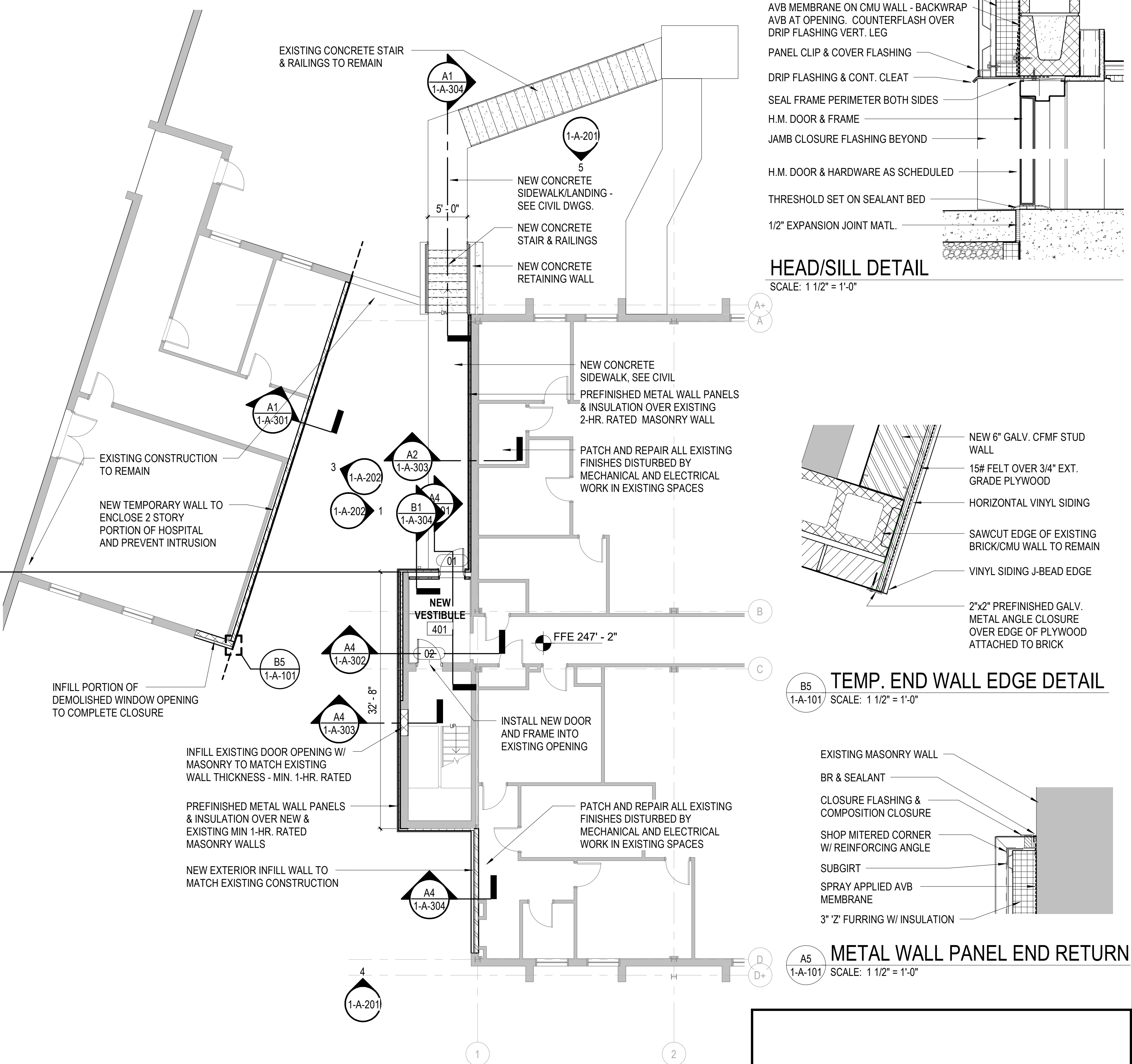
TEMP. END WALL EDGE DETAIL
SCALE: 1 1/2" = 1'-0"



METAL WALL PANEL END RETURN
SCALE: 1 1/2" = 1'-0"

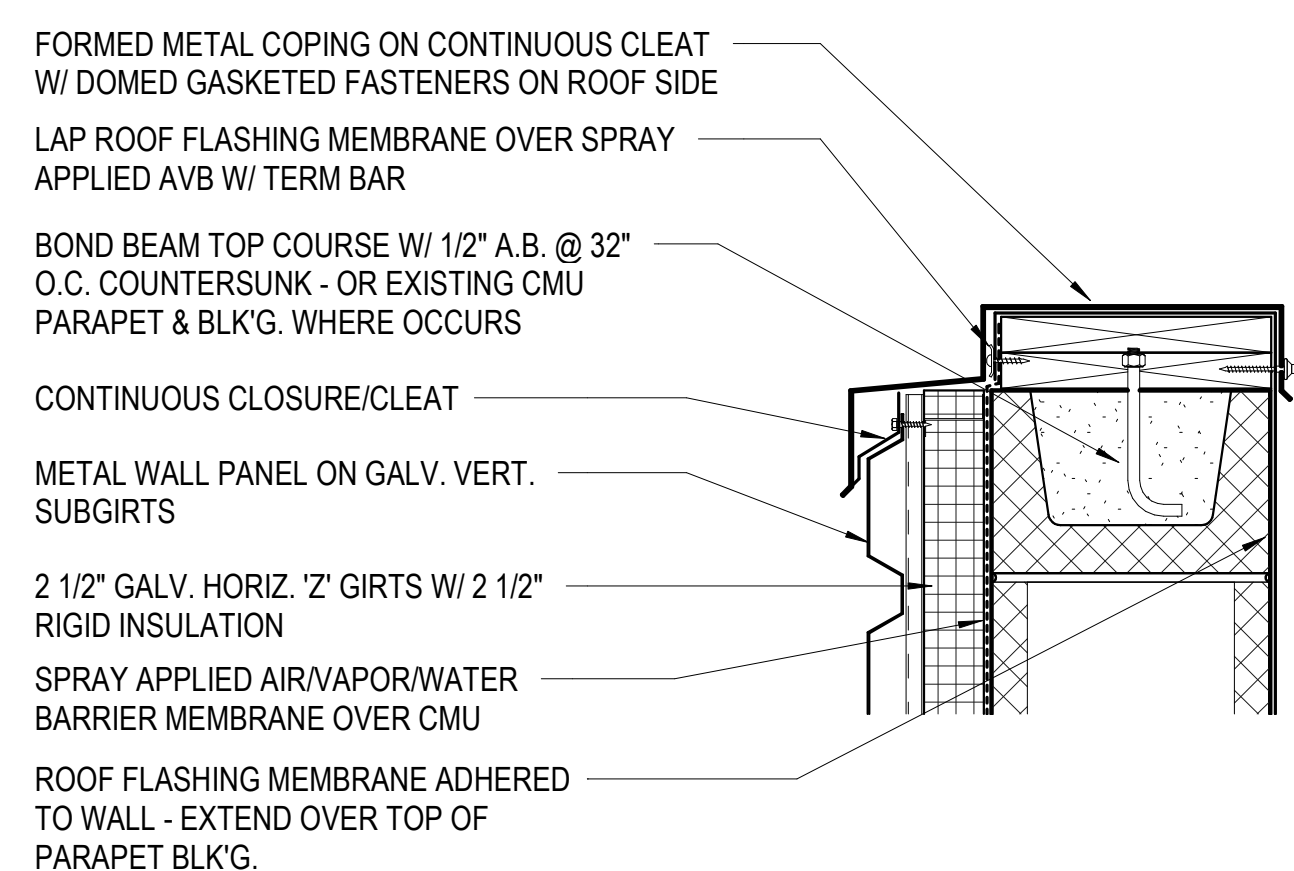


FOURTH FLOOR - DEMOLITION SEE SHEET 1-G-1-2 FOR SEQUENCING INFORMATION
SCALE: 1/8" = 1'-0"

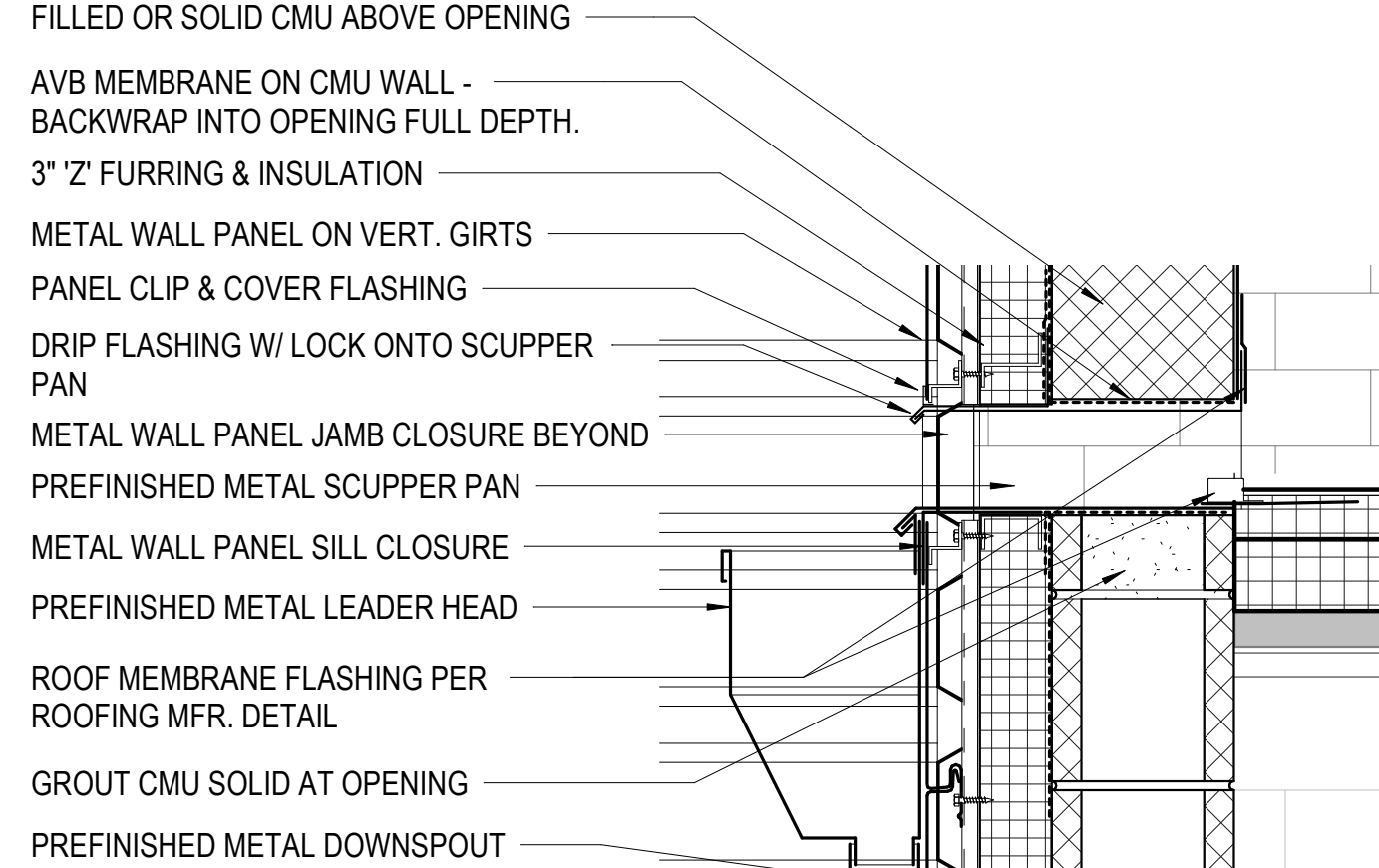


DEMOLITION KEYNOTES - FIFTH FLOOR LEVEL

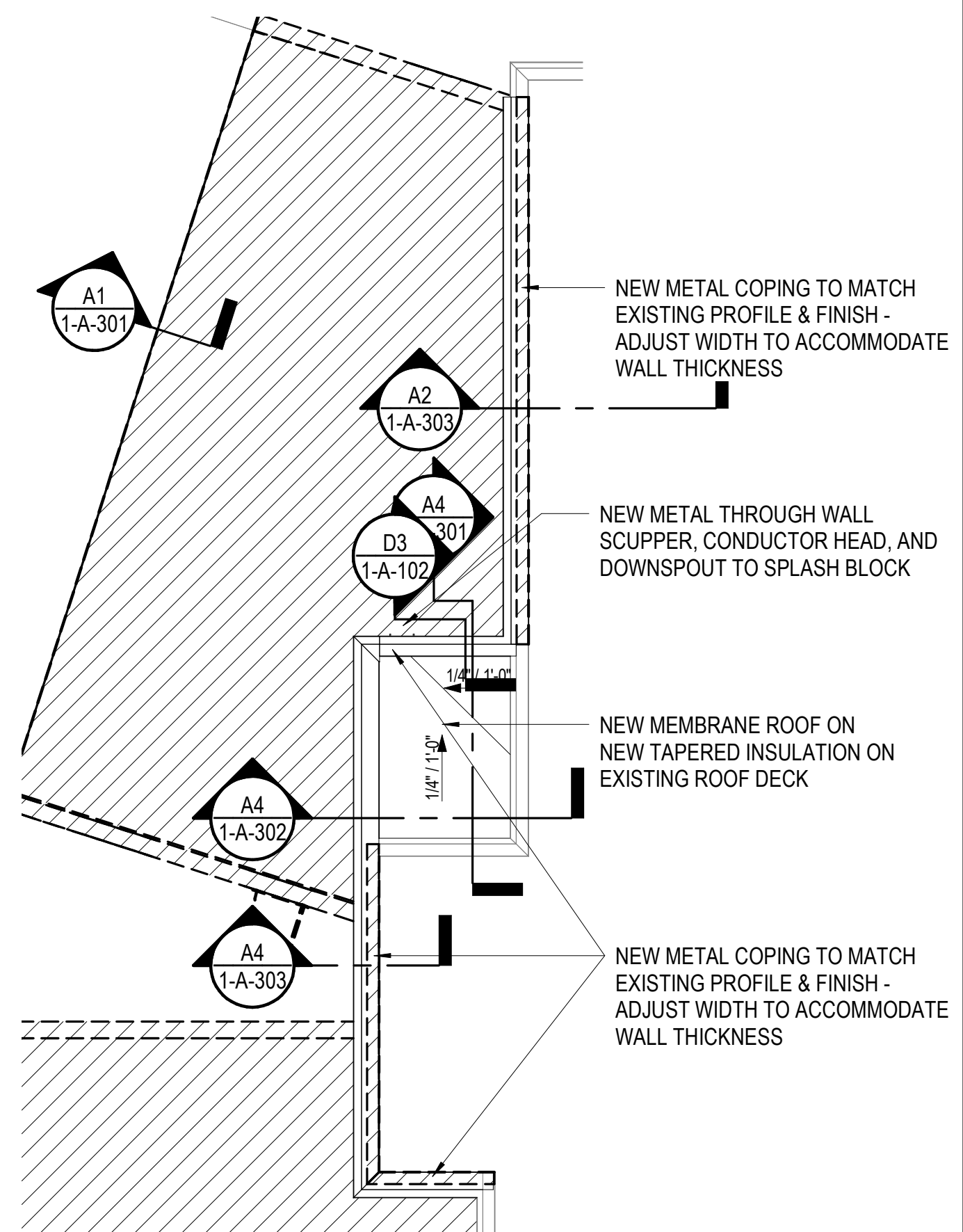
NO.	NOTE
1	LIMIT OF DEMOLITION. DEMOLISH ALL OF THE STRUCTURE TO THIS POINT INCLUDING BELOW GRADE STRUCTURES TO AN ELEVATION OF APPROXIMATELY 242.00'. SAWCUT FLOOR, ROOF, AND WALLS CLEANLY. MAINTAIN STABILITY OF STRUCTURE TO REMAIN.
2	DEMOLISH ENTIRE MRI ADDITION INCLUDING ALL ABOVE & BELOW GRADE CONSTRUCTION.
3	TEMPORARY 1-HR RATED STUD WALL TO SEPERATE NEW WORK FROM EXISTING EGRESS PATH.
4	EXISTING FLOOR TO REMAIN. MODIFY SUPPORTING STRUCTURE PER THE STRUCTURAL DWGS. SAWCUT FLOOR SLAB EDGE TO ALIGN WITH NEW CONSTRUCTION.
5	DEMOLISH ALL FINISHES BACK TO FACE OF MASONRY.
6	RETAIN EXISTING GYPSUM BOARD FURRED WALL TO THE EXTENT OF THE NEW WORK.
7	NOT USED.
8	MAINTAIN EXISTING CONSTRUCTION IN BUILDING TO REMAIN - DEMOLISH ONLY TO THE EXTENT NECESSARY FOR NEW MECHANICAL AND ELECTRICAL WORK. PATCH ALL FINISHES TO MATCH EXISTING.



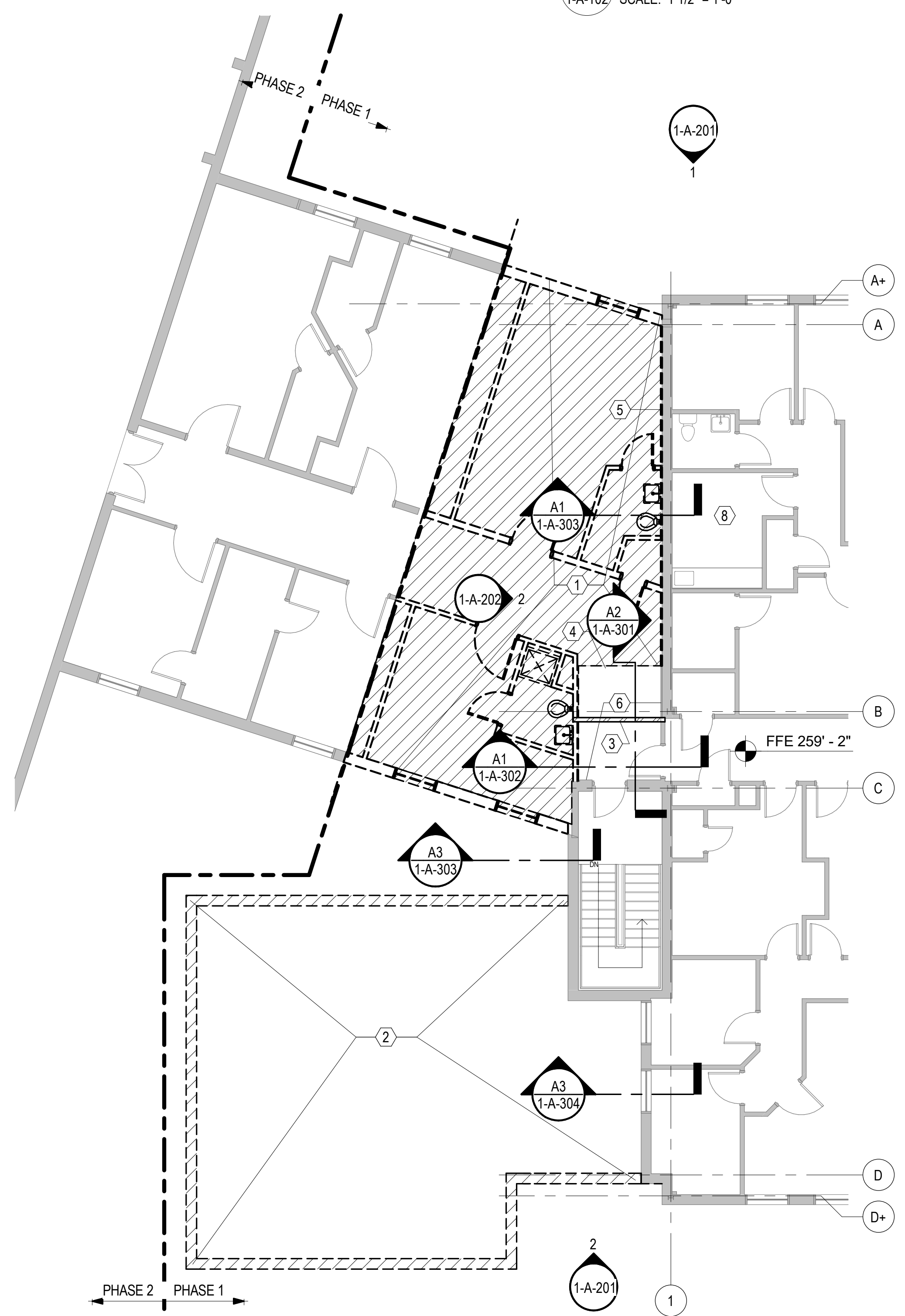
D2 COPING DETAIL
1-A-102 SCALE: 1 1/2" = 1'-0"



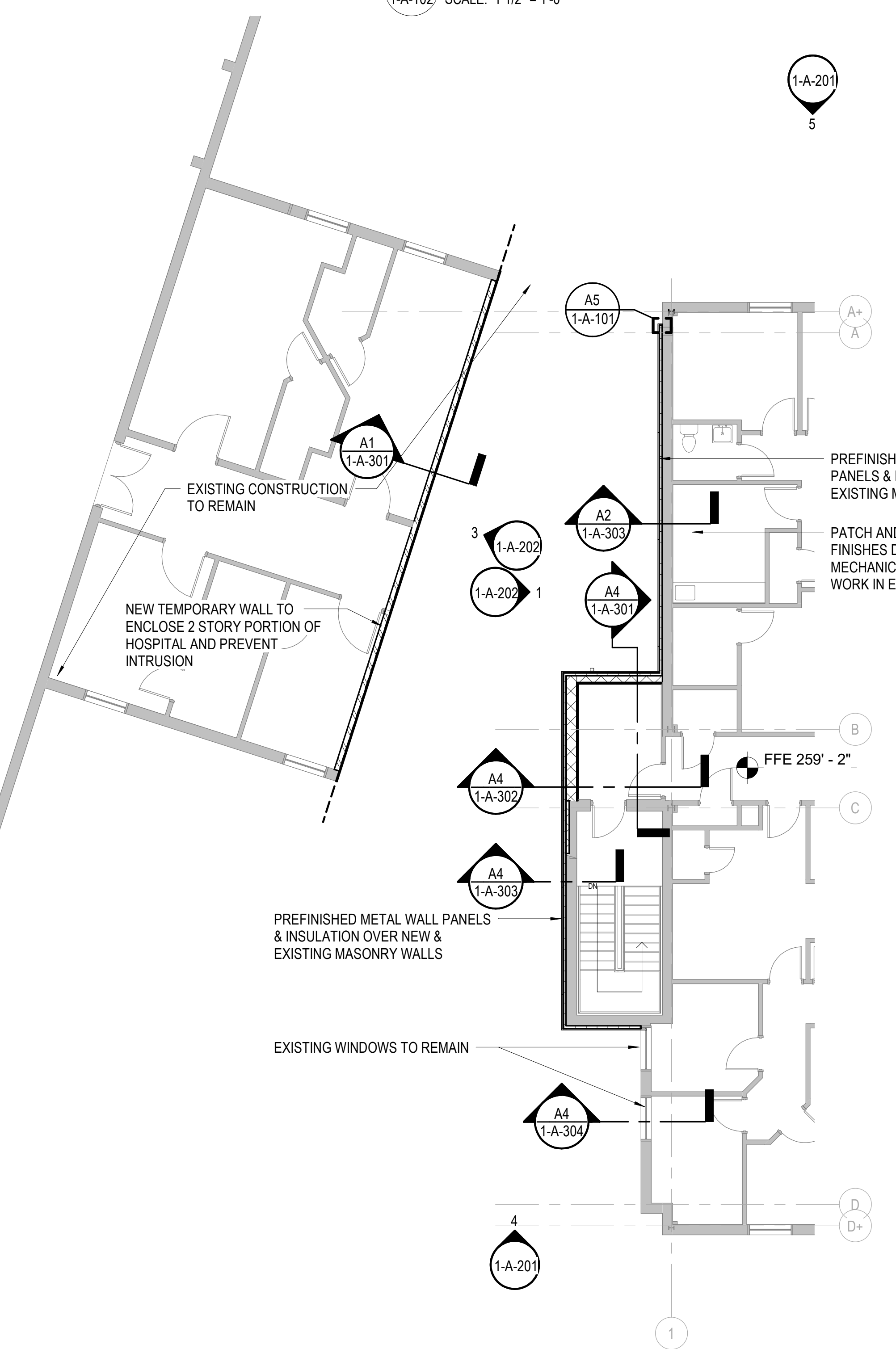
D3 SCUPPER DETAIL
1-A-102 SCALE: 1 1/2" = 1'-0"



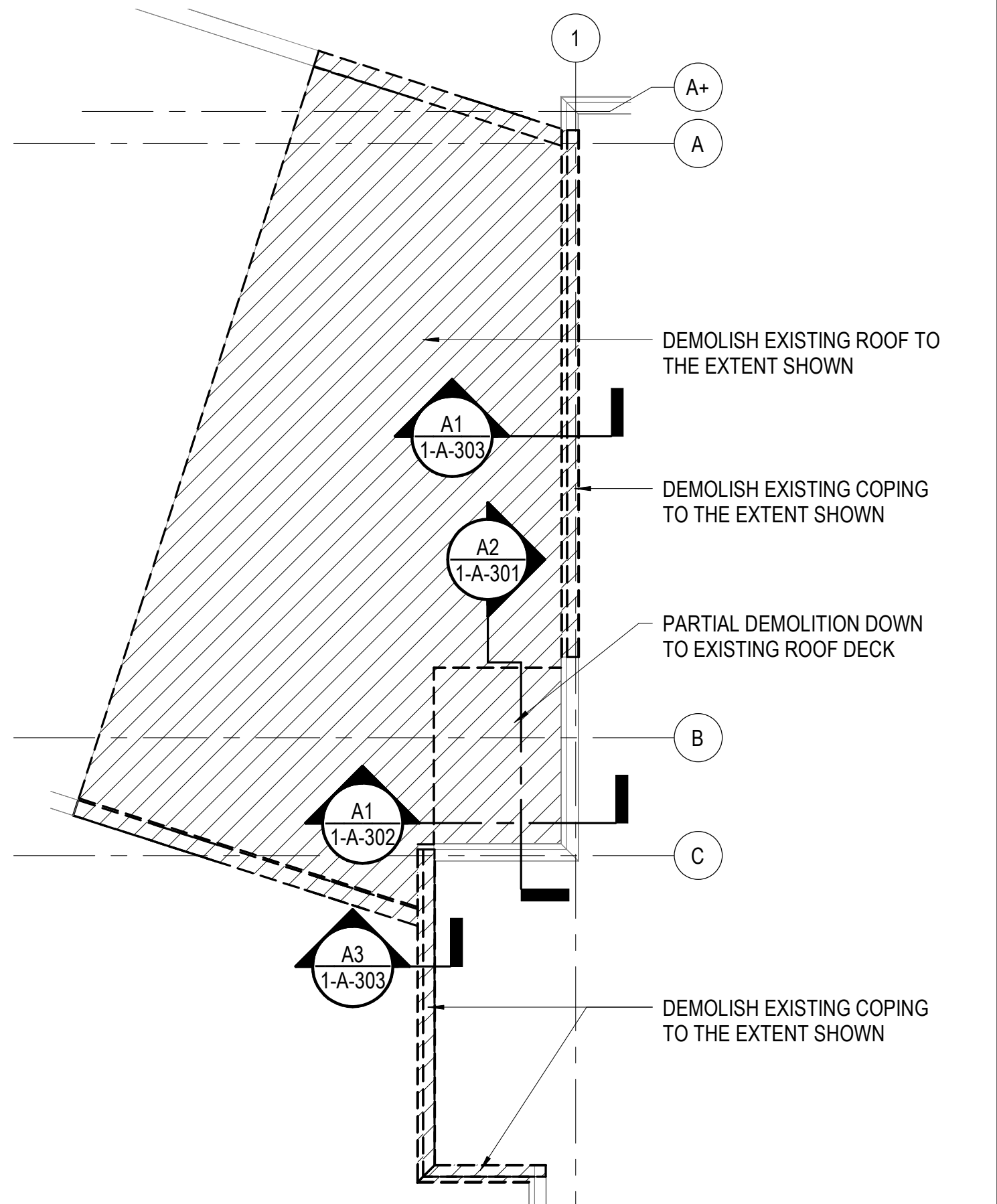
ROOF PLAN - NEW WORK
SCALE: 1/8" = 1'-0"



FIFTH FLOOR - DEMOLITION
SCALE: 1/8" = 1'-0"
SEE SHEET 1-G-1-2 FOR SEQUENCING INFORMATION



FIFTH FLOOR - NEW WORK
SCALE: 1/8" = 1'-0"
SEE SHEET 1-G-1-2 FOR SEQUENCING INFORMATION



ROOF PLAN - DEMOLITION
SCALE: 1/8" = 1'-0"

CD Revisions	Permit Revisions	DES
1	05.15.2020	
2	07.30.2020	

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	KDL	DWH	KDL
12.11.2020	13356.28						

RRMM ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING FIFTH FLOOR AND ROOF DEMOLITION AND NEW WORK PLANS

SHEET
1-A-102

BIN 360/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.vt 12/11/2020 9:11:03 AM



12/11/2020 9:11:04 AM BIN 360/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.vt

NEW LAY IN ACOUSTIC CEILING AT 8'-0" A.F.F.
EXISTING STAIR FINISHES TO REMAIN

REPAIR EXISTING CEILINGS DAMAGED BY NEW WORK, INCLUDING WORK IN THIRD FLOOR CEILING SPACES - TYPICAL
NEW SOFFIT

04-FOURTH FLOOR CEILING - NEW

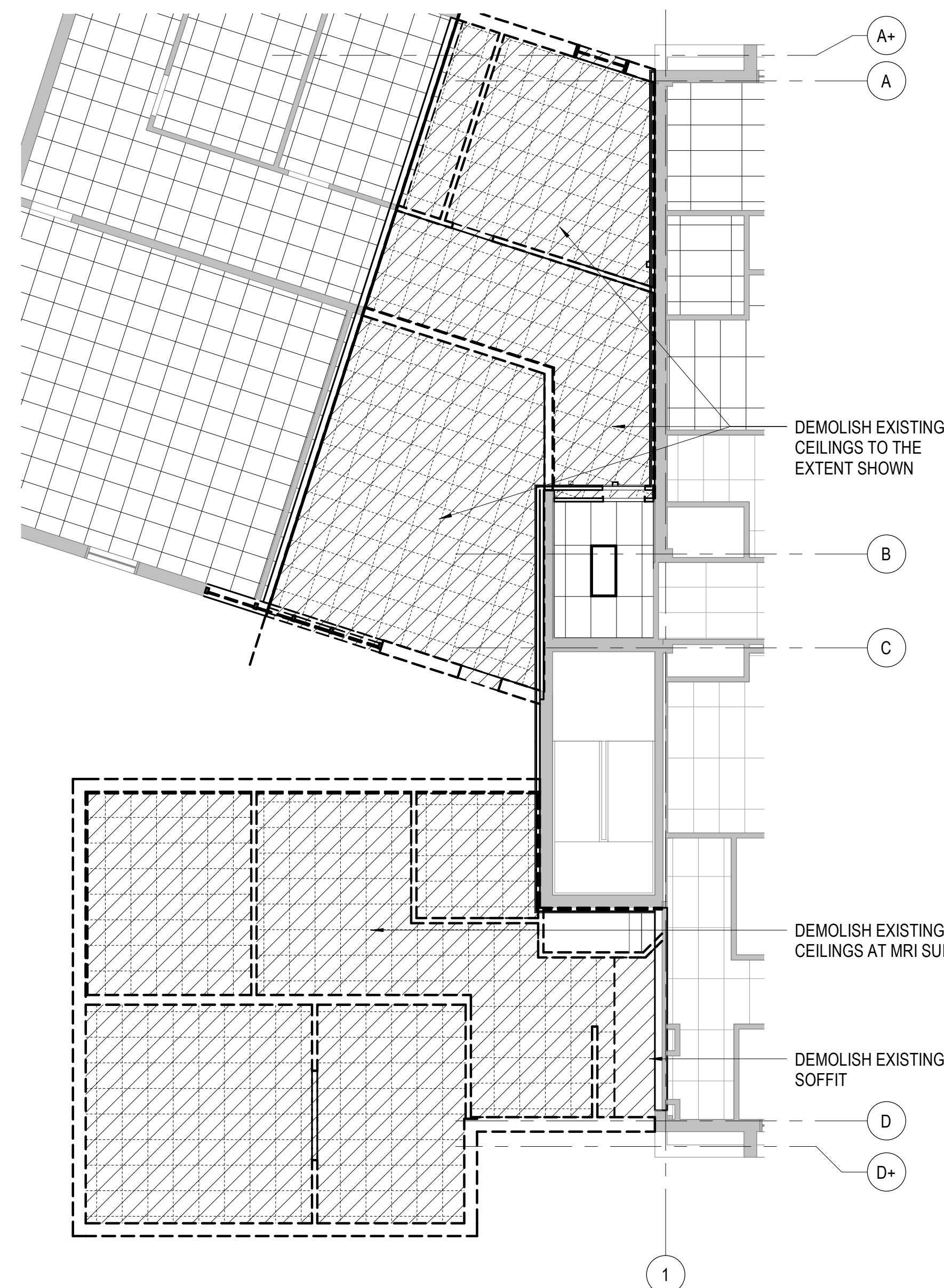
SCALE: 1/8" = 1'-0"

REPAIR EXISTING CEILINGS DAMAGED BY NEW WORK - TYPICAL

NEW LAY IN ACOUSTIC CEILING AT 8'-0" A.F.F.
EXISTING STAIR FINISHES TO REMAIN

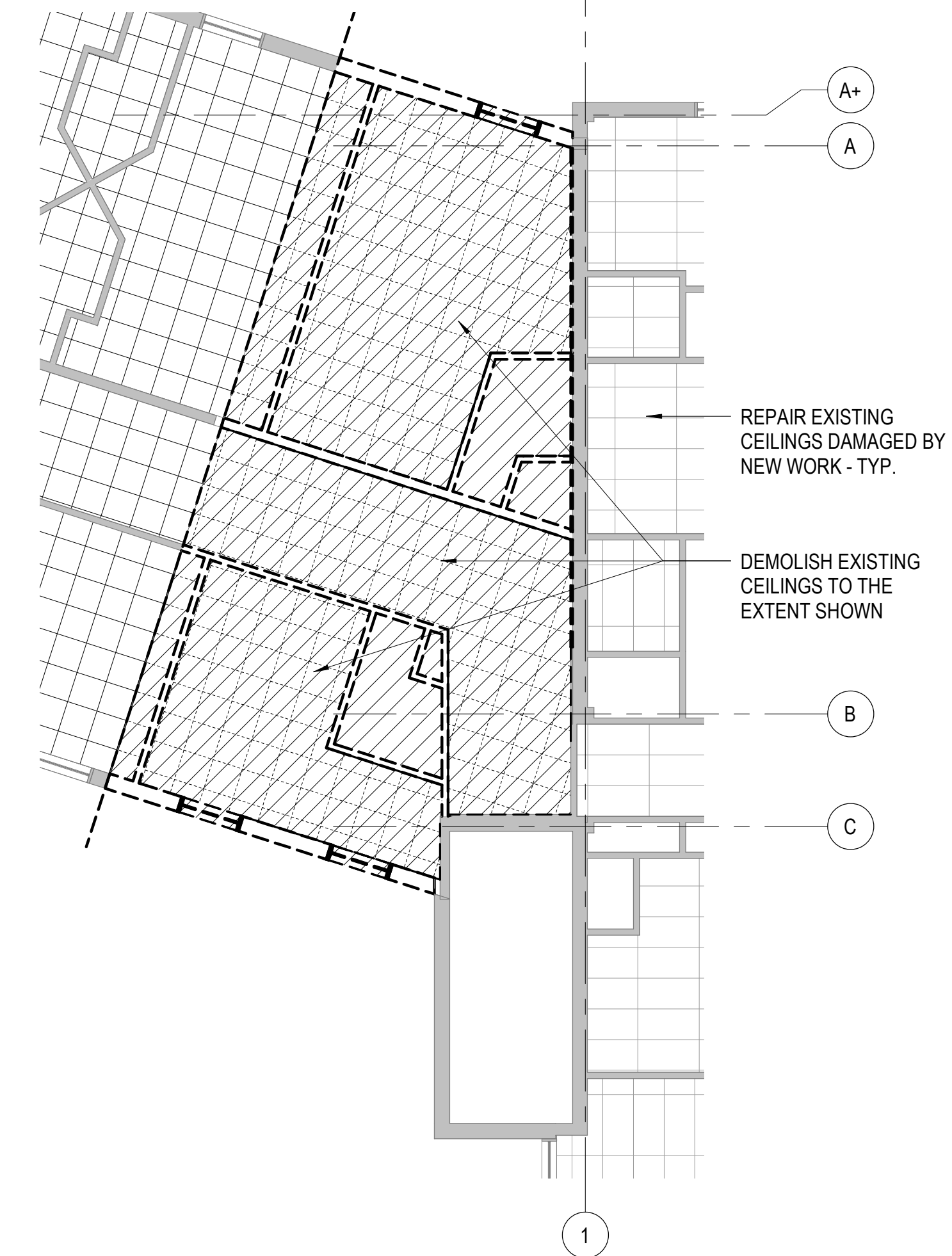
05-FIFTH FLOOR CEILING - NEW

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



04-FOURTH FLOOR CEILING - DEMOLITION

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



05-FIFTH FLOOR CEILING - DEMOLITION

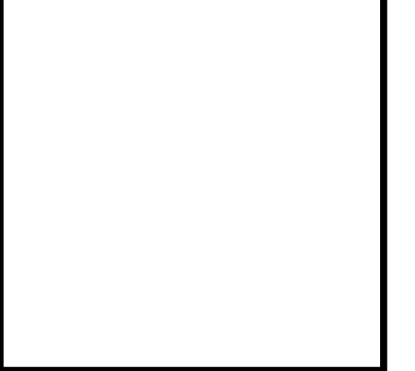
SCALE: 1/8" = 1'-0"



MARK	DATE	BY	DES

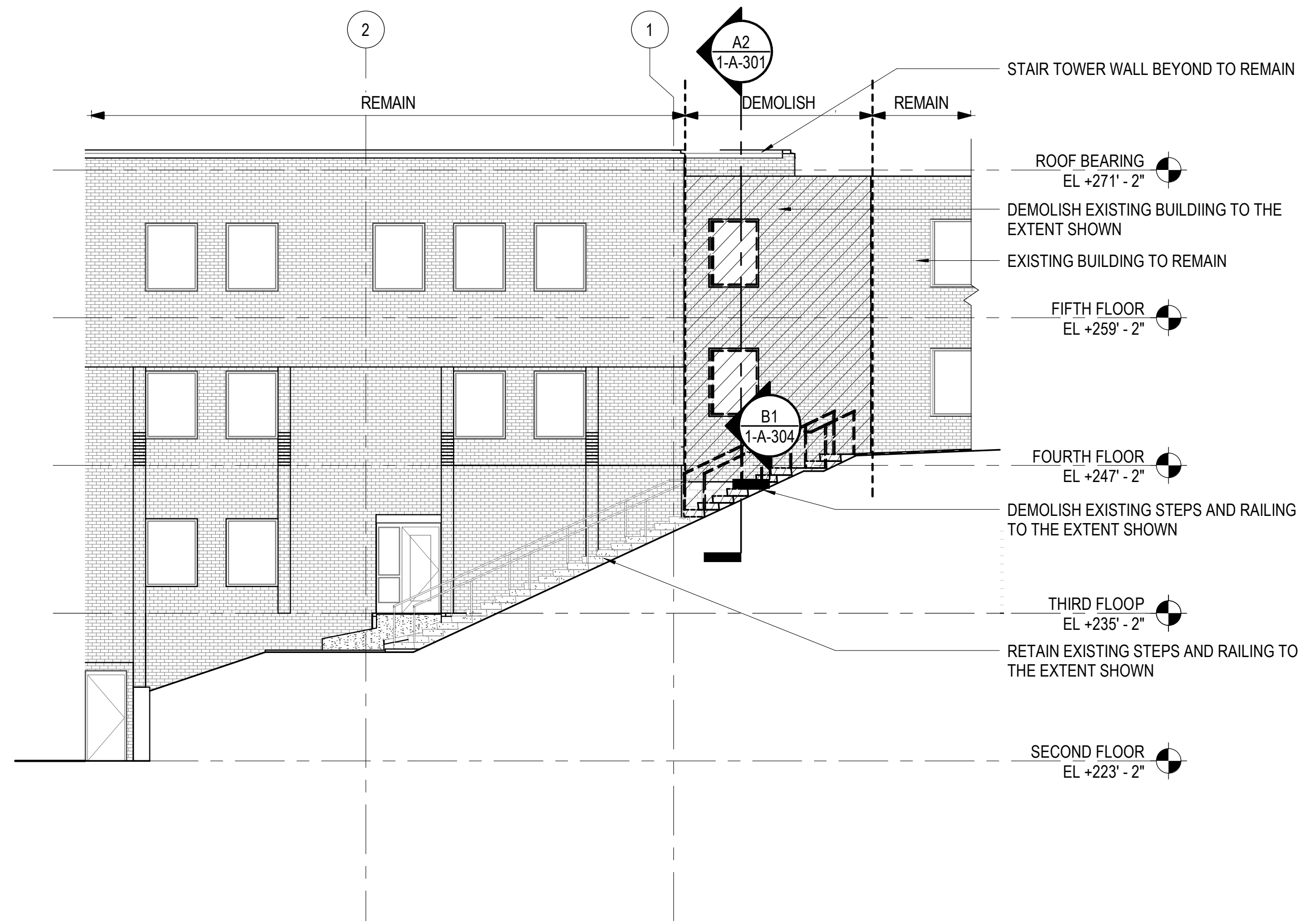
DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	KDL	DWH	KDL

RRMM
ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

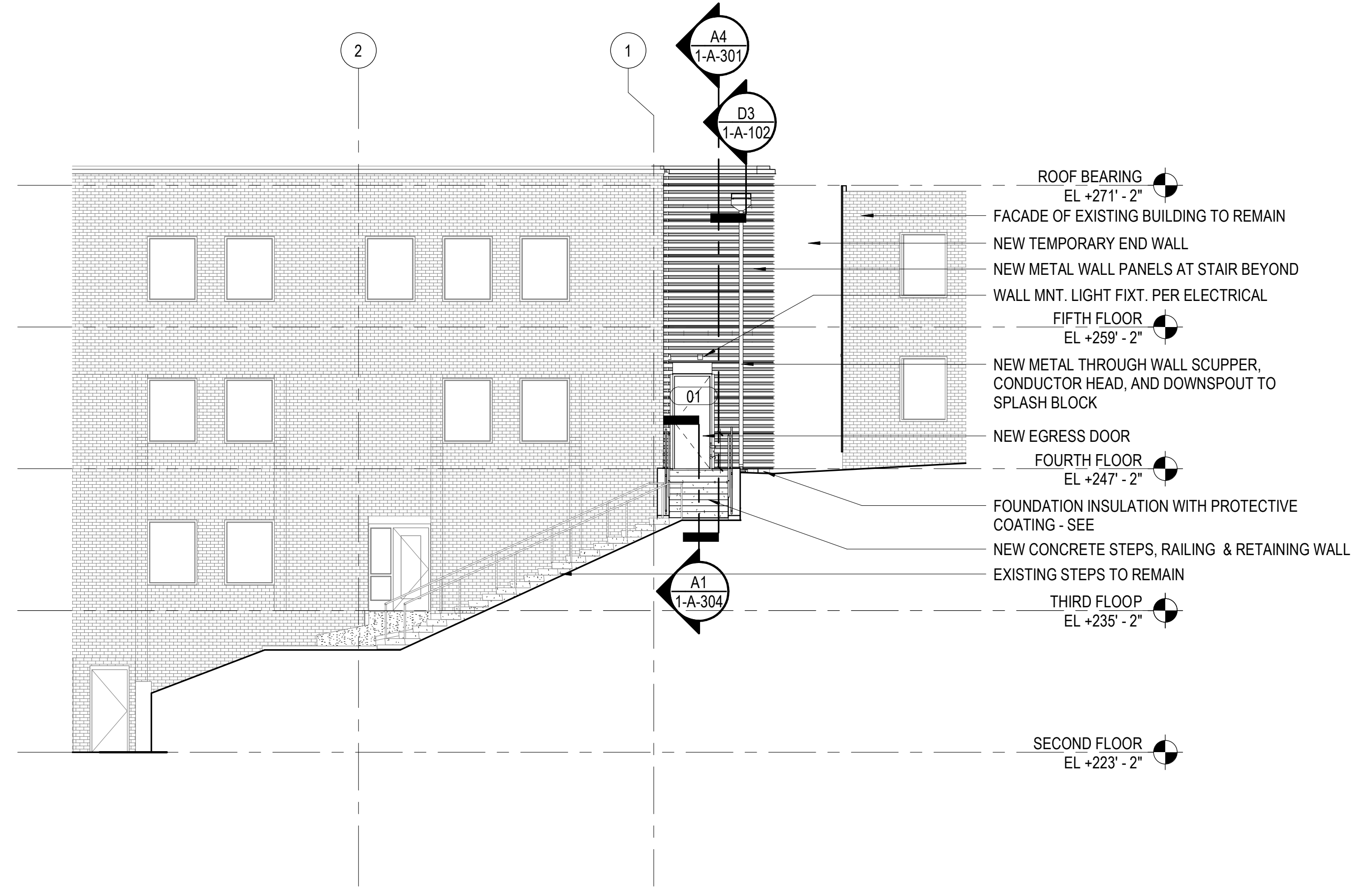


PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING REFLECTED CEILING DEMOLITION AND NEW WORK PLANS

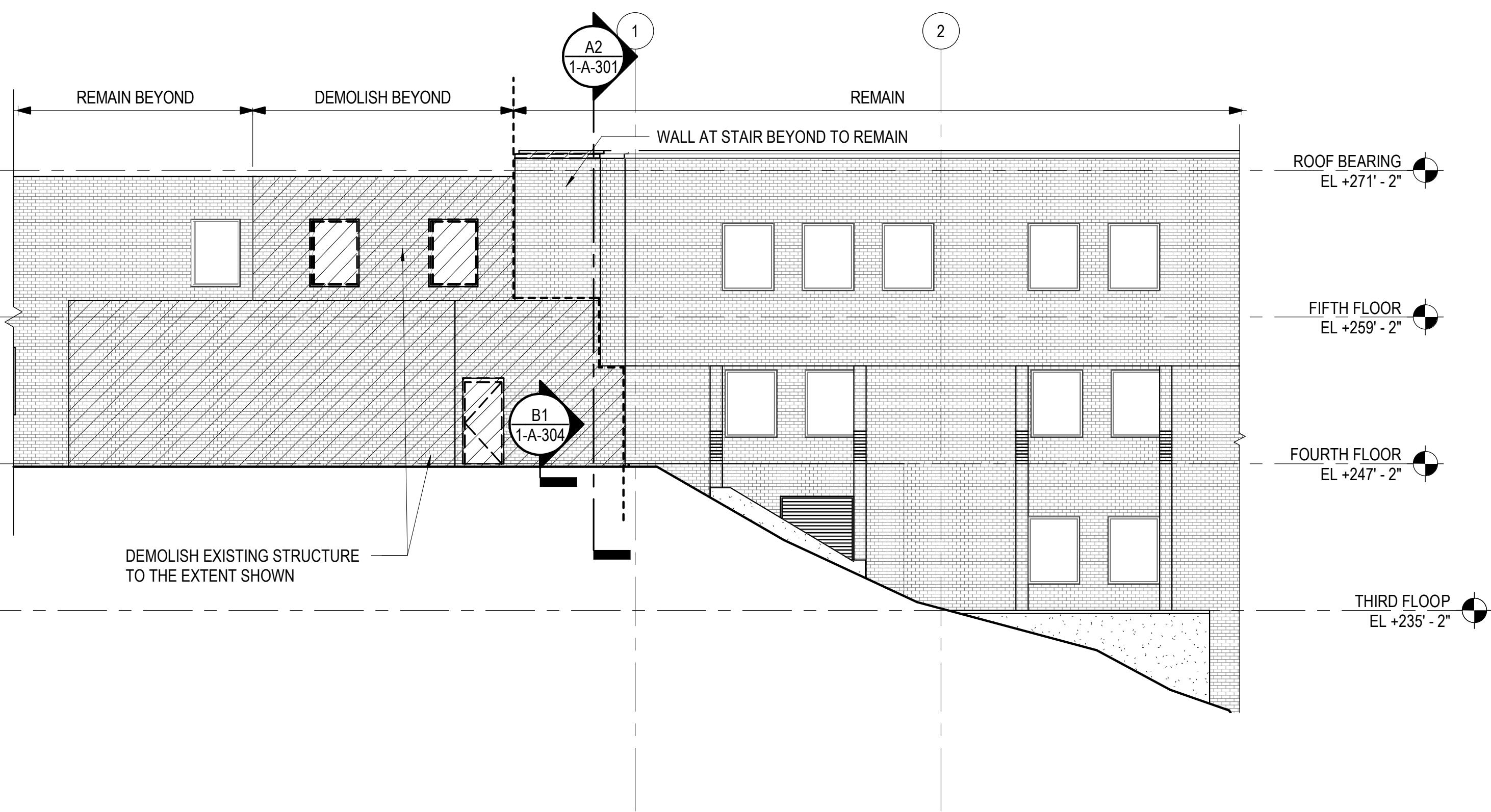
SHEET
1-A-103



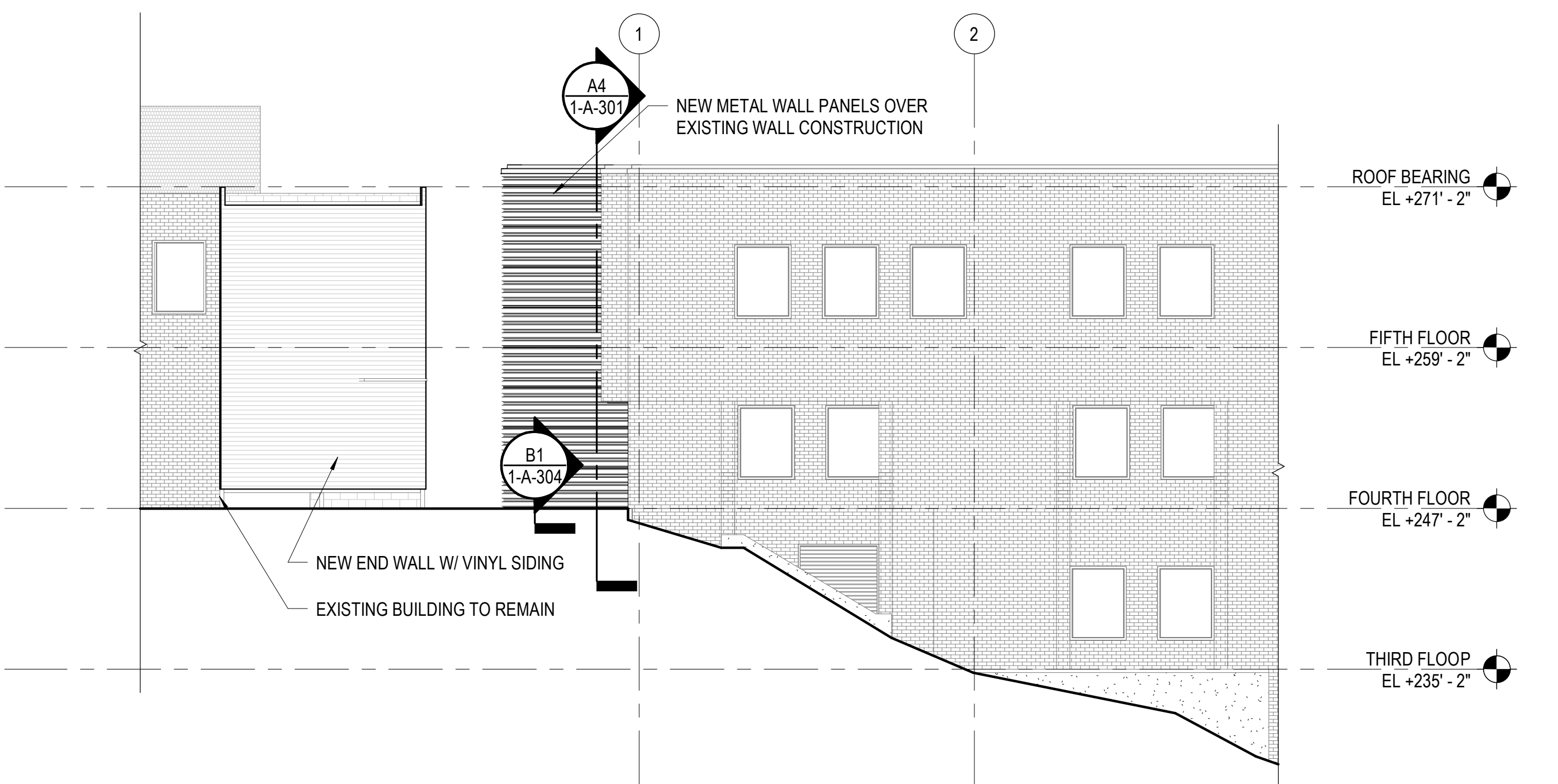
1 EAST ELEVATION - DEMOLITION
1-A-201 SCALE: 1/8" = 1'-0"



5 EAST ELEVATION - NEW WORK
1-A-201 SCALE: 1/8" = 1'-0"



2 WEST ELEVATION - DEMOLITION
1-A-201 SCALE: 1/8" = 1'-0"



4 WEST ELEVATION - NEW WORK
1-A-201 SCALE: 1/8" = 1'-0"

CD	REVISIONS	BY	DATE
1			05.15.2020

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	DATE	MARK	REVISIONS
12.11.2020	13356.28	KDL	DWH	KDL			

RRMM
ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

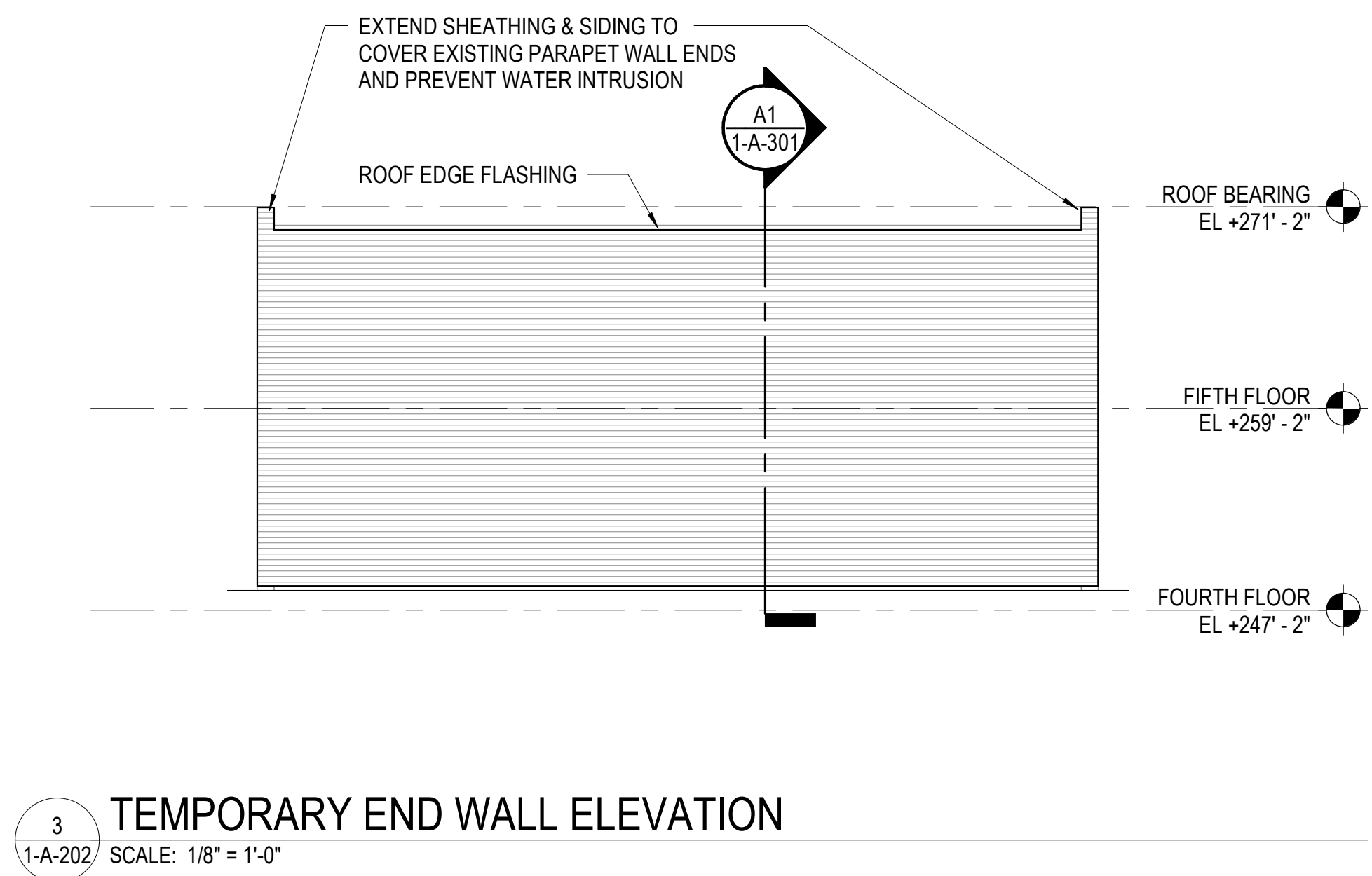
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING EAST AND WEST ELEVATIONS - DEMOLITION AND NEW WORK

SHEET
1-A-201

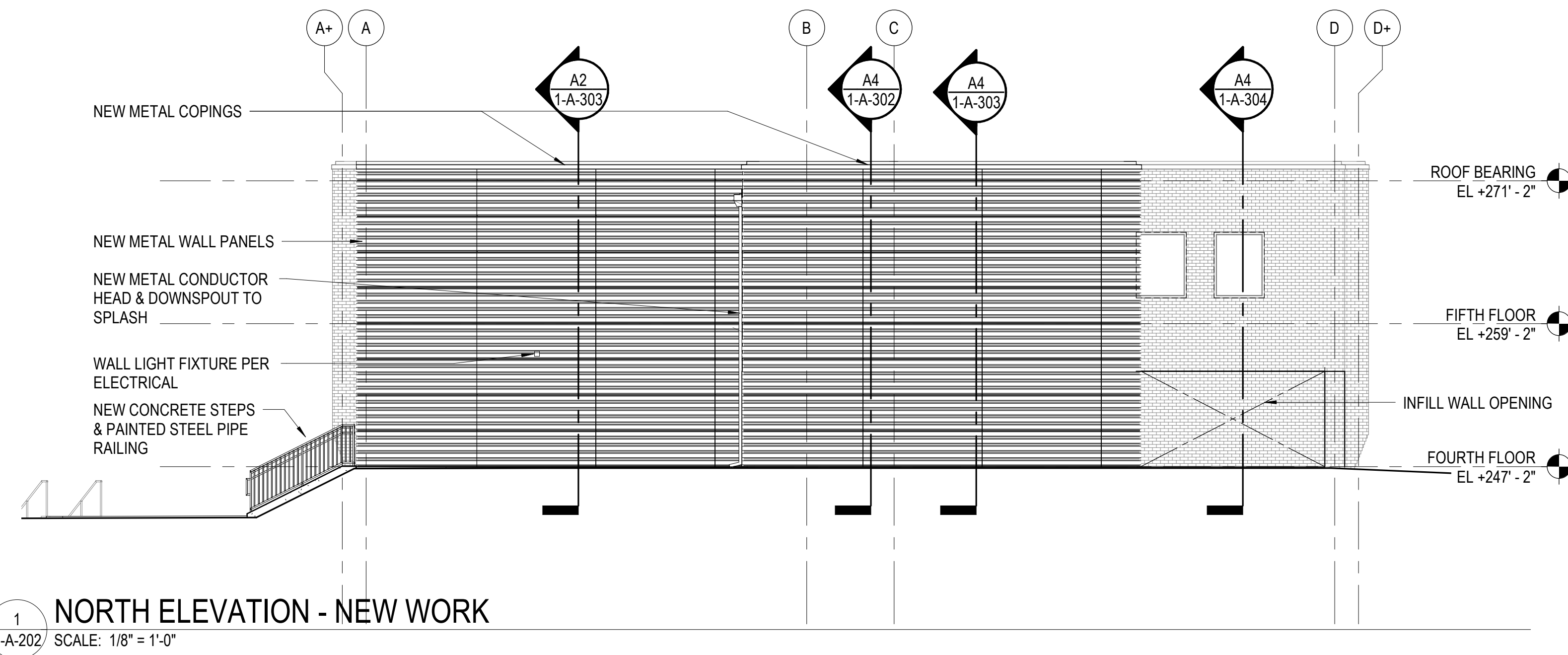
12/11/2020 9:11:06 AM BIN 360 / 13356-28 Virginia Hospital Center / 13356-28 v20 Virginia Hospital Center - Arch.vt



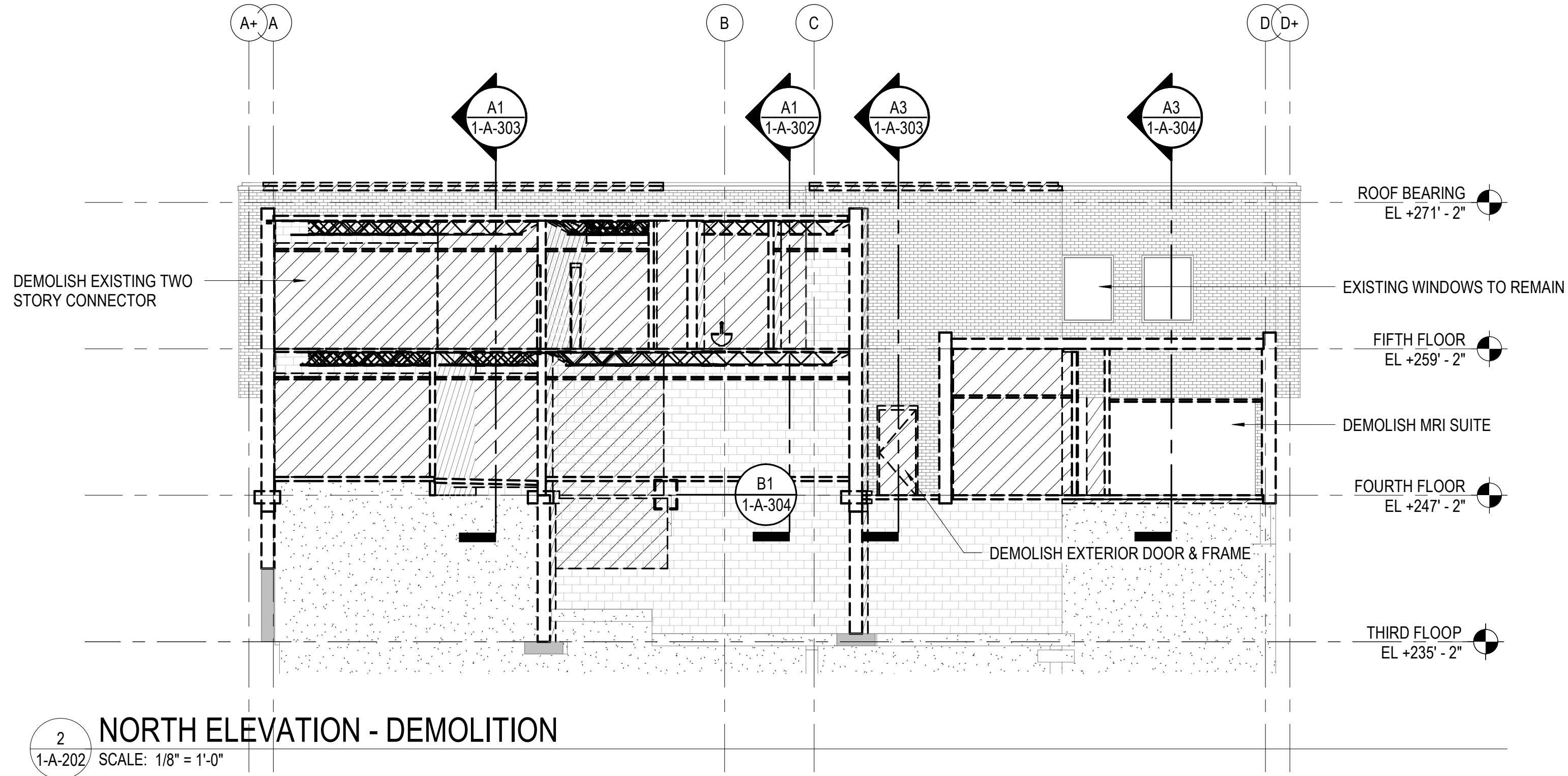
12/11/2020 9:11:07 AM BIN 360/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.rvt



3 TEMPORARY END WALL ELEVATION
1-A-202 SCALE: 1/8" = 1'-0"



1 NORTH ELEVATION - NEW WORK
1-A-202 SCALE: 1/8" = 1'-0"



2 NORTH ELEVATION - DEMOLITION
1-A-202 SCALE: 1/8" = 1'-0"

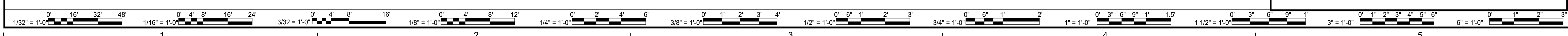
MARK	DATE	BY	DES
1	05.15.2020		
2	07.30.2020		

DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	KDL	DWH	KDL

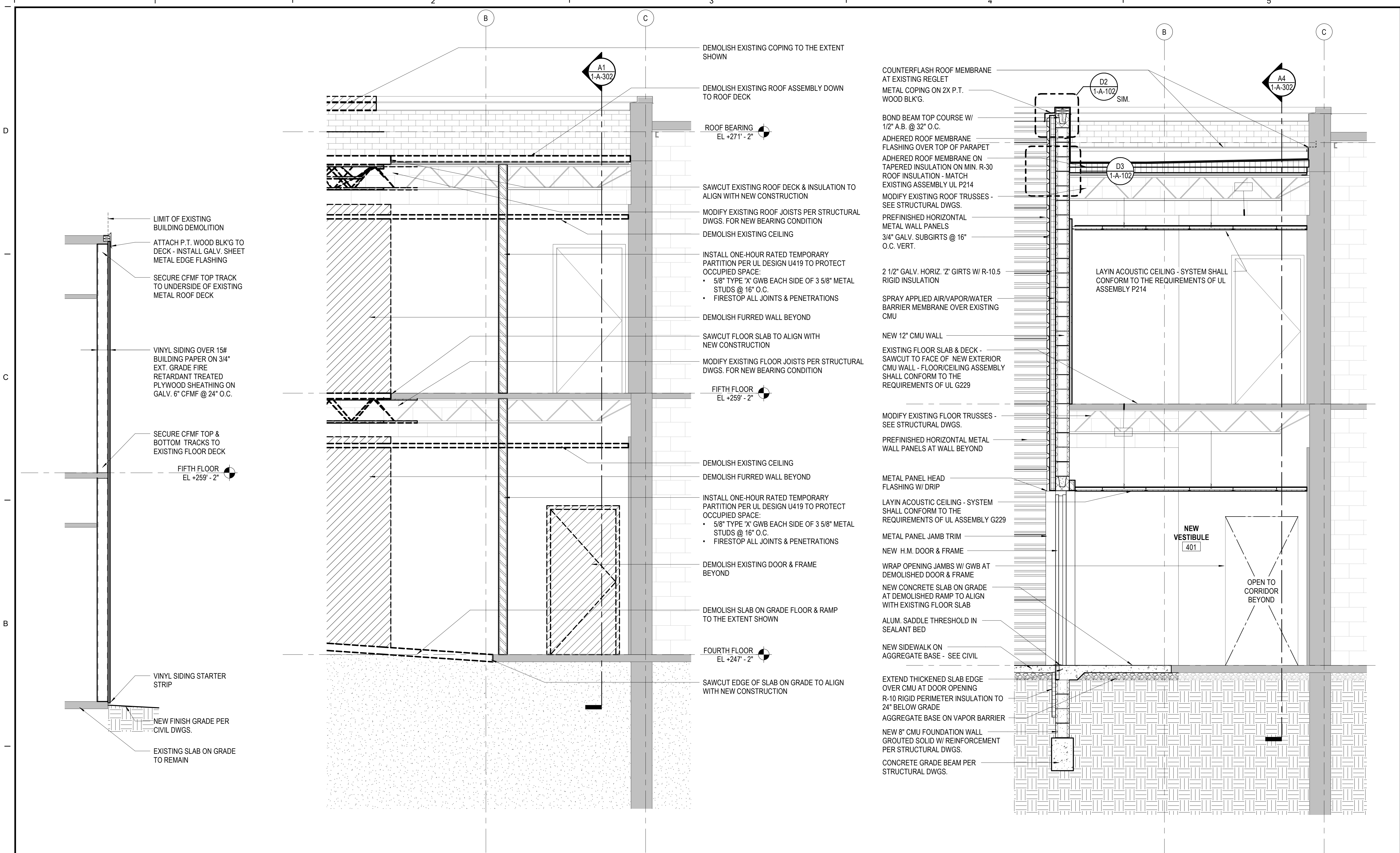
RRMM
ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING NORTH ELEVATION - DEMOLITION AND NEW WORK

SHEET
1-A-202



12/11/2020 9:11:08 AM BIN 360/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.vt



A1 SECTION AT TEMPORARY END WALL
 1-A-301 SCALE: 1/2" = 1'-0"

A2 SECTION AT VESTIBULE - DEMOLITION
 1-A-301 SCALE: 1/2" = 1'-0"

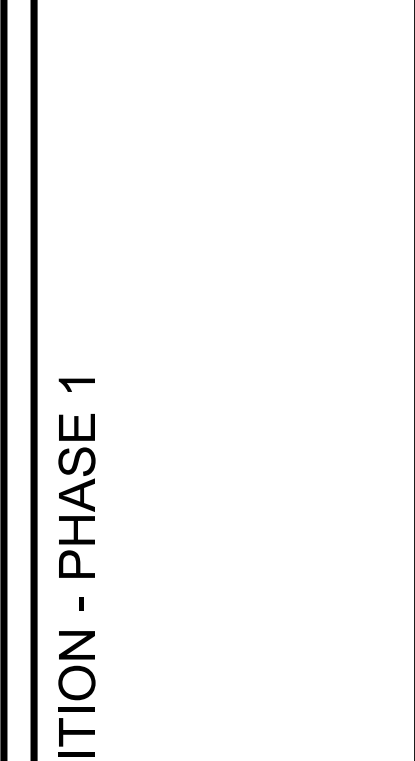
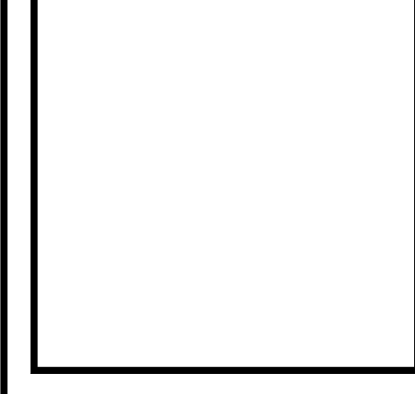
A4 SECTION AT VESTIBULE - NEW
 1-A-301 SCALE: 1/2" = 1'-0"



CD Revisions				
Permit Revisions				
Permit Revisions				
2				
05.15.2020				
07.30.2020				
12.04.2020				
1				
2				
3				
	MARK	DATE	BY	DES

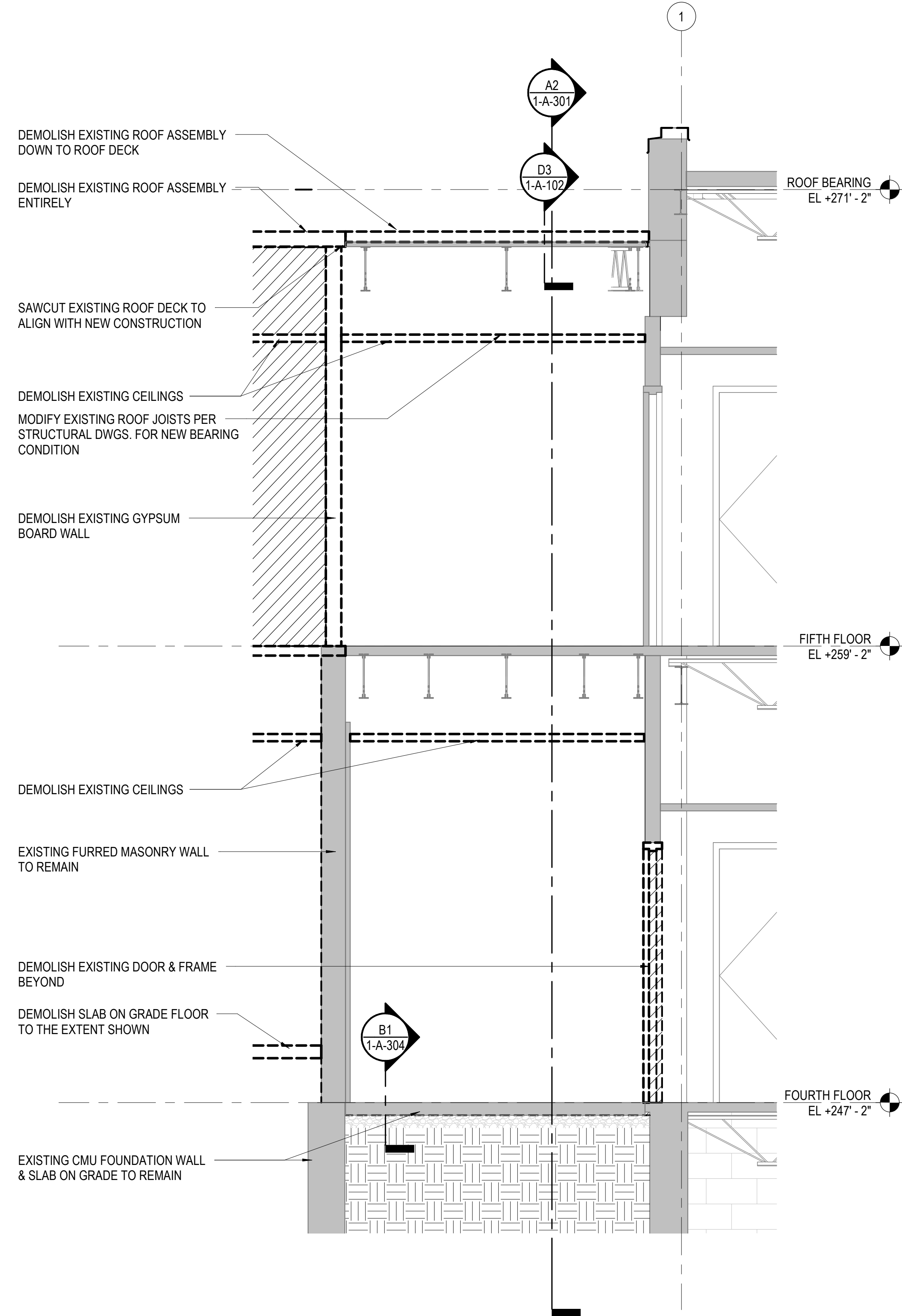
DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	KDL	DWH	KDL

RRMM ARCHITECTS, PC
 2900 South Quincy Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101

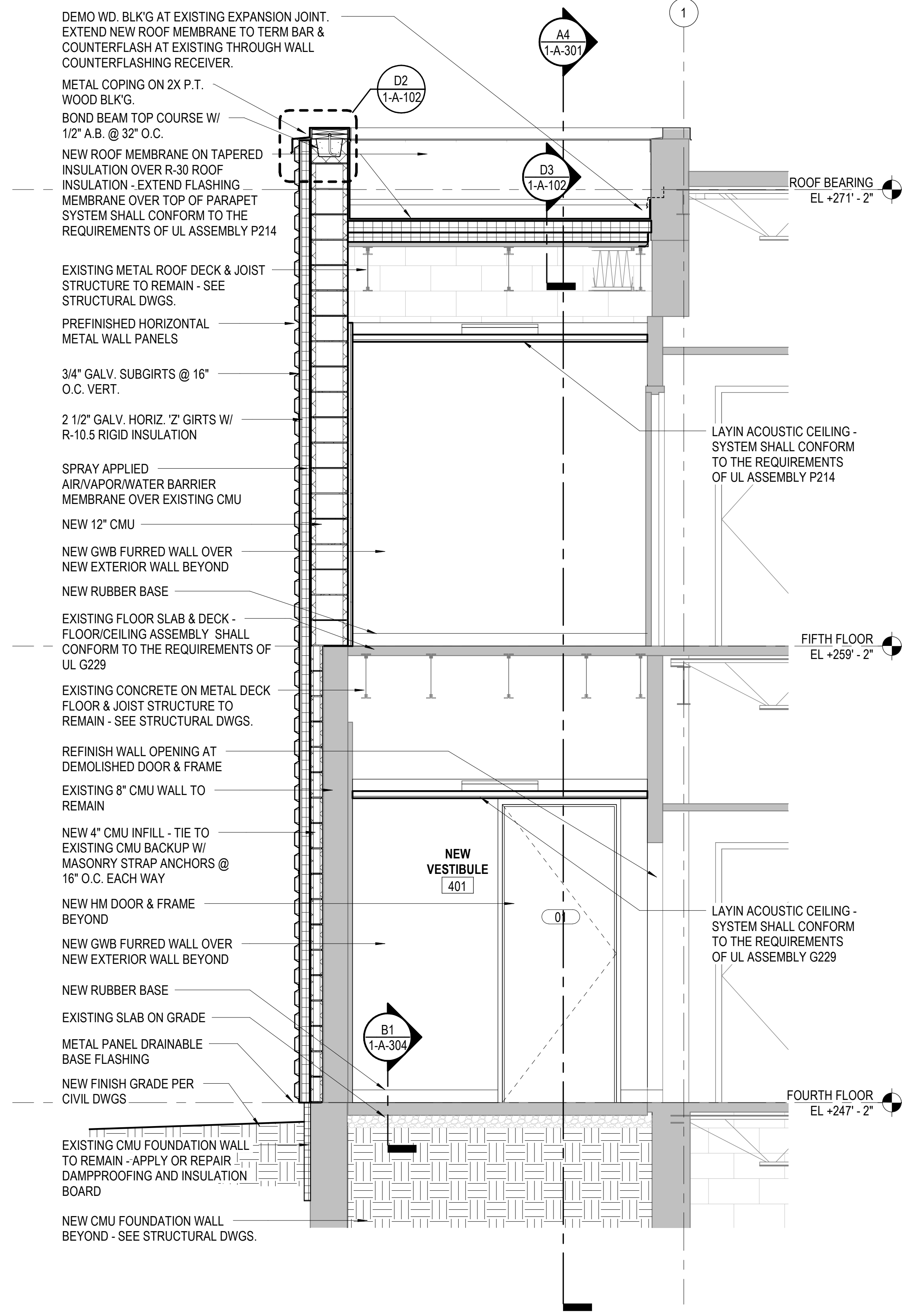


PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 DRAWING WALL SECTIONS

SHEET
1-A-301



A1
1-A-302
SCALE: 1/2" = 1'-0"



A4
1-A-302
SCALE: 1/2" = 1'-0"

CD Revisions	05.15.2020	DES
Permit Revisions	07.30.2020	BY
Permit Revisions	12.04.2020	MARK
2		DATE
1		REVISIONS

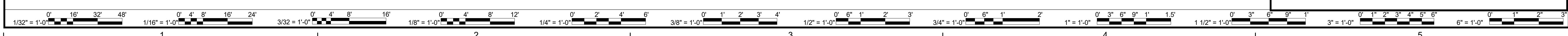
DATE	12.11.2020	KDL	DWH	KDL
PROJECT	13356-28	DESIGNED	DRAWN	CHECKED

RRMM
ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

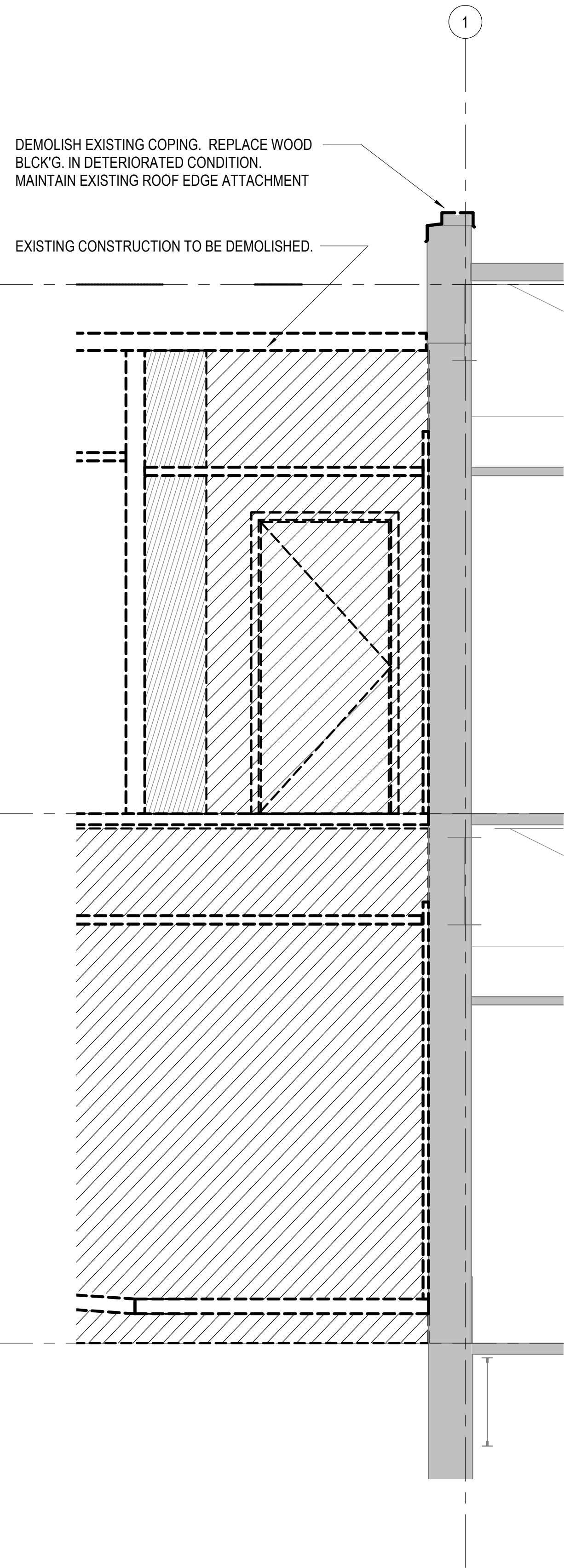
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING WALL SECTIONS

SHEET
1-A-302

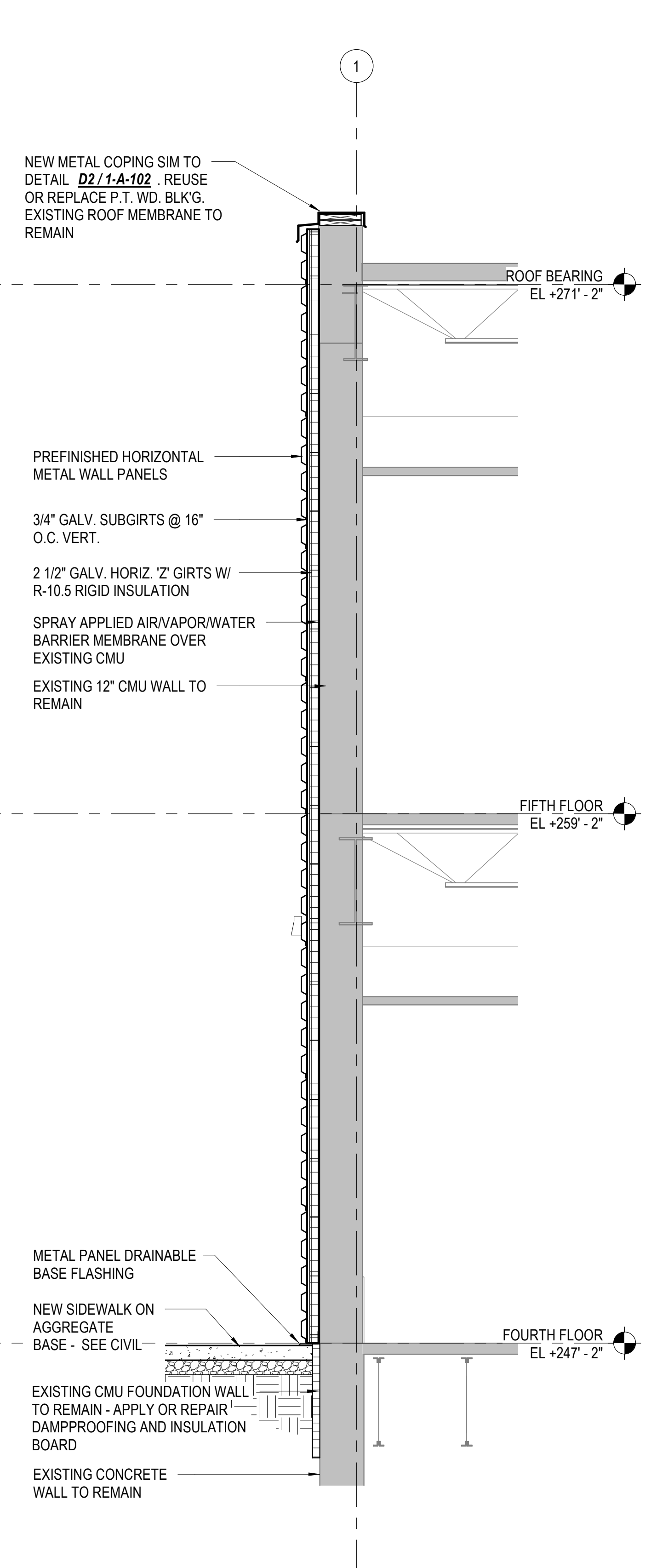
12/11/2020 9:11:09 AM BIN 360/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.rvt



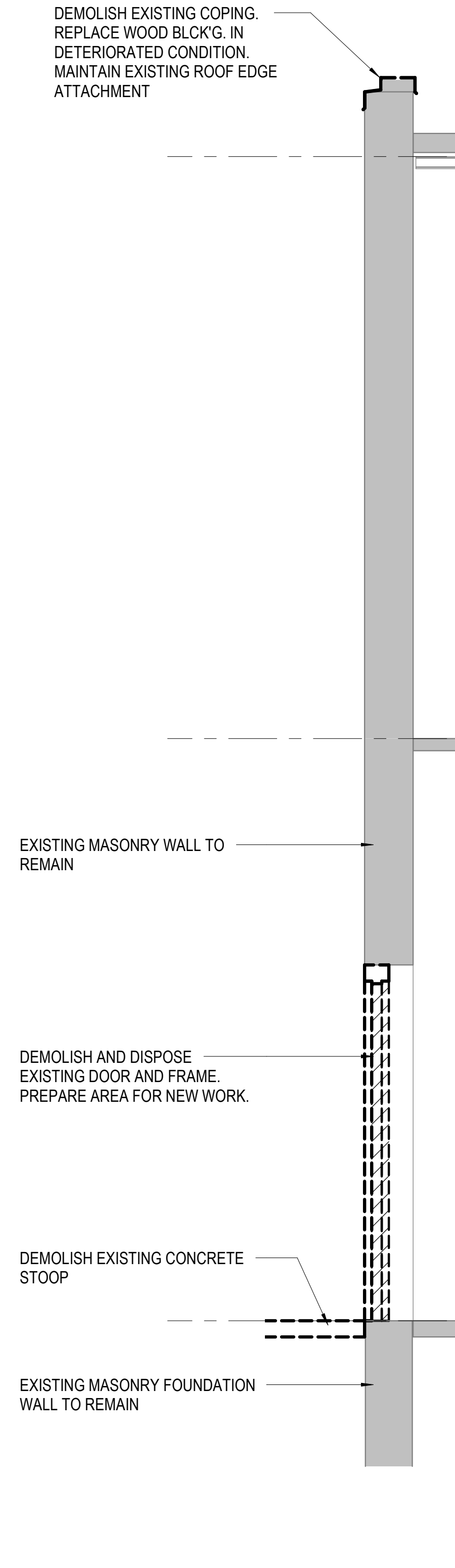
12/11/2020 9:11:10 AM BIN 360/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.rvt



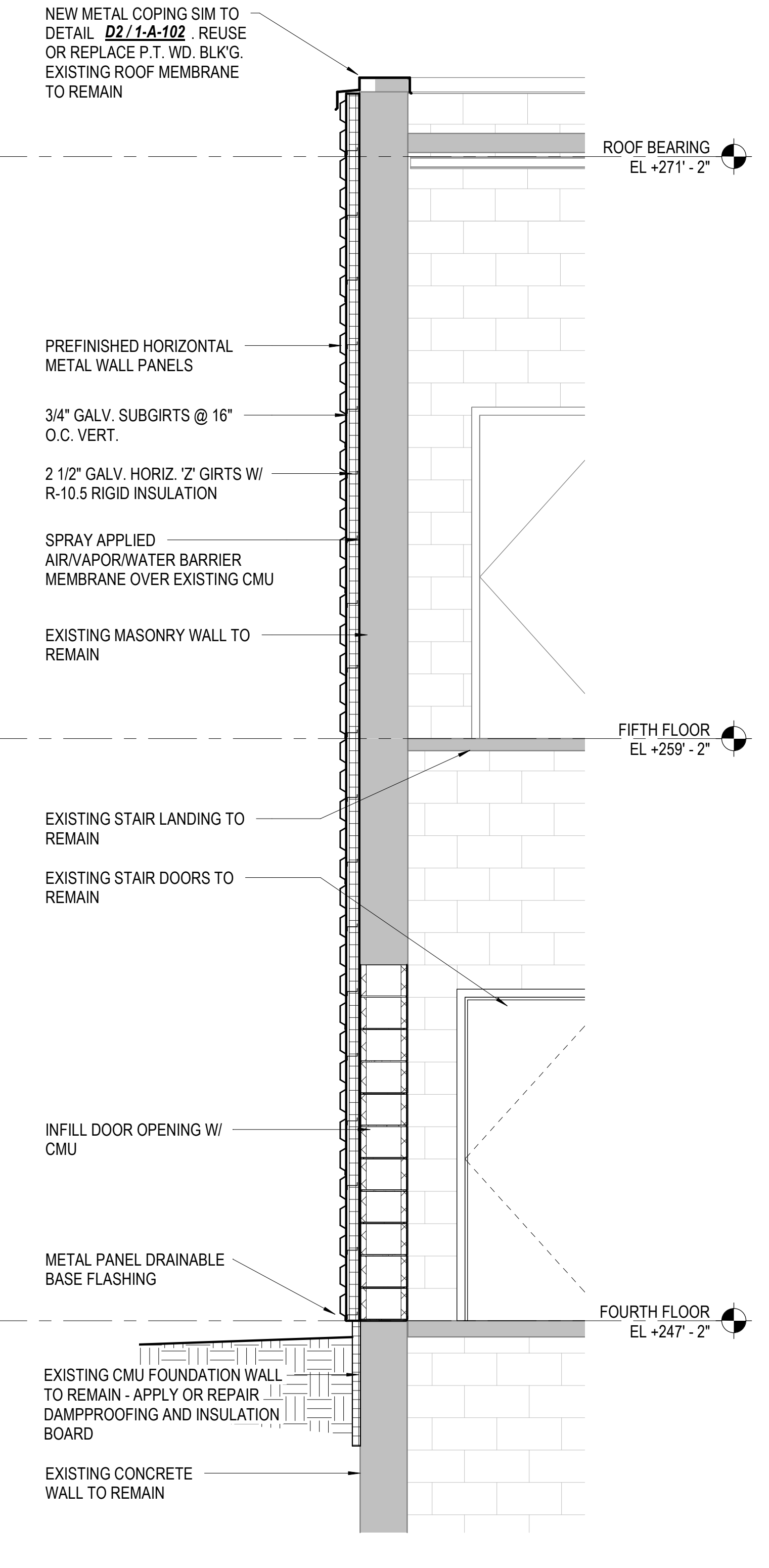
A1 WALL SECTION - DEMOLITION
1-A-303 SCALE: 1/2" = 1'-0"



A2 WALL SECTION - NEW WORK
1-A-303 SCALE: 1/2" = 1'-0"



A3 WALL SECTION - DEMOLITION
1-A-303 SCALE: 1/2" = 1'-0"



A4 WALL SECTION - NEW WORK
1-A-303 SCALE: 1/2" = 1'-0"



CD Revisions	Permit Revisions	Permit Revisions	MARK	DATE	BY	DES
1	05.15.2020	07.30.2020	2	12.04.2020		DES
2						
3						

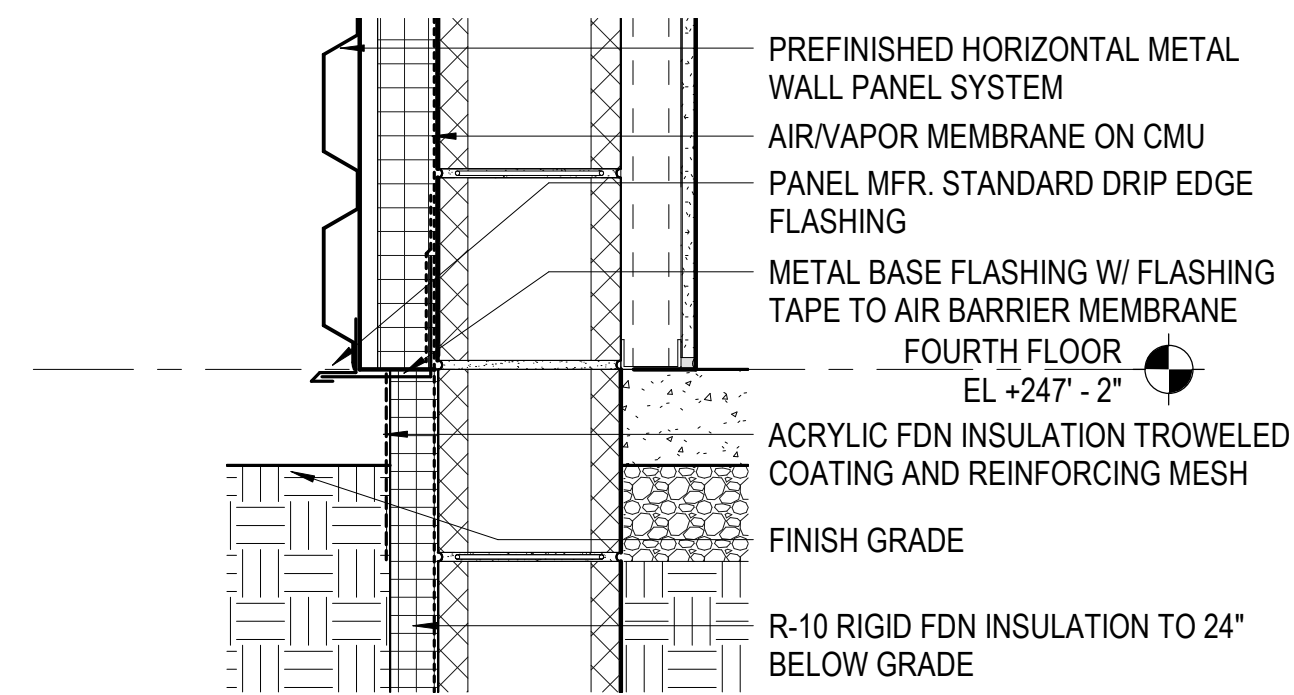
DATE	PROJECT	DESIGNED	DRAWN	CHECKED	KDL	DWH	KDL
12.11.2020	13356.28						

RRMM ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

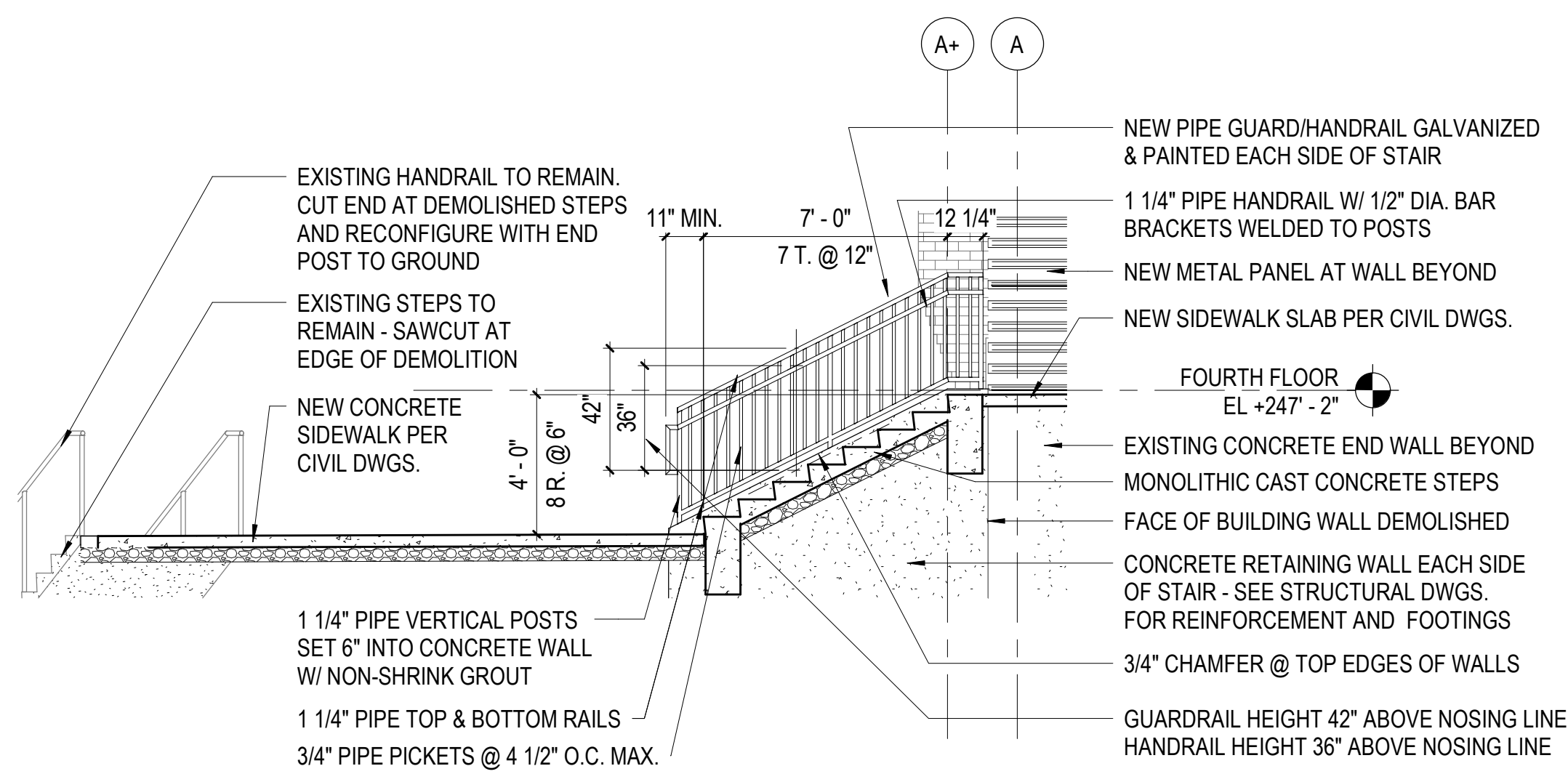
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING WALL SECTIONS

SHEET
1-A-303

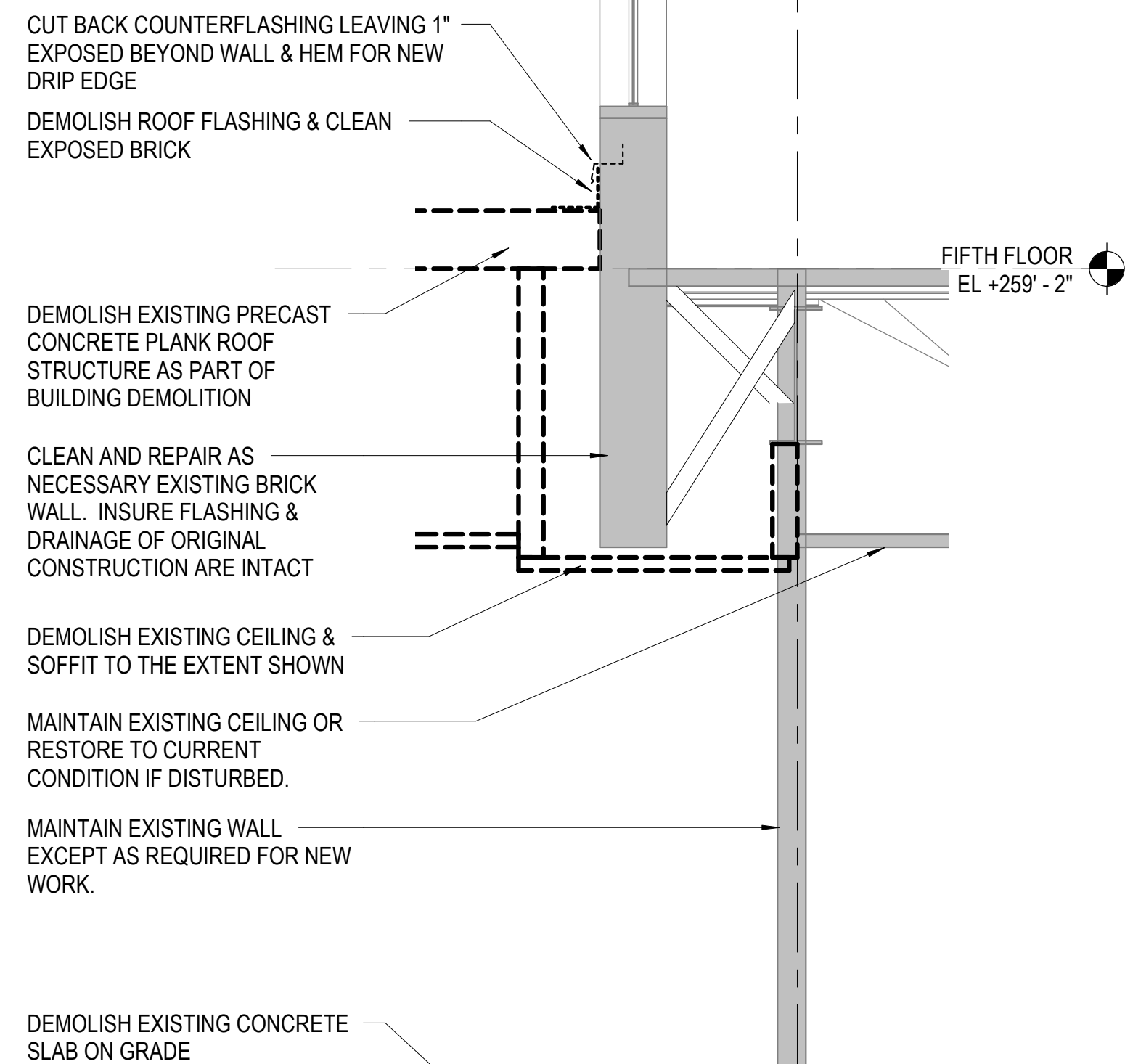
12/11/2020 9:11:11 AM BIN 360/13356-28 Virginia Hospital Center/13356-28 v20 Virginia Hospital Center - Arch.vt



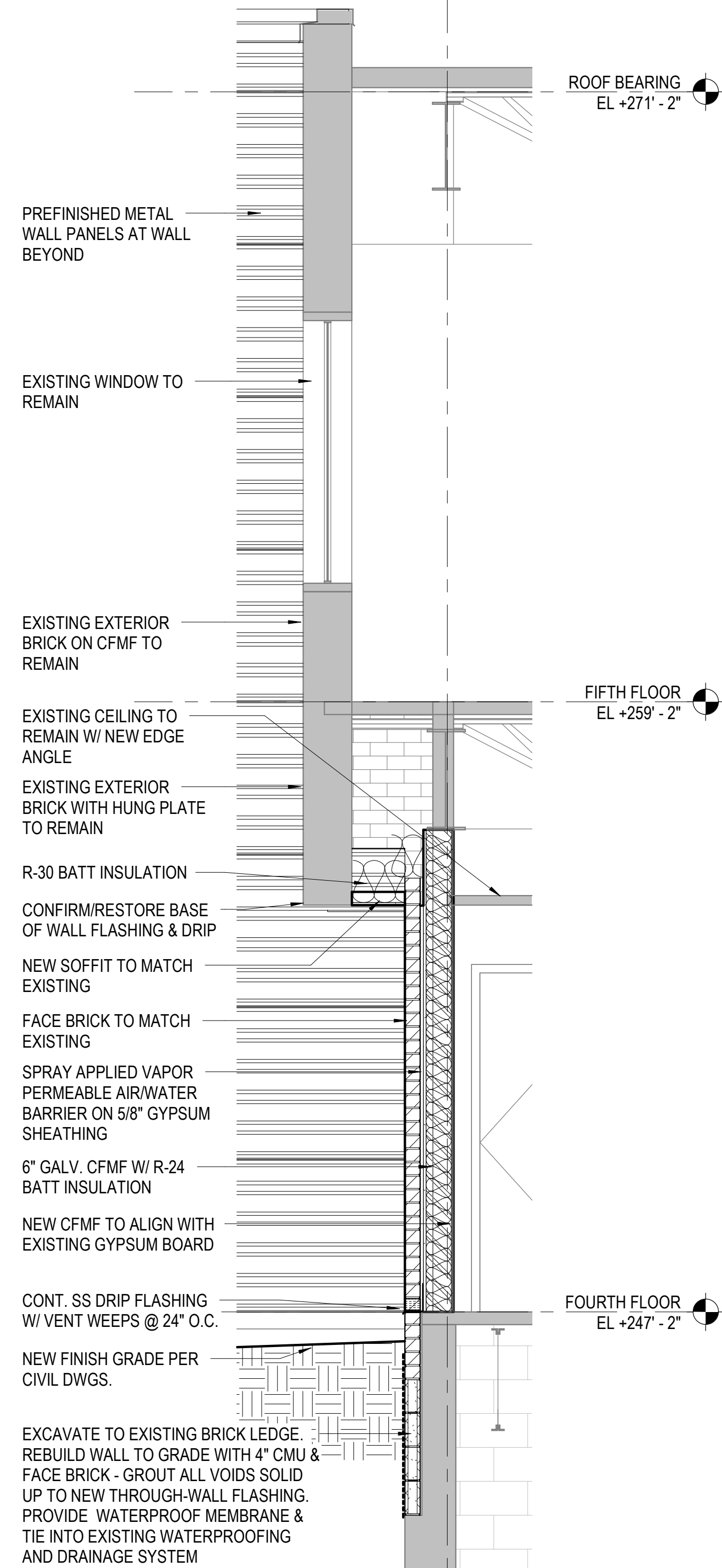
B1
1-A-304 SCALE: 1 1/2" = 1'-0"



A1
1-A-304 SCALE: 1/4" = 1'-0"



A3
1-A-304 SCALE: 1/2" = 1'-0"



A4
1-A-304 SCALE: 1/2" = 1'-0"



CD Revisions	Permit Revisions	Permit Revisions	MARK	DATE	BY	DES
1	05.15.2020	07.30.2020	1	12.11.2020		
2		12.04.2020	2			
3			3			

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	KDL	DWH	KDL
12.11.2020	13356.28						

RRMM
ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING WALL SECTIONS

SHEET
1-A-304

STRUCTURAL GENERAL NOTES

A. GENERAL:

1. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ALL OTHER CONTRACT DOCUMENTS AND SPECIFICATIONS.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE BEGINNING WORK.
3. SECTIONS AND DETAILS PROVIDED ON THESE DRAWINGS DESCRIBE STANDARD CONSTRUCTION REQUIREMENTS TO BE APPLIED THROUGHOUT THE PROJECT. THE DETAILS SHALL BE ADJUSTED AS REQUIRED TO ACCOUNT FOR VARYING CONDITIONS IN THE FIELD. SIGNIFICANT ADJUSTMENTS SHALL BE PRESENTED TO THE PROJECT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION OR FABRICATION. ALL TYPICAL DETAILS SHALL BE REVIEWED BY THE CONTRACTOR AND APPROPRIATE SUBCONTRACTORS PRIOR TO ANY DETAILING, FABRICATION, AND INSTALLATION. ANY CONFLICTS OR CLARIFICATIONS SHALL BE RESOLVED BEFORE BEGINNING WORK.
4. PROVIDE ADEQUATE SHORING AND BRACING DURING CONSTRUCTION UNTIL LOAD FRAMES ARE IN PLACE.
5. COORDINATE SIZE AND INSTALLATION OF ALL OPENINGS, SLEEVES, INSERTS, TIES, EQUIPMENT PADS, EQUIPMENT SUPPORTS, ETC. WITH APPROPRIATE TRADES AND CONTRACT DRAWINGS PRIOR TO INSTALLATION OR FABRICATION.
6. BOTH SIDES OF FOUNDATION WALLS SHALL BE BACKFILLED SIMULTANEOUSLY SO AS TO PREVENT OVERTURNING OR LATERAL MOVEMENT OF WALLS.

B. DESIGN CRITERIA:

1. CODES: (USE LATEST EDITIONS AS OF DRAWING DATE, UON)
 - a. VIRGINIA CONSTRUCTION CODE (VCC) 2015
 - b. INTERNATIONAL BUILDING CODE (IBC) 2015
 - c. BUILDING CLASSIFICATION: RISK CATEGORY III
 - d. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) MINIMUM DESIGN LOADS FOR BUILDINGS 7-10
 - e. BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI-318) AS AMENDED BY IBC 2015.
 - f. SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS ANSI/AISC 360.
 - g. DESIGN HANDBOOK OF THE CRSI (CONCRETE REINFORCING STEEL INSTITUTE).
2. GRAVITY LOADS:

a. ROOF MINIMUM LIVE LOAD	30 PSF (300# CONCENTRATED)
b. COLLATERAL ROOF LOAD	10 PSF
c. OFFICE AREAS	50 PSF
d. CORRIDORS	100 PSF
3. WIND LOADS:

a. WIND SPEED (Vult)	120 MPH
b. EXPOSURE	B
c. INTERNAL PRESSURE COEFFICIENTS	+0.18 & -0.18
d. WALL COMPONENTS & CLADDING	33.0 PSF & -35.0 PSF
4. SNOW LOAD:

a. GROUND SNOW LOAD (Pg)	25 PSF
b. FLAT ROOF SNOW LOAD (Pf)	25 PSF (PLUS DRIFT LOADS)
c. EXPOSURE FACTOR (Ce)	1.0
d. THERMAL FACTOR (Ct)	1.0
e. SLOPE FACTOR (Cs)	1.0
f. IMPORTANCE FACTOR (Ie)	1.1
5. EARTHQUAKE LOAD:

a. SEISMIC DESIGN CATEGORY	B
b. SITE CLASS	D
c. SITE COEFFICIENTS	$F_a = 1.6$; $F_v = 2.4$
	$S_{DS} = 0.144$; $S_{D1} = 0.07$
d. IMPORTANCE FACTOR (Ie)	1.25
6. EARTHWORK:
 - a. DESIGN SOILS BEARING PRESSURE: FOUNDATION AND FOOTING
 - b. DESIGN BASED ON AN ALLOWABLE BEARING PRESSURE OF 1500 PSF

C. FOUNDATIONS:

1. NEW GRADE BEAM IS DESIGNED TO BEAR ON COMPACTED EXISTING SUBGRADE MATERIALS. REMOVE ANY SOFT OR LOOSE FILL AND REPLACE WITH #57 STONE TO ACHIEVE FULL BEARING.
2. ANY EXISTING LOOSE OR UNCOMPACTED FILL MATERIALS ENCOUNTERED BELOW THE BUILDING SLAB ON GRADE SHALL BE REMOVED AS PART OF THE SITE PREPARATIONS AND EXCAVATION. REPLACE WITH STRUCTURAL ENGINEERED FILL OR COMPACTED #57 STONE DURING BACKFILLING EFFORTS.
3. INSTALL ENGINEERED FILL AND/OR STONE BACKFILL TO ACHIEVE REQUIRED SUBGRADES. ANY SUBGRADES SUPPORTING SLABS ON GRADE SHALL ALSO BE TESTED BY THE THE SOILS ENGINEER PRIOR TO SURFACE STABILIZATION.
4. WHEN BACKFILLING, BOTH SIDES OF SUBGRADE WALLS SHALL BE BACKFILLED SIMULTANEOUSLY TO PREVENT OVERTURNING OR LATERAL MOVEMENT OF WALLS.
5. STRUCTURAL ENGINEERED FILL SHALL BE FREE OF ORGANIC OR OTHER DELETERIOUS MATTER AND FALL INTO A USCS GROUP SC, SM, SW, SP, SP-SM, SP-SC, OR GRAVELS. THE LIQUID LIMIT SHALL NOT EXCEED 40 AND THE PLASTIC LIMIT SHALL NOT EXCEED 12. INSTALL WITHIN 2% OF OPTIMAL MOISTURE CONTENT AT 98% OF THE STANDARD PROCTOR ASTM D-698 (THE UPPER 12" SHALL BE AT 100%)
6. ALL EXCAVATIONS SHALL BE INSPECTED, PRIOR TO FILL PLACEMENT AND/OR CONCRETE PLACEMENT, BY THE SOILS ENGINEER TO VERIFY SUITABLE BEARING MATERIAL AND CAPACITIES AS NOTED. ANY AND ALL UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE ENGINEERED FILL MATERIAL FILL MATERIAL AS REQUIRED. SOILS ENGINEER SHALL BE A REGISTERED PROFESSIONAL IN THE COMMONWEALTH OF VIRGINIA.

D. DRILLED AND EPOXIED ADHESIVE ANCHOR BOLTS:

1. ALL DRILLED AND EPOXIED ANCHOR BOLTS PLACED IN CONCRETE SHALL BE HILTI, HAS THREADED RODS WITH HIT HY 200 ADHESIVE SYSTEM OR APPROVED EQUAL (TYP., U.N.O.) ICBO ER-5193. USE HIT HY-270 AT MASONRY ANCHORAGE.
2. INSTALL ACCORDING TO MANUFACTURER'S SPECIFICATIONS. ANCHOR SIZES AND EMBEDMENT LENGTHS SHALL BE AS NOTED ON DRAWINGS.

E. CONCRETE:

1. CONCRETE USED IN THE WORK SHALL MEET OR EXCEED THE FOLLOWING COMPRESSIVE STRENGTH AT 28 DAYS:

GRADE BEAM	4000 PSI NORMAL WT
SLABS ON GRADE	4000 PSI NORMAL WT
MASONRY GROUT	3000 PSI NORMAL WT
2. ALL CONCRETE SUBJECT TO FREEZE/THAW CYCLES SHALL BE AIR ENTRAINED
3. SAW-CUT OR TOOLED CONTROL JOINTS (CJ ON PLANS) SHALL BE AS DETAILED. SAW-CUTS ARE TO BE MADE AS SOON AS PRACTICAL WITHOUT DAMAGING THE SURFACE (12 HOURS MAX). TOOLED JOINTS PREFERRED.
4. SLAB CONSTRUCTION JOINTS SHALL BE LOCATED, AS REQUIRED FOR CONSTRUCTION, AT CONTROL JOINT (CJ) LOCATIONS NOTED ON PLANS.
5. PROVIDE ISOLATION JOINTS AT ALL COLUMNS WITH 1/2" PREFORMED JOINT FILLER AS INDICATED ON TYPICAL DETAILS.
6. CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL HAVE REINFORCING CONTINUE THROUGH JOINT UON ON DETAILS. CONSTRUCTION JOINTS ARE TO BE LOCATED BY THE CONTRACTOR, TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE, AND SHALL BE APPROVED BY THE ENGINEER.
7. CUTTING AND/OR CORING CONCRETE SHALL BE APPROVED BY THE STRUCTURAL ENGINEER PRIOR TO CONSTRUCTION. NO REINFORCEMENT SHALL BE CUT.
8. EXPOSED CONCRETE EDGES SHALL BE BUILT SQUARE AND RUBBED TO A MINIMUM RADIUS CHAMFER, UNLESS SPECIFIC CHAMFERS ARE CALLED FOR IN DETAILS.
9. SEE ARCHITECTURAL, MECHANICAL ELECTRICAL, & PLUMBING DRAWINGS FOR LOCATIONS OF OPENINGS AND SLEEVES. DO NOT CUT REINFORCEMENT.
10. DEPRESS FLOOR SLABS AS INDICATED. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF DEPRESSED AREAS AND DEPTH REQUIREMENTS.

F. REINFORCEMENT:

1. REINFORCING STEEL SHALL BE DEFORMED BARS IN ACCORDANCE WITH ASTM A615 SPECIFICATIONS, GRADE 60.
2. WELDED WIRE FABRIC REINFORCING SHALL CONFIRM TO ASTM A185.
3. MAINTAIN MINIMUM CONCRETE COVERAGE FOR REINFORCING AS SPECIFIED IN ACI-318 AND AS FOLLOWS:

CONCRETE CAST AGAINST GROUND 3"	
CONCRETE EXPOSED TO GROUND OR WEATHER; #6 & LARGER 2"	
CONCRETE EXPOSED TO GROUND OR WEATHER; #5 & SMALLER 1-1/2"	
CONCRETE NOT EXPOSED TO GROUND OR WEATHER:	
SLABS, WALLS, & JOISTS 1" TOP & 3/4" BOTTOM	
BEAMS & COLUMNS 1-1/2"	
4. ALL CONTINUOUS REINFORCING IN FOOTINGS SHALL BE LAP-SPLICED 1'-6". ALL OTHER SPLICE SHALL BE CLASS B TENSION, U.O.N.
5. ALL HOLES IN CONCRETE SLABS AND WALLS SHALL HAVE, ADDITIONALLY, 2 #5 X (OPENING DIM. + 2 FT.) ALONG EACH SIDE OF OPENING AND 2 #5 X 5'-0" DIAGONALLY AT EACH CORNER.
6. DETAILING, FABRICATION, AND INSTALLATION OF REINFORCING BARS SHALL COMPLY WITH THE "DESIGN HANDBOOK OF THE CRSI" AND THE MANUAL OF STANDARD PRACTICE OF THE ACI.
7. PROVIDE DOWELS TO MATCH REINFORCEMENT IN ALL WALLS, PIERS, COLUMNS, AND FOUNDATIONS.

G. MASONRY:

1. MASONRY DESIGNED BY THE ALLOWABLE STRESS DESIGN PROVISIONS OF IBC SECTION 2101.2.1.
2. CONCRETE MASONRY UNITS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 1900 PSI @ 28 DAYS AND BE NORMAL WEIGHT.
3. MORTAR SHALL BE TYPE M OR S.
4. MINIMUM CONCRETE PRISM STRENGTH (fm) SHALL BE 1500 PSI.
5. REINFORCEMENT AND CONCRETE FILL ARE NOTED ABOVE.
6. ALL MASONRY BELOW GRADE SHALL BE GROUTED SOLID.
7. ALL MASONRY CELLS WITH REINFORCEMENT SHALL BE GROUTED SOLID.
8. SOLID MASONRY PIERS, IDENTIFIED AS SMP ON PLAN, SHALL BE GROUTED SOLID FULL HEIGHT OF WALL TO FOUNDATION.
9. INSTALL LINTELS AT ALL OPENINGS IN MASONRY WALLS. REFER TO LINTEL SCHEDULE AND ARCHITECTURAL DRAWINGS FOR SIZES AND LOCATIONS. PRECAST CONCRETE LINTELS ARE NOT ACCEPTABLE IN ANY LOCATIONS EXPOSED TO VIEW.
10. MASONRY CONSTRUCTION SHALL BE INSPECTED AND VERIFIED IN ACCORDANCE WITH TMS 402/ACI 530/ASCE 5 AND TMS 602/ACI 530.1/ASCE 6 LEVEL B QUALITY ASSURANCE PROGRAM REQUIREMENTS.

H. DEMOLITION NOTES:

1. PHASE 1 PROJECT INCLUDES THE PARTIAL DEMOLITION AND REMOVAL OF THE BUILDING ADJACENT TO THE EXISTING PHYSICIAN'S OFFICE BUILDING AND EXPANDED STAIR TOWER ATTACHED THERETO.
2. THE STRUCTURAL DEMOLITION SHALL BE SCHEDULED AFTER ANY AND ALL INTERIOR DEMOLITION IS COMPLETE FOR SAFETY CONCERNS.
3. DEBRIS, INCLUDING BRICK, CONCRETE, STONE, METALS AND SIMILAR MATERIALS FROM THE DEMOLITION SHALL BECOME PROPERTY OF CONTRACTOR AND SHALL BE DISPOSED OF DAILY OFF SITE TO AVOID ACCUMULATION AT THE DEMOLITION SITE.
4. MATERIALS THAT CANNOT BE REMOVED DAILY SHALL BE STORED IN AREAS THAT WILL NOT CURTAIL OPERATIONS OR DIVERT STORM RUN-OFF.
5. DEMOLITION SHALL BE SCHEDULED AND PROSECUTED TO ASSURE STABILITY OF THE REMAINING STRUCTURE AT THE END OF EACH WORKDAY.
6. BREAK UP CONCRETE SLABS, WALLS, AND FOUNDATION AND REMOVE FROM THE SITE.
7. CONTRACTOR SHALL DISPOSE DEBRIS IN COMPLIANCE WITH APPLICABLE FEDERAL, STATE OR LOCAL PERMITS, RULES AND/OR REGULATIONS.

I. SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE REQUIRED FOR SOILS, CONCRETE, STEEL, AND LIGHT GAGE FRAMING CONSTRUCTION. IN ACCORDANCE WITH THE VIRGINIA CONSTRUCTION CODE AND IBC 2015; CHAPTER 17.
2. REFER TO STATEMENT OF SPECIAL INSPECTIONS FOR APPLICABLE ITEMS.
3. PROVIDE SPECIAL INSPECTIONS ENGINEER OF RECORD AND TESTING AGENCY FULL ACCESS TO SITE AND CONSTRUCTION.



	DES
	BY
	MARK DATE
	REVISIONS

DATE	12.11.2020	BTY	RKS
PROJECT	133556.28	BTY	
DESIGNED		BTY	
DRAWN		BTY	
CHECKED			



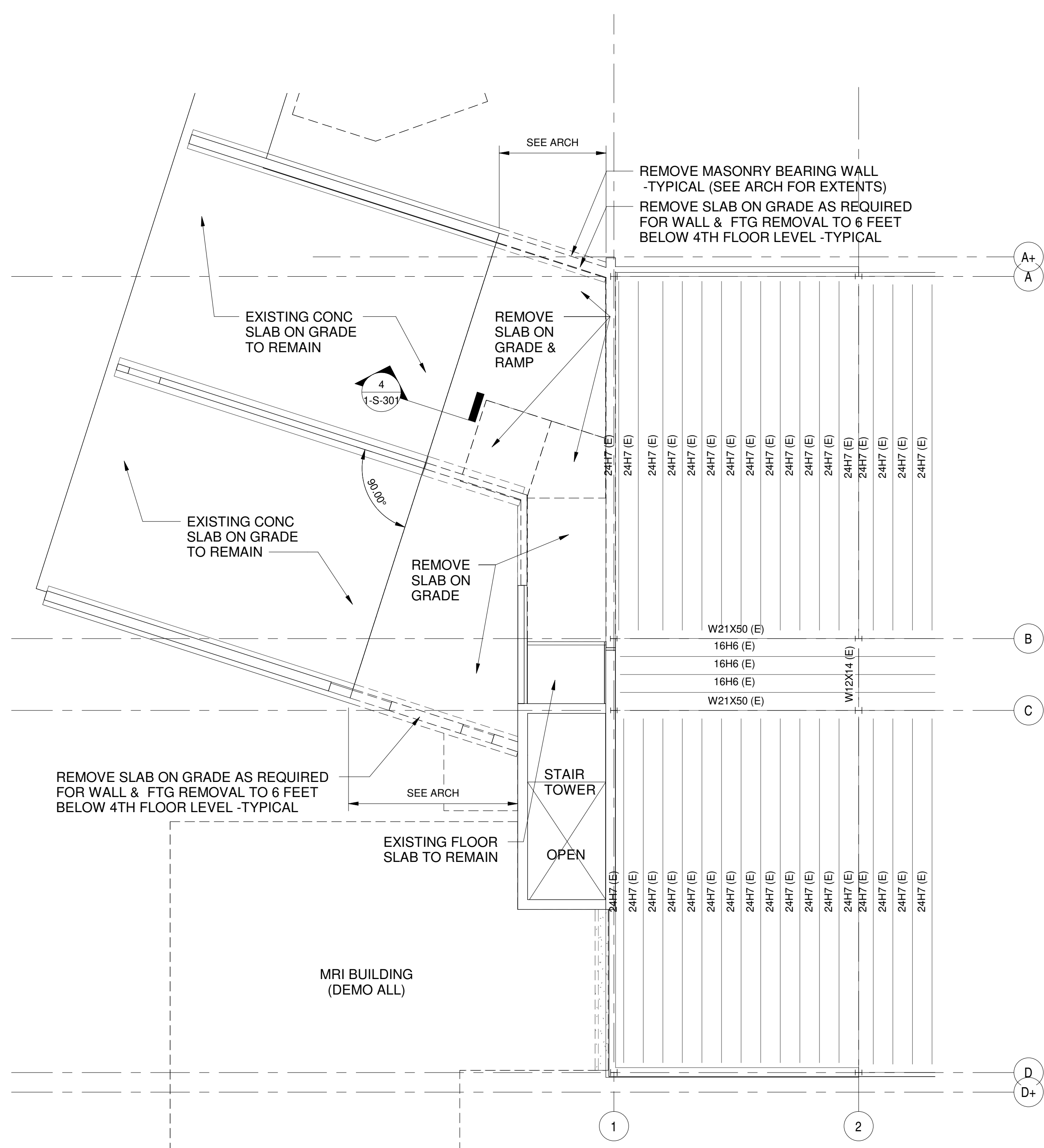
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 DRAWING STRUCTURAL GENERAL NOTES

SHEET
1-S-001

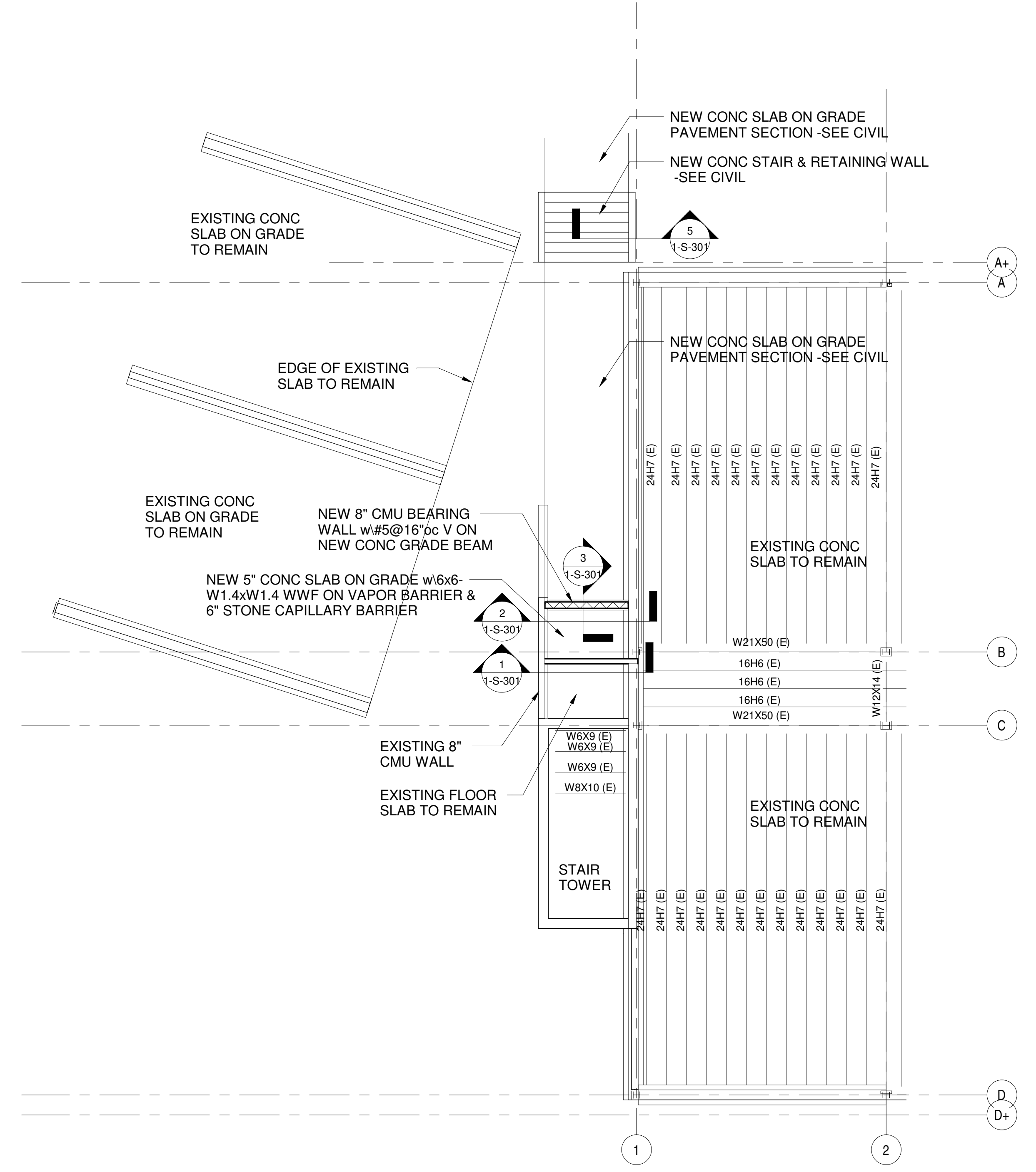


12/9/2020 4:32:26 PM BIN:360;133556-28 Virginia Hospital Center/201952200 v20 - Structural.rvt

12/9/2020 4:36:22 PM BIN 360/13356-28 Virginia Hospital Center/201952200 v20 - Structural.rvt



1 FOURTH FLOOR FRAMING - DEMOLITION
 1/8" = 1'-0"



2 FOURTH FLOOR FRAMING- NEW WORK
 1/8" = 1'-0"



GPI
 Greenman-Pedersen, Inc.
 Engineering and Construction Services
 8001 Braddock Road, Suite 200, Springfield, VA 22151
 703-978-0100 www.gpinet.com
 Project #: 2019322.00

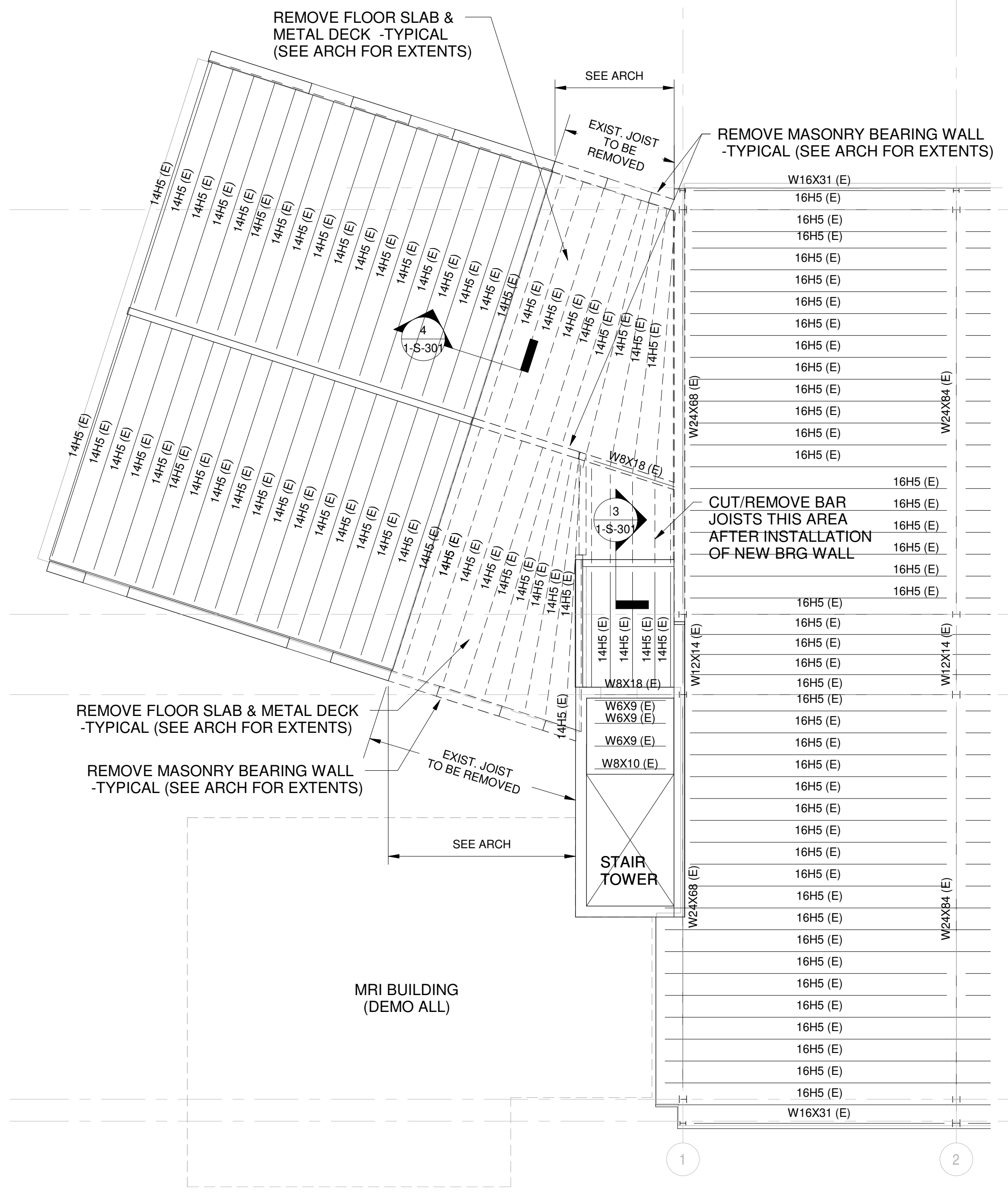
5-15-2020	REVISIONS	BY	DES
1	MARK	DATE	

12.11.2020	13356.28	BTY	BTY	RKS
DATE	PROJECT	DESIGNED	DRAWN	CHECKED

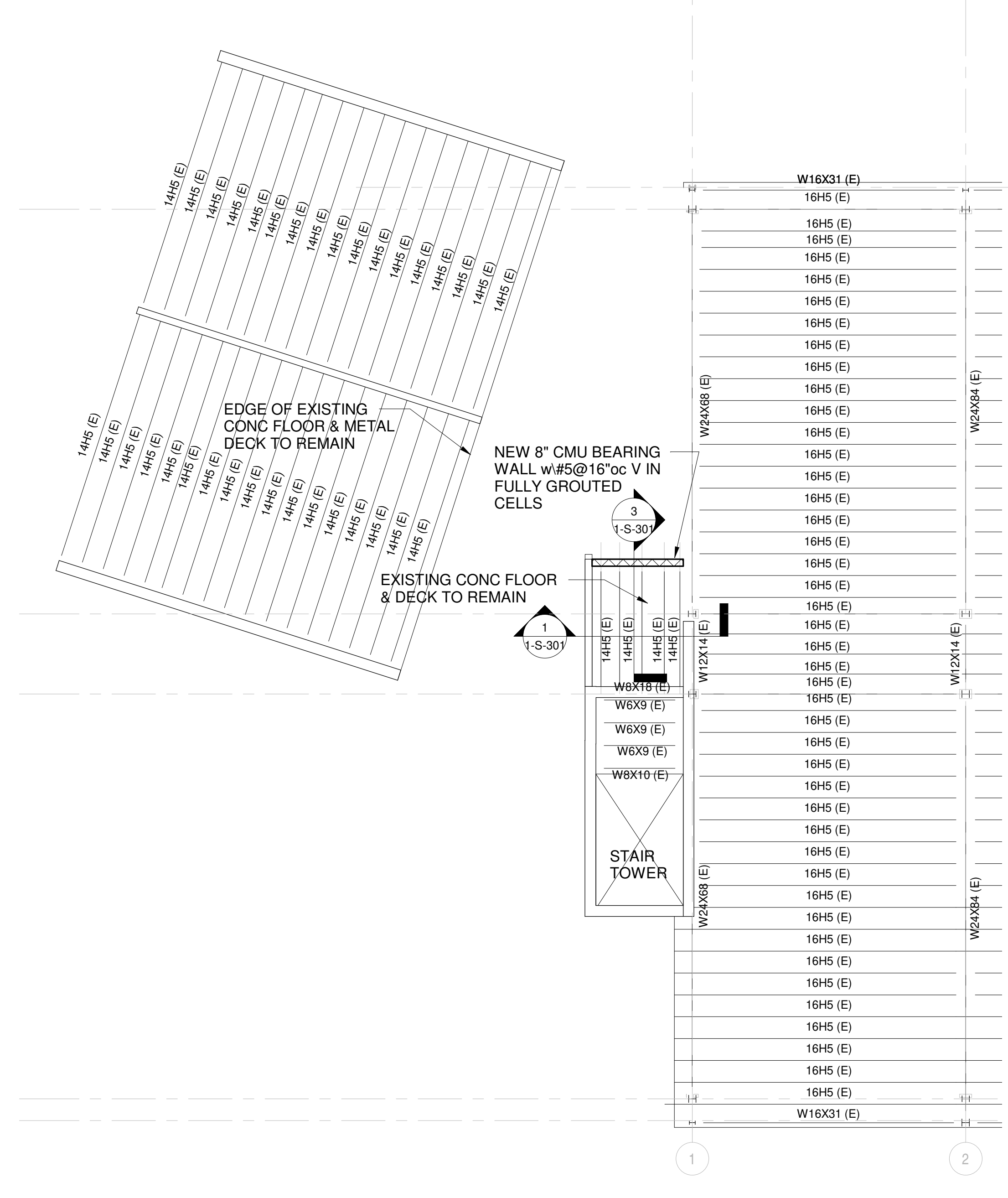
RRMM
 ARCHITECTS, PC
 2900 South Quincy Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 DRAWING FOURTH FLOOR FRAMING- DEMOITLION & NEW WORK

SHEET
1-S-101



1 FIFTH FLOOR FRAMING - DEMOLITION
1-S-102 1/8" = 1'-0"



2 FIFTH FLOOR FRAMING - NEW WORK
1-S-102 1/8" = 1'-0"



GPI
 Greenman-Pedersen, Inc.
 Engineering and Construction Services
 8001 Braddock Road, Suite 200, Springfield, VA 22151
 703-978-0100 www.gpinet.com
 Project #: 2019322.00

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	MARK	DATE	BY	DES
12.11.2020	13356.28	BTY	BTY	RKS				

DATE 12.11.2020
 PROJECT 13356.28
 DESIGNED BTY
 DRAWN BTY
 CHECKED RKS

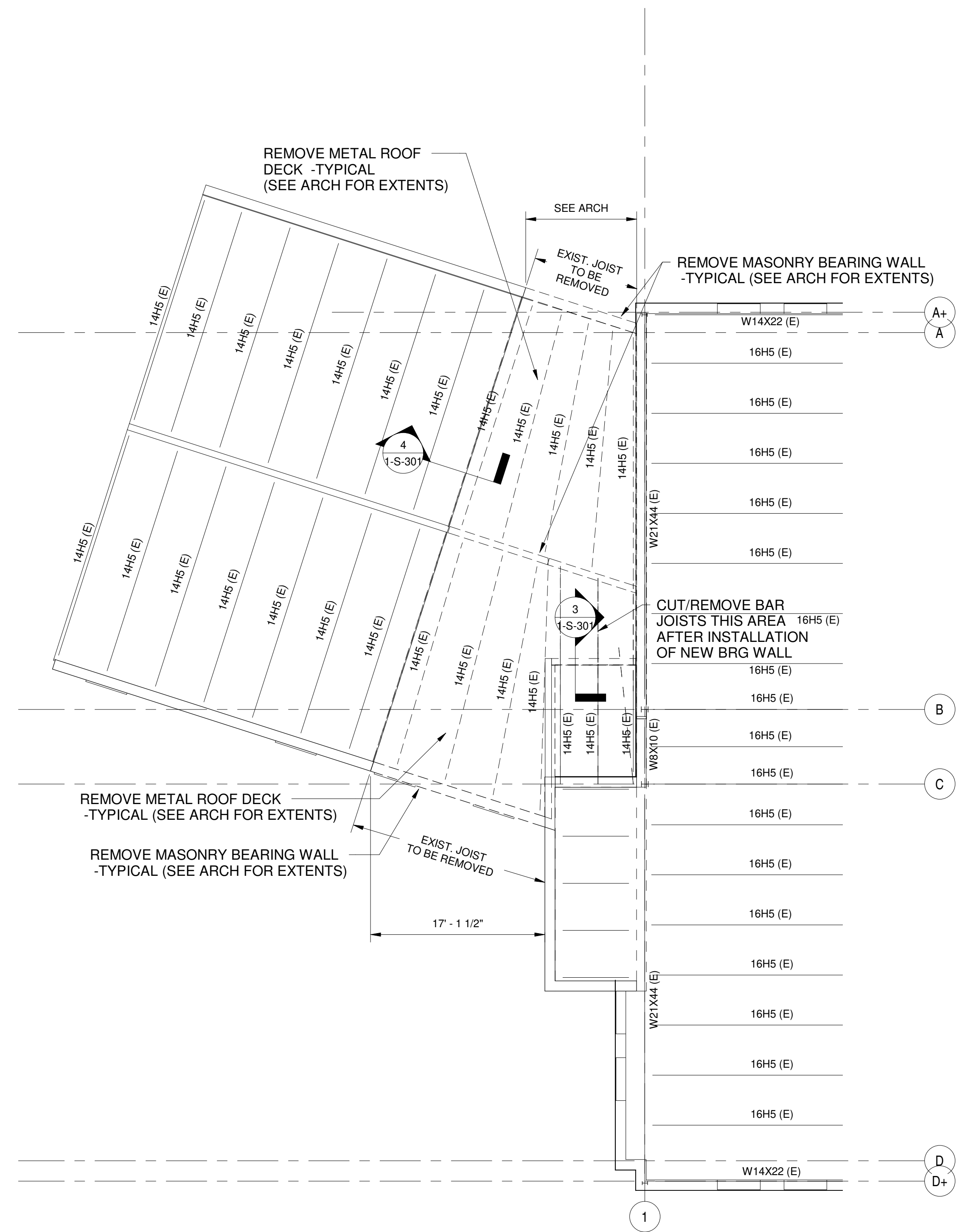


PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204

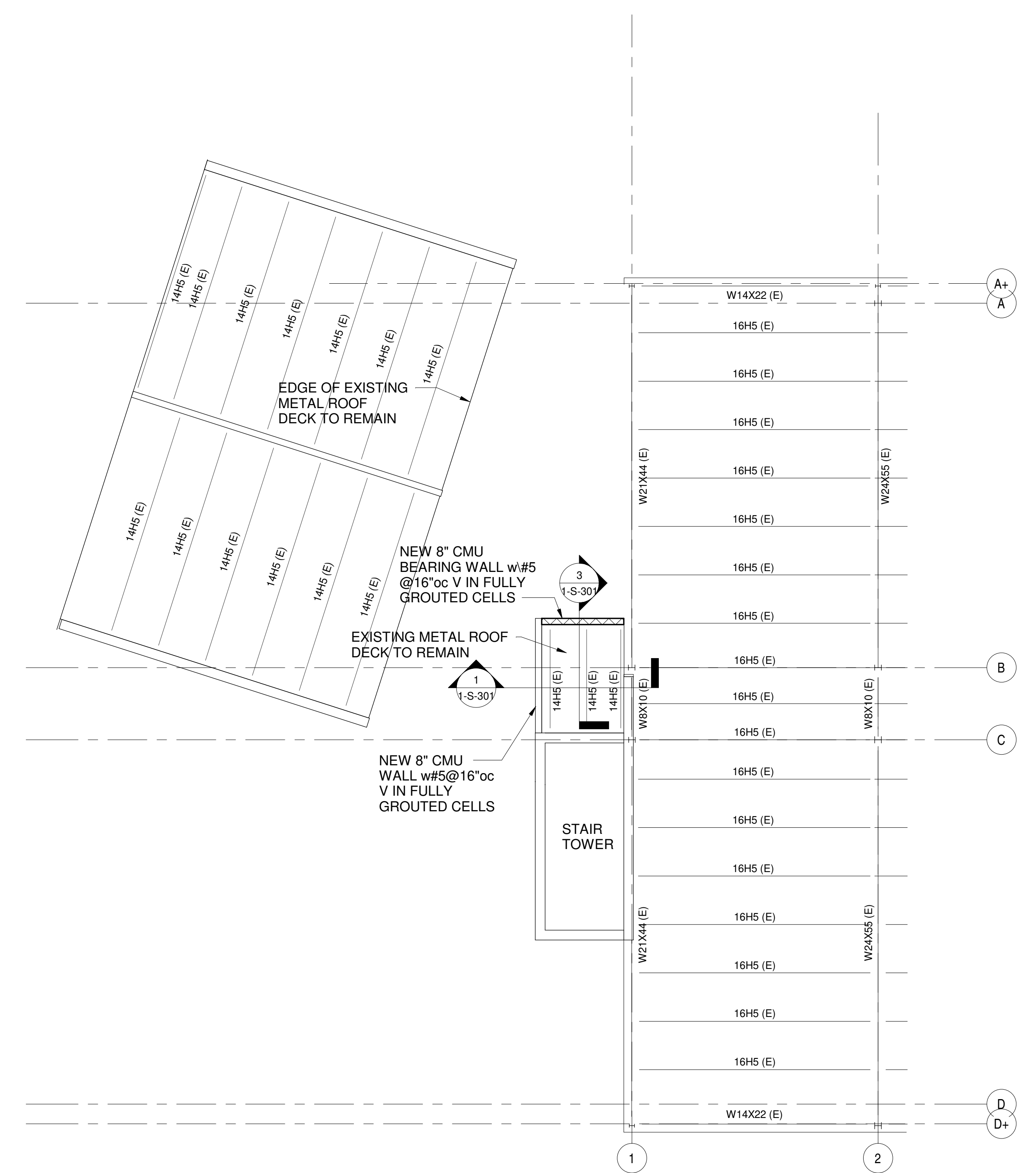
DRAWING FIFTH FLOOR FRAMING - DEMOLITION & NEW WORK

SHEET
1-S-102

12/9/2020 4:32:27 PM BIN 360/13356-28 Virginia Hospital Center/201952200 v20 - Structural.rvt



1 ROOF BEARING FRAMING - DEMOLITION
 1-S-103 1/8" = 1'-0"



2 ROOF BEARING FRAMING - NEW WORK
 1-S-103 1/8" = 1'-0"



GPI
 Greenman-Pedersen, Inc.
 Engineering and Construction Services
 8001 Braddock Road, Suite 200, Springfield, VA 22151
 703-978-0100 www.gpinet.com
 Project #: 2019322.00

DATE	PROJECT	DESIGNED	DRAWN	CHECKED	MARK	DATE	BY	DES
12.11.2020	13356.28	BTY	BTY	RKS				

DATE 12.11.2020
 PROJECT 13356.28
 DESIGNED BTY
 DRAWN BTY
 CHECKED RKS

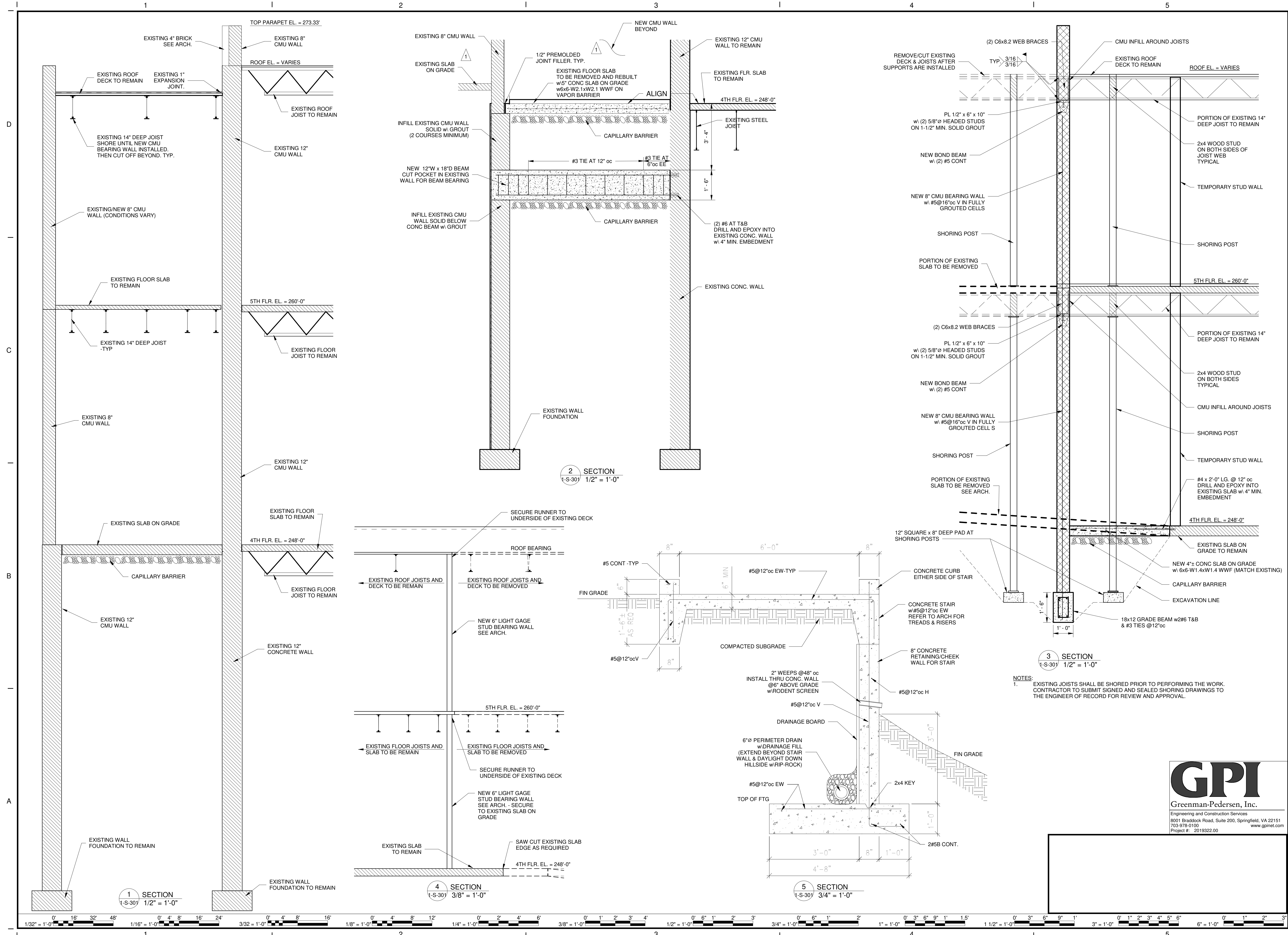
RRMM
 ARCHITECTS, PC
 2300 South Quincy Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204

DRAWING ROOF FRAMING - DEMOLITION & NEW WORK

SHEET
1-S-103

12/9/2020 4:32:27 PM BIN 360/113556-28 Virginia Hospital Center/201952200 v20 - Structural.rvt



1 SECTION
1-S-301 1/2" = 1'-0"

2 SECTION
1-S-301 1/2" = 1'-0"

3 SECTION
1-S-301 1/2" = 1'-0"

4 SECTION
1-S-301 3/8" = 1'-0"

5 SECTION
1-S-301 3/4" = 1'-0"

NOTES:
1. EXISTING JOISTS SHALL BE SHORED PRIOR TO PERFORMING THE WORK. CONTRACTOR TO SUBMIT SIGNED AND SEALED SHORING DRAWINGS TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL.



CD Revisions	DES
5-15-2020	BY
1	MARK DATE REVISIONS

DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	133556.28	BTY	BTY	RKS

RRMM ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204

DRAWING SECTIONS

SHEET
1-S-301

GENERAL DEMOLITION NOTES

- ENTIRE HVAC SYSTEMS - EQUIPMENT, DUCTWORK, PIPING, CONTROLS, ETC. - SHALL BE DEMOLISHED IN THE AREA OF CONSTRUCTION, EXCEPT THE WORK CONNECTED TO THE PHYSICIANS BUILDING SYSTEMS TO REMAIN SHALL BE DISCONNECTED AND CAPPED. DESCRIPTIONS OF THE SYSTEMS BELOW AND FLOOR PLANS ARE PROVIDED FOR INFORMATION ONLY, AND THEY DO NOT INCLUDE ALL WORK REQUIRED TO BE DEMOLISHED. CONTRACTOR IS RESPONSIBLE FOR COMPLETE DEMOLITION OF ALL SYSTEMS IN THE AREA OF CONSTRUCTION WITH THE EXCEPTION NOTED ABOVE.
- THE EXISTING HEATING AND COOLING FOR THE STRUCTURES TO BE DEMOLISHED IS PROVIDED BY A VARIETY OF SYSTEMS INCLUDING, CONSTANT VOLUME DX COOLING ROOFTOP UNIT, ROOF MOUNTED CONDENSER, MINI-SPLIT SYSTEM HEAT PUMPS, WALL MOUNTED PACKAGED WATER-SOURCE HEAT PUMP UNITS, EXHAUST FANS, AND GRAVITY VENTILATORS. AIR DISTRIBUTION IS PROVIDED TO SUPPLY AIR REGISTERS BY SHEET METAL DUCTS CONCEALED ABOVE THE CEILINGS WITH DUCTED RETURNS.
- IN OTHER AREAS THERE ARE ELECTRIC AIR-TO-AIR MINI-SPLIT SYSTEM HEAT PUMPS. THE OUTDOOR HEAT PUMP UNITS ARE PAD-MOUNTED ON GRADE. THESE SYSTEMS USE R-410A AS A REFRIGERANT.
- THE PROJECT INCLUDES THE COMPLETE DEMOLITION OF ALL OF THESE SYSTEMS. REMOVE ALL EQUIPMENT, DUCTWORK AND MECHANICAL SYSTEM PIPING, AND CAP DUCTS AND PIPING AS REQUIRED WHERE DISCONNECTED.
- DISCONNECT ALL UTILITY CONNECTIONS INCLUDING ELECTRICAL WIRE AND CONDUITS, AND PIPING CONNECTED TO ALL MECHANICAL EQUIPMENT. SALVAGE EACH ITEM OF EQUIPMENT LISTED IN THE COUNTY'S SALVAGE SCHEDULE AS A WHOLE UNIT, LISTED, INDEXED, TAGGED, AND STORED. SALVAGE EACH SCHEDULED UNIT WITH ITS NORMAL OPERATING AUXILIARY EQUIPMENT. TRANSPORT SALVAGED EQUIPMENT, INCLUDING MOTORS, TO A DESIGNATED STORAGE AREA. DO NOT REMOVE EQUIPMENT FROM THE STORAGE AREA UNTIL APPROVED BY THE COUNTY. REMOVE EQUIPMENT NOT SCHEDULED FOR SALVAGE FROM THE SITE AND DISPOSE OF IT AS REQUIRED BY THE LOCAL AUTHORITY.
- DISCONNECT PIPING AT UNIONS, FLANGES AND VALVES, AND FITTINGS AS REQUIRED TO REDUCE THE PIPES INTO STRAIGHT LENGTHS FOR REMOVAL. CAREFULLY DISMANTLE PIPING THAT PREVIOUSLY CONTAINED GAS, GASOLINE, OIL, OR OTHER DANGEROUS FLUIDS, WITH PRECAUTIONS TAKEN TO PREVENT INJURY TO PERSONS AND PROPERTY. STORE PIPING MATERIALS OUTDOORS UNTIL ALL FUMES AND RESIDUES ARE REMOVED AND OR DISSIPATED. DISCARD ALL SUPPORTS, HANGERS, PLATES, VALVES, AND SPECIALTY ITEMS. TRANSPORT ANY PIPING MATERIALS SCHEDULED FOR SALVAGE TO A DESIGNATED STORAGE AREA, AND STORE ACCORDING TO SIZE AND TYPE. DO NOT REMOVE PIPING MATERIALS FROM THE STORAGE AREA UNTIL APPROVED BY THE OWNER. CLASSIFY THESE PIPING MATERIALS NOT DESIGNATED FOR SALVAGE AS SCRAP METAL. CLASSIFY ALL REMOVED DUCT WORK AS SCRAP METAL. REMOVE MATERIALS NOT SCHEDULED FOR SALVAGE FROM THE SITE AND DISPOSE OF IT AS REQUIRED BY THE LOCAL AUTHORITY.
- THERMOMETERS, THERMOSTATS, ETC. THAT CONTAINING MERCURY SHALL BE TAGGED FOR IDENTIFICATION AS POTENTIALLY HAZARDOUS MATERIALS, PROTECTED FROM BREAKAGE, AND PROPERLY DISPOSED OF.
- ALL REFRIGERANT TO BE REMOVED FROM THE EXISTING SYSTEMS SHALL BE FULLY RECOVERED IN ACCORDANCE WITH FEDERAL REGULATIONS.
- A SALVAGE SCHEDULE WILL BE PREPARED AND INCLUDED IN THE CONTRACT DOCUMENTS.

SCHEDULE

THE DEMOLITION SHALL OCCUR IN TWO PHASES:

PHASE 1

THE FIRST PHASE SHALL INCLUDE THE ISOLATION OF THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING FROM THE REST OF THE STRUCTURE. THIS EFFORT SHALL INCLUDE THE DEMOLITION OF A PART OF THE CONNECTOR BUILDING, THE DEMOLITION OF THE MRI ADDITION, AND THE CONSTRUCTION OF AN EXPANDED VESTIBULE AND ACCESS PATHS AT THE EXISTING STAIR TOWER. THE EFFORT SHALL ALSO INCLUDE SOME BUILDING UTILITY WORK AS NOTED BELOW.

HVAC AND PLUMBING:

TO MECHANICALLY ISOLATE THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING, THE CONTRACTOR SHALL FIRST REMOVE PORTIONS OF DUCTS AND PIPES, WHICH CROSS THE EXTERIOR WALL OF THE PHYSICIAN'S OFFICE BUILDING, AS REQUIRED FOR THIS PHASE OF DEMOLITION, AND CAP BOTH ENDS, ONE END INSIDE THE PHYSICIAN'S OFFICE BUILDING AND THE OTHER END INSIDE THE TO BE DEMOLISHED CONNECTOR BUILDING. PRIOR TO DEMOLITION OF MRI ADDITION, THE CONTRACTOR SHALL LOCATE UNDERGROUND CONDENSER WATER PIPES RUN FROM THE MECHANICAL ROOM IN THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING TO THE COOLING TOWER SET ON GRADE AS IT IS POSSIBLE THAT THE PIPES REMAINED IN PLACE UNDER MRI ADDITION WHEN MRI ADDITION WAS BUILT UNLESS THEY WERE REROUTED. THESE PIPES SHOULD REMAIN IN SERVICE FOR THE PHYSICIAN'S OFFICE BUILDING. THE COOLING TOWER AS WELL AS THE NEARBY UNDERGROUND OIL STORAGE TANK SHALL BE PROTECTED FROM DAMAGE AND KEPT OPERATIONAL DURING THE ENTIRE CONSTRUCTION PERIOD (BOTH PHASES 1 AND 2).

PHASE 2 (REFER TO SEPARATE CONSTRUCTION DOCUMENTS)

ONCE THE PHYSICIAN'S OFFICE BUILDING IS FULLY ISOLATED AND THE EGRESS STAIR TOWER RENOVATION AND EGRESS PATH IS COMPLETE, THE SECOND PHASE OF THE DEMOLITION CAN PROCEED. THE SECOND PHASE OF DEMOLITION SHALL INCLUDE THE COMPLETE DEMOLITION OF THE EXISTING VIRGINIA HOSPITAL CENTER (BUILDING 601) AND THE REMAINING PART OF THE CONNECTOR BUILDING.

DUCTWORK LEGEND

	EXISTING DUCTWORK, EQUIPMENT OR PIPING TO REMAIN
	EXISTING DUCTWORK, EQUIPMENT OR PIPING TO BE REMOVED OR RELOCATED
	NEW DUCTWORK, EQUIPMENT OR PIPING
	DUCTWORK WITH SOUNDLINING
	SUPPLY AIR DUCT TURNING UP/DOWN
	RETURN AIR DUCT TURNING UP/DOWN
	EXHAUST AIR DUCT TURNING UP/DOWN
	CHANGE IN ELEVATION OF DUCTWORK IN DIRECTION OF AIRFLOW - RISE
	CHANGE IN ELEVATION OF DUCTWORK IN DIRECTION OF AIRFLOW - DROP
	MOTORIZED DAMPER
	DUCT MOUNTED SMOKE DETECTOR
	SQUARE TO SQUARE TRANSITION
	SQUARE TO ROUND TRANSITION
	BRANCH DUCT
	ELBOW WITH TURNING VANES
	ELBOW WITHOUT TURNING VANES
	RADIUS ELBOW
	SPIN-IN COLLAR WITH INTEGRAL VOLUME DAMPER
	VOLUME DAMPER
	FIRE DAMPER
	FIRE SMOKE DAMPER
	THERMOSTAT WITH CONTROL WIRE
	HUMIDISTAT
	CARBON MONOXIDE SENSOR
	SQUARE CEILING DIFFUSER
	LINEAR SLOT DIFFUSER
	LINEAR RETURN DIFFUSER
	CFM DESIGNATION
	DIFFUSER OR GRILLE TYPE DESIGNATION
	RETURN GRILLE
	KEYED NOTE DEMOLITION
	KEYED NOTE NEW WORK
	POINT OF REMOVAL
	POINT OF CONNECTION

PIPING LEGEND

	CHILLED WATER SUPPLY
	CHILLED WATER RETURN
	CONDENSER WATER SUPPLY
	CONDENSER WATER RETURN
	GLYCOL SUPPLY
	GLYCOL RETURN
	HOT WATER SUPPLY
	HOT WATER RETURN
	REFRIGERANT SUCTION
	REFRIGERANT LIQUID
	FUEL OIL SUPPLY
	FUEL OIL RETURN
	CONDENSATE DRAIN
	PUMPED CONDENSATE DRAIN
	MAKE-UP WATER
	PIPE TURNING UP
	PIPE TURNING DOWN
	VALVE IN VERTICAL
	CONCENTRIC PIPE REDUCER
	PIPE BRANCH BOTTOM TAKEOFF
	PIPE BRANCH TOP TAKEOFF
	DIRECTION OF FLOW
	PITCHED IN DIRECTION OF FLOW
	UNION
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
	BALL VALVE
	BUTTERFLY VALVE
	COMBINATION BALANCING/SHUT-OFF VALVE
	STRAINER WITH VALVE AND CAP
	STRAINER
	TRIPLE DUTY VALVE
	CHECK VALVE
	THERMOMETER
	PRESSURE GAUGE
	MANUAL AIR VENT
	PRESSURE/TEMPERATURE PORT
	PRESSURE REDUCING VALVE

ABBREVIATIONS

(E)	EXISTING TO REMAIN	KW	KILOWATTS
(R)	EXISTING TO BE RELOCATED	LAT	LEAVING AIR TEMPERATURE
(RE)	EXISTING TO BE REMOVED AND RELOCATED	LBS	POUNDS
AC	AIR CONDITIONER	LWT	LEAVING WATER TEMPERATURE
AFF	ABOVE FINISHED FLOOR	MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
AHU	AIR HANDLING UNIT	MCA	MINIMUM CIRCUIT AMPACITY
BAS	BUILDING AUTOMATION SYSTEM	OA	OUTSIDE AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	PH	PHASE
CFM	CUBIC FEET PER MINUTE	RA	RETURN AIR
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT	RLA	RATED LOAD AMPS
CU	CONDENSING UNIT	RTU	ROOFTOP UNIT
DB	DRY BULB	SA	SUPPLY AIR
DX	REFRIGERANT	TAD	TRANSFER AIR DUCT
EAT	ENTERING AIR TEMPERATURE	TAD	TRANSFER AIR OPENING
EF	EXHAUST FAN	TF	TRANSFER FAN
ESP	EXTERNAL STATIS PRESSURE	TSP	TOTAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE	TYP	TYPICAL
FLA	FULL LOAD AMPS	V	VOLT, VOLTS
FPB	FAN POWERED BOX	VAV	VARIABLE AIR VOLUME
FT	FOOT, FEET	VFD	VARIABLE FREQUENCY DRIVE
GPM	GALLONS PER MINUTE	WB	WET BULB
HP	HORSEPOWER	WG	WATER GAUGE
HZ	HERTZ		
IN	INCH, INCHES		

DRAWING LIST

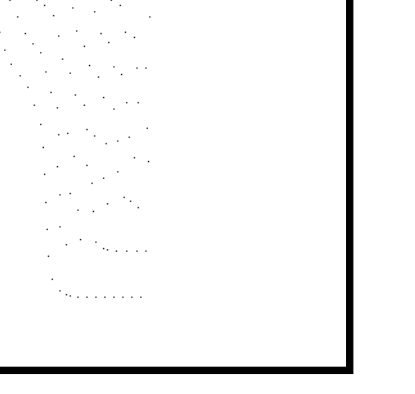
- 1-M-001 COVER SHEET
- 1-M-102 FOURTH FLOOR DEMOLITION & NEW WORK PLANS
- 1-M-103 FIFTH FLOOR DEMOLITION & NEW WORK PLANS

GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
8001 Braddock Road, Suite 200, Springfield, VA 22151
703-978-0100 www.gpinet.com
Project #: 2019322.00

CD Revision		DES
05-15-2020		BY
		MARK DATE
		REVISIONS

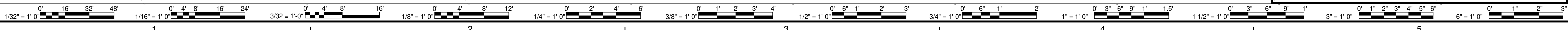
DATE	12.11.2020
PROJECT	13356.28
DESIGNED	
DRAWN	
CHECKED	

RRMM ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101



PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING COVER SHEET

SHEET
1-M-001



KEYED NOTES - DEMOLITION

1. REMOVE ALL HVAC EQUIPMENT, DUCTWORK PIPING, AND CONTROLS IN THESE AREAS BEING DEMOLISHED, EXCEPT THE WORK IN EXISTING BUILDING TO REMAIN. CAP UNUSED DUCT OPENINGS RESULTING FROM DEMOLITION WORK. ALL WORK TO BE REMOVED IS NOT SHOWN.

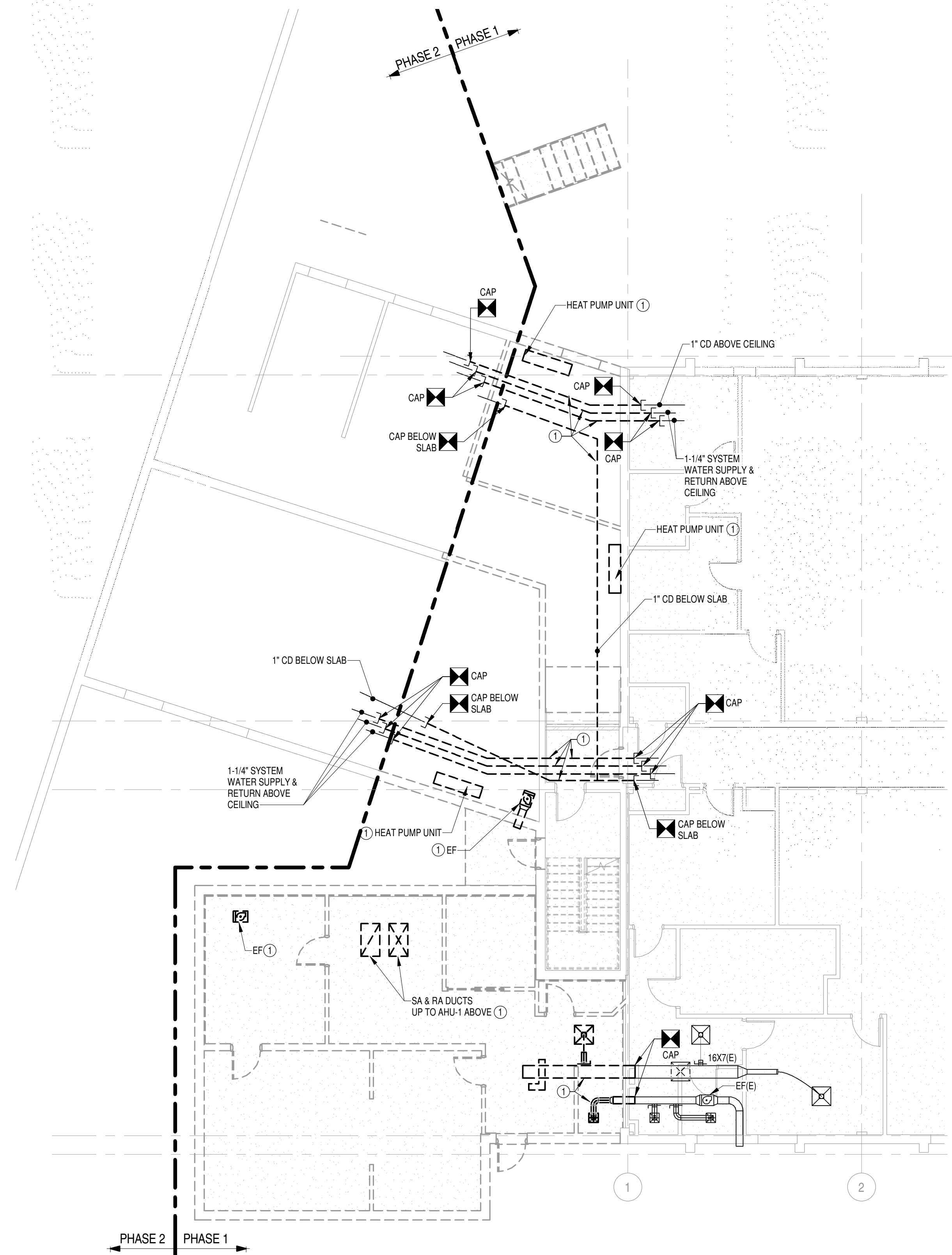
KEYED NOTES - NEW WORK

1. WSHP-1: TRANE GEC006, 1/2 TON WATER SOURCE HEAT PUMP CONSOLE UNIT. 1.1 GPM SYSTEM WATER FLOW, FLA 4.1, COMP LRA 14.0, MCA 4.9, MOCP 15 AT 208/1/60 ELECTRICAL CHARACTERISTICS. WITH HOT GAS REHEAT COIL WITH UNIT-MOUNTED HUMIDISTAT, CONDENSATE OVERFLOW SENSOR, STANDALONE UNIT-MOUNTED CONTROLS, PLEATED AIR FILTERS, POWER CORD/RECEPTACLE BOX WITH CIRCUIT BREAKER. DESIGN BASIS EFFICIENCIES - COOLING EER 12.5; HEATING COP 4.90. UNIT EFFICIENCIES SHALL MEET CODE MINIMUM EER 12.2 AND COP 4.3.

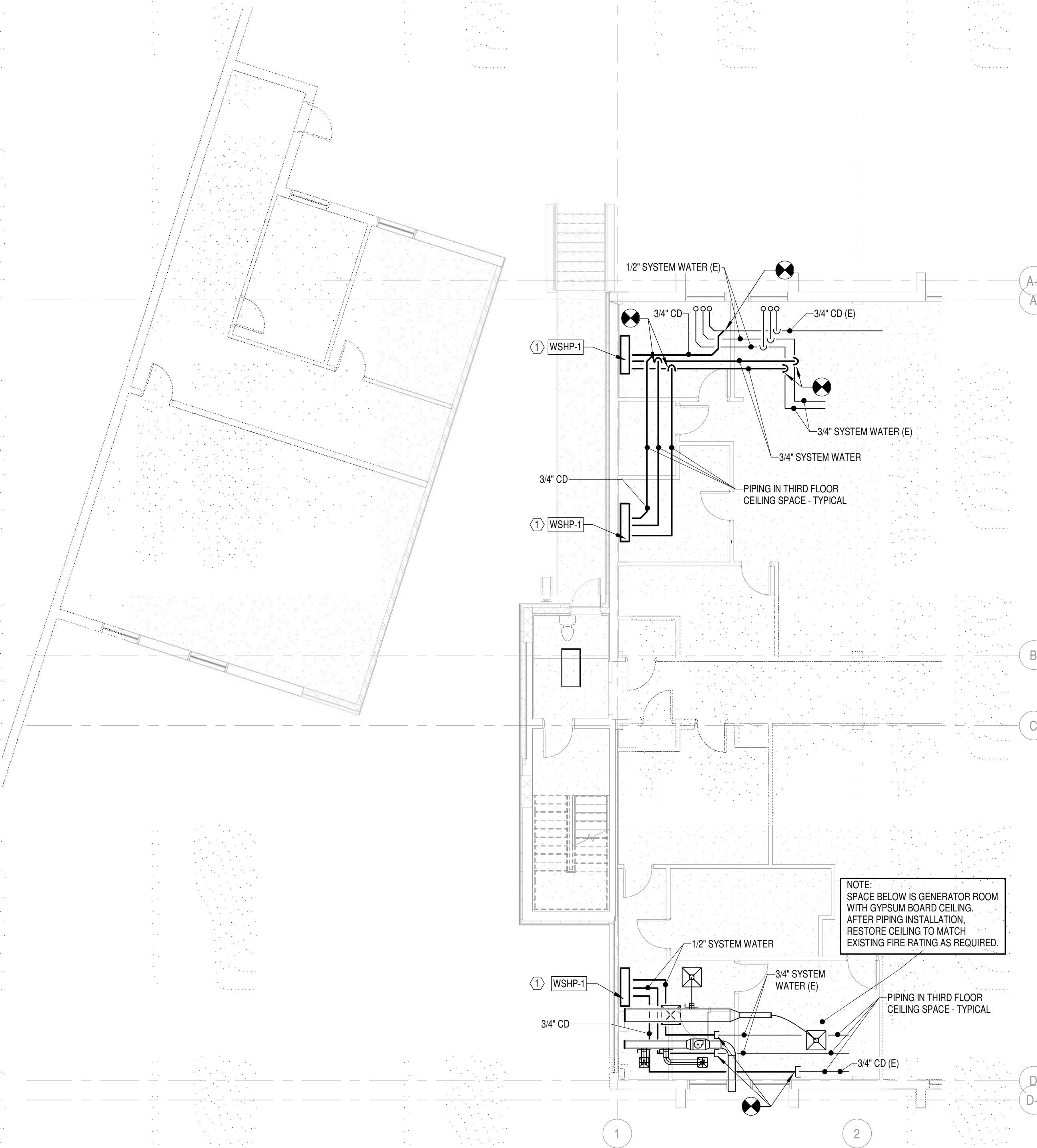
PROVIDE ALL PIPING AND POWER WIRING AS REQUIRED FOR OPERATION OF UNIT.

PIPING: RUN PIPING BELOW FLOOR AND CONNECT TO (E) MAIN PIPING. PROVIDE ISOLATION BALL VALVES IN PIPING INSIDE UNIT CABINET TO FACILITATE UNIT REPLACEMENT. PIPING MATERIALS SHALL MATCH (E) PIPING MATERIALS. INSULATE CONDENSATE DRAIN LINES WITH 1/2" THICK FIBERGLASS PREFORMED PIPE INSULATION WITH ALL SERVICE VAPOR RETARDER JACKET PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

WIRING: ELECTRICAL CONTRACTOR SHALL INSTALL AND WIRE ALL ELECTRICAL ACCESSORIES (FURNISHED WITH UNIT) INSIDE UNIT CABINET. ALL INSTALLATION AND WIRING SHALL BE PER UNIT MANUFACTURER'S INSTALLATION RECOMMENDATIONS.



2 FOURTH FLOOR - DEMOLITION
1-M-102 SCALE: 1/8" = 1'-0"



1 FOURTH FLOOR - NEW WORK
1-M-102 SCALE: 1/8" = 1'-0"

GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
8001 Braddock Road, Suite 200, Springfield, VA 22151
703-978-0100 www.gpinet.com
Project #: 2019322.00

CD Revision	DES
Permit Revisions	BY
05-15-2020	MARK
06-12-2020	DATE
1	REVISIONS
2	

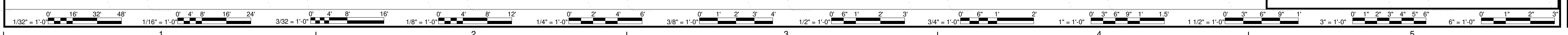
DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	KDL	DWH	KDL

RRMM ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING FOURTH FLOOR DEMOLITION & NEW WORK
PLANS

SHEET
1-M-102

12/29/2020 4:49:48 PM C:\Users\jnguyen\Documents\201932200 v20 - Mechanical_injuyenR32ZE.rvt



KEYED NOTES - DEMOLITION

1. REMOVE ALL HVAC EQUIPMENT, DUCTWORK AND CONTROLS IN THESE AREA BEING DEMOLISHED, EXCEPT THE WORK IN EXISTING OFFICE BUILDING TO REMAIN. ALL WORK TO BE REMOVED IS NOT SHOWN.

KEYED NOTES - NEW WORK

1. WSH-1: TRANE GEC006, 1/2 TON WATER SOURCE HEAT PUMP CONSOLE UNIT, 1.1 GPM SYSTEM WATER FLOW, FLA 4.1, COMP LRA 14.0, MCA 4.9, MOCP 15 AT 208/1/60 ELECTRICAL CHARACTERISTICS, WITH HOT GAS REHEAT COIL WITH UNIT-MOUNTED HUMIDISTAT, CONDENSATE OVERFLOW SENSOR, STANDALONE UNIT-MOUNTED CONTROLS, PLEATED AIR FILTERS, POWER CORD RECEPTACLE BOX WITH CIRCUIT BREAKER. DESIGN BASIS EFFICIENCIES - COOLING EER 12.5; HEATING COP 4.90. UNIT EFFICIENCIES SHALL MEET CODE MINIMUM EER 12.2 AND COP 4.3.

PROVIDE ALL PIPING AND POWER WIRING AS REQUIRED FOR OPERATION OF UNIT.

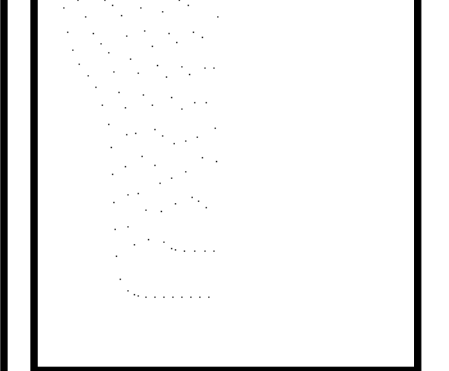
PIPING: RUN PIPING BELOW FLOOR AND CONNECT TO (E) MAIN PIPING. PROVIDE ISOLATION BALL VALVES IN PIPING INSIDE UNIT CABINET TO FACILITATE UNIT REPLACEMENT. PIPING MATERIALS SHALL MATCH (E) PIPING MATERIALS. INSULATE CONDENSATE DRAIN LINES WITH 1/2" THICK FIBERGLASS PREFORMED PIPE INSULATION WITH ALL SERVICE VAPOR RETARDER JACKET PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

WIRING: ELECTRICAL CONTRACTOR SHALL INSTALL AND WIRE ALL ELECTRICAL ACCESSORIES (FURNISHED WITH UNIT) INSIDE UNIT CABINET. ALL INSTALLATION AND WIRING SHALL BE PER UNIT MANUFACTURER'S INSTALLATION RECOMMENDATIONS.

CD Revision	Permit Revisions	DES
05-15-2020	06-12-2020	BY
1		MARK
2		DATE
		REVISIONS

DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	KDL	DWH	KDL

RRMM ARCHITECTS, PC
 2900 South Quincy Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101



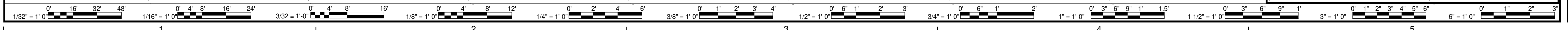
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204

DRAWING FIFTH FLOOR DEMOLITION & NEW WORK PLANS

GPI
 Greenman-Pedersen, Inc.
 Engineering and Construction Services
 8001 Braddock Road, Suite 200, Springfield, VA 22151
 703-978-0100 www.gpinet.com
 Project #: 2019322.00

1 FIFTH FLOOR - DEMOLITION
 1-M-103 SCALE: 1/8" = 1'-0"

2 FIFTH FLOOR - NEW WORK
 1-M-103 SCALE: 1/8" = 1'-0"



12/29/2020 4:49:52 PM C:\Users\jnguyen\Documents\201932200_v20 - Mechanical_injuyen\RR32E.rvt

GENERAL NOTES

- ENTIRE PLUMBING AND FIRE PROTECTION SYSTEMS - EQUIPMENT, TANKS, PIPING, CONTROLS, ETC. ABOVE AND BELOW GROUND SHALL BE DEMOLISHED. DESCRIPTIONS OF THE SYSTEMS ARE PROVIDED FOR INFORMATION ONLY AND DO NOT INCLUDE ALL WORK REQUIRED TO BE DEMOLISHED. CONTRACTOR IS RESPONSIBLE FOR COMPLETE DEMOLITION OF ALL SYSTEMS IN THE AREA OF CONSTRUCTION.
- PLUMBING SYSTEMS
 - THE EXISTING PLUMBING SYSTEMS INCLUDES THE HOT AND COLD WATER PIPING SYSTEM, THE SANITARY SEWER AND VENT SYSTEMS, AND THE STORM WATER SYSTEM. THE RISERS AND THE HORIZONTAL DISTRIBUTION PIPING ARE GENERALLY COPPER THROUGHOUT THE BUILDINGS. THE SOIL AND VENT SYSTEMS AND STORM WATER SYSTEM ARE CAST IRON AND PVC.
 - THERE ARE STORM LINES UNDER SLAB OF MRI ADDITION.
 - THE PROJECT INCLUDES THE COMPLETE DEMOLITION OF ALL OF THESE PLUMBING AND PIPING SYSTEMS.
 - DEMOLITION OF STORM LINES EXITING THE BUILDINGS SHALL BE COORDINATED WITH CIVIL DEMOLITION WORK.
 - CLASSIFY REMOVED MATERIALS AS SCRAP METAL AND REMOVE THE MATERIALS FROM THE SITE AS DESCRIBED UNDER MECHANICAL SYSTEMS UNLESS ON THE SALVAGE SCHEDULE.

SCHEDULE

THE DEMOLITION SHALL OCCUR IN TWO PHASES:

PHASE 1
 THE FIRST PHASE SHALL INCLUDE THE ISOLATION OF THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING FROM THE REST OF THE STRUCTURE. THIS EFFORT SHALL INCLUDE THE DEMOLITION OF A PART OF THE CONNECTOR BUILDING, THE DEMOLITION OF THE MRI ADDITION, AND THE CONSTRUCTION OF AN EXPANDED VESTIBULE AND ACCESS PATHS AT THE EXISTING STAIR TOWER. THE EFFORT SHALL ALSO INCLUDE SOME BUILDING UTILITY WORK AS NOTED BELOW:

HVAC AND PLUMBING:
 TO MECHANICALLY ISOLATE THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING, THE CONTRACTOR SHALL FIRST REMOVE PORTIONS OF DUCTS AND PIPES, WHICH CROSS THE EXTERIOR WALL OF THE PHYSICIAN'S OFFICE BUILDING, AS REQUIRED FOR THIS PHASE OF DEMOLITION, AND CAP BOTH ENDS, ONE END INSIDE THE PHYSICIAN'S OFFICE BUILDING AND THE OTHER END INSIDE THE TO BE DEMOLISHED CONNECTOR BUILDING.
 PRIOR TO DEMOLITION OF MRI ADDITION, THE CONTRACTOR SHALL LOCATE UNDERGROUND CONDENSER WATER PIPES RUN FROM THE MECHANICAL ROOM IN THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING TO THE COOLING TOWER SET ON GRADE AS IT IS POSSIBLE THAT THE PIPES REMAINED IN PLACE UNDER MRI ADDITION WHEN MRI ADDITION WAS BUILT UNLESS THEY WERE REROUTED. THESE PIPES SHOULD REMAIN IN SERVICE FOR THE PHYSICIAN'S OFFICE BUILDING. THE COOLING TOWER AS WELL AS THE NEARBY UNDERGROUND OIL STORAGE TANK SHALL BE PROTECTED FROM DAMAGE AND KEPT OPERATIONAL DURING THE ENTIRE CONSTRUCTION PERIOD (BOTH PHASES 1 AND 2).
 AN EXHAUST FAN ON THE ROOF OF THE CONNECTOR BUILDING, WHICH SERVES MULTIPLE TOILETS IN THE CONNECTOR BUILDING, ALSO SERVES TELECOM ROOM ON THE FIFTH FLOOR OF THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING 611. A NEW, SMALLER, FAN AND DUCTWORK SHALL BE INSTALLED IN THE PHYSICIAN'S OFFICE BUILDING FOR THE ROOM PRIOR TO ANY DISCONNECTION AS DESCRIBED ABOVE TO MAINTAIN REQUIRED AIR FLOW.

PHASE 2 (REFER TO SEPARATE CONSTRUCTION DOCUMENTS)
 ONCE THE PHYSICIAN'S OFFICE BUILDING IS FULLY ISOLATED AND THE EGRESS STAIR TOWER RENOVATION AND EGRESS PATH IS COMPLETE, THE SECOND PHASE OF THE DEMOLITION CAN PROCEED. THE SECOND PHASE OF DEMOLITION SHALL INCLUDE THE COMPLETE DEMOLITION OF THE EXISTING VIRGINIA HOSPITAL CENTER (BUILDING 601) AND THE REMAINING PART OF THE CONNECTOR BUILDING.

PLUMBING LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
		EXISTING PIPING OR EQUIPMENT TO BE REMOVED
	CW	DOMESTIC COLD WATER
	HW	DOMESTIC HOT WATER
	HWC	DOMESTIC HOT WATER RECIRCULATION
		SANITARY SOIL AND WASTE
		SANITARY VENT
		STORM WATER
		PIPE TURNING UP
		PIPE TURNING DOWN
		PIPE BRANCH BOTTOM TAKEOFF
		PIPE BRANCH TOP TAKEOFF
		OFFSET IN PIPE
		CAPPED PIPE
		POINT OF REMOVAL
		KEYED NOTE, DEMOLITION
		KEYED NOTE, NEW WORK

ABBREVIATION

(E) EXISTING
 FHV FIRE HOSE VALVE
 (N) NEW

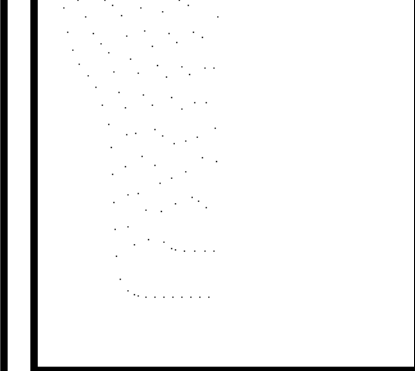
DRAWING LIST

1-P-001 COVER SHEET
 1-P-102 FOURTH FLOOR DEMOLITION PLAN
 1-P-103 FIFTH FLOOR DEMOLITION PLAN



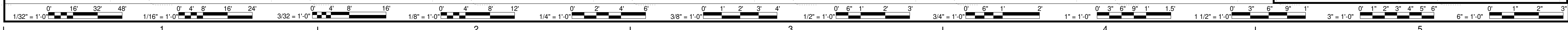
CD Revisions	DES
05-15-2020	BY
1	MARK DATE
	REVISIONS

DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	BKM	TTN	RMD



PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 DRAWING COVER SHEET

SHEET
1-P-001

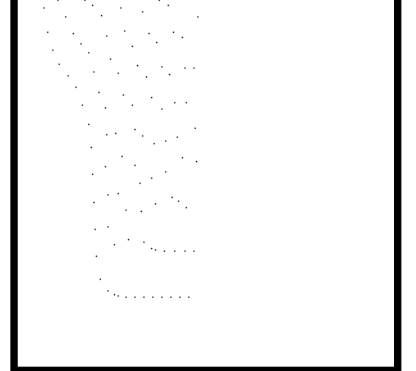


KEYED NOTES - DEMOLITION	
1.	REMOVE ALL PIPING - DOMESTIC HOT AND COLD WATER, SANITARY SEWER, VENT, STORM SEWER, FOUNDATION DRAIN, SPRINKLER PIPING, AND SPRINKLER HEAD IN THESE AREAS BEING DEMOLISHED, EXCEPT THE WORK IS INDICATED TO REMAIN. REMOVE ALL SANITARY SEWER AND VENT PIPING TO WITHIN 2 FEET OF ACTIVE PIPING TO NOT CREATE DEAD ENDS AS DESCRIBED IN PLUMBING CODE.
2.	SEE CIVIL DRAWINGS FOR CONTINUATION.

CD Revisions	MARK	DATE	BY	DES
1		05-15-2020		

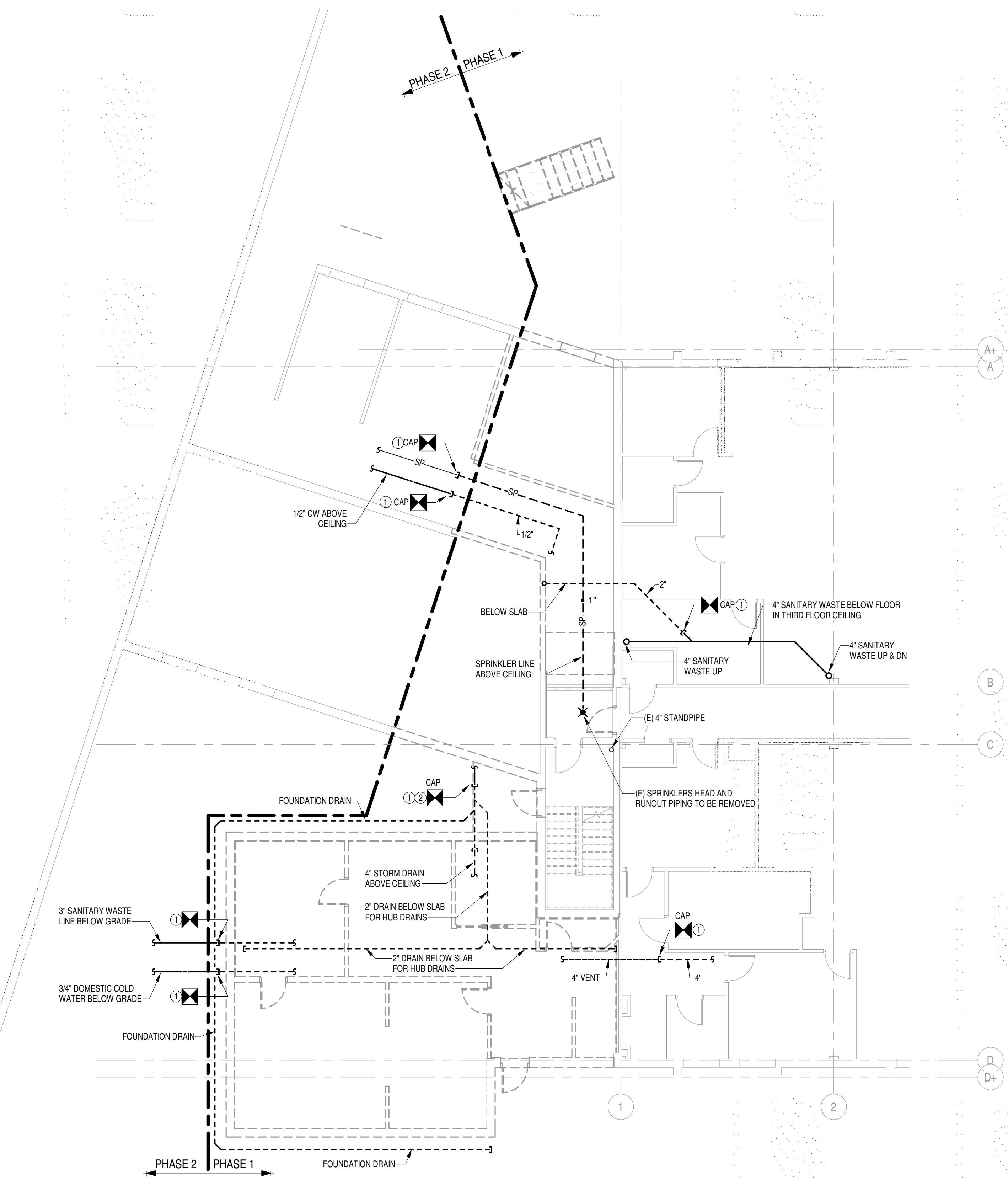
DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28			

RRMM
ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101

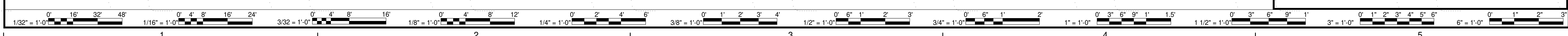


PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204.
DRAWING FOURTH FLOOR DEMOLITION PLAN

GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
8001 Braddock Road, Suite 200, Springfield, VA 22151
703-978-0100 www.gpinet.com
Project #: 2019322.00



2 FOURTH FLOOR - DEMOLITION
1-P-102 SCALE: 1/8" = 1'-0"



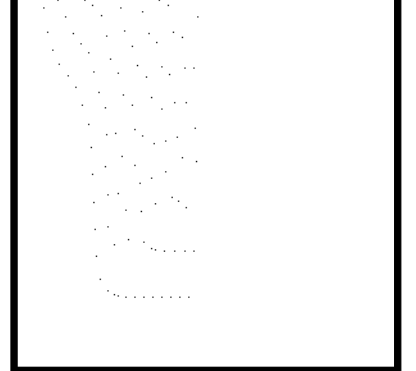
SHEET
1-P-102

KEYED NOTES - DEMOLITION			
1.	REMOVE ALL PIPING - DOMESTIC HOT AND COLD WATER, SANITARY SEWER, VENT, STORM SEWER, FOUNDATION DRAIN, SPRINKLER PIPING, AND SPRINKLER HEAD IN THESE AREAS BEING DEMOLISHED, EXCEPT THE WORK IS INDICATED TO REMAIN. REMOVE ALL SANITARY SEWER AND VENT PIPING TO WITHIN 2 FEET OF ACTIVE PIPING TO NOT CREATE DEAD ENDS AS DESCRIBED IN PLUMBING CODE.		
2.	SEE CIVIL DRAWINGS FOR CONTINUATION.		

CD Revisions	MARK	DATE	BY	DES
1		05-15-2020		

DATE	12.11.2020
PROJECT	13356.28
DESIGNED	
DRAWN	
CHECKED	

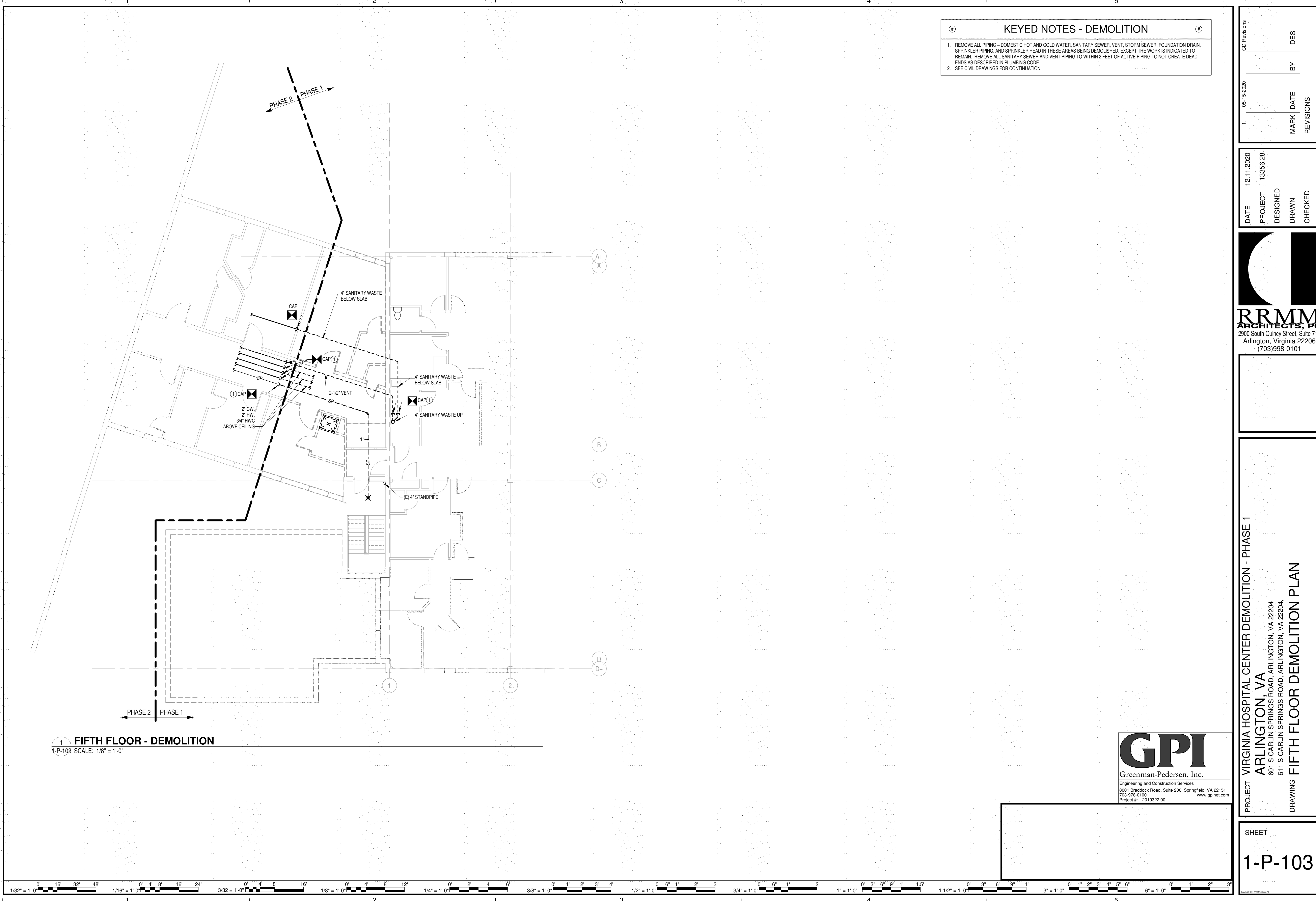
RRMM
ARCHITECTS, PC
2900 South Quincy Street, Suite 710
Arlington, Virginia 22206
(703)998-0101



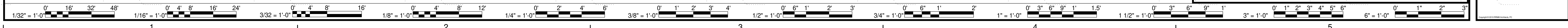
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
DRAWING FIFTH FLOOR DEMOLITION PLAN

GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services
8001 Braddock Road, Suite 200, Springfield, VA 22151
703-978-0100 www.gpinet.com
Project #: 2019322.00

1 FIFTH FLOOR - DEMOLITION
1-P-103 SCALE: 1/8" = 1'-0"



12/29/2020 4:47:01 PM C:\Users\jnguyen\Documents\201932200_v20 - Plumbing_jnguyenR32E.rvt



ELECTRICAL SPECIFICATIONS

- A. GENERAL**
- REFER TO BOOK SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND SCOPE.
 - THE CONTRACTOR SHALL COMPLY WITH ALL THE LAWS, ORDINANCES, RULES AND REGULATIONS OF ALL LOCAL AND STATE GOVERNMENTAL AUTHORITIES, THE RULES OF THE NATIONAL FIRE PROTECTION ASSOCIATION AS INTERPRETED BY THE ENFORCING AUTHORITY HAVING JURISDICTION AND OF THE PUBLIC UTILITIES HAVING CONNECTION WITH ANY OF THE SYSTEMS HEREIN SPECIFIED.
 - THE CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY ANY OF THE FOREGOING AUTHORITIES, AND PAY FOR ALL OTHER COSTS IN CONNECTION WITH THE WORK. ALL CERTIFICATES SHALL BE IN DUPLICATE AND SHALL BE DELIVERED TO THE ARCHITECT/ENGINEER/OWNER.
 - THE SITE, LOCATION AND ROUTING OF SYSTEMS INDICATED TO HAVE NEW CONNECTIONS MADE TO THEM ARE SHOWN AS ACCURATELY AS FIELD CONDITIONS WOULD PERMIT. BIDDERS SHALL VISIT THE SITE AND THOROUGHLY EXAMINE THE CONTRACT DRAWINGS. BIDDERS WHO DO NOT VISIT THE SITE MAY BE UNLAWFULLY NOT PERMITTED TO SUBMIT A BID IF THE OWNER SO DETERMINES. ALL EXISTING CONDITIONS SHALL BE EXAMINED AND THEIR EXACT LOCATIONS VERIFIED. THE CONTRACTOR SHALL REPORT TO THE ARCHITECT/ENGINEER/OWNER BEFORE SUBMITTING A BID, ANY CONDITIONS WHICH MIGHT MAKE INSTALLATION OF REQUIRED EQUIPMENT A PROBLEM. NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED FOR FAILURE TO INVESTIGATE CONDITIONS OR MISUNDERSTANDINGS OF THE CONTRACTUAL REQUIREMENTS.
 - THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT NOT INDICATED TO BE REUSED TO A DESIGNATED LOCATION AT THE PROJECT SITE. AFTER THE EQUIPMENT HAS BEEN ASSEMBLED FOR THE OWNER'S INSPECTION AND POSSIBLE RETENTION, ALL EQUIPMENT NOT TO BE RETAINED BY THE OWNER SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR. ALL BUILDING SYSTEMS SHALL REMAIN IN SERVICE UNLESS INDICATED OTHERWISE. ALL OUTAGES OR INTERRUPTIONS SHALL BE KEPT TO MINIMUM DURATION. NOTIFY THE OWNER 48 HOURS IN ADVANCE OF ANY OUTAGE OR INTERRUPTION.
 - THE CONTRACTOR SHALL INSTALL AND CONNECT ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE BEST ENGINEERING PRACTICE AND, UNLESS OTHERWISE SHOWN OR SPECIFIED, FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS AND FURNISH AND INSTALL ALL REQUIRED AUXILIARY ITEMS COMPLETE.
 - DRAWINGS SHALL BE CONSIDERED DIAGRAMMATIC AND FOR BIDDING PURPOSES ONLY. WHILE THE DRAWINGS ARE GENERALLY TO SCALE AND ARE AS ACCURATE AS THE SCALE WILL PERMIT, ALL IMPORTANT DIMENSIONS SHALL BE DETERMINED IN THE FIELD. THEY ARE NOT TO BE CONSIDERED TO BE ERECTION DRAWINGS.
 - COORDINATE WITH ALL TRADES TO AVOID INTERFERENCE AMONG MECHANICAL, ELECTRICAL, ARCHITECTURAL AND STRUCTURAL ITEMS. PROVIDE ALL NECESSARY OFFSETS AND FITTINGS IN CIRCUITRY AND OTHER ITEMS REQUIRED TO INSTALL THE WORK WITHOUT INTERFERENCES.
 - THE CONTRACTOR SHALL TEST ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT AND DEMONSTRATE TO THE OWNER ITS PROPER OPERATIONS. ALL NEW EQUIPMENT SHALL BE MOUNTED VIBRATION FREE.
 - ALL EQUIPMENT AND WORKMANSHIP SHALL BE GUARANTEED IN FULL FROM ALL DEFECTS FOR ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THIS WORK.
 - ALL EQUIPMENT INSTALLED SHALL BE NEW AND SHALL CONFORM IN ALL RESPECTS TO THE LATEST APPROVED STANDARDS OF IEEE, ANSI, NEMA AND UNDERWRITERS LABORATORIES, INC., UNLESS INDICATED OTHERWISE.
 - SHOP DRAWINGS AND PRODUCT DATA. SUBMIT SHOP DRAWINGS AND PRODUCT DATA FOR ALL NEW MATERIAL AND EQUIPMENT PROVIDED UNDER THIS WORK. MATERIAL AND EQUIPMENT SHALL BE SUBMITTED AND APPROVED BEFORE ORDERING. SUBMIT A MINIMUM OF 6 COPIES TO THE ARCHITECT/ENGINEER/OWNER FOR REVIEW. ELECTRONIC SUBMISSIONS ARE ACCEPTABLE. SUBSTITUTION ARE SUBJECT TO DISCRETION OF THE ARCHITECT/ENGINEER. IF CONSIDERED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION AND SHALL MEET THE INTENT OF THE CONSTRUCTION DOCUMENTS.
 - REPAIR OF EXISTING WORK: ALL WORK SHALL BE CAREFULLY LAID OUT IN ADVANCED, AND WHERE CUTTING, CHANNELING, CHASING, OR DRILLING OF FLOORS, WALL, PARTITIONS, CEILING, OR OTHER SURFACES IS NECESSARY FOR THE PROPER INSTALLATION, SUPPORT, OR ANCHORAGE OF THE CONDUIT, RACEWAYS OR OTHER ELECTRICAL WORK, THIS WORK SHALL BE CAREFULLY DONE, AND ANY DAMAGE TO BUILDING, PIPING, OR EQUIPMENT SHALL BE REPAIRED BY SKILLED MECHANICS OF THE TRADE INVOLVED, AT NO ADDITIONAL COST TO THE OWNER. METHODS FOR AND EXACT LOCATIONS OF PROPOSED CUTTING, CHANNELING, CHASING OR DRILLING OF EXISTING CONSTRUCTION SHALL BE AS APPROVED BY THE OWNER.
 - THE CONTRACTOR SHALL REPAIR ALL WALL, CEILING, FLOOR, OR ROOF OPENINGS WHICH ARE CREATED BY DEMOLITION OR PENETRATION. THE REPAIRS SHALL BE WITH MATERIALS AND FINISHES TO MATCH EXISTING. ALL FIRE RATED PENETRATIONS SHALL BE SEALED WITH SUITABLE MATERIALS TO PRESERVE FIRE RATED INTEGRITY.
 - DEFINITIONS: "PROVIDE" UNDER THIS CONTRACT IS DEFINED AS FURNISH AND INSTALL. "CONCEALED" UNDER THIS CONTRACT IS DEFINED AS WITHIN ARCHITECTURAL WALLS AND ABOVE CEILING. "EXPOSED" UNDER THIS CONTRACT IS DEFINED AS VISIBLE TO VIEW, INCLUDING ELECTRICAL ROOMS. "INDICATED" UNDER THIS CONTRACT IS DEFINED AS SHOWN IN THE CONTRACT DOCUMENTS. "CIRCUITRY" UNDER THIS CONTRACT IS DEFINED AS CONDUIT, FEEDER AND/OR CIRCUIT.
 - UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN THE CONTRACT AREA AND ALL OTHER AREAS USED FOR STORAGE, STAGING, ETC.
 - THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER/OWNER WHEN THE PROJECT IS APPROXIMATELY 75% COMPLETED IN ORDER TO SCHEDULE A PRE-FINAL REVIEW OF CONSTRUCTION. NO WORK SHALL BE CONCEALED BY CEILING, WALLS, ETC. FINAL REVIEW SHALL BE SCHEDULED AT 100% COMPLETION. ALL PUNCH LIST ITEMS MUST BE ACCOMPLISHED PRIOR TO FINAL ACCEPTANCE.
 - THE CONTRACTOR SHALL PREPARE A COMPREHENSIVE METHOD OF PROCEDURE AND SUBMIT IT TO THE OWNER WITH SHOP DRAWINGS FOR REVIEW. THE SUBMITTAL SHALL ITEMIZE METHODS OF PROCEDURE FOR ALL POTENTIAL EMERGENCY SITUATIONS AND SHALL INCLUDE A LIST OF PERSONS REPRESENTING THE OWNER AND THE CONTRACTOR ALONG WITH DAYTIME EMERGENCY PHONE NUMBERS INDICATING WHO SHALL BE CONTACTED IN THE EVENT OF AN EMERGENCY. THIS LIST SHALL BE DISTRIBUTED TO THE OWNER'S REPRESENTATIVE AND THE CONTRACTOR'S SUPERINTENDENT OR FOREMAN AT THE SITE. EMERGENCY SITUATIONS SHALL INCLUDE BUT NOT BE LIMITED TO POWER OUTAGES, CHILLED AND CONDENSER WATER SYSTEM RUPTURES, AUTOMATIC TEMPERATURE CONTROL OUTAGES AND OWNER'S EQUIPMENT DAMAGE. THE COMPREHENSIVE METHOD OF PROCEDURE SHALL BE SUBMITTED TO THE OWNER PRIOR TO COMMENCEMENT OF ANY WORK.
 - PROVIDE TEMPORARY SERVICE FOR LIGHTING AND POWER EQUIPMENT (DRILLS, SAW, ETC.). VERIFY TEMPORARY REQUIREMENTS WITH GENERAL CONTRACTOR. TEMPORARY LIGHTING AND POWER SHALL MEET OSHA REQUIREMENTS AND LOCAL CODE. TEMPORARY POWER SHALL BE 120 VOLTS.
 - PROTECT ADJACENT MATERIALS INDICATED TO REMAIN. INSTALL AND MAINTAIN DUST AND NOISE BARRIERS TO KEEP DIRT, DUST, AND NOISE FROM BEING TRANSMITTED TO ADJACENT AREAS. REMOVE PROTECTION AND BARRIERS AFTER DEMOLITION OPERATIONS ARE COMPLETE.
 - FINAL TESTING: AT THE TIME OF FINAL INSPECTION AND TESTS, ALL CONNECTIONS AT PANELBOARDS, DEVICES AND EQUIPMENT AND ALL SPLICES MUST BE COMPLETED. EACH BRANCH CIRCUIT AND ITS RESPECTIVE CONNECTED EQUIPMENT MUST TEST FREE OF SHORT CIRCUITS. UPON COMPLETION OF THE WORK, CLEAN AND POLISH ALL EXPOSED SURFACES IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 - CONTRACTOR SHALL PROVIDE ACCESS PANEL FOR JUNCTION BOXES, DISCONNECT SWITCHES, OR OTHER DEVICES WHICH REQUIRE SERVICE ACCESS PER NEC.
- B. LIGHTING**
- COORDINATE RECESSED LIGHTING FIXTURES WITH MECHANICAL EQUIPMENT AND ARCHITECTURAL CEILING PLAN. GRID LAYOUT ON PLANS IS APPROXIMATE. ADJUST LIGHTING FIXTURES IN FIELD PER ARCHITECT.
 - PROVIDE FINISHING FRAMES FOR ALL RECESSED LIGHTING FIXTURES. TYPE TO BE COMPATIBLE WITH CEILING. COORDINATE ALL FIXTURE TYPES WITH CEILING SYSTEM BEFORE ORDERING FIXTURES. PROVIDE ALL MOUNTING ATTACHMENTS FOR A COMPLETE INSTALLATION.
 - IN LOCATIONS WHERE NEW DUCTWORK OR CEILING IS INSTALLED UNDER THIS CONTRACT BUT LIGHTING FIXTURES HAVE NOT BEEN REVISED, REMOVE EXISTING FIXTURES AS NECESSARY TO RUN THE NEW DUCTWORK OR CEILING AND RE-HANG AFTER THE MECHANICAL OR ARCHITECTURAL WORK IS COMPLETED.
 - PROVIDE ALL REQUIRED ACCESSORIES FOR A COMPLETE AND OPERATIONAL INSTALLATION TO SUIT PROJECT CONDITIONS.
 - PROVIDE MEANS OF SUPPORT PER NEC 410.36.
- C. EQUIPMENT CONNECTION**
- EXTEND WIRING TO ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS AND MAKE FINAL AND COMPLETE CONNECTIONS TO ALL EQUIPMENT. BEFORE ROUGHING IN, THE LOCATION AND TYPE OF DEVICES SHALL BE VERIFIED FROM SHOP DRAWINGS OF THE EQUIPMENT. STARTERS AND DISCONNECTS AND OTHER ELECTRICAL CIRCUITRY AND DEVICES SHALL BE LOCATED TO ALLOW ACCESS TO DEVICES AND NOT INTERFERE WITH THE OPERATION OF THE MECHANICAL OR ARCHITECTURAL DEVICES OR THEIR POSSIBLE MAINTENANCE OR REMOVAL.
- D. DEMOLITION**
- PROVIDE DEMOLITION AS INDICATED ON DEMOLITION PLANS. CIRCUITRY NOTED FOR REMOVAL SHALL BE REMOVED BACK TO THE SOURCE BUS UNLESS OTHERWISE NOTED. BE RESPONSIBLE FOR THE COMPLETE REMOVAL FROM THE SITE FOR ALL EQUIPMENT AND MATERIAL REMOVED UNDER DEMOLITION WORK, UNLESS OTHERWISE NOTED OR DIRECTED. EXISTING CIRCUITS TO REMAIN INTERRUPTED BY DEMOLITION SHALL BE RESTORED FOR OPERATION AS BEFORE. OUTAGES REQUIRED TO PERFORM DEMOLITION SHALL BE COORDINATED WITH THE OWNER AND PROCESSED OUTSIDE OF NORMAL BUSINESS HOURS. REPAIR ALL WALL, CEILING, FLOOR OR ROOF OPENINGS CREATED BY DEMOLITION. REPAIRS SHALL BE PROVIDED BY WORKMAN SKILLED IN THE TRADE AND SHALL CONFORM WITH MATERIAL AND FINISHES TO MATCH EXISTING.
 - LOCATE, IDENTIFY AND PROTECT ELECTRICAL SERVICES PASSING THROUGH DEMOLITION AREA AND SERVING OTHER AREAS OUTSIDE THE DEMOLITION LIMITS. MAINTAIN SERVICES TO AREAS OUTSIDE DEMOLITION LIMITS. WHEN SERVICES MUST BE INTERRUPTED, INSTALL TEMPORARY SERVICES FOR AFFECTED AREAS.

SCHEDULE

THE DEMOLITION WILL OCCUR IN TWO PHASES:

PHASE 1
THE FIRST PHASE WILL INCLUDE THE ISOLATION OF THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING FROM THE REST OF THE STRUCTURE. THIS EFFORT WILL INCLUDE THE CONSTRUCTION OF AN EXPANDED VESTIBULE AND ACCESS PATHS AT THE EXISTING STAIR TOWER. THE EFFORT WILL ALSO INCLUDE SOME BUILDING UTILITY WORK AS NOTED BELOW:

ELECTRICAL
IN ORDER TO ELECTRICALLY ISOLATE AND MAINTAIN SYSTEM OPERATIONS OF THE MULTI-STORY PHYSICIAN'S OFFICE BUILDING, THE CONTRACTOR SHALL DISCONNECT ALL ELECTRICAL DEVICES, LIGHTING CIRCUITS, AND MECHANICAL EQUIPMENT FEEDERS SERVING IN THE CONNECTOR BUILDING AND MRI BUILDING. THE MRI BUILDING, THE STAIR TOWER, AND CONNECTOR BUILDING ARE DETERMINED TO FEED FROM THE PHYSICIAN'S OFFICE BUILDING.

AS PART OF THIS FIRST PHASE OF THE WORK, ALL POWER AND LIGHTING PANELS AND TRANSFORMERS WITHIN THE MRI ADDITION ARE TO BE REMOVED ALONG WITH ALL ASSOCIATED FEEDERS BACK TO THE SOURCE CONNECTION POINT IN THE PHYSICIAN'S OFFICE BUILDING. AT THE SOURCE PANELBOARDS AND SWITCHBOARDS WITHIN THE PHYSICIAN'S OFFICE BUILDING, TURN CIRCUIT BREAKER(S) TO THE OFF POSITION AND LABEL AS "SPARE". RESTORE CONNECTION TO EXISTING DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION. REMOVE ALL CIRCUITRY CROSSING BETWEEN BUILDINGS BACK TO THE NEXT ACTIVE OUTLET, FIXTURE, OR EQUIPMENT OR BACK TO THE SOURCE PANELBOARD IF THE CIRCUIT IS NO LONGER ACTIVE AS NOTED ABOVE.

ELECTRICAL DEVICES, FIXTURES, AND EQUIPMENT IN THE EXISTING STAIR TOWER ARE EXISTING TO REMAIN. CIRCUITS SERVING THIS AREA ARE TO BE MAINTAINED AND ADJUSTED AS REQUIRED TO KEEP THE EGRESS STAIR TOWER OPERATIONAL THROUGHOUT THE PROJECT DURATION. EXIT DISCHARGE LIGHTING AT THE STAIR EXIT SHALL BE RELOCATED AS NECESSARY TO ACCOMMODATE THE NEW DOOR LOCATION.

ALL FIRE ALARM DEVICES IN THE CONNECTOR BUILDING AND THE EXISTING STAIR TOWER SHALL BE DISCONNECTED, AND ALL WIRING SHALL BE REMOVED BACK TO THE SOURCE IN VHS BUILDING. FIRE ALARM DEVICES IN THE EXISTING STAIR TOWER SHALL BE RECONNECTED TO THE FIRE ALARM SYSTEM IN PHYSICIAN'S OFFICE BUILDING. THE EXISTING FIRE ALARM CONTROL PANEL SHALL BE ADJUSTED TO ACCOMMODATE THESE ADDITIONAL DEVICES. OTHER FIRE ALARM DEVICES IN THE CONNECTOR BUILDING SHALL BE REMOVED AS WELL AS ALL FIRE ALARM BRANCH CIRCUITRY, ELECTRICAL DEVICES AND FIXTURES, PANELBOARDS, AND FEEDERS IN THE MRI ADDITION.

ALL ELECTRICAL SERVICES TO THE EXISTING VIRGINIA HOSPITAL CENTER (BLDG 601) ARE TO BE DISCONNECTED. TEMPORARY SERVICES ARE TO BE PROVIDED AS NECESSARY TO FEED THE BLDG 601 PARKING LOT LIGHTS, FIRE ALARM SYSTEM, SECURITY SYSTEM, AND NEWLY INSTALLED LIGHTING FIXTURES.

PHASE 2 (REFER TO SEPARATE CONSTRUCTION DOCUMENTS)
THE TEMPORARY ELECTRICAL SERVICES PROVIDED IN PHASE ONE SHALL BE DISCONNECTED. ONCE THE PHYSICIAN'S OFFICE BUILDING IS FULLY ISOLATED AND THE EGRESS STAIR TOWER RENOVATION AND EGRESS PATH IS COMPLETE, THE SECOND PHASE OF THE DEMOLITION CAN PROCEED. THE SECOND PHASE OF DEMOLITION WILL INCLUDE THE COMPLETE DEMOLITION OF THE EXISTING VIRGINIA HOSPITAL CENTER (BUILDING 601), THE REMAINING PORTION OF THE CONNECTOR BUILDING.

ABBREVIATIONS

A	AMPS		
AIC	AMPERES INTERRUPTING CAPACITY		
ATS	AUTOMATIC TRANSFER SWITCH	MIN	MINIMUM
AWG	AMERICAN WIRE GAUGE	MLO	MAIN LUG ONLY
BLDG	BUILDING	MOC	MAXIMUM OVERCURRENT PROTECTION
C	CONDUIT		
CATV	CLOSED CIRCUIT TELEVISION	MTS	MANUAL TRANSFER SWITCH
CB	CIRCUIT BREAKER	N	NEUTRAL
CKT	CIRCUIT	NEC	NATIONAL ELECTRICAL CODE
CO	CARBON MONOXIDE	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
DED	DEDICATED		
DISC SW	DISCONNECT SWITCH	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
DP	DISTRIBUTION PANEL		
DWG	DRAWING	NFSS	NON FUSED SAFETY SWITCH
EA	EACH	NIC	NOT IN CONTRACT
EC	EMPTY CONDUIT	NO	NUMBER
EGC	EQUIPMENT GROUND CONDUCTOR	NTS	NOT TO SCALE
EM/NL	EMERGENCY/NIGHT LIGHT	OCPO	OVER-CURRENT PROTECTION DEVICE
EMT	ELECTRICAL METALLIC TUBING		
ENGR	ENGINEER	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
EPO	EMERGENCY POWER OFF		
EQUIP	EQUIPMENT	P	POLE
EUH	CABINET UNIT HEATER	PB	PULL BOX
EWC	ELECTRIC WATER COOLER	PC	PERSONAL COMPUTER
FA	FIRE ALARM	PH	PHASE
FAAP	FIRE ALARM ANNUNCIATOR PANEL	PNL	PANEL
FACP	FIRE ALARM CONTROL PANEL	PVC	POLYVINYL CHLORIDE
FLA	FULL LOAD AMPS	RCPT	RECEPTACLE
FLOR	FLORESCENT	RECEPT	RECEPTACLE
FPVAV	FAN POWER VAV BOX	RLA	RUN LOAD AMP
FSS	FUSED SAFETY SWITCH	RM	ROOM
G.GND.GRD.G	GROUND CONDUCTOR	RSC	RIGID STEEL CONDUIT
GAP	GRAPHIC ANNUNCIATOR PANEL	SD	SMOKE DETECTOR
GC	GENERAL CONTRACTOR	SW	SWITCH
GEC	GROUND ELECTRODE CONDUCTOR	SWB	SWITCHBOARD
GI	GROUND FAULT INTERRUPTER	SYS FURN	SYSTEM FURNITURE
HP	HORSE POWER	TEL	TELEPHONE
HWH	HOT WATER HEATER	TF	TRANSFER FAN WITH LOCAL TOGGLE SWITCH
HZ	HERTZ		
IG	ISOLATED GROUND	TYP	TYPICAL
JJB	JUNCTION BOX	UL	UNDERWRITER LABORATORIES
KVA	KILO-VOLT AMPERE	UNON	UNLESS OTHERWISE NOTED
KW	KILO-WATT	V	VOLT
LRA	LOCKED ROTOR AMPS	W	WIRE
LTG	LIGHT	W	WITH
MAX	MAXIMUM	WATT, #W	WATT
MC	METAL CLAD CABLE	WH	WATER HEATER
MCA	MINIMUM CIRCUIT AMPS	WP	WATER PROOF
MOB	MAIN CIRCUIT BREAKER	WSA	WIRE SIZE AMPS
MOC	MOTOR CONTROL CENTER	WT	WIRING TROUGH
MDP	MAIN DISTRIBUTION PANEL	XFMR	TRANSFORMER
MH	MOUNTING HEIGHT		

GENERAL NOTES

- ALL WORK IS NEW UNLESS OTHERWISE NOTED.
- SHADED REGIONS ON THE FLOOR PLANS ARE OUTSIDE THE AREA OF WORK UNLESS OTHERWISE NOTED.

ELECTRICAL LEGEND

DESIGNATION	DESCRIPTION	MTG HGT TO CENTER LINE AFF. (UN)
	FLUORESCENT LED LIGHTING FIXTURE - "UPPER CASE" INDICATES FIXTURE TYPE "LOWER CASE" (IF SHOWN) INDICATES SWITCH CONTROL	
	FLUORESCENT LED LIGHTING FIXTURE - "UPPER CASE" INDICATES FIXTURE TYPE "LOWER CASE" (IF SHOWN) INDICATES SWITCH CONTROL	
	FLUORESCENT LED EMERGENCY LIGHTING FIXTURE - "UPPER CASE" INDICATES FIXTURE TYPE	
	LED EMERGENCY EXTERIOR WALLPACK LIGHTING FIXTURE - "UPPER CASE" INDICATES FIXTURE TYPE	9'-0"
	FLUORESCENT LED LIGHTING FIXTURE - "UPPER CASE" INDICATES FIXTURE TYPE "LOWER CASE" (IF SHOWN) INDICATES SWITCH CONTROL	
	CEILING MOUNTED EXIT LIGHT SINGLE FACE/DOUBLE FACE WITH ARROWS AS INDICATED	
	SINGLE POLE SWITCH	
	DUPLEX RECEPTACLE - NEMA 5-20R	18"
	DUPLEX RECEPTACLE - NEMA 5-20R WITH INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER	18"
	DOUBLE DUPLEX RECEPTACLE - NEMA 5-20R	18"
	CEILING MOUNTED JUNCTION BOX	
	WALL MOUNTED JUNCTION BOX	
	CARD READER - PROVIDE 4" SQUARE BOX AND STUB OUT 3/4" x 6" INTO CEILING SPACE. PROVIDE MATCHING OUTLET FOR PUSH EXIT BUTTON AS REQUIRED.	4'-0"
	TRANSFORMER	
	GROUND	
	PANELBOARD 120/208V SYSTEM	6'-0" TO TOP
	PANELBOARD 277/480V SYSTEM	6'-0" TO TOP
	MOTOR CONNECTION	
	NON-FUSED SAFETY DISCONNECT SWITCH - NUMERAL DENOTES SWITCH SIZE - 3 POLE UNON	5'-0" TO TOP
	FUSED SAFETY DISCONNECT SWITCH - UPPER NUMERAL DENOTES SWITCH SIZE, LOWER NUMERAL DENOTES FUSE SIZE - 3 POLE UNON	5'-0" TO TOP
	HOMERUN TO PANELBOARD - NO. OF ARROWHEADS INDICATE NO. OF CIRCUITS. NUMERALS & LETTERS ADJACENT TO ARROWHEADS INDICATE ASSIGNED PANEL & CIRCUIT NO. S	
	TICK MARKS IN HOMERUN OR BRANCH CIRCUITRY. UNLESS OTHERWISE SCHEDULED, INDICATE THE QUANTITY (WHERE MORE THAN TWO) OF CURRENT CARRYING CONDUCTORS. NUMERAL ADJACENT TO TICKS INDICATES WIRE SIZE IF OTHER THAN #12. ALL WIRING SHALL ALSO CONTAIN AN INSULATED EQUIPMENT GROUND CONDUCTOR SIZED PER NEC. (NOT SHOWN)	
	GENERAL CIRCUITRY	
	CIRCUITRY INSTALLED CONCEALED IN OR BELOW FLOOR SLAB	
	DENOTES PLAN SPECIFIC NOTE	
	METER	
	EXISTING TO REMAIN - CONTINUE IN SERVICE	
	REMOVE EXISTING AND RELOCATE	
	RELOCATED EQUIPMENT	
	REMOVE WITH ALL CIRCUITRY THERETO	

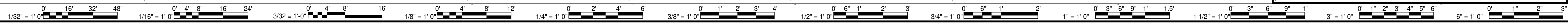
DRAWING LIST

1-E-001	COVER SHEET - ELECTRICAL
1-E-101	SITE PLAN - ELECTRICAL
1-E-102	FOURTH FLOOR DEMOLITION & NEW WORK - ELECTRICAL
1-E-103	FIFTH FLOOR DEMOLITION & NEW WORK - ELECTRICAL
1-E-104	FOURTH & FIFTH FLOOR NEW WORK - FIRE ALARM
1-E-701	DETAILS & SCHEDULES



PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
ARLINGTON, VA
601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204.
DRAWING COVER SHEET - ELECTRICAL

SHEET
1-E-001





GENERAL NOTES - ELECTRICAL

1. REFER TO ELECTRICAL COVER SHEET FOR SPECIFICATIONS, GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

KEYED NOTES - ELECTRICAL

1. TO BE REMOVED FROM SERVICE: DOMINION ENERGY UTILITY TRANSFORMER FEEDING THE VIRGINIA HOSPITAL CENTER (BLDG 601). OWNER SHALL APPLY FOR AND OBTAIN UTILITY DISCONNECT LETTERS.

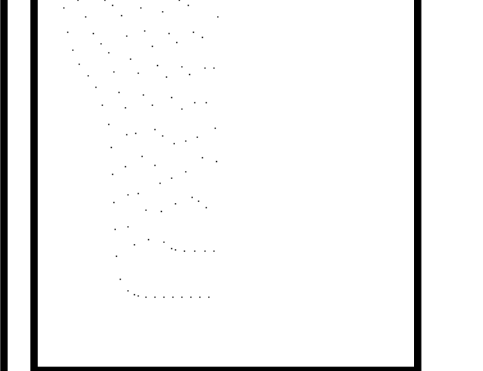
2. EXISTING TO REMAIN: DOMINION ENERGY UTILITY TRANSFORMER FEEDING THE DOCTOR'S OFFICE BUILDING (BLDG 611).

3. DIESEL GENERATOR FEEDING THE VIRGINIA HOSPITAL CENTER (BLDG 601). REMOVE FROM SERVICE. REPROGRAM FIRE ALARM SYSTEM TO PREVENT SUPERVISORY AND TROUBLE SIGNALS FROM GENERATOR DISCONNECTION.

CD Revisions	BY	DES
5/15/2020	GTH	
1		

DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	GTH	GTH	GTH

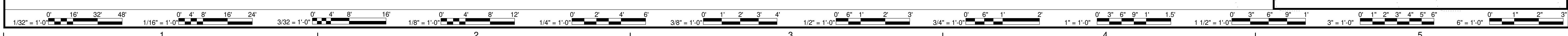
RRMM ARCHITECTS, PC
 2900 South Quincy Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101



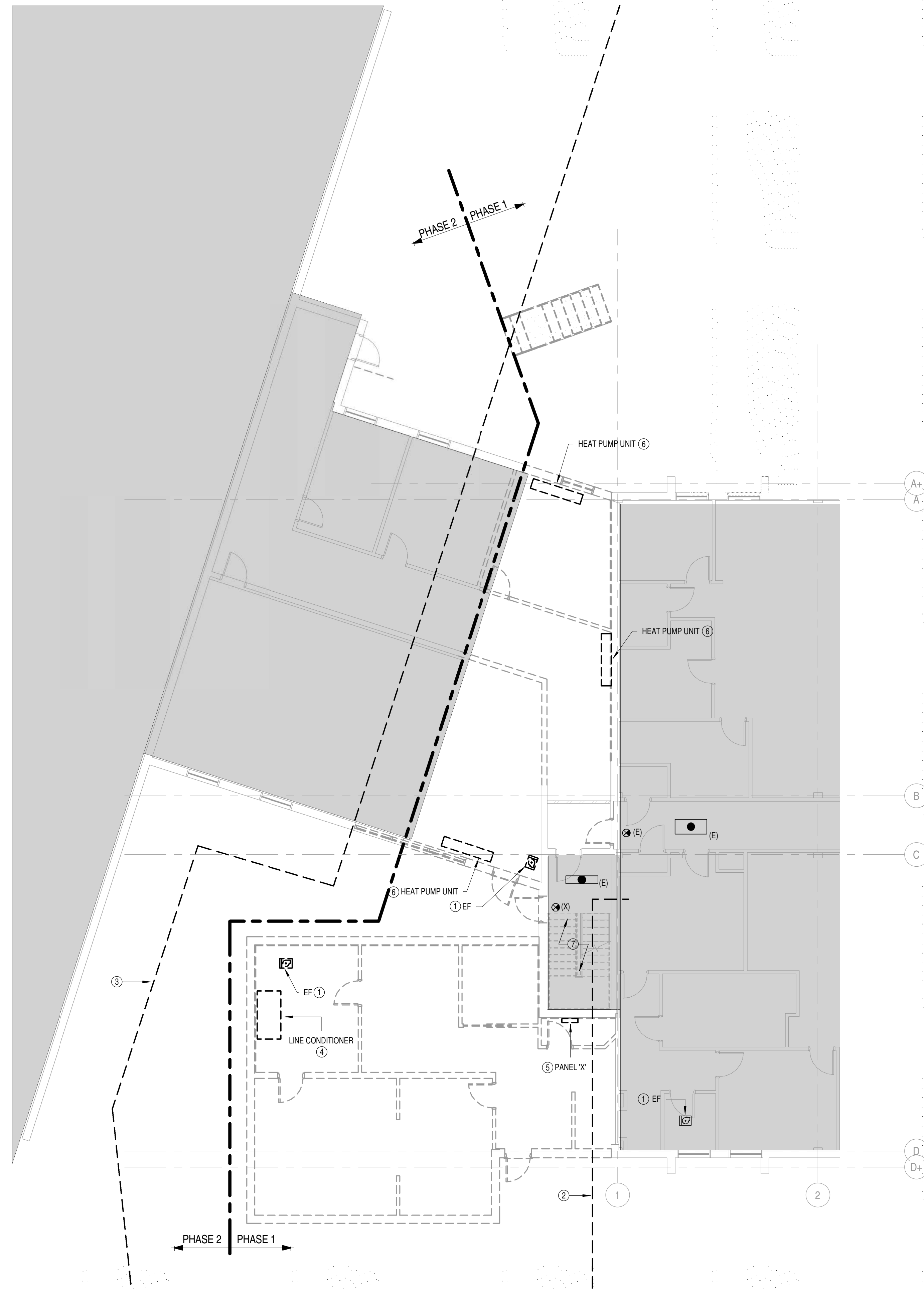
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 2
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 DRAWING SITE PLAN - ELECTRICAL

GPI
 Greenman-Pedersen, Inc.
 Engineering and Construction Services
 8001 Braddock Road, Suite 200, Springfield, VA 22151
 703-978-0100 www.gpinet.com
 Project #: 2019322.00

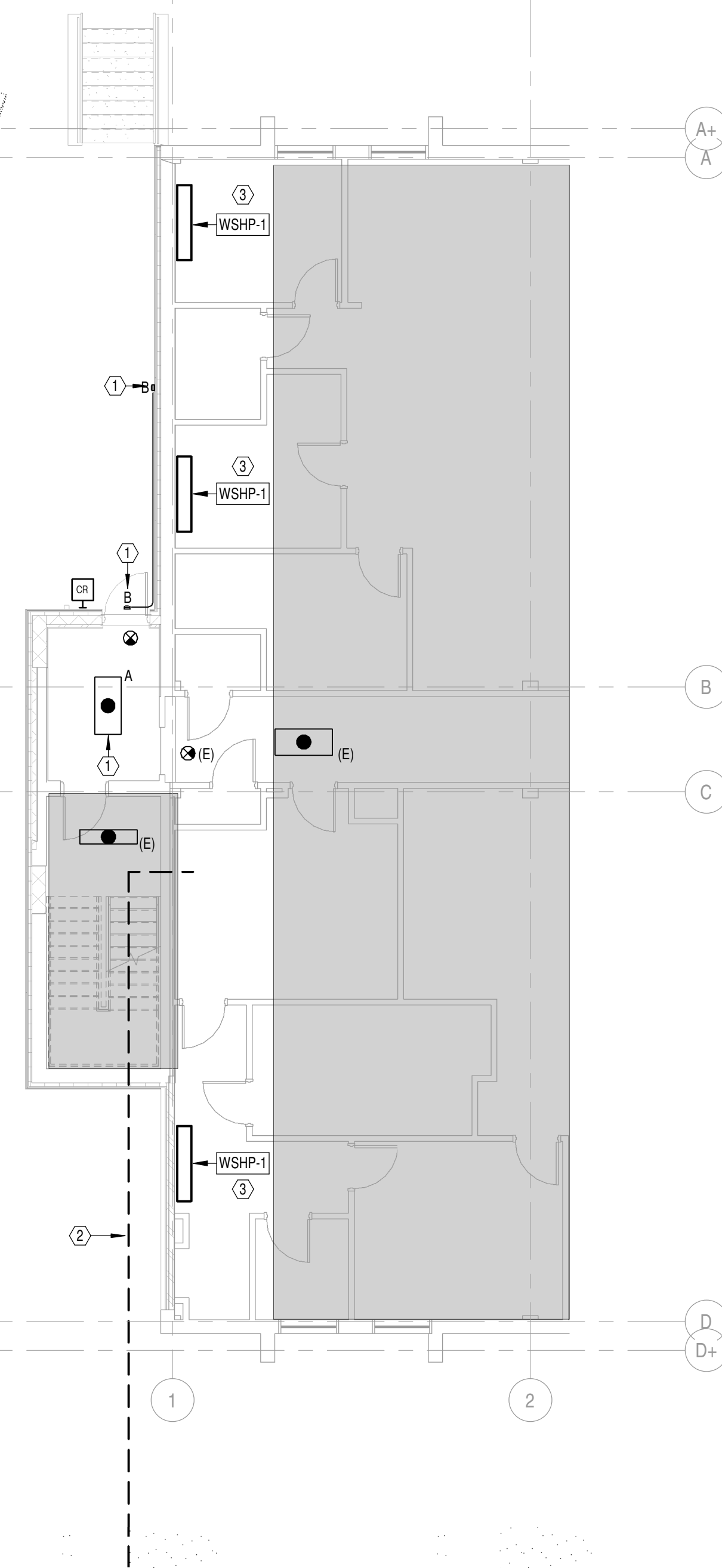
Electrical Site Plan
 SCALE: 1" = 24'



C:\Users\inguyen\Documents\201932200_v20 - Electrical_in\inguyenR1832E.rvt 12/29/2020 4:43:12 PM



1 FOURTH FLOOR - DEMOLITION - ELECTRICAL
 -E-102 SCALE: 1/8" = 1'-0"



2 FOURTH FLOOR - NEW WORK - ELECTRICAL
 -E-102 SCALE: 1/8" = 1'-0"

GENERAL NOTES - DEMOLITION

- REFER TO ELECTRICAL COVER SHEET FOR SPECIFICATIONS, GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. REFER TO FIRE ALARM NEW WORK PLAN FOR FIRE ALARM SYMBOLS.
- REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR EXACT LOCATIONS FOR ALL RELATED/DEMOLISHED EQUIPMENT.
- PROVIDE COMPLETE ELECTRICAL DEMOLITION IN THE AREA OF WORK UNLESS OTHERWISE NOTED SO AS TO ELECTRICALLY ISOLATE EXISTING TO REMAIN BUILDING PORTIONS.
- PROTECT EXISTING EMERGENCY LIGHTS, EXIT SIGNS AND FIRE ALARM DEVICES EXCEPT WHERE DEMOLITION IS NEEDED.
- DEMOLITION WORK INDICATED IS DIAGRAMMATIC AND NOT SHOWN INCLUSIVE. DEMOLITION DRAWING IS INTENDED TO DEMONSTRATE MAJOR ITEMS ONLY. CONTRACTOR IS REQUIRED TO PERFORM SELECTIVE DEMOLITION AS NEEDED TO ACCOMPLISH THE PROJECT INTENT. IF DEMOLITION WORK IS UNCLEAR FOR ANY ITEM, THE CONTRACTOR SHALL BRING IT TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR RESOLUTION BEFORE PROCEEDING.
- REMOVE ALL ABANDONED WIRING BACK TO THE PANEL/SOURCE AS APPLICABLE.
- COORDINATE WITH OWNERS/BUILDING ENGINEERS PRIOR TO SCHEDULING ANY SHUTDOWN REQUIRED DURING CONSTRUCTION.
- DISCONNECT AND REMOVE ALL (NOT SHOWN) LIGHTING FIXTURES AND ASSOCIATED CONTROLS IN AREA OF WORK UNLESS OTHERWISE NOTED. REMOVE WIRING FROM FIXTURE/DEVICE LOCATION BACK TO NEXT ACTIVE OUTLET (OR BACK TO SOURCE PANELBOARD IF CIRCUIT IS NO LONGER ACTIVE. AT PANELBOARD, TURN CIRCUIT BREAKER(S) TO THE OFF POSITION AND LABEL AS "SPARE". RESTORE CONNECTION TO EXISTING FIXTURES/DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
- DISCONNECT AND REMOVE ALL (NOT SHOWN) EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS IN AREA OF WORK UNLESS OTHERWISE NOTED. SAFELY TERMINATE EMERGENCY LIGHTING CIRCUITRY ABOVE CEILING FOR REUSE. RESTORE CONNECTION TO EXISTING EMERGENCY FIXTURES AND EXIT SIGNS FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
- DISCONNECT AND REMOVE ALL (NOT SHOWN) FIRE ALARM DEVICES IN AREA OF WORK UNLESS OTHERWISE NOTED. SAFELY TERMINATE FA CIRCUITRY ABOVE CEILING FOR REUSE. COORDINATE REMOVAL OF FIRE ALARM WIRING WITH BUILDING ENGINEER BEFORE PROCEEDING WITH DEMOLITION.
- DISCONNECT AND REMOVE ALL (NOT SHOWN) RECEPTACLES, POKE-THRU DEVICES, SYSTEMS FURNITURE POWER/DATA FEEDS, AND CABLE TRAY SYSTEMS IN AREA OF WORK UNLESS OTHERWISE NOTED. REMOVE CIRCUITRY FROM DEVICE LOCATION BACK TO NEXT ACTIVE OUTLET (OR BACK TO SOURCE PANELBOARD IF CIRCUIT IS NO LONGER ACTIVE. AT PANELBOARD, TURN CIRCUIT BREAKER(S) TO THE OFF POSITION AND LABEL AS "SPARE". RESTORE CONNECTION TO EXISTING DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
- DISCONNECT AND REMOVE ALL (NOT SHOWN) TELEPHONE/DATA OUTLETS AND SECURITY DEVICES IN AREA OF WORK UNLESS OTHERWISE NOTED.

KEYED NOTES - DEMOLITION

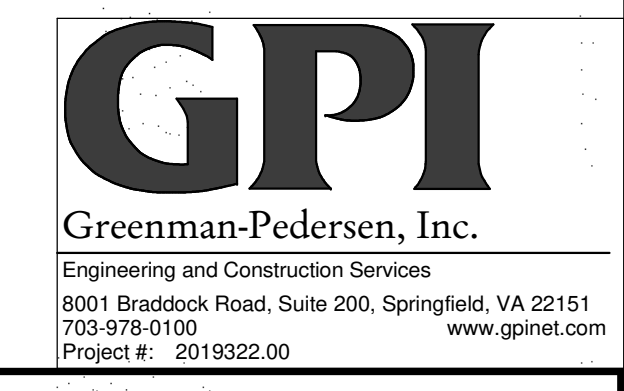
- REMOVAL: DISCONNECT POWER AND REMOVE ASSOCIATED SAFETY DISCONNECT FROM MECHANICAL AND PLUMBING EQUIPMENT AS SHOWN ON PLAN, UNLESS OTHERWISE NOTED. REMOVE EXISTING WIRING FROM UNIT LOCATIONS BACK TO SOURCE PANELBOARD. TURN CIRCUIT BREAKER(S) TO THE OFF POSITION, AND LABEL BREAKER(S) AS "SPARE". RESTORE CONNECTION TO EXISTING DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
- EXISTING TO REMAIN CONCRETE ENCASED 16-WAY DUCTBANK BENEATH MRI BUILDING AND STAIRWELL.
- UNDERGROUND ELECTRICAL PRIMARY CONDUIT AND CONDUCTORS SERVING THE ADJACENT BLDG 601. COORDINATE ELECTRICAL UTILITY DISCONNECTION FOR BLDG 601 PRIOR TO ANY DEMOLITION WORK.
- DISCONNECT POWER FOR LINE CONDITIONER CIRCUIT AT THE MAIN SWITCHBOARD AND LABEL BREAKER AS "SPARE". REMOVE ASSOCIATED SAFETY DISCONNECT AND CIRCUITRY FOR THE LINE CONDITIONER BACK TO THE TRANSFORMER SECONDARY DISCONNECT IN THE MAIN ELECTRICAL ROOM ON THE THIRD FLOOR.
- DISCONNECT POWER FOR EXISTING PANEL X AT THE MAIN SWITCHBOARD LABEL AS BREAKER AS "SPARE". REMOVE PANEL AND REMOVE CIRCUITRY BACK TO THE METER IN THE MAIN ELECTRICAL ROOM ON THE THIRD FLOOR.
- DISCONNECT POWER AND REMOVE ASSOCIATED SAFETY DISCONNECT FROM EXISTING WATER SOURCE HEAT PUMP (208V/1PH, 4.8 FLA). SAFELY TERMINATE CIRCUITRY ABOVE THE FIFTH FLOOR CEILING WITHIN BLDG 611 FOR REUSE. RESTORE CONNECTION TO EXISTING DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
- FIRE ALARM DEVICES IN THE STAIRWELL ARE CURRENTLY FED FROM THE BLDG 601 FIRE ALARM SYSTEM AND SHALL BE PREPARED FOR RECONNECTION TO THE BLDG 611 FIRE ALARM SYSTEM, UNLESS OTHERWISE NOTED. DISCONNECT ALL FIRE ALARM DEVICES AND REMOVE CIRCUITRY BACK TO NEXT ACTIVE DEVICE IN BLDG 601.

GENERAL NOTES - NEW WORK

- REFER TO ELECTRICAL COVER SHEET FOR SPECIFICATIONS, GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
- REFER TO ELECTRICAL DETAIL SHEET FOR LIGHTING FIXTURE SCHEDULE AND ADDITIONAL INFORMATION.
- COORDINATE ALL HVAC EQUIPMENT CONNECTION REQUIREMENTS WITH THE MANUFACTURER PRIOR TO ORDERING AND ROUGH-IN.

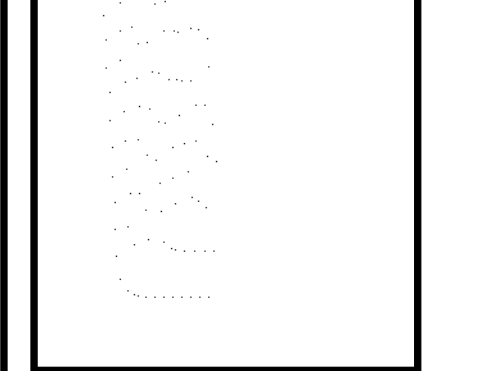
KEYED NOTES - NEW WORK

- CONNECT NEW OR RELOCATED EMERGENCY LIGHTS & EXIT SIGNS TO EXISTING 277V EMERGENCY LIGHTING CIRCUIT PREVIOUSLY FEEDING THIS AREA, LOCATED IN (E) EMERGENCY PANEL "E". PANEL DIRECTORY DOES NOT CHANGE UNDER THIS WORK. CIRCUIT SHALL NOT EXCEED 350VA.
- EXISTING TO REMAIN CONCRETE ENCASED 16-WAY DUCTBANK BENEATH MRI BUILDING AND STAIRWELL.
- SPLICE AND EXTEND EXISTING WATER SOURCE HEAT PUMP CIRCUITRY TO NEW WATER SOURCE HEAT PUMP (208V/1PH, 4.1 FLA). PROVIDE NEMA RECEPTACLE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING THE ELECTRICAL ACCESSORIES FURNISHED WITH UNIT INSIDE THE UNIT CABINET. COORDINATE INSTALLATION WITH THE MECHANICAL CONTRACTOR AND THE MANUFACTURER'S INSTRUCTIONS PRIOR TO PROCEEDING WITH WORK.



CD Revisions	
DATE	BY
5.15.2020	GTH
12.11.2020	GTH
13356.28	GTH

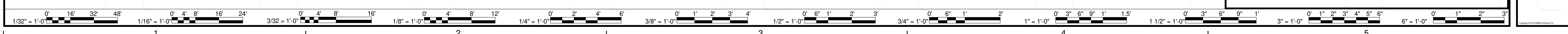
DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	GTH	GTH	GTH



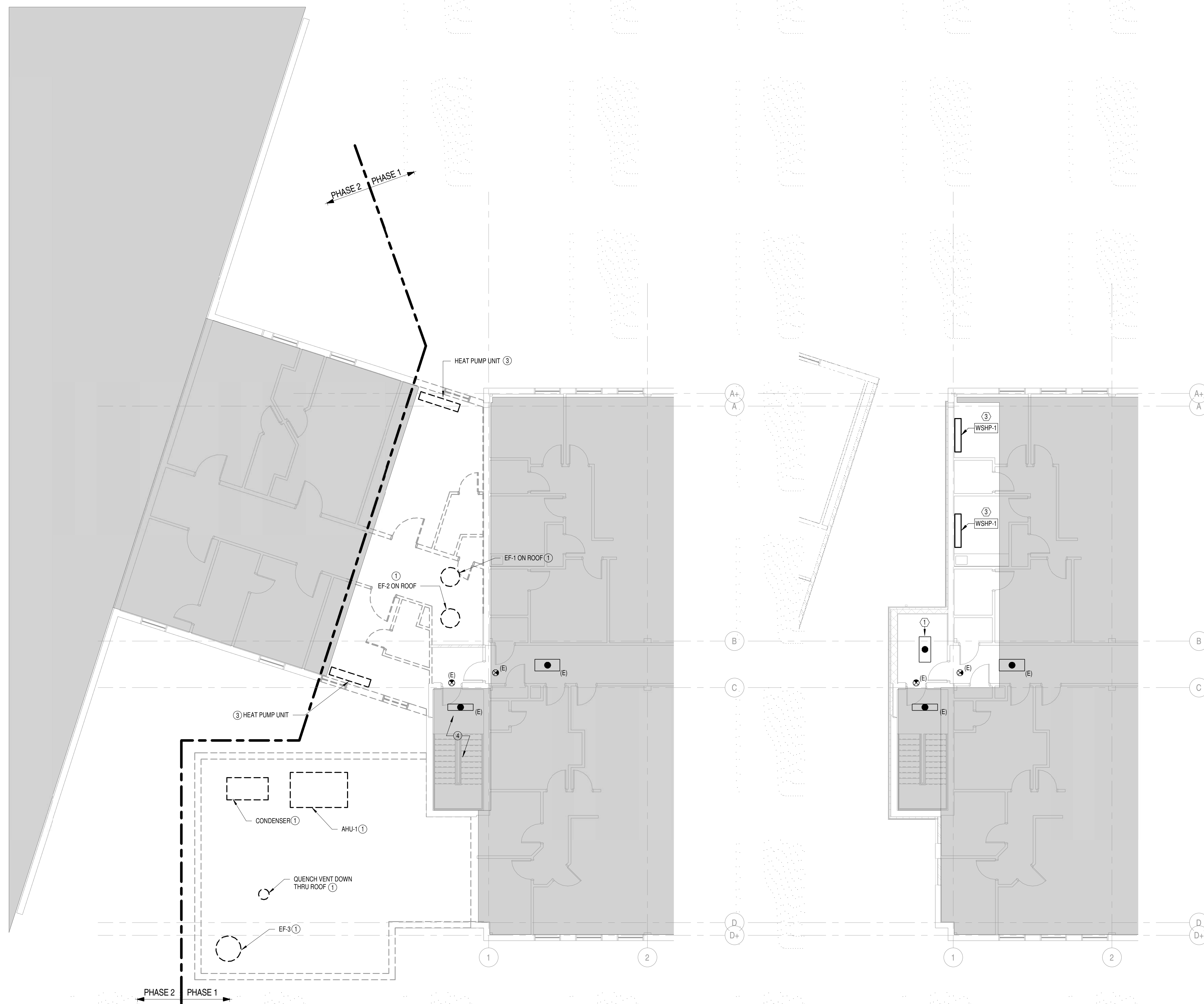
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204.
 DRAWING FOURTH FLOOR DEMOLITION & NEW WORK - ELECTRICAL

PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204.
 DRAWING FOURTH FLOOR DEMOLITION & NEW WORK - ELECTRICAL

SHEET
1-E-102



C:\Users\jnguyen\Documents\2019\22200_v20 - Electrical\jnguyenR532E.rvt 12/29/2020 4:43:20 PM



1 FIFTH FLOOR - DEMOLITION - ELECTRICAL
 E-103 SCALE: 1/8" = 1'-0"

2 FIFTH FLOOR - NEW WORK - ELECTRICAL
 E-103 SCALE: 1/8" = 1'-0"

- ### GENERAL NOTES - DEMOLITION
- REFER TO ELECTRICAL COVER SHEET FOR SPECIFICATIONS, GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. REFER TO FIRE ALARM NEW WORK PLAN FOR FIRE ALARM SYMBOLS.
 - REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR EXACT LOCATIONS FOR ALL RELOCATED/DEMOLISHED EQUIPMENT.
 - PROVIDE COMPLETE ELECTRICAL DEMOLITION IN THE AREA OF WORK UNLESS OTHERWISE NOTED SO AS TO ELECTRICALLY ISOLATE EXISTING TO REMAIN BUILDING PORTIONS.
 - PROTECT EXISTING EMERGENCY LIGHTS, EXIT SIGNS AND FIRE ALARM DEVICES EXCEPT WHERE DEMOLITION IS NEEDED.
 - DEMOLITION WORK INDICATED IS DIAGRAMATIC AND NOT SHOWN INCLUSIVE. DEMOLITION DRAWING IS INTENDED TO DEMONSTRATE MAJOR ITEMS ONLY. CONTRACTOR IS REQUIRED TO PERFORM SELECTIVE DEMOLITION AS NEEDED TO ACCOMPLISH THE PROJECT INTENT. IF DEMOLITION WORK IS UNCLEAR FOR ANY ITEM, THE CONTRACTOR SHALL BRING IT TO THE ATTENTION OF THE ARCHITECT/ENGINEER FOR RESOLUTION BEFORE PROCEEDING.
 - REMOVE ALL ABANDONED WIRING BACK TO THE PANEL/SOURCE AS APPLICABLE.
 - COORDINATE WITH OWNERS/BUILDING ENGINEERS PRIOR TO SCHEDULING ANY SHUTDOWN REQUIRED DURING CONSTRUCTION.
 - DISCONNECT AND REMOVE ALL (NOT SHOWN) LIGHTING FIXTURES AND ASSOCIATED CONTROLS IN AREA OF WORK UNLESS OTHERWISE NOTED. REMOVE WIRING FROM FIXTURE/DEVICE LOCATION BACK TO NEXT ACTIVE OUTLET (OR BACK TO SOURCE PANELBOARD IF CIRCUIT IS NO LONGER ACTIVE. AT PANELBOARD, TURN CIRCUIT BREAKER(S) TO THE OFF POSITION AND LABEL AS "SPARE". RESTORE CONNECTION TO EXISTING FIXTURES/DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
 - DISCONNECT AND REMOVE ALL (NOT SHOWN) EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS IN AREA OF WORK UNLESS OTHERWISE NOTED. SAFELY TERMINATE EMERGENCY LIGHTING CIRCUITRY ABOVE CEILING FOR REUSE. RESTORE CONNECTION TO EXISTING EMERGENCY FIXTURES AND EXIT SIGNS FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
 - DISCONNECT AND REMOVE ALL (NOT SHOWN) FIRE ALARM DEVICES IN AREA OF WORK UNLESS OTHERWISE NOTED. SAFELY TERMINATE FA CIRCUITRY ABOVE CEILING FOR REUSE. COORDINATE REMOVAL OF FIRE ALARM WIRING WITH BUILDING ENGINEER BEFORE PROCEEDING WITH DEMOLITION.
 - DISCONNECT AND REMOVE ALL (NOT SHOWN) RECEPTACLES, POKE-THRU DEVICES, SYSTEMS FURNITURE POWER/DATA FEEDS, AND CABLE TRAY SYSTEMS IN AREA OF WORK UNLESS OTHERWISE NOTED. REMOVE CIRCUITRY FROM DEVICE LOCATION BACK TO NEXT ACTIVE OUTLET (OR BACK TO SOURCE PANELBOARD IF CIRCUIT IS NO LONGER ACTIVE. AT PANELBOARD, TURN CIRCUIT BREAKER(S) TO THE OFF POSITION AND LABEL AS "SPARE". RESTORE CONNECTION TO EXISTING DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
 - DISCONNECT AND REMOVE ALL (NOT SHOWN) TELEPHONE/DATA OUTLETS AND SECURITY DEVICES IN AREA OF WORK UNLESS OTHERWISE NOTED.

- ### KEYED NOTES - DEMOLITION
- REMOVAL, DISCONNECT POWER AND REMOVE ASSOCIATED SAFETY DISCONNECT FROM MECHANICAL AND PLUMBING EQUIPMENT AS SHOWN ON PLAN, UNLESS OTHERWISE NOTED. REMOVE EXISTING WIRING FROM UNIT LOCATIONS BACK TO SOURCE PANELBOARD, TURN CIRCUIT BREAKER(S) TO THE OFF POSITION, AND LABEL BREAKER(S) AS "SPARE". RESTORE CONNECTION TO EXISTING DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
 - NOT USED.
 - DISCONNECT POWER AND REMOVE ASSOCIATED SAFETY DISCONNECT FROM EXISTING WATER SOURCE HEAT PUMP (208V/1PH, 4.8 FLA). SAFELY TERMINATE CIRCUITRY ABOVE THE FIFTH FLOOR CEILING WITHIN BLDG 611 FOR REUSE. RESTORE CONNECTION TO EXISTING DEVICES FOR OPERATION AS BEFORE IF INTERRUPTED BY DEMOLITION.
 - FIRE ALARM DEVICES IN THE STAIRWELL ARE CURRENTLY FED FROM THE BLDG 601 FIRE ALARM SYSTEM AND SHALL BE PREPARED FOR RECONNECTION TO THE BLDG 611 FIRE ALARM SYSTEM, UNLESS OTHERWISE NOTED. DISCONNECT ALL FIRE ALARM DEVICES AND REMOVE CIRCUITRY BACK TO NEXT ACTIVE DEVICE IN BLDG 601.

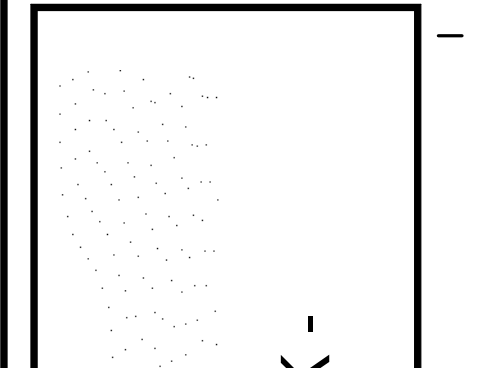
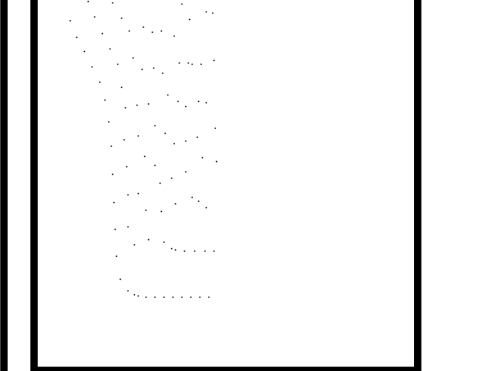
- ### GENERAL NOTES - NEW WORK
- REFER TO ELECTRICAL COVER SHEET FOR SPECIFICATIONS, GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
 - REFER TO ELECTRICAL DETAIL SHEET FOR LIGHTING FIXTURE AND OCCUPANCY SENSOR SCHEDULES AND ADDITIONAL INFORMATION.
 - COORDINATE ALL HVAC EQUIPMENT CONNECTION REQUIREMENTS WITH THE MANUFACTURER PRIOR TO ORDERING AND ROUGH-IN.

- ### KEYED NOTES - NEW WORK
- CONNECT NEW OR RELOCATED EMERGENCY LIGHTS & EXIT SIGNS TO EXISTING 277V EMERGENCY LIGHTING CIRCUIT PREVIOUSLY FEEDING THIS AREA. LOCATED IN (E) EMERGENCY PANEL "E". PANEL DIRECTORY DOES NOT CHANGE UNDER THIS WORK. CIRCUIT SHALL NOT EXCEED 3500VA.
 - NOT USED.
 - SPLICE AND EXTEND EXISTING WATER SOURCE HEAT PUMP CIRCUITRY TO NEW WATER SOURCE HEAT PUMP (208V/1PH, 4.1 FLA). PROVIDE NEMA RECEPTACLE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLING THE ELECTRICAL ACCESSORIES FURNISHED WITH UNIT INSIDE THE UNIT CABINET. COORDINATE INSTALLATION WITH THE MECHANICAL CONTRACTOR AND THE MANUFACTURER'S INSTRUCTIONS PRIOR TO PROCEEDING WITH WORK.



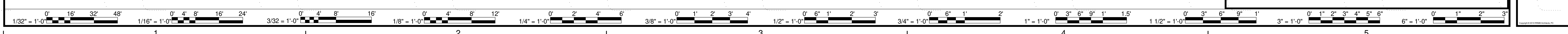
DATE	PROJECT	DESIGNED	DRAWN	CHECKED	DATE	BY	REVISIONS
12.11.2020	13356.28	GTH	GTH	GTH	5.15.2020	GTH	DES

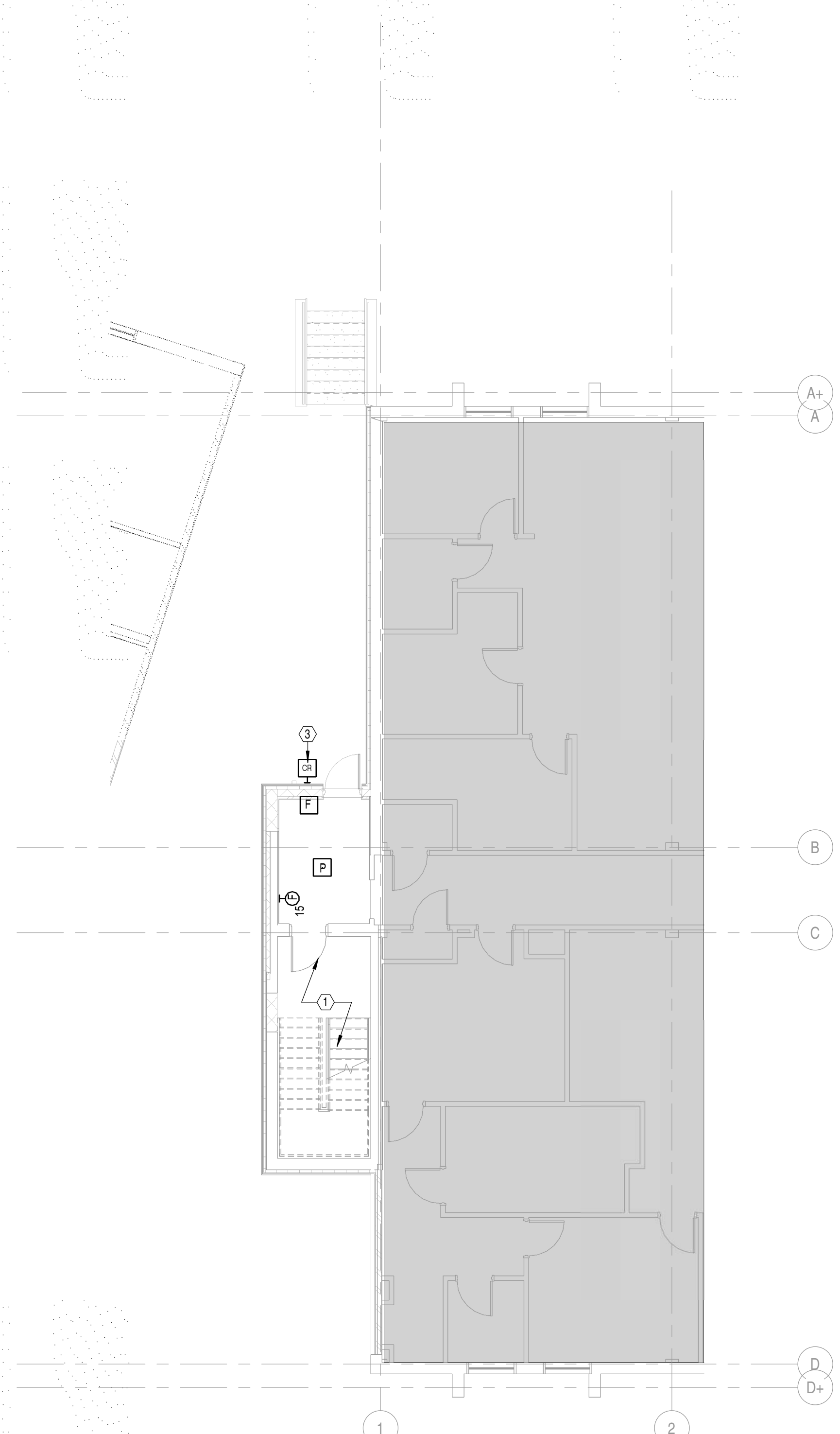
DATE	PROJECT	DESIGNED	DRAWN	CHECKED	DATE	BY	REVISIONS
12.11.2020	13356.28	GTH	GTH	GTH	5.15.2020	GTH	DES



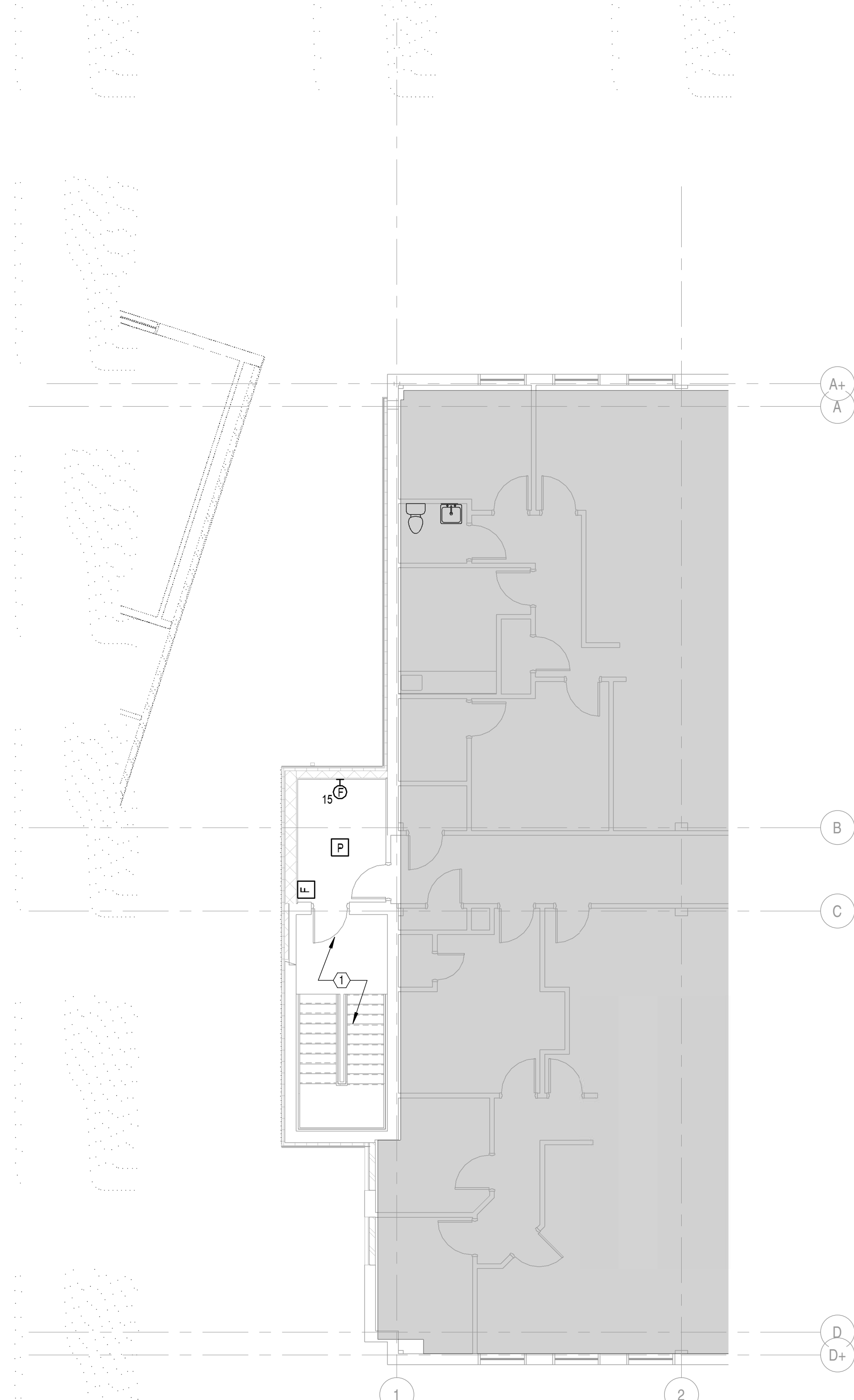
PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204,
 DRAWING FIFTH FLOOR DEMOLITION & NEW WORK - ELECTRICAL

SHEET
1-E-103





1 FOURTH FLOOR - NEW WORK - FIRE ALARM
 1-E-104 SCALE: 1/8" = 1'-0"



2 FIFTH FLOOR - NEW WORK - FIRE ALARM
 1-E-104 SCALE: 1/8" = 1'-0"

GENERAL NOTES - FIRE ALARM

- REFER TO ELECTRICAL COVER SHEET FOR SPECIFICATIONS, GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FIRE ALARM WORK INCLUDING BUT NOT LIMITED TO: ADDITION OF STROBES, AUDIBLE DEVICES, CIRCUITRY EXTENSION, AND SYSTEM PROGRAM MODIFICATIONS. FURNISH AND INSTALL ALL NECESSARY CONTROL EQUIPMENT INCLUDING EXTENDER PANEL, INITIATING DEVICES AND NOTIFICATION APPLIANCES REQUIRED FOR THE EXPANSION OF THE EXISTING FIRE ALARM SYSTEMS DETAILED ON THE CONTRACT DRAWINGS AND AS SPECIFIED HEREIN. THE EQUIPMENT FURNISHED SHALL BE COMPATIBLE WITH THE EXISTING EQUIPMENT. THE CONTRACTOR SHALL SURVEY THE EXISTING CONTROL PANEL TO DETERMINE ANY NECESSARY MODIFICATIONS AND/OR ADDITIONS NECESSARY TO INCORPORATE THE DEVICES ADDED UNDER THIS CONTRACT. PROVIDE SYNCHRONIZING OF STROBES FOR ALL EXISTING, NEW & RELOCATED DEVICES WITHIN THE AREA OF WORK. SYNCHRONIZATION OF STROBES SHALL BE PER NFPA72 REQUIREMENTS. IN THE EVENT OF A BUILDING EVACUATION ALARM, PROVIDE CONTROL WIRING FROM THE BUILDING FACP TO ALL SECURED DOORS IN THE PATH OF EGRESS TO RELEASE THE LOCK. COORDINATE WORK WITH THE SECURITY CONTRACTOR. PROVIDE REQUIRED DRY CONTACTS IN BUILDING FACP. SHOP DRAWINGS SHALL BE PREPARED AND SUBMITTED TO THE LOCAL AUTHORITY AND SHALL INCLUDE, BUT NOT LIMITED TO EQUIPMENT CUT SHEET, SEQUENCE OF OPERATION, BATTERY CALCULATIONS, CIRCUIT CAPACITY CALCULATIONS, WIRING DIAGRAMS, RISER DIAGRAMS AND FLOOR PLANS.
- PROVIDE ALL VISUAL AND AUDIBLE DEVICES (SPEAKER OR HORNS) IN WHITE COLOR W/ RED LETTERING UNLESS OTHERWISE NOTED. INSTALL ALL CEILING MOUNTED FIRE ALARM DEVICES IN THE CENTER OF CEILING TILE.
- PROTECT EXISTING BUILDING SMOKE/FIRE DETECTION SYSTEM AS REQUIRED TO PREVENT FALSE ALARMS DUE TO CONSTRUCTIONS.
- ALL FIRE ALARM EQUIPMENT SHALL BE REMAIN OPERATIONAL AND IN PLACE AS THE BUILD OUT OCCURS.
- IF THE CONSTRUCTION REQUIRES INTERRUPTION OF THE BUILDING FIRE ALARM, OBTAIN WRITTEN 7-DAY NOTICE FROM THE BUILDING OWNER PRIOR TO THE INTERRUPTION. FOLLOW ALL RULES AND REGULATIONS PROVIDED BY THE BUILDING OWNER AND ALL CODE REQUIREMENTS FOR A FIRE ALARM INTERRUPTION.
- FINAL CONNECTION TO BUILDING FIRE ALARM SYSTEM SHALL BE PERFORMED BY BASE BUILDING FIRE ALARM CONTRACTOR BUT SHALL BE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- THE SYSTEM SHALL COMPLY WITH NFPA 72.

KEYED NOTES - FIRE ALARM

- RECONNECT EXISTING FIRE ALARM DEVICES IN STAIRWELL TO BLDG 611 FIRE ALARM SYSTEM. VERIFY OPERATIONAL STATUS OF DEVICES AND REPLACE DEFECTIVE DEVICES. PROVIDE UPDATED GRAPHIC ANNUNCIATOR PANEL AS REQUIRED.
- NOT USED.
- CARD READERS/MAG LOCKS: PROVIDE CONTROL WIRING FROM SECURITY SYSTEM TO CONNECT TO BASE BUILDING FIRE ALARM SYSTEM FOR RELEASE OF DOORS UPON SIGNAL FROM BASE BUILDING FIRE ALARM SYSTEM.

FIRE ALARM SYMBOLS

DESIGNATION	DESCRIPTION	MTG HGT TO AFF CENTERLINE (UGN)
15-1	FIRE ALARM VISUAL ALARM SIGNAL MOUNTED AT LOWER OF 80" OR 6" BELOW CEILING - NUMBER ADJACENT TO SYMBOL DENOTES MINIMUM REQUIRED LIGHT OUTPUT, CANDELA	4'-0"
15-1	FIRE ALARM COMBINATION AUDIBLE/VISUAL ALARM SIGNAL - MOUNTED AT LOWER OF 80" OR 6" BELOW CEILING. NUMBER ADJACENT TO SYMBOL DENOTES MINIMUM REQUIRED LIGHT OUTPUT, CANDELA	
15-2	CEILING FIRE ALARM VISUAL ALARM SIGNAL. NUMBER ADJACENT TO SYMBOL DENOTES MINIMUM REQUIRED LIGHT OUTPUT, CANDELA	
15-3	CEILING FIRE ALARM COMBINATION AUDIBLE/VISUAL ALARM SIGNAL. NUMBER ADJACENT TO SYMBOL DENOTES MINIMUM REQUIRED LIGHT OUTPUT, CANDELA	
F	FIRE ALARM MANUAL STATION	
(K)	DENOTES PLAN SPECIFIC KEYED NOTE	
(E)	EXISTING TO REMAIN - CONTINUE IN SERVICE	
(R)	EXISTING TO BE REMOVED AND RELOCATED	
(RE)	RELOCATED EQUIPMENT	
P	CEILING MOUNTED PHOTOELECTRIC SMOKE DETECTOR - SUBSCRIPT D DENOTES DUCT DETECTOR	

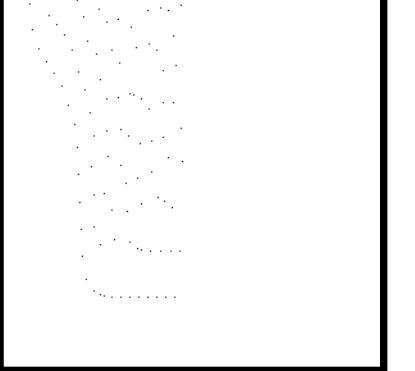
GPI
 Greenman-Pedersen, Inc.
 Engineering and Construction Services
 8001 Braddock Road, Suite 200, Springfield, VA 22151
 703-978-0100 www.gpinet.com
 Project #: 2019322.00

CD Revisions

5.15.2020	GTH	BY	DES
1	MARK	DATE	REVISIONS

DATE	PROJECT	DESIGNED	DRAWN	CHECKED
12.11.2020	13356.28	GTH	GTH	GTH

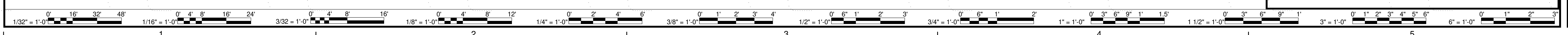
RRMM ARCHITECTS, PC
 2900 South Quincy Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101



PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204.
 DRAWING FOURTH & FIFTH FLOOR NEW WORK - FIRE ALARM

SHEET
1-E-104

12/9/2020 4:43:23 PM C:\Users\jnguyen\Documents\201932200 v20 - Electrical_jnguyenR532E.rvt



1 1 2 3 4 5

D

C

B

A

LIGHTING FIXTURE SCHEDULE									
FIXTURE ID	DESCRIPTION	MANUFACTURER	CATALOG NO.	LAMP		VOLTS	MOUNTING	DIMMING (YES OR NO)	KEYED NOTES
				QUANTITY	TYPE				
A	2'X4' VOLUMETRIC LED TROFFER	ELITE	24-0VHP-LED-400L-DIM10-MVOLT-35K-85	-	LED-41W	120/277	RECESSED	NO	
B	EXTERIOR LED WALLPACK	LITHONIA	LIL LED 30K MVOLT PE BB DDBTXD	-	LED-8.4W	120/277	SURFACE	NO	2
X	EXIT SIGN	LITHONIA	LRP-X-X-RC-X-120/277	-	LED (INCLUDED)	120/277	RECESSED	NO	1

GENERAL NOTES

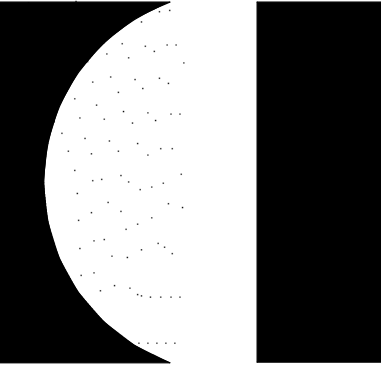
- COORDINATE MOUNTING HEIGHT (PENDANT/SUSPENDED/WALL LUMINARIES) & LENGTH (LINEAR FLUORESCENT/LED LUMINARIES) WITH ARCHITECT.
- PROVIDE LAMP(S) AT 80 CRI OR BETTER. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL LAMP COLOR TEMPERATURE.

KEYED NOTES

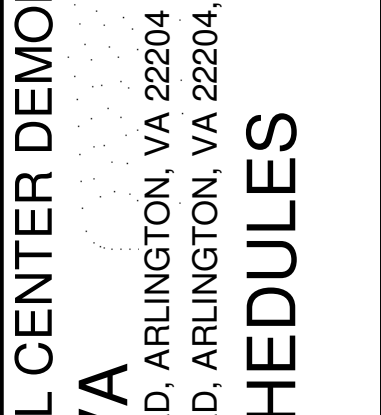
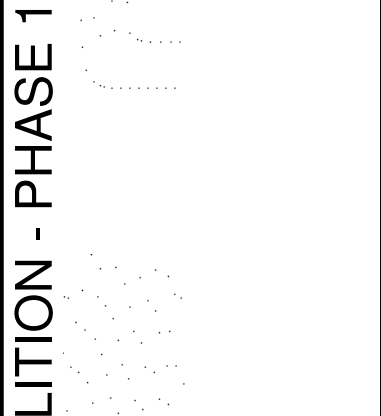
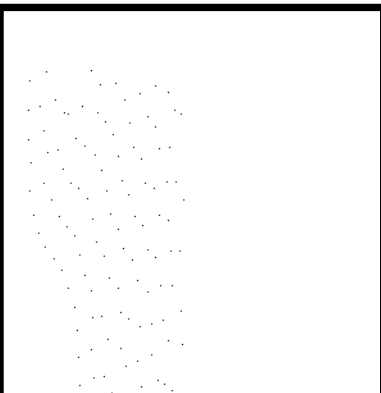
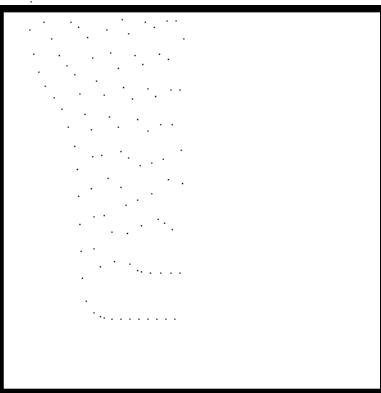
- PROVIDE QUANTITY OF FACES, DIRECTIONAL ARROWS, AND MOUNTING AS SHOWN ON DRAWINGS. MATCH BUILDING STANDARD AS REQUIRED.
- PROVIDE INTEGRAL PHOTOCELL AND CONDUIT BACKBOX.

DATE	12.11.2020	PROJECT	13356.28	DESIGNED	GTH	DRAWN	GTH	CHECKED	GTH
MARK	DATE	BY	DES	REVISIONS					

DATE	12.11.2020	PROJECT	13356.28	DESIGNED	GTH	DRAWN	GTH	CHECKED	GTH
------	------------	---------	----------	----------	-----	-------	-----	---------	-----

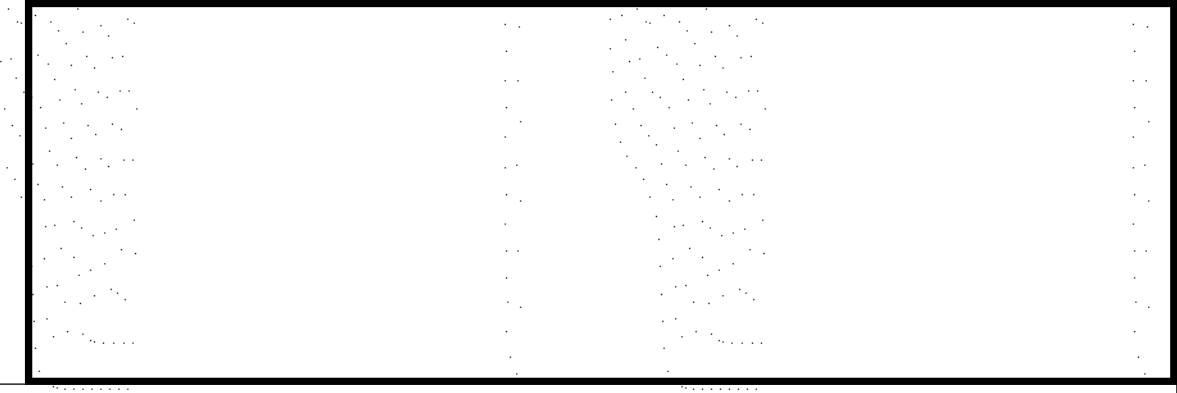


RRMM ARCHITECTS, PC
 2900 South Quincey Street, Suite 710
 Arlington, Virginia 22206
 (703)998-0101

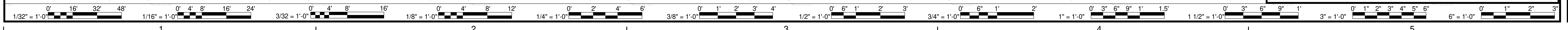


PROJECT VIRGINIA HOSPITAL CENTER DEMOLITION - PHASE 1
 ARLINGTON, VA
 601 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204
 DRAWING DETAILS & SCHEDULES

GPI
 Greenman-Pedersen, Inc.
 Engineering and Construction Services
 8001 Braddock Road, Suite 200, Springfield, VA 22151
 703-978-0100 www.gpinet.com
 Project #: 2019322.00



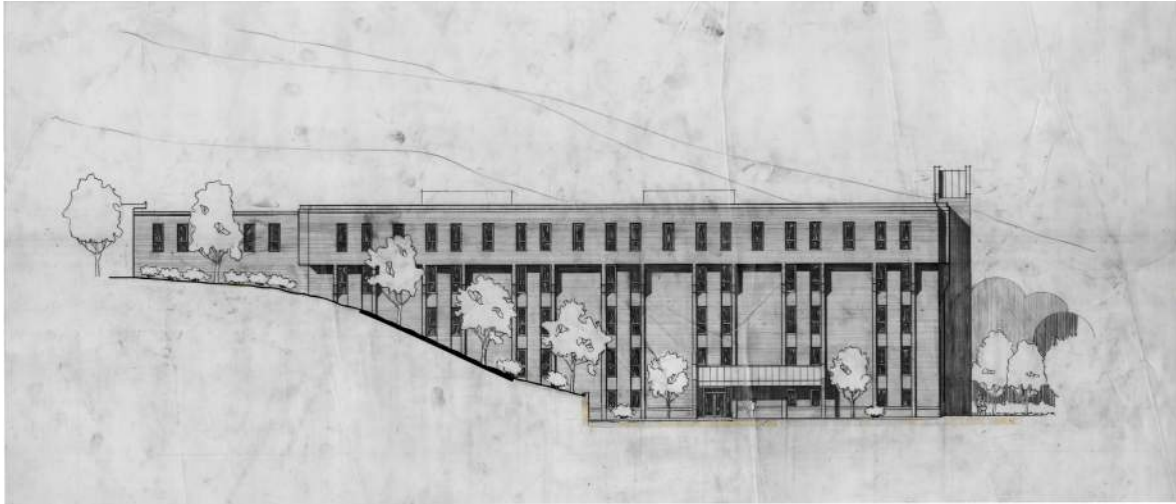
12/9/2020 4:43:24 PM C:\Users\jnguyen\Documents\201932200_v20 - Electrical_jnguyenR32E.rvt



SHEET
1-E-701

Attachment D - Bid Specifications

VIRGINIA HOSPITAL CENTER DEMOLITION PHASE 1 SPECIFICATIONS BID SET



RRMM #: 13356.28

Address: 611 S CARLIN SPRINGS ROAD, ARLINGTON, VA 22204

Date: December 11, 2020



Architect / Interior Design:	RRMM Architects
Civil Engineer:	A. Morton Thomas and Associates, Inc.
Structural Engineer:	Greenman-Pedersen, Inc.
M, E, P Engineers:	Greenman-Pedersen, Inc.

<u>SPEC #</u>	<u>SPEC TITLE</u>
<u>DIVISION 0</u>	
	CONTRACT REQUIREMENTS
-	COVER SHEET
-	TABLE OF CONTENTS
000016	ARLINGTON COUNTY CONSTRUCTION GENERAL CONDITIONS I
003119	EXISTING CONDITION INFORMATION
003126	EXISTING HAZARDOUS MATERIAL INFORMATION
<u>DIVISION 1</u>	
011100	GENERAL REQUIREMENTS
012600	SUMMARY OF WORK
012900	CONTRACT MODIFICATION PROCEDURES
013000	APPLICATIONS FOR PAYMENT
013100	SUBMITTALS
013200	PROJECT MEETINGS
013233	CONSTRUCTION SCHEDULE
013523	PROJECT REPORTING AND PHOTOGRAPHS
015000	SAFETY AND SECURITY
015639	TEMPORARY CONSTRUCTION FACILITIES, UTILITIES AND CONTROLS
016310	TEMPORARY TREE AND PLANT PROTECTION
017329	PRODUCT SUBSTITUTIONS
017419	CUTTING AND PATCHING
017700	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
017800	SUBSTANTIAL COMPLETION
017839	CLOSEOUT AND WARRANTY PERFORMANCE AS BUILT DOCUMENTATION
<u>DIVISION 2</u>	
024119	EXISTING CONDITIONS SELECTIVE DEMOLITION
<u>DIVISION 3</u>	
033000	CONCRETE CAST IN PLACE CONCRETE
<u>DIVISION 4</u>	
042000	MASONRY UNIT MASONRY
<u>DIVISION 5</u>	
051200	METALS
053100	STRUCTURAL STEEL
054000	STEEL DECKING
055000	COLD FORMED METAL FRAMING METAL FABRICATIONS
<u>DIVISION 6</u>	
061023	WOOD, PLASTICS AND COMPOSITES
061600	MISCELLANEOUS ROUGH CARPENTRY SHEATHING
<u>DIVISION 7</u>	
072100	THERMAL AND MOISTURE PROTECTION
072726	BUILDING INSULATION
074213	FLUID APPLIED MEMBRANE AIR BARRIERS FORMED METAL WALL PANELS

074633	VINYL SIDING
075419	POLYVINYL-CHLORIDE (PVC) ROOFING
076200	FLASHING AND SHEET METAL
079200	JOINT SEALANTS
<u>DIVISION 8</u>	<u>OPENINGS</u>
081113	HOLLOW METAL DOORS AND FRAMES
087100	DOOR HARDWARE
<u>DIVISION 9</u>	<u>FINISHES</u>
092900	GYPSUM BOARD AND FRAMING
095113	ACOUSTICAL PANEL CEILINGS
096519	RESILIENT TILE FLOORING
096513	RESILIENT BASE AND ACCESSORIES
099000	PAINTING
<u>DIVISION 23</u>	<u>HEATING VENTILATING AND AIR CONDITIONING</u>
230513	COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
230529	HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
230593	TESTING, ADJUSTING AND BALANCING FOR HVAC
232113	HYDRONIC PIPING
238146.13	WATER-TO-AIR HEAT PUMP
<u>DIVISION 26</u>	<u>ELECTRICAL</u>
260519	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
260533	RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
260553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
265119	LED INTERIOR LIGHTING
<u>DIVISION 28</u>	<u>ELECTRONIC SAFETY AND SECURITY</u>
284621.11	ADDRESSABLE FIRE-ALARM SYSTEMS
<u>DIVISION 31</u>	<u>EARTHWORK</u>
311000	SITE CLEARING
312000	EARTH MOVING
<u>DIVISION 32</u>	<u>EXTERIOR IMPROVEMENTS</u>
321313	CONCRETE PAVEMENTING
321373	CONCRETE PAVING JOINT SEALANTS
329113	SOIL PREPARATION
329200	TURF AND GRASSES
320300	PLANTS

III. ARLINGTON COUNTY CONSTRUCTION GENERAL CONDITIONS
TABLE OF CONTENTS

A. *INTRODUCTION TO TERMS*.....3

B. *DRAWINGS, SPECIFICATIONS, RELATED DATA AND RECORDS KEEPING*7

1. INTENT OF THE DRAWINGS AND SPECIFICATIONS7

2. DISCREPANCIES AND ERRORS.....7

3. DIFFERING SITE CONDITIONS8

4. COPIES FURNISHED.....8

5. USE OF CADD FILES.....8

6. DOCUMENTS ON THE JOBSITE9

7. OWNERSHIP OF DRAWINGS AND SPECIFICATIONS9

8. SUBMITTALS9

9. SAMPLES.....10

10. TESTS11

11. MATERIALS AND EQUIPMENT LIST11

12. STANDARDS, SUBSTITUTIONS12

13. SURVEYS AND CONTROLS.....12

14. RECORD DRAWINGS13

C. *COUNTY, COUNTY PROJECT OFFICER, AND CONTRACTOR RELATIONS*.....14

1. STATUS OF COUNTY PROJECT OFFICER OR DESIGNEE14

2. LIMITATION ON COUNTY’S RESPONSIBILITIES14

3. DISPUTES14

4. INSPECTION OF WORK.....14

5. INSPECTION OF MATERIALS15

6. EXAMINATION OF COMPLETED WORK15

7. RIGHT TO SUSPEND WORK15

8. RIGHT TO CARRY OUT THE WORK15

9. CONTRACTOR MANAGEMENT PERSONNEL16

10. DRUG-FREE POLICY.....16

11. LANDS BY COUNTY16

12. LANDS BY CONTRACTOR.....17

13. PROTECTION OF WORK AND PROPERTY17

14. SEPARATE CONTRACTS.....18

15. SUBCONTRACTS.....19

16. ELIMINATED ITEMS.....20

17. COUNTY ORDINANCES.....20

D. *MATERIALS AND WORKMANSHIP*21

1. MATERIALS FURNISHED BY THE CONTRACTOR21

2. IBC AND VUSBC REQUIREMENTS21

3. ADA COMPLIANCE21

4. MANUFACTURER’S DIRECTIONS.....21

5. WARRANTY.....21

6. INSPECTION AND ACCEPTANCE OF MATERIALS22

7. CONTRACTOR’S TITLE TO MATERIALS22

8. TITLE TO MATERIALS AND WORK COVERED BY PARTIAL PAYMENTS.....23

9. CONNECTING WORK.....23

10. REJECTED WORK AND MATERIALS23

11. PROHIBITION AGAINST ASBESTOS CONTAINING MATERIALS24

E. LEGAL RESPONSIBILITY AND PUBLIC SAFETY.....24

1. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK.....24

2. PUBLIC CONVENIENCE.....26

3. SAFETY AND ACCIDENT PREVENTION.....26

4. HAZARDOUS MATERIALS27

5. HAZARDOUS WASTE27

6. ASBESTOS28

7. CROSSING UTILITIES28

8. OVERHEAD HIGH VOLTAGE LINES SAFETY ACT28

9. SANITARY PROVISIONS.....29

10. SITE CLEAN-UP AND WASTE DISPOSAL.....29

11. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)29

F. PROGRESS AND COMPLETION OF THE WORK.....29

1. NOTICE TO PROCEED30

2. TIME FOR COMPLETION30

3. SCHEDULE OF COMPLETION.....30

4. CONDITIONS FOR COMPLETION.....30

5. USE OF COMPLETED PORTIONS32

G. MEASUREMENT AND PAYMENT33

1. PAYMENTS TO CONTRACTOR.....33

2. PAYMENT FOR STORED MATERIALS.....34

3. PAYMENTS WITHHELD34

4. COUNTY ORDERED CHANGES IN WORK34

5. FORCE ACCOUNT WORK.....37

6. CLAIMS FOR EXTRA COST41

7. DAMAGES FOR DELAY; EXTENSION OF TIME OTHER THAN FOR WEATHER.....41

8. TIME EXTENSIONS FOR WEATHER.....42

9. RELEASE OF LIENS.....44

10. FINAL PAYMENT44

RELEASE AND REQUEST FOR FINAL PAYMENT.....45

A. INTRODUCTION TO TERMS

- 1) The term "Agreement" means the completed and signed Form of Contract Agreement.
- 2) The term "Award Date" means the date of execution of the Agreement by the Purchasing Agent.
- 3) The term "Business Day" shall refer to any day that the County is open for general business.
- 4) The term "Calendar Day" means any day of twenty-four hours measured from midnight to the next midnight. Included are weekends and holidays. When the term "Day" is used it shall be assumed to refer to a Calendar Day unless otherwise specified.
- 5) The term "Change Order" means a written order to the Contractor, signed by the Project Officer and the Contractor, which authorizes a change in the Work, and/or adjustment to the Contract Amount and/or an adjustment to the Time for Completion. A Change Order once signed by all the parties is incorporated into and becomes part of the Contract.
- 6) The term "Commencement Date" means the date on which the Time for Completion will commence for the Contractor to begin to perform his obligations under the Contract Documents as provided in the Notice to Proceed.
- 7) The term "Construction Change Directive" means a written order issued by the County directing a change in the Work prior to agreement on adjustment, if any, in the Contract Amount or Contract Time, or both.
- 8) The term "Contract Documents" means the Agreement and all the documents and Exhibits and/or Attachments identified therein which shall include the Drawings and the Specifications, and all modifications including amendments and subsequent Change Orders thereto properly incorporated in the Contract.
- 9) The terms "County" and "Contractor" shall mean the respective parties to the Contract. They shall be treated throughout the Contract Documents as though each were of the singular number and masculine gender. Only one Contractor is recognized as a party to this Contract.
- 10) The term "Critical Path Method or CPM" means a step-by-step project management technique for process planning that defines critical and non-critical tasks with the goal of preventing time-frame problems and process bottlenecks. An activity on the critical path cannot be started until its predecessor activity has been completed. is delayed then the entire project is delayed.

- 11) The term "Delay" means an event or condition that results in a work activity starting or being completed later than originally planned.
- 12) The term "Drawings" means all drawings pertaining to the Contract, including the Contract Drawings and Construction Notes which show and describe the locations, character, dimensions, and details of the Work to be performed under the contract.
- 13) The term "Final Acceptance" shall mean the date on which the County issues the final payment for the Work.
- 14) The term "Final Completion" shall mean the condition when the County agrees that all the Work has been fully completed in accordance with the Contract Documents and is acceptable. The date of the Final Completion of the Work under the Contract is the date on which Final Completion is accomplished.
- 15) The term "Float" shall represent the amount of time that a task in a project network or sequence can be delayed without causing a delay to: subsequent tasks ("free float") or project completion date ("total float"). Float shall belong to the County and shall be used for the successful completion of the Project within the Time for Completion.
- 16) The term "Notice to Proceed" shall mean a written notice issued by the County to the Contractor stating the Commencement Date. The Notice to Proceed will specify the Time for Completion of the Contract.
- 17) The term "Project" means the entire proposed construction to be executed as stipulated in the Contract Documents
- 18) The term "Project Officer" means the County Project Officer assigned by the Director of the County Department responsible for the project, or the Director's designee. When a designee to act on behalf of the Project Officer is used by the County, the name of the designee and the duties and authority of such designee will be identified in the Contract Documents or in a written notice to the Contractor from the Project Officer responsible for the project. The designee may be a professional architect or engineer or other person employed by the County to perform construction services administration, design services, or project oversight.
- 19) The term "Punch List" means unfinished items of the construction of the Project, which unfinished items of construction are minor or insubstantial details of construction, mechanical adjustment or decoration remaining to be performed, the non-completion of which would not materially affect use of the Project, and which are capable of being completed within the time specified for Final Completion after Substantial Completion has been achieved.

- 20) The term "Request for Information" (RFI) means a request originated by the Contractor requesting clarification or additional information from the Project Officer and/or Architect/Engineer concerning information in the construction documents where the Contractor believes there is insufficient information or a conflict in the documents. RFI's shall be submitted by the Contractor sufficiently in advance of the Work to provide time for assessment and response without delay of the Work. Responses to RFI's shall not be construed as authorization for a Change Order.
- 21) The term "Schedule of Values" means a listing of the Contractor's total contract value by Construction Specifications Institute (CSI) divisions, including Division 1, Contractor's General Conditions.
- 22) The term "Site" refers to that portion of the property on which the Work is to be performed or which has otherwise been set aside for use by the Contractor.
- 23) The terms "Special Conditions" mean the written statements modifying or supplementing the Technical Specifications or General Conditions for requirements or conditions peculiar to the Contract.
- 24) The term "Specifications" means and shall include the Technical Specifications, the Special Conditions and all written agreements and instructions pertaining to the performance of the Work.
- 25) When used, the term "Stipulated Price Item" means and includes an item of Work, unanticipated or of unknown quantity at the time of issuance of the solicitation for a Bid and determined to be executed, based on the actual field conditions during the progress of Work under the Contract. The Unit Price for the "Stipulated Price Item", as identified in the "Stipulated Price Items" section of the Bid Form, is predetermined by the County as the current reasonably workable rate for the Item inclusive of all necessary labor, equipment, materials, overheads (provision and installation), and the contractor's profit.
- 26) The term "Subcontractor", shall include only those having a direct contract with the Contractor, and it shall include those who furnish material worked to a special design according to the plans and specifications for this Work but shall not include those who merely furnish material not so worked.
- 27) The term "Substantial Completion" shall mean the condition when the County agrees that the Work, or a specific portion thereof, is sufficiently complete, in accordance with the Contract Documents, so that it can be utilized by the County for the purposes for which it was intended. The date of Substantial Completion of the Work under the Contract is the milestone date on which Substantial Completion condition is accomplished.

- 28) The term "Technical Specifications" means that part of the Contract Documents that describe the quality of materials, method of installation, standard of workmanship, and the administrative and procedural requirements for the performance of the Work under the contract.
- 29) The term "Time for Completion" shall mean the time period set forth in the Agreement.
- 30) The term "Work" shall mean the services performed under this Contract including, but not limited to, furnishing labor, and furnishing and installing materials and equipment required to complete the Project specified in the Contract Documents.

B. DRAWINGS, SPECIFICATIONS, RELATED DATA AND RECORDS KEEPING

1. INTENT OF THE DRAWINGS AND SPECIFICATIONS

- a. It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, water haulage, light power, transportation, superintendence, temporary construction of all kinds, and other services and facilities of every nature whatsoever that are necessary to execute and deliver the Work, complete and usable within the scope of the Contract with all parts in working order, and all connections properly made.
- b. The general character and scope of the Work are illustrated by the Drawings and listed in the Specifications. Any additional drawings and or other instructions deemed necessary by the Project Officer or designee will be furnished to the Contractor when required for the Work and shall be incorporated into the Contract Documents.
- c. Where "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that direction, requirements, permission, or review of Project Officer or designee is intended unless stated otherwise. As used herein, "provide" shall be understood to mean "provide complete in place", that is, "furnish and install."
- d. Unless otherwise specifically noted, the word "similar" where it occurs in the Drawings, shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their locations and their connection with other parts of the Work.
- e. Materials or work described in words which, so applied, have a well-known technical, construction industry, or trade meaning, shall be held to refer to the recognized technical or trade meaning.
- f. The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all documents. In case of conflicting variance between the Contract Documents, the Order of Precedence stated in the Agreement shall govern. Figured dimensions on the plans shall be used; drawings shall not be scaled.

2. DISCREPANCIES AND ERRORS

If the Contractor discovers any discrepancies between the Drawings and Specifications and the site conditions or any errors or omissions in the Drawings or Specifications, the Contractor shall at once, but in no event later than three calendar days after discovery of the discrepancy or error, report them in writing to the Project Officer or designee. If the

Contractor proceeds with any work that may be affected by such discrepancies, errors, or omissions, after their discovery, but before a clarification is provided, such work shall be at the Contractor's risk and expense. Issues affecting critical path activities shall be made known to the Project Officer or designee within one business day after discovery.

3. DIFFERING SITE CONDITIONS

The Contractor shall immediately, and before the conditions are further disturbed, give notice to the Project Officer of subsurface or latent physical conditions at the site which differ materially from those indicated in this Contract, or previously unknown physical conditions discovered at the site of an unusual nature and which differ materially from those ordinarily expected to be encountered at the site. Such notice shall be followed by a written notice provided within 48 hours of discovery.

The Project Officer will investigate the site conditions promptly after receiving the notice. If the conditions do materially differ to the extent that an increase or decrease would result in the Contractor's cost of the Work, or the time required for performing any part of the Work under the contract, an equitable adjustment may be made under this clause and the Contract modified in writing accordingly.

No request by the Contractor for an adjustment to the Contract under this clause shall be allowed, unless the Contractor has given the written notice required. If the Contractor proceeds with any work that may be affected by such differing site conditions before giving notice to the Project Officer as set forth herein, such work shall be at the Contractor's sole risk and expense.

No request by the Contractor for an adjustment to the contract for differing site conditions shall be allowed if made after Final Payment under the Contract.

4. COPIES FURNISHED

Except as provided for otherwise, copies of the Drawings and Specifications reasonably necessary for the execution of the Work will be furnished to the Contractor. One electronic copy of the Contract Drawings and Specifications will be provided by the Project Officer or designee to the Contractor.

5. USE OF CADD FILES

The Contractor may request Electronic CADD files related to the Work or the Project. The CADD files will be provided by the County only if the Contractor completes the Arlington County Electronic CADD Drawing Release Form, which form is then incorporated by reference into this Contract. Use of CADD files is at the Contractor's own risk and in no way alleviates Contractor's responsibility for the Work to conform to the Plans and Specifications.

6. DOCUMENTS ON THE JOBSITE

The Contractor shall keep on the site of the Project a copy of the Drawings and Specifications updated to include all authorized revisions and RFI responses, and shall at all times give the County and its authorized representatives access thereto. The Contractor shall mark up the Drawings on a daily basis in red. The drawings shall be submitted to the County at Substantial Completion as the Record marked up set.

7. OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All Drawings and Specifications and copies thereof furnished by the County are the property of the County and shall not be used on other projects. All copies of the Drawings and Specifications except the signed Contract sets shall be returned to the Project Officer or designee at Final Completion.

8. SUBMITTALS

- a. The term "submittals", as used herein, shall include fabrications, erection and setting drawings, manufacturers' standard drawings, schedules, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, and other descriptive data pertaining to the materials and equipment as required to demonstrate compliance with the Contract requirements.
- b. Unless other specified in the Specifications the Contractor shall submit for the review of the Project Officer or designee a listing of all submittals required by the Specifications or requested by the Project Officer or designee within fifteen (15) calendar days after receipt of the Notice to Proceed. This listing shall include due dates for each required submittal, coordinated with the project schedule such that adequate time is allotted for review and potential resubmittals, fabrication and delivery without causing delay. The Contractor bears all risk for delay associated with submittals not received in a timely manner.
- c. Submittals shall be submitted in such number of copies as established in the Specifications. Each submission shall be accompanied by a letter of transmittal, listing the contents of the submission and identifying each item by reference to specification section or drawing. All submittals shall be clearly labeled with the name of the project and such information as may be necessary to enable their complete review by the Project Officer or designee. Catalog plates and other similar material that cannot be so labeled conveniently shall be bound in suitable covers bearing the identifying data.
- d. Submittals shall be accompanied by all required certifications and other such supporting material, and shall be submitted in sequence or groups that all related items can be checked together. When submittals cannot

be checked because a submission is not complete, or because submittals on related items have not been received by the Project Officer or designee, then such submittals will be returned without action or will be held, not checked, until the missing material is received. Incomplete or defective submittals shall not be considered to have been submitted. Failure to deliver submittals within the specified time will not be grounds for additional time or compensation.

- e. Submittals shall have been reviewed by the Contractor and coordinated with all other related or affected work before they are submitted for review and acceptance and shall bear the Contractor's certification that the Contractor has checked and approved them as complying with all relevant information in the Contract Documents. Submittals submitted without such certification and coordination will be returned to the Contractor without action and will not be considered as a formal submission.
- f. If shop drawings show variations from the Drawings and Specifications because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in the Contractor's letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Drawings and Specifications even though shop drawings have been accepted.
- g. The Project Officer or designee shall review the shop drawings with reasonable promptness. Review and/or acceptance of shop drawings will be general for conformance with the design concept of the Project and compliance with the information given in the Contract Documents, and will not include quantities, detailed dimensions, nor adjustments of dimensions to actual field conditions. Acceptance shall not be construed as permitting any departure from Contract requirements, as authorization of any increase in price nor as relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist. Review is not intended to relieve the contractor of full responsibility for the accuracy and completeness of the plans and calculations, or for the complete compliance with the contract documents. Contractor is solely responsible for the means and methods of the construction, including temporary items proposed for use.

9. SAMPLES

The Contractor shall submit to the Project Officer or designee, all samples required by the Specifications or requested by the Project Officer or designee. Samples shall be submitted in single units only, unless the Contractor desires additional units for the Contractor's own use. Each sample shall bear a label indicating what the material represented, the name of the producer and the title of the Project. Acceptance of a sample shall be only for conformance with

the design concept of the Project and compliance with the information given in the Contract Documents, and only for the characteristics or use named in such acceptance. Such acceptance shall not be construed to change or modify any Contract requirements or the Contract Price. Materials and equipment incorporated in the Work shall match the accepted samples. The Contractor shall be responsible for researching the availability of the specified product in the dimensions and colors specified at no additional cost to the County. Failure of the Contractor to identify specified products that are not commercially produced within the time required for submittal transmittal in order to meet the project schedule shall not be entitled to additional time or compensation.

10. TESTS

Any specified tests of materials and finished articles shall be made by bureaus, laboratories or agencies approved by the Project Officer or designee and the certified reports of such tests shall be submitted to the Project Officer or designee. All tests shall be in compliance with the Specifications. All costs in connection with the testing and test failures shall be borne by the Contractor. Failure of any material to pass the specified tests or any test performed by the Project Officer or designee, will be sufficient cause for refusal to consider, under this Contract, any further materials of the same brand or make of that material. Samples of various materials delivered on the site or in place may be taken by the Project Officer or designee for testing. Samples failing to meet the Contract requirements will automatically void previous acceptance of the items tested. The Contractor will not be compensated for additional time and/or cost incurred in finding an acceptable replacement or the removal and replacement of the defective item.

11. MATERIALS AND EQUIPMENT LIST

- a. Unless otherwise specified in the Specifications, within thirty (30) days of the Commencement Date the Contractor shall submit to the Project Officer or designee a complete list of materials and equipment proposed for use in connection with the Project. Partial lists submitted from time to time will not be considered unless specifically approved by the Project Officer or designee.
- b. After any material or piece of equipment has been approved through submittal process, no change in brand or make will be permitted unless satisfactory written evidence is presented to prove that the manufacturer cannot make scheduled delivery of the accepted material, or that material delivered has been rejected and the substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that acceptance of such other material is in the best interest of the County. The Contractor is solely responsible for the cost and time required to obtain and install a suitable replacement.

12. STANDARDS, SUBSTITUTIONS

- a. Any material specified by reference to the number, symbol or title of a specific standard, such as a Commercial Standard, a Federal Specification, a Trade Association Standard, or other similar standard, shall comply with the requirements in the latest revision of the standards or specification and any amendment or supplement, except as limited to type, class or grade, or as modified in such reference. The standard referred to, except as modified in the Specifications, shall have full force and effect as though printed in the Specifications.
- b. Reference in the Specifications or on the Drawings to any article, device, product, material, fixture, form or type of construction by name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as eliminating from competition other products of equal or better quality by other approved manufacturers. Otherwise, applications for acceptance of substitutions for the specified items will be considered only upon request of the Contractor, not of individuals, trades or suppliers, and only for a specific purpose; no blanket acceptance will be granted. No acceptance of a substitution shall be valid unless it is in written form and signed by the Project Officer or designee.
- c. If any proposed substitution will affect a correlated function, adjacent construction or the work of other contractors, then the necessary changes and modifications to the affected work shall be considered as an essential part of the proposed substitution, to be accomplished by the Contractor without additional expense to the County or an extension of the contract time, if and when accepted. Detail drawings and other information necessary to show and explain the proposed modifications shall be submitted with the request for acceptance of the substitution.

13. SURVEYS AND CONTROLS

Unless otherwise specified, the Contractor shall establish all baselines for the location of the principal component parts of the Work, establish a suitable number of benchmarks adjacent to the Work, and develop all detail surveys necessary for construction by a professional land surveyor licensed in the Commonwealth of Virginia. The Contractor shall carefully preserve benchmarks, reference points and stakes, and in the case of destruction thereof by the Contractor or due to the Contractor's negligence or the negligence of any subcontractor or supplier, the Contractor shall be responsible for expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the loss or disturbance of such benchmarks, reference points and stakes. The Contractor shall within 30 days of NTP perform a full site survey to verify all control points shown on the drawings against existing conditions within the site limits. Any discrepancies found during this effort shall be made

known immediately to the Project Officer. Failure to perform this survey and provide proof and acceptance of Project datum, control points, and existing benchmarks will not give rise to any extensions to contract time or amount. The cost of all necessary surveying services shall be considered incidental to the work and, unless otherwise specified, shall be included in the cost of the Work.

14. RECORD DRAWINGS

Record drawings shall be the responsibility of the Contractor. The Contractor shall maintain and mark up one set of prints of the applicable Contract Drawings to portray record construction. The prints shall be neatly and clearly marked in red to show all variations between the Work actually provided and that indicated on the Contract Drawings, and all utilities encountered in the Work. All drafting shall conform to good drafting practice and shall include such supplementary notes, legends and details as may be necessary for legibility and clear portrayal of the record construction. These drawings shall be marked promptly upon any approved change to the Work or discovery of any undocumented utility or obstruction and shall be submitted to the Project Officer or designee in sufficient time to be approved no later than thirty (30) calendar days after the Substantial Completion Date. The final record drawings approved by the Project Officer or designee shall be submitted in paper copy and .pdf format electronic files prior to Final Completion. Unless otherwise required under the Contract Documents, incorporation of red-lined changes into CADD format shall be the responsibility of the Architect and/or Engineer of Record, with the exception being any documents prepared by the Contractor in CADD, the record version of which shall also be provided to the County in CADD format by the Contractor. Final payments will be held until the complete set of red-line drawings are submitted to and approved by the Project Officer.

C. COUNTY, COUNTY PROJECT OFFICER, AND CONTRACTOR RELATIONS**1. STATUS OF COUNTY PROJECT OFFICER OR DESIGNEE**

The Project Officer or designee shall be the County's representative during the construction period. All Contractor instructions or requests shall be issued from or submitted through the Project Officer or designee. The Project Officer or designee shall have authority to suspend the Work whenever such suspension may be necessary in the responsible opinion of the Project Officer or designee to ensure the proper execution of the Contract. The Project Officer or designee shall also have authority to reject all work and materials that do not conform to the Contract and to decide questions that arise in the execution of the Work. The County Project Officer or designee will, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work.

2. LIMITATION ON COUNTY'S RESPONSIBILITIES

The County shall not supervise, direct, or have control or authority over, nor be responsible for: The Contractor's means, methods, techniques, sequences or procedures of construction; the safety precautions and programs related to safety, or the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

3. DISPUTES

- a. All disputes or claims arising under this Contract or its interpretation, whether involving law or fact or both, or extra work, and all claims for alleged breach of Contract shall be submitted in writing to the Project Officer or designee as set forth in these General Conditions. Such claims must set forth in detail the amount of the claim, and shall state the facts surrounding it in sufficient detail to identify it together with its character and scope.
- b. Claims denied by the Project Officer shall be processed in accordance with the procedures outlined in Sections 7-107, Contractual Disputes and 7-108, Legal Actions of the Arlington County Purchasing Resolution and the Dispute Resolution paragraph in the Agreement.
- c. The Contractor shall not cause a delay in the work pending a decision of the Project Officer or designee, County Manager, County Board, or court, except by prior written approval of the Project Officer or designee.

4. INSPECTION OF WORK

The Project Officer or designee and representatives of any public authority having jurisdiction shall, at all times, have access to the Work while in progress. The Contractor shall provide suitable facilities for such access and for proper observation of the Work and shall conduct all special tests required by the Specifications, the Project Officer or

designee's instructions, and any laws, ordinances or the regulations of any public authority applicable to the work. Nothing in this section shall abrogate or otherwise limits or relieves the Contractor's independent duty to inspect the Work.

5. INSPECTION OF MATERIALS

All articles, materials, and supplies purchased by the Contractor for the Work are subject to inspection upon delivery to the site and during manufacturing or fabrication. The County reserves the right to return for full credit, at the risk and expense of the Contractor, all or part of the articles, materials, or supplies furnished contrary to Specifications and instructions. Nothing in this section shall abrogate or otherwise limit or relieve the Contractor's independent duty to inspect materials.

6. EXAMINATION OF COMPLETED WORK

If the Project Officer or designee requests it, the Contractor, at any time before acceptance of the Work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the Specifications. Should the work thus exposed or examined prove acceptable, then the uncovering or removing, and the replacing of the covering or making good of the parts removed shall be paid for as extra work, but should the work so exposed or examined prove unacceptable, then the uncovering, removing and replacing shall be at the Contractor's expense.

7. RIGHT TO SUSPEND WORK

The County shall have the authority to suspend the Work, in whole or in part, for such periods and such reasons as the County may deem necessary or desirable. Any such suspension shall be in writing to the Contractor and the Contractor shall obey such order immediately and not resume the Work until so ordered in writing by the County. No such suspension of the Work shall be the basis for a claim by the Contractor for any increase in the Contract Amount provided that the suspension is for a reasonable time under the circumstances then existing. If the suspension of Work is caused by the County's belief that non-conforming work is being installed, and subsequent investigation proves that the Work was non-conforming, the Contractor shall not be awarded additional time or costs.

8. RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 10-day period after receipt of written notice from the County or such shorter time as may be reasonable under the circumstances, to commence and continue correction of such default or neglect with diligence and promptness, the County may, without prejudice to other remedies the County may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including the County's expenses, and any additional architect or engineering costs necessary by Contractor's default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the County upon demand.

9. CONTRACTOR MANAGEMENT PERSONNEL

The Contractor shall keep a competent superintendent and any necessary assistants on the Site at all times during progress of the Work and such persons shall be satisfactory to the Project Officer or designee. The superintendent or project manager shall not be changed except with the Project Officer or designee's consent. If the Project Officer determines that the superintendent or project manager is no longer satisfactory, then the superintendent or project manager must be replaced within 15 days of the Project Officer's written notice with a replacement superintendent or project manager with equal or superior qualifications and subject to Project Officer approval.

The superintendent and project manager shall represent the Contractor and all directions given to such persons shall be as binding as if given to the Contractor. The Contractor shall at all times enforce strict discipline and good order among the workers performing under this Contract, and shall not employ on the Work any person not reasonably proficient in the Work assigned. Persons permitted to perform Work under Contractor, or any subcontractor, or sub-subcontractor, shall meet all employment eligibility, safety training, security or drug/alcohol testing requirements required by law or by the County. Any person not complying with all such requirements shall be immediately removed from the Site.

10. DRUG-FREE POLICY

The Contractor is responsible for ensuring that the Site remains a drug-free site. Contractor will require that employees undergo random drug/alcohol screening on a quarterly interval. Any employee who fails the test must be removed from the Site immediately. Random screening shall be performed by a third party licensed to do so in the Commonwealth of Virginia. The Contractor shall provide its random testing policy and schedule to the Project Officer within 30 days of Notice to Proceed. The Contractor will include this provision in every subcontract relating to this Contract. Any infraction by an employee of the Drug-Free policy shall be reported to the Project Officer within 24 hours.

11. LANDS BY COUNTY

The County shall provide access to the lands shown on the Drawings upon which the Work under the Contract is to be performed and to be used for rights of way and for access. In case all the lands, rights-of-way or easements have not been obtained as herein contemplated before construction begins, then the Contractor shall begin its work on such lands and rights-of-way that the County has acquired access to. No additional time or compensation shall be awarded to the Contractor for modifying work location and sequence provided other locations are available for work.

Contractor shall verify the acquisition of all off-site easements and Rights-of-Way prior to the start of off-site construction. Restore all off-site easements to the conditions existing prior to the start of work.

12. LANDS BY CONTRACTOR

If the Contractor requires additional land or lands for temporary construction facilities and for storage of materials and equipment other than the areas available on the site or right-of-way, or as otherwise furnished by the County, then the Contractor shall provide such other lands and access thereto entirely at the Contractor's own expense and without liability to the County. The Contractor shall not enter upon private property for any purpose without prior written permission of all of the persons and entities who own the property. The Contractor shall provide copies of all agreements to the County and shall include language in the agreement indemnifying and holding the County harmless for any damages, repairs, restoration or fees associated with the use of the property. Upon termination of the agreement, the Contractor shall provide to the County a fully executed release from the property owner.

13. PROTECTION OF WORK AND PROPERTY

- a. The Contractor shall continuously maintain and protect all of its Work from damage and shall protect the County's property from damage or loss arising in connection with this Contract until Substantial Completion. After Substantial Completion, the maintenance or protection of any incomplete or remedial Work identified on the punch list that requires maintenance or protection in order to allow for the final completion and acceptance of such Work shall be the responsibility of the Contractor until Final Completion. The Contractor shall make good any such damage or loss, except such as may be caused by agents or employees of the County. Failure to adequately protect the Work shall not be grounds for additional compensation for any maintenance and/or repairs to such Work.
- b. The Contractor shall not place upon the Work, or any part thereof, any loads which are not consistent with the design strength of that portion of the Work.
- c. The Contractor shall be responsible for the preservation of all public and private property, trees, monuments, etc., along and adjacent to the street and/or right-of-way, and shall use every precaution to prevent damage to pipes, conduits and other underground structures, curbs, pavements, etc., except those to be removed or abandoned in place and shall protect carefully from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. Any damage which occurs by reason of the operations under this Contract, whether shown or not on the approved construction plans, shall be completely repaired or replaced to the County's satisfaction by the Contractor at the Contractor's expense.
- d. Prior to commencing construction activity at the Site, the Contractor shall videotape the Site and an additional fifty (50) feet outside the

perimeter of the Site. Contractor shall submit a copy of high resolution digital recording on a DVD or flash drive to the County. The recording shall be stable, continuous, and contain all items within the limits of Work. Submission of the DVD to the County shall be a condition precedent to any obligation of the County to consider an Application for Payment. The DVD shall be the property of the County, and the County shall be permitted to reproduce such DVD's and use the same for any purpose without limitation or claim of ownership or compensation from any party. Contractor shall incorporate the cost of the preconstruction survey in the bid amount or the unit prices of the bid items, as applicable. No additional payment will be made by the County.

- e. The Contractor shall shore, brace, underpin, secure, and protect, as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site that may be affected in any way by excavations or other operations connected with the work required under this Contract. The Contractor shall be responsible for giving any and all required notices to owners or occupants of any adjoining or adjacent property or other relevant parties before commencement of any work. Contractor shall provide all engineering (signed and sealed) for items listed in this section per the Specifications. The Contractor shall indemnify and hold the County harmless from any damages on account of settlements or loss of all damages for which the County may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- f. In an emergency affecting the safety of life or of the Work, or of adjoining property, the Contractor, without special instruction or authorization from the Project Officer or designee, or the County, is hereby permitted to act, at the Contractor's discretion, to prevent such threatened loss or injury, and the Contractor shall so act without appeal, if so instructed or authorized.

14. SEPARATE CONTRACTS

- a. The County reserves the right to let other contracts in connection with this Project. The Contractor shall afford other contractors reasonable access to the Project including storage of their materials and the execution of their work, and shall properly connect and coordinate its work with the work of other such contractors.
- b. If any part of the Contractor's work depends, for proper execution or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the Project Officer or designee any defects in such work that renders it unsuitable for such proper execution and results. The Contractor's failure to so inspect and report

shall constitute an acceptance of the other contractor's work as fit and proper for the reception of the Contractor's work, except as to defects which may develop in other contractor's work after its execution.

- c. If the Contractor or any of the Contractor's subcontractors or employees cause loss or damage to any separate contractor on the Work, the Contractor agrees to settle or make every effort to settle or compromise with such separate contractor. If such separate contractor sues the County on account of any loss so sustained, the County shall notify the Contractor, who shall indemnify and save the County harmless against any expense, claim or judgment arising therefrom, including reasonable attorney's fees.
- d. In case of a dispute arising between two or more separate contractors engaged on adjacent work as to the respective rights of each under their respective contracts, the Project Officer shall determine the rights of the parties.

15. SUBCONTRACTS

- a. Unless otherwise specified, the Contractor shall, within fifteen (15) calendar days after the execution of the Contract by the County, provide to the Project Officer or designee, in writing, the names of all subcontractors proposed for the principal parts of the Work and for such others as requested by the Project Officer or designee, and shall not employ any subcontractors that the Project Officer or designee may object to as incompetent or unfit after an appropriate determination of the subcontractor's ability. No proposed subcontractor will be disapproved except for cause.
- b. The Contractor shall make no substitutions for any subcontractor previously selected/approved unless first submitted to the County for approval.
- c. The Contractor shall be as fully responsible to the County for the acts and omissions of the Contractor's subcontractors as the Contractor is for the acts and omissions of persons directly employed by the Contractor.
- d. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions of the Contract, Special Provisions and other Contract Documents comprising the Contract insofar as such documents are applicable to the work of subcontractors.
- e. Nothing contained in the Contract shall be construed to create any contractual relation between any subcontractor and the County, nor shall it establish any obligation on the part of the County to pay to, or see to the payment of any sums to any subcontractor. The County will not discuss, negotiate or otherwise engage in any contractual disputes with any subcontractor.

- f. If requested by the County, the Contractor shall replace any subcontractor at no cost to the County within 30 days of the Project Officers written notice or as otherwise specified. No additional time or compensation will be provided in the event a subcontractor is removed due to non-compliance of the requirements outlined within the Contract.

16. ELIMINATED ITEMS

If any item(s) in the Contract are determined to be unnecessary for the proper completion of the Work contracted, the Project Officer or designee may, upon written notice to the Contractor, eliminate such item(s) from the Contract. Payment will not be made for such item(s) so eliminated; except that the Contractor will be compensated for the actual cost of any work performed and the net cost of materials purchased before the item(s) was eliminated from the Contract, including freight and tax costs, as evidenced by invoice. No additional compensation will be made for overhead or anticipated profit. The County will receive the full unit price credit for work eliminated prior to production or installation.

17. COUNTY ORDINANCES

The Contractor shall comply with all applicable County ordinances, including but not limited to: the *Noise Control, Erosion & Sediment Control, Storm Water Management, and Chesapeake Bay Preservation ordinances (Chapters 15, 57, 60, and 61 of the County Code)*.

D. MATERIALS AND WORKMANSHIP**1. MATERIALS FURNISHED BY THE CONTRACTOR**

Unless otherwise specified, all materials and equipment incorporated in the Work under the Contract shall be new. All work shall be accomplished by persons qualified in the respective trades.

2. IBC AND VUSBC REQUIREMENTS

The Contractor certifies that all material supplied or used under this Contract meets all current International Building Code (IBC) requirements and the requirements of the Virginia Uniform Statewide Building Code (VUSBC); and further certifies that, if the material delivered or used in the performance of the work is found to be deficient in any of the applicable state or national code requirements, all costs necessary to bring the material into compliance with the requirements shall be borne by the Contractor. The County shall be entitled to offset such costs against any sums owed by the County to the Contractor under this Contract.

3. ADA COMPLIANCE

The Contractor shall ensure that all Work performed under this Agreement is completed in accordance with the Contract Documents, including Work intended to meet the accessibility requirements of the Americans with Disabilities Act (ADA).

The Contractor is not required to ascertain whether the Contract Documents meet ADA design standards and guidelines. However, should the Contractor discover any non-conformity with such requirements, the Contractor shall immediately inform the County and its design consultant, if applicable, to allow for corrective action.

The Contractor shall defend and hold the County harmless from any expense or liability arising from the Contractor's non-compliance in meeting its obligations herein. The Contractor shall be responsible for all costs related to permitting delays, redesign, corrective Work, and litigation relating to such non-compliance.

4. MANUFACTURER'S DIRECTIONS

Manufactured articles, material, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's directions as accepted by the Project Officer or designee, unless herein specified to the contrary.

5. WARRANTY

All material provided to the County shall be fully guaranteed by the Contractor against manufacturing defects within the period of the manufacturer's standard warranty. Such defects shall be corrected by the Contractor at no expense to the County. The Contractor shall provide all manufacturers' warranties to the Project Officer by the date of Final Completion.

All Work is guaranteed by the Contractor against defects resulting from the use of inferior or faulty materials. The Contractor warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects or inferior or faulty workmanship, or work not in accordance with the Contract Documents for one (1) year from the date of Substantial Completion or as set forth in the Specifications of the work by the County in addition to and irrespective of any manufacturer's or supplier's warranty.

No date other than Substantial Completion or as set forth in the Specifications shall govern the effective date of the Warranty, unless that date is agreed upon by the County and the Contractor in advance and in a signed writing.

The Contractor shall promptly correct any defective work or materials after receipt of a written notice from the County to do so. If the Contractor fails to proceed promptly or use its best efforts and due diligence to complete such compliance as quickly as possible, the County may have the materials or work corrected and the Contractor and its Sureties shall be liable for all expenses and costs incurred by the County.

Nothing contained in this section shall be construed to establish a period of limitations with respect to other obligations the Contractor may have under this Contract.

6. INSPECTION AND ACCEPTANCE OF MATERIALS

Inspection and acceptance by the County will be at the work site in Arlington County, Virginia and within ten (10) calendar days of delivery unless otherwise provided for in the Contract Documents. The County will not inspect, accept, or pay for any materials stored or delivered off-site by the Contractor, except as provided by the Payment for Stored Materials clause of these General Conditions and other requirements of the Contract Documents. The County's right of inspection shall not be deemed to relieve the Contractor of its obligation to ensure that all articles, materials and supplies are consistent with Specifications and instructions and are fit for their intended use. The County reserves the right to conduct any tests or inspections it may deem appropriate before acceptance. The Contractor shall be responsible for maintaining all materials and supplies in the condition in which they were accepted until they are used in the work.

The Contractor is to coordinate its work and request inspections in such a manner as to minimize the cost to the County without impacting the overall schedule of the Project within reason. All costs associated with re-inspection shall be borne by the Contractor.

7. CONTRACTOR'S TITLE TO MATERIALS

No materials or supplies for the work shall be purchased by the Contractor or any subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that it has good title to, and that it will require all subcontractors to warrant that they have good title to, all materials and supplies for which the Contractor invoices for payment. The County may request proof of title or payment prior to acceptance of the Contractor's invoice.

8. TITLE TO MATERIALS AND WORK COVERED BY PARTIAL PAYMENTS

All material and work covered by partial payments made by the County will become the property solely of the County at the time the partial payment is made. However, risk of loss or damage to all items shall be the responsibility of the Contractor until Final Acceptance by the County. This provision will not be construed as relieving the Contractor from having sole responsibility for all materials and work upon which payments have been made and for the restoration of any damaged work or replacement or repair at the County's option of any damaged materials. This provision will not be construed as a waiver of the County's right to require fulfillment of all terms of the Agreement, including full rights under the terms of the Warranty provisions of the Agreement, nor shall payment indicate acceptance of the materials or work.

9. CONNECTING WORK

The Contractor shall do all cutting, patching, or digging of the Contractor's work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors as shown upon or reasonably implied by the Drawings and Specifications for the completed Project and shall make good after them as the Project Officer or designee may direct. This work will be performed in a workmanlike manner utilizing proper care and equipment to achieve proper line and grade. The Contractor shall not endanger any work by cutting, patching, or digging, or otherwise, and shall not cut or alter the work of any other contract except with the prior written consent of the Project Officer or designee.

10. REJECTED WORK AND MATERIALS

- a. Any of the Work or materials, goods, or equipment which do not conform to the requirements of the Contract Documents, or are not equal to samples accepted by the Project Officer or designee, or are in any way unsatisfactory or unsuited to the purpose for which they are intended, shall be rejected and replaced immediately so as not to cause delay to the Project or work by others. Any defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, shall be removed and the work shall be re-executed by the Contractor at the Contractor's expense. The fact that the Project Officer or designee may have previously overlooked such defective work shall not constitute acceptance of any part of it.
- b. If the Contractor fails to proceed at once with the replacement of rejected material and/or the correction of defective workmanship when notified to do so by the Project Officer or designee, the County may, by contract or otherwise, replace such material or correct such workmanship and charge the cost to the Contractor. This clause applies during the Contract and during any warranty or guarantee period.
- c. The Contractor shall be responsible for managing, addressing within a timely manner, and formally closing out all notices of non-compliance issued by the inspector of record, Arlington County Inspection Services, or the Design Team. The Contractor shall be solely liable for any costs or time associated with the

corrective action to address any notices of non-compliance. The Contractor must work directly with the entity issuing the notice of non-compliance.

- d. If the Project Officer or designee deems it expedient not to require correction of work which has been damaged or not done in accordance with the Contract, an appropriate adjustment to the Contract Price may be made.

11. **PROHIBITION AGAINST ASBESTOS CONTAINING MATERIALS**

No goods or equipment provided to the County or construction material installed shall contain asbestos. If a Contractor or supplier provides or installs any goods, equipment, supplies, or materials that contain asbestos in violation of this prohibition, the Contractor shall be responsible for all costs related to the immediate removal and legal disposal of the goods, equipment or materials containing asbestos and replacement with County-approved alternate. The Contractor shall be responsible for all goods, equipment, supplies or materials installed or provided by any of its employees, agents or subcontractors in connection with the work under this contract. The Contractor shall also reimburse to the County all costs of such goods, equipment, supplies or materials installed if not corrected by the Contractor.

E. LEGAL RESPONSIBILITY AND PUBLIC SAFETY

1. **SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK**

The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and locations of the work of the Contract, and that it has investigated and satisfied itself as to the general and local conditions and factors which can affect the Work or its cost, including but not limited to:

- a. conditions bearing upon transportation, disposal, handling, and storage of materials;
- b. the availability of labor, water, electric power, and roads;
- c. uncertainties of weather, river stages, tides, or similar physical conditions at the site;
- d. the information and conditions of the ground; and
- e. the character of equipment and facilities needed before and during work performance.

The Contractor, by executing the Contract, represents that it has reviewed and understands the Contract Documents and has notified the County of and obtained clarification of any discrepancies which have become apparent during the bidding period. During the Contract, the Contractor must promptly notify the County in writing of any apparent errors, inconsistencies, omissions, ambiguities, construction impracticalities or code violations discovered as a result of the Contractor's review of the Contract Documents including any differences between actual and indicated dimensions, locations and descriptions, and must give the County timely notice in writing of same and of any corrections, clarifications, additional Drawings or Specifications, or other information required to define the Work in greater detail or to

permit the proper progress of the Work. The Contractor must provide similar notice with respect to any variance between its review of the Site and physical data and Site conditions observed. If the Contractor performs any Work involving an apparent error, inconsistency, ambiguity, construction impracticality, omission or code violation in the Contract Documents of which the Contractor is aware, or which could reasonably have been discovered, without prompt written notice to the County and request for correction, clarification or additional information, as appropriate, the Contractor does so at its own risk and expense and all related claims are specifically waived.

The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the County, as well as from the Drawings and Specifications made a part of this Contract. Unless otherwise specified, all existing structures, materials and obstructions that interfere with the new construction shall be removed and disposed of as part of this Contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the Work without additional expense to the County.

The locations of existing utilities, including underground utilities, which may affect the Work, are indicated on the Drawings or in the Specifications insofar as their existence and location were known at the time of preparation of the drawings. However, nothing in these Drawings or Specifications shall be construed as a guarantee that such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of the operations. The Contractor shall make all necessary investigations to determine the existence and locations of such utilities. Should uncharted or incorrectly charted utilities be encountered during performance of the Work, notify the Project Officer or designee immediately for instructions. The Contractor will be held responsible for any damage to and maintenance and protection of existing utilities and structures, of both public and private ownership. However, if it is determined that such existing utility lines or structures require relocation or reconstruction or any other work beyond normal protection, then such additional work will be ordered under the terms of the clause entitled "Changes in Work." At all times, cooperate with the County and utility companies to keep utility services and facilities in operation.

The County assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the County. The County assumes no responsibility for any understanding reached or representation made concerning conditions which can affect the Work by any of its officers or agents before the execution of this Contract, unless that understanding or representation is expressly stated in this Contract.

2. PUBLIC CONVENIENCE

The Contractor shall at all times so conduct its Work as to ensure the least possible obstruction to traffic (vehicular, bicycle and pedestrian) and inconvenience to the general public, County employees, and the residents in the vicinity of the Work. Traffic shall be maintained in accordance with the approved MOT plan. No road, street or sidewalk shall be closed to the public except with the permission of the Project Officer or designee and or proper governmental authority. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor and included in the cost of the Work to ensure the use of sidewalks, trails, and transit facilities compliant with all applicable ADA and other regulations, as well as the proper functioning of all gutters, drainage inlets, drainage ditches, and irrigation ditches, which shall not be obstructed except as approved by the Project Officer or designee.

3. SAFETY AND ACCIDENT PREVENTION

The Contractor shall comply with, and ensure that the Contractor's employees and subcontractors comply with, all current applicable local, state and federal policies, regulations and standards relating to safety and health, including, by way of illustration and not limitation, the U.S. Department of Labor's Occupational Safety and Hazard Administration (OSHA) Construction Industry Regulations, the standards of the Virginia Occupational Safety and Health program of the Department of Labor and Industry for General Industry and for the Construction Industry, the Federal Environmental Protection Agency Standards and the applicable standards of the Virginia Department of Environmental Quality.

The Contractor shall provide, or cause to be provided, all technical expertise, qualified personnel, equipment, tools and material to safely accomplish the Work specified to be performed by the Contractor and subcontractor(s).

The Contractor shall identify to the County Project Officer at least one on-site person who is the Contractor's competent, qualified, and authorized safety officer on the worksite and who is, by training or experience, familiar with and trained in policies, regulations and standards applicable to the work being performed. The competent, qualified and authorized person must be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, shall be capable of ensuring that applicable safety regulations are complied with, and shall have the authority and responsibility to take prompt corrective measures, which may include removal of the Contractor's personnel from the work site.

The Contractor shall provide to the County, within 7 days of issuance of the Notice to Proceed, a copy of the Contractor's written safety policies and safety procedures applicable to the scope of work. Failure to provide this information within may result in cancellation of the Contract.

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all injury to persons and damage to

property either on or off the site, which occur as a result of the Contractor's prosecution of the Work.

The Contractor shall take or cause to be taken such additional safety and health measures as the County may determine to be reasonably necessary. Machinery, equipment, and all hazards shall be guarded in accordance with the safety provisions of the current version of "Manual of Accident Prevention" published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws. The Contractor is directed to the "Rules and Regulations Governing Construction, Demolition and All Excavation" and adopted by the Safety Codes Commission of Virginia, 1966, or latest edition, covering requirements for shoring, bracing, and sheet piling of trench excavations.

4. HAZARDOUS MATERIALS

Arlington County is subject to the Hazard Communication Standard, 29 CFR §1910.1200 (Standard). The Contractor agrees that it will provide or cause to be provided Safety Data Sheets (SDS) required under the Standard for all hazardous materials supplied to the County or used in the performance of the work. Such SDS shall be delivered to the County no later than the time of actual delivery of any hazardous materials to the County or use of such material in the performance of work under the Contract by the Contractor or its subcontractors, whichever occurs first. Container labeling meeting the requirements of the Standard shall be appropriately affixed to the shipping or internal containers. The County reserves the right to refuse shipments of hazardous materials not appropriately labeled, or when SDS have not been received prior to or at the time of receipt of the shipment for use by the County or for use by the Contractor in the performance of the Contract, or whenever the material is delivered in a manner inconsistent with any applicable law or regulation. Any expenses incurred due to the refusal or rejection of SDS are the responsibility of the Contractor. The Contractor shall comply with all federal, state, and local laws governing the storage, transportation, and use of toxic and hazardous materials. The Contractor shall maintain onsite an up to date SDS binder for all material used and delivered to the Project. The County Project Officer or his designee shall be allowed access to the SDS book at all times.

5. HAZARDOUS WASTE

Hazardous Waste Generator/Hazardous Waste Disposal: The County Board of Arlington County, Virginia and the Contractor shall be listed as Co-generators. The Contractor shall assume all the duties pertaining to the Waste Generator, including signing the Waste Shipment Record ("WSR") and manifest. The Contractor shall supply the County Project Officer with the executed original Owner's Copy of the WSR, as required by applicable regulatory agencies within 35 days from the time the waste was accepted by the initial waste transporter, and prior to request for final payment. A separate WSR shall be submitted for each shipment to the disposal site.

Delayed Waste Shipment Records: The Contractor shall report in writing to the EPA Region III office within 45 days if an executed copy of the WSR is not received from the operator of the disposal site. The report to the EPA regional office shall include a copy of

the original WSR and a cover letter signed by the Contractor stating the efforts taken to locate the hazardous waste shipment and the results of those efforts.

Temporary Hazardous Waste Storage Prohibited: The Contractor shall not temporarily store hazardous waste unless pre-approved by the County in writing. If so approved, hazardous waste stored off-site in a temporary facility shall be monitored and records shall be kept on the number of containers, size, and weight. The Contractor shall inform the County when the hazardous waste is to be transported to the final disposal site. The County has the right to inspect the temporary site at any time. The Contractor shall submit copies of all relevant manifests, Waste Shipment Record(s), and landfill receipts to the County Project Officer prior to the request for final payment. All paperwork shall be signed by the Contractor and disposal site operator as required.

6. ASBESTOS

Whenever and wherever during the course of performing any work under this Contract the Contractor discovers the presence of asbestos or suspects that asbestos is present, the Contractor shall stop work immediately, secure the area, notify the County Project Officer immediately and await positive identification of the suspect material. During the downtime in such a case, the Contractor shall not disturb any surrounding surfaces but shall protect the area with suitable dust covers. Work shall not proceed without an Asbestos-Related Work Authorization executed by the County Asbestos Program Manager.

7. CROSSING UTILITIES

When construction crosses highways, railroads, streets, waterways, or utilities under the jurisdiction of State, County, City, or other public agency, public utility, or private entity, the Contractor shall secure written permission where necessary from the proper authority before executing such new construction. A copy of such written permission must be filed with the County before any work is started. The Contractor shall be required to furnish a release from the proper authority before Final Acceptance of the Work.

8. OVERHEAD HIGH VOLTAGE LINES SAFETY ACT

If any work required herein will be performed within ten feet of an overhead high voltage line, the provisions of Virginia Statute 59.1-406, et. seq., "Overhead High Voltage Line Safety Act" (Act) shall apply. The "person or contractor responsible for the work to be done", as that term is used in the Act, will be interpreted to mean the Contractor. The Contractor shall notify the owner or operator of the high voltage line in the manner prescribed in Section 59.1-411 of the Act in sufficient time prior to the time work is to be commenced to avoid any delays in the work. The County will not pay for lost time, profits, or permit any extension of the work for any delays caused by the failure of the Contractor to make such arrangements in a timely manner. All costs for the work shall be paid by the Contractor. The County shall reimburse the Contractor for the actual reasonable cost paid to the owner or operator of the high voltage line by the Contractor on presentation to the County by the Contractor of original invoices from the owner or operator of the high voltage line in the same manner as for other Contractor invoices submitted for work performed. Retention, if applicable to the Contract, shall

not be withheld from the payment to the Contractor by the County for this work. No processing, administrative, or other charges above the actual amount charged by the owner or operator of the high voltage line shall be paid to the Contractor by the County.

9. SANITARY PROVISIONS

The Contractor shall provide and maintain such sanitary accommodations for the use of the Contractor's employees and those of its subcontractors as may be necessary to comply with the requirements and regulations of OSHA and of the local and State departments of health.

10. SITE CLEAN-UP AND WASTE DISPOSAL

The Contractor shall frequently remove and properly dispose of all refuse, rubbish, scrap materials, and debris from the site resulting from the Contractor's operations during the performance of this contract. The Contractor shall ensure the work site presents a neat and orderly appearance at all times. The Contractor shall isolate any and all dumpsters, trash cans and recycling bins provided for the Project from public use until Final Acceptance.

Unless otherwise stated, the Contract Amount and any unit prices shall include all costs and fees for removal and disposal of all waste and debris, whether disposed of at a County site or at any other location.

The Contractor shall remove all surplus material, false work, temporary structures including foundations thereof, and debris resulting from the Contractor's operations at work completion and before Final Acceptance. The County shall reserve the right to remove the surplus material, false work, temporary structures including foundations and debris. The County will restore the site to a neat, orderly condition if the Contractor fails to do so. The County shall be entitled to offset such cost against any sums owed by the County to the Contractor under this Contract.

11. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

When the Project includes an approved SWPPP, the Contractor shall strictly abide by this plan which includes: a Pollution Prevention (P2) Plan, an Erosion and Sediment Control (E&S) Plan, and a Stormwater Management Plan. If the Contractor proposes to deviate from this approved plan, it shall be the Contractor's responsibility to coordinate and obtain approval from the County Project Officer prior to implementing any changes.

No separate payment shall be made by the County for SWPPP implementation, with the exception of E&S items as specified on the E&S plans or listed as pay items. The Contractor shall not be entitled to any additional payment for changes to the SWPPP which are the result of the Contractor's work schedule or resource allocation, weather delays, or other factors not controlled by the County.

F. PROGRESS AND COMPLETION OF THE WORK

1. NOTICE TO PROCEED
The Contractor shall be given written Notice to Proceed with the Work. Such Notice to Proceed shall state the date on which the Work is to be commenced, and every calendar day thereafter shall be counted in computing the actual Time for Completion.
2. TIME FOR COMPLETION
It is hereby understood and mutually agreed by and between the Contractor and the County that the Commencement Date, the rate of progress, and the Time for Completion of the Work to be done hereunder are essential conditions of the Contract. The Contractor agrees that the Work shall be started promptly upon receipt of a written Notice to Proceed in accordance with the accepted schedule. The Work shall be prosecuted regularly, diligently, and uninterruptedly at a rate of progress that will ensure full completion of the Project within the Time for Completion specified in the Contract Documents.
3. SCHEDULE OF COMPLETION
Unless otherwise specified, the Contractor shall within 10 business days after the Award Date, or prior to the pre-construction meeting, whichever occurs first, submit schedules which show the order in which the Contractor proposes to carry on the Work, with dates for starting and completing the various activities of the Work. The Contractor shall submit an updated schedule monthly with the request for partial payment. Review and acceptance by the County of the Contractor's schedule of completion shall in no way relieve the Contractor of its responsibility to complete the Work within the contract time. If the Work falls behind the schedule, the County may require the Contractor to prepare and submit, at no extra cost to the County, a recovery schedule indicating by what means the Contractor intends to regain compliance with the schedule. The recovery schedule must be submitted to the County for review by the date indicated in the County's written demand.
4. CONDITIONS FOR COMPLETION
 - a. **SUBSTANTIAL COMPLETION:** The Work will be considered Substantially Complete when all of the following conditions have been met and accepted by the Project Officer, and a Certificate of Substantial Completion has been issued:
 1. The Contractor has provided formal notice that the Work is substantially complete, and the Project Officer has agreed that the condition of the Work warrants a Substantial Completion inspection;
 2. The Contractor has provided a Punch List and that list has been reviewed and approved by the Project Officer. Failure to include an item on the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents;
 3. Final test reports as required by the Contract and certificates of inspection and approval required for use and occupancy;

4. Fire Marshal's report, if applicable;
 5. Approval forms and transfer documents for all utilities;
 6. All life safety systems, including fire alarms, visual and audios alarms, fire detectors and fire alarm annunciator system, sprinkler systems, and all mechanical and electrical systems are complete and working in an automatic mode, and the County has been adequately trained in the operation of the systems;
 7. The HVAC system Testing and Balancing Report and build air quality test results as required for LEED certification have been accepted by the Project Officer;
 8. Operation and Maintenance Manuals have been submitted for review;
 9. All documents and verification of training required in accordance with any Commissioning Plan;
 10. Mark-ups of construction drawings showing the Record or "Record" condition have been submitted for review and approval by the Project Officer;
 12. Entrances and egress pathways have been constructed and can remain clear of construction activities;
 13. A Certificate of Occupancy has been issued for the space by the County's Inspection Services Division;
 14. All Commissioning has performed and completed to the satisfaction of the Project Officer; and
 15. Schedule to complete the Punch List and value of Work not yet complete.
- b. Upon the Contractor providing notice that the Work is substantially complete, the Project Officer or designee will invite all relevant parties to perform an inspection of the Work, and any noted deficiencies or incomplete items not indicated on the Contractor's punch list will be added. All punch list items, whether generated by the Contractor or any other party on behalf of the County, shall be completed within thirty (30) days of the date of Substantial Completion, unless otherwise agreed to by the County due to seasonal or other extenuating circumstances.

- c. FINAL COMPLETION: The Work will be considered Finally Complete when all of the following conditions have been met and accepted and a Final Completion Notice has been issued by the Project Officer:
1. The Contractor has provided formal notice that the Work is complete, and the Project Officer has agreed that the condition of the Work warrants a Final Completion inspection;
 2. All construction deficiencies and punch list items have been closed and all construction deficiencies corrected and accepted by the Project Officer;
 3. All spare parts and attic stock have been delivered, stored in an orderly manner in a space designated by the Project Officer and a complete inventory list has been verified and accepted by the Project Officer;
 4. All warranties and manufacturer certificates and contact information for parties providing warranties have been delivered and accepted by the Project Officer;
 5. All final Operating and Maintenance manuals have been delivered and approved and accepted by the Project Officer;
 6. All final Record Drawings in .pdf format on a CD delivered and accepted by the Project Officer;
 7. All commissioning has been completed and any open construction items in the commissioning agent's report have been closed and accepted by the Project Officer; and
 8. All LEED documents and submittals, if applicable, to be provided by the Contractor or sub-contractors have been submitted and accepted by the Project Officer.
5. USE OF COMPLETED PORTIONS
The County shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding that the time for completing the entire Work or such portions may not have expired; but taking such possession and use shall not be deemed an acceptance of any work not done in accordance with the Contract Documents. If the Contractor claims that such prior use increases the cost or delays, the completion of remaining work, or causes refinishing of completed work, the Contractor may submit a claim for compensation or extension of time, or both.

G. MEASUREMENT AND PAYMENT**1. PAYMENTS TO CONTRACTOR**

The County will make partial payments, less retainage, to the Contractor monthly on the basis of the Contractor's written estimate of the work performed during the preceding calendar month as approved by the Project Officer or designee.

The Contractor's application for payment shall indicate the amount of work completed to date in a format consistent with the accepted bid and as indicated below:

- a. Lump Sum: For lump sum contracts, the Contractor shall provide to the Project Officer a Schedule of Values, and the application for payment will reflect the Schedule of Values and the amount of work completed in those units.

For contracts that include multiple lump sum line items, the application for payment shall reflect the percentage of work completed for each lump sum item. If requested by the Project Officer, the Contractor shall provide a Schedule of Values for each lump sum line item in the contract.

- b. Unit Price: The schedule of unit prices in the accepted bid shall be used as the basis for preparing the estimates, and each partial payment shall represent the total value of all units of work completed, computed at the unit prices stated in the Contract, less the aggregate of previous payments.

At the discretion of the Project Officer, payments may alternatively be based on actual quantities and site measurements taken in the field by County staff using the Contract Unit Prices.

If Stipulated Price Items are included in the contract, Work on such Stipulated Price Items shall be carried out only upon written order by the Project Officer. The payment for a Stipulated Price Item shall be made by the County to the Contractor at the related unit price specified in the 'Stipulated Price Items' section of the Bid Form on the same basis as the payment for any other regular Bid Item.

In addition to the amount of work completed to date, the application for payment shall indicate the aggregate of all previous payments for each line item, the retainage previously withheld, and the total payment requested this period.

The Contractor's application for payment will not be reviewed or processed unless an updated schedule is attached. The pay application shall also contain a certification by the Contractor that due and payable amounts have been paid by the Contractor, including payments to subcontractors, for work which previous payment was received by the Contractor from the County.

2. PAYMENT FOR STORED MATERIALS

When requested in writing by the Contractor, payment allowances may be made for material secured for use on the Project and secured at the project site. Such payments will only be made for materials scheduled for incorporation into the work within sixty (60) days.

Payment for materials stored offsite may be considered at the discretion of the Project Officer. Any such request shall be made in writing, and the Contractor shall provide photographs of materials stored offsite, bills of sale, and proof of insurance on the premises at which off-site materials are stored with the application for payment. Payment for stored materials may also be subject to additional requirements contained elsewhere in the Contract Documents.

3. PAYMENTS WITHHELD

The Project Officer or designee may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate for payment to the extent necessary to protect the County from loss on account of defective work not remedied or withhold payment for violation of any contract term or condition not remedied after sufficient notice given to the Contractor.

Any such withholding shall not result in any liability to the Contractor for damages.

4. COUNTY ORDERED CHANGES IN WORK

The County, without invalidating the Contract, may order extra Work or make changes by addition, deletion or revision in the Work, with the total Contract Amount being adjusted accordingly if applicable. Any change that will increase the Contract Amount more will require notice to sureties and require that Performance and Payment Bonds be increased by the Contractor. The increased Performance and Payment Bonds must be sent to the County's Office of the Purchasing Agent within 15 calendar days of the County's approval of such change. All such work shall be executed under the conditions of the original Contract, except that modification of the Time for Completion caused thereby shall be made at the time of approving such change.

a. The Project Officer or designee shall have authority to make minor changes in the Work by verbal order when such changes do not involve extra cost and are not inconsistent with the purpose of the Project. Otherwise, except in an emergency endangering life or property, no extra Work or change shall be made unless in pursuance of a written Construction Change Directive or Change Order and no claim for an addition to the Contract Amount or Contract Time shall be valid unless so ordered.

b. The Contractor shall review any County requested or directed change and shall respond in writing within 14 days after receipt of the proposed change stating the effect of the proposed change upon Contractor's work, including any increase or decrease in Contract time and price. The Contractor shall furnish the County an itemized breakdown of the quantities and prices used in computing the proposed change. The Contractor shall also furnish any sketches,

drawings, and or pictures to properly explain the change or impact to the Project Officer. It is the sole responsibility of the Contractor to provide adequate change order backup to satisfy the Project Officer.

- c. The value of any such extra work or change shall be proposed by the Contractor in one or more of the following ways: (a) by estimate in a lump sum; (b) by cost and fixed fee; (c) by unit price additions or deletions of quantities stated in the unit price contract; or (d) by any other method permitted under the Arlington County Purchasing Resolution. The Project Officer will determine the method appropriate based on the nature of the changes.
- d. If none of the aforementioned methods is agreed upon the Contractor shall proceed with the work without delay under force account, provided the Contractor receives a Construction Change Directive. In such case, the Contractor shall keep and present in such form as the Project Officer or designee may direct, a correct account of the cost, together with vouchers. The Project Officer or designee shall be permitted to verify such records on a daily basis and may require such additional records as are necessary to determine the cost of the change to the Work. The Project Officer or designee shall certify to the amount due to the Contractor, including a reasonable lump sum allowance for overhead and profit. A complete accounting of the extra cost shall be made within 14 days after completion of the work involved in the claim. Refer to Paragraph G.5, *Force Account Work*, below for a description of allowable costs when work is performed under force account.
- e. A cost proposal for a change in the Work shall provide a complete breakdown itemizing the estimated quantities and costs of labor, materials, and equipment (base cost) required in addition to any markup used. The allowable percentage markups for overhead and profit for a non-force account change to the Work performed by the Contractor's own forces or performed by the Subcontractor shall be negotiated based on the nature, size, and complexity of the Work involved but shall not exceed the percentages for each category listed below.
 - 1) Subcontractor's markup for overhead and profit for the work it performs in a change to the Work shall be a maximum of fifteen (15%).
 - 2) Contractor's markup for overhead and profit on the Subcontractor's base cost in a change to the Work shall be a maximum of ten percent (10%).
 - 3) Contractor's markup for overhead and profit (including bonds and insurance) for work it performs in a change to the Work shall be a maximum of fifteen percent 15%.
 - 4) The markup for overhead and profit of a sub-subcontractor at any tier on a change to the Work it performs shall be a maximum of fifteen percent (15%). The Contractor and all intervening tiers of

subcontractors' markup on such sub-subcontractor's base cost in the change to the Work shall not exceed a total of ten percent (10%).

- f. Base Cost is defined as the total of labor, material, and equipment costs, it does not include markup for overhead and profit. The labor costs include only the costs of employees directly constructing or installing the change in the Work and exclude the costs of employees coordinating or managing the work.
- g. The allowable percentage markups for overhead and profit stated above shall compensate the Contractor, subcontractor, and sub-subcontractor for all other costs associated with or relating to the change to the Work including by way of illustration and not limitation, general conditions, supervision, field engineering, coordination, insurance, bond(s), use of small tools, incidental job costs, and all other general and administrative home and field office expenses.
- h. Allowable costs for changes in the Work shall not include home office expenses including payroll costs for the Contractor's officers, executives, administrators, project managers, estimators, clerks timekeepers, and other administrative personnel employed by the Contractor, whether at the Site or in the Contractor's principal or branch office for general administration of the Work. These costs are deemed overhead included in the percentage markups in Subsection (e) above.
- i. If the change to the Work also changes the Time for Completion by adding days to perform the Work, an itemized accounting of the following Site direct overhead expenses for the change to the time may be considered as allowable costs for compensation in addition to the base cost indicated above:
 - 1) site superintendent's pro-rata salary
 - 2) temporary site office trailer expense
 - 3) temporary site utilities including basic telephone service, electricity, heat, water, and sanitary/toilet facilities.

All other direct and indirect overhead expenses are considered covered by and included in Subsection (e) markups above. In no case shall subcontractor extended overhead be submitted or considered. The County does not have a direct contractual relationship with any subcontractor or supplier and therefore will not direct, discuss or negotiate with subcontractors employed by the Contractor.

- j. If Contractor requests an extension to the Time for Completion due to changes in the Work it must provide to the Project Officer adequate documentation substantiating its entitlement for the time extension. The documentation must demonstrate an anticipated actual increase in the time required to complete the Work beyond that allowed by the Contract as adjusted by prior changes to the Work, not just an increase or decrease in the time needed to complete a portion of the total Work. In the event a Critical Path Method (CPM) schedule is

required by the Contract, no extension to the Time for Completion shall be granted unless the additional or change to the Work increases the length of the critical path beyond the Time for Completion as demonstrated on the approved CPM schedule or bar chart schedule. Any Float belongs to Arlington County. A written statement in addition to a CPM analysis shall be prepared explaining how no other sequence of work activities could have been performed to decrease the impact or eliminate the impact altogether. If requested by the Project Officer the Contractor must provide alternate documentation detailing the claim to the County's satisfaction.

5. FORCE ACCOUNT WORK

A Force Account may be used at the County's discretion and only when either 1) agreement on the valuation of a change cannot be made using the methods described in the preceding paragraph, *County Ordered Changes in the Work*, or 2) the County cannot firmly establish an applicable and acceptable estimate for the cost of the work because the level of effort necessary to perform and complete the work cannot be reasonably estimated or anticipated but can only be determined by performing the work. Because of the significant burden on the County to monitor and control the work, Force Account work is not a preferred method, and it shall be the responsibility of the Contractor to provide all necessary documentation and justification of costs. The rates for labor, equipment and materials to be used in cases of work performed on a force account basis will be compensated as documented below. No costs other than those explicitly listed below shall be allowed:

- a. Labor: Before any Force Account work begins, the Contractor shall submit for approval to the Project Officer the proposed hourly rates and associated labor costs (benefits and payroll burden) for all laborers and forepersons to be engaged in the work. The number of laborers and forepersons engaged in the work will be subject to regulation by the Project Officer and shall not exceed the number that the Project officer deems most practical and economical for the work. For all labor and forepersons in direct charge of the force account work, excluding general superintendence, compensation will be as follows:
 - 1) Certified Pay Rate: The Contractor will receive the actual rate of wage or scale as set forth in his most recent payroll for each classification of laborers, and forepersons who are in direct charge of the specific operation. The time allowed for payment will be the number of hours such workers are actually engaged in the work. If overtime work is authorized by the County, payment will be at the normal overtime rate set forth in the Contractor's most recent payroll.
 - 2) Benefits: The Contractor will be entitled to receive the actual cost for any fringe benefits that are regularly provided to the classes of laborers and forepersons engaged in the work and that are not included in the certified pay rate.

- 3) Payroll Burden: The Contractor will be entitled to receive the actual cost for all costs associated with required payroll taxes and payroll benefits not covered in 2) above, including:
 - Social Security Tax
 - Medicare Tax
 - Unemployment Tax
 - Worker's Compensation Insurance
 - Contractor's Public Liability Insurance
 - Contractor's Property Damage Liability Insurance
 - 4) If the Contractor is unable to provide the necessary documentation for Benefits and Payroll Burden as identified above, the Contractor will be entitled to an additive of 20% of the Certified Hourly Pay Rate as full and final compensation for Benefits and Payroll Burdens
 - 5) Overhead and Profit: The Contractor will be entitled to an additive of 10% on all properly documented and approved costs established in paragraphs 1), 2), 3), and 4) above for all administrative, overhead, and profit associated with labor costs.
 - 6) Subsistence and lodging allowances may be allowed by the Project Officer at the actual and documented costs for lodging and meals if the following conditions are met and the applicable rates and authorization for such costs are established prior to beginning the work. No additives for overhead, administrative, profit, or any other costs will be permitted for subsistence and lodging.
 - i. The specific Force Account work is outside the scope of the original contract, requires mobilization of a separate crew not intended to be used on the original contract, and the Contractor's base location is more than 50 miles from the work site, or
 - ii. Forces which have been working on the Contract will be used for the Force Account work and have been routinely staying overnight during the life of the Project, and the Force Account Work will warrant an extension of the contract time, and the distance from the Contractor's base location to the work site is more than 50 miles
- b. Materials: The Contractor will receive the actual cost of materials accepted by the Project Officer that are delivered and used for the work including taxes, transportation, and handling charges paid by the Contractor, not including labor and equipment rentals as herein set forth, to which 15 percent (15%) of the cost will be added for administration and profit. The Contractor shall make every reasonable effort to take advantage of trade discounts offered by material suppliers. Any discount received shall pass through to the County. Salvageable temporary construction materials will be retained by the County, or their appropriate salvage value shall be credited to the County, at the County's

discretion.

- c. Equipment: For all equipment other than small tools, the Contractor will be entitled to rental rates as established herein, and agreed to in writing before the work is begun. Transportation costs directly attributable to Force Account work will be as stated below. Small tools will be considered any equipment which has a new cost of \$1000 or less, and will not be eligible for any compensation. The Contractor shall provide the Project Officer a list of all equipment to be used in the work. For each piece of equipment, the list shall include the serial number; date of manufacture; location from which equipment will be transported; and, for rental equipment, the rental rate and name of the company from which it is rented. The number and types of equipment engaged in the work will be subject to regulation by the Project Officer as deemed to be the most practical and economical for the work. No compensation will be allowed for equipment which is inoperable due to mechanical failure. Compensation for equipment shall be as follows:
- 1) Hourly Base Equipment Rental Rates (Owned Equipment) – For equipment authorized for use in the Force Account work that is owned by the Contractor, the Contractor shall be entitled to an Hourly Base Rental Rate as detailed in the following paragraphs. The Hourly Base Rental Rate for Contractor owned equipment will not exceed 1/176 of the monthly rates of the schedule shown in the *Rental Rate Blue Book* modified in accordance with the *Rental Rate Blue Book* rate adjustment tables that are current at the time the force account is authorized. The rates for equipment not listed in the *Rental Rate Blue Book* schedule shall not exceed the hourly rate being paid for such equipment by the Contractor at the time of the force account authorization. In the absence of such rates, prevailing rates being paid in the area where the authorized work is to be performed shall be used.
 - 2) Hourly Base Equipment Rental Rates (Rented Equipment) – If the Contractor does not possess or have readily available equipment necessary for performing the force account work and such equipment is rented from a source other than a company that is an affiliate of the Contractor, payment will be based on actual invoice rates when the rates are reasonably in line with established rental rates for the equipment in question and are approved by the Project Officer.
 - 3) Hourly Operating Rates – Hourly Operating Rates shall be as established in the Blue Book estimated operating cost per hour. This operating cost will be full compensation for fuel, lubricants, repairs, servicing (greasing, fueling, and oiling), small tools, and any and all incidentals. If rental rates for the equipment being used in the work are not listed in the Blue Book or otherwise readily available, the Hourly Operating Cost will be 15% of the established Hourly Base Rental Rate. If invoices for Rental Equipment include the furnishing of fuel, lubricants, repair, and

servicing, then the Contractor will not be entitled to any Hourly Operating costs for that equipment.

- 4) Equipment Usage - Equipment usage will be measured by time in hours of actual time engaged in the performance of the work. The Contractor shall be entitled to the applicable Hourly Base Equipment Rental Rate and Hourly Operating Rate for all approved Equipment Usage.
 - 5) Equipment Standby – Standby time is defined as the period of time equipment authorized for Force Account work by the Project Officer is available on-site for the work but is idle for reasons not the fault of the Contractor or normally associated with the efficient and necessary use of that equipment in the overall operation of the work at hand. Hourly rates for Contractor owned equipment on standby, will be at 50 percent (50%) of the rate paid for equipment performing work. Operating costs will not be allowed for equipment on Standby. When equipment is performing work less than 40 hours for any given week and is on standby, payment for standby time will be allowed for up to 40 hours, minus hours performing work. Payment for Standby will be allowed only for working days. Payment for Standby will not be made for the time that equipment is on the Project in excess of 24 hours prior to its actual performance in the force account work.
 - 6) Transporting Costs – When it is necessary to obtain equipment exclusively for Force Account work from sources beyond the Project limits and the Project Officer authorizes the transporting of such equipment to the Project site, the cost of transporting the equipment will be allowed as an expense. Where the transport requires the use for a hauling unit, the allowable expense will consist only of the actual cost incurred for the use of the hauling equipment, or the applicable Blue Book cost, whichever is less. When equipment is transferred under its own power, the allowable Transporting cost shall be 50% of the Hourly Base Equipment Rental Rate.
 - 7) Overhead and Profit – The Contractor shall be entitled to an additive of 10% on all appropriate and approved Equipment Rental, Operating, and Transporting costs as defined above.
- d. Subcontracting: The Contractor shall receive the cost of work performed by a subcontractor as determined in (a), (b), and (c) above. In addition, the Contractor will be allowed an allowance per the schedule below for administrative costs and profit.

Total Cost of Subcontract Work: Rate Schedule

\$0 - \$10,000	10%
> \$10,000	\$1,000 + 5 % above \$10,000

- e. Other Costs: The Contractor shall not be entitled to any costs associated with Force Account Work other than those specifically identified in this section.
 - f. Statements: Payments will not be made for work performed on a force account basis until the Contractor has furnished the Project Officer duplicate itemized statements of all costs of such work detailed as follows:
 - 1. Payroll indicating name, classification, date, daily hours, total hours, rate, and extension of each laborer, foreperson
 - 2. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of equipment
 - 3. Quantities of materials, prices, and extensions
 - 4. Transportation of materials
 - 5. Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the Force Account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock; that the quantity claimed was actually used; and that the price, transportation, and handling claimed represented his actual cost.
6. CLAIMS FOR EXTRA COST
If the Contractor claims that any event will give rise to a claim for an increase in the Contract Amount or that any instructions from the Project Officer, by drawings or otherwise, will incur him extra cost under the Contract, then, except in emergencies endangering life or property, it shall give the Project Officer written notice thereof no later than three (3) days of the event or instruction. The Contractor thereafter must provide to the Project Officer a full cost proposal within 14 days detailing the amount of additional compensation claimed, together with the basis therefore and documentation supporting the claimed amount. No such claims shall be valid unless so made. If the Project Officer agrees that such event or instructions involve extra cost to the Contractor, any additional compensation will be determined by one of the methods provided in the Changes in Work paragraph of these General Conditions as selected by the Project Officer. All pricing and supporting documentation requirements of the Changes in the Work clause shall apply to claims for extra cost deemed valid under this paragraph.
7. DAMAGES FOR DELAY; EXTENSION OF TIME OTHER THAN FOR WEATHER
The Contractor's relief for any claim for delay which is unreasonable, or caused by the acts and omissions of the County, or due to causes within the County's control, shall be an extension of the Time for Completion and/or the Contractor's direct costs which result from the delay, but only to the extent any damages for delay were actually caused by the County. The Contractor must give the Project Officer written notice of such delay and damages at the time they were incurred but in no event later than three (3) calendar days following the perceived onset of the delay. The Contractor's written notice shall specify the nature the delay claimed by the Contractor, the cause of the

delay, and the anticipated impact of the delay on the Contractor's work schedule. The Contractor thereafter must provide to the Project Officer a full claim within 14 days after cessation of the delay detailing the amount of additional contract time or compensation claimed, together with the basis therefor and documentation supporting the claim.

If the Contractor is entitled to compensation for delay which is unreasonable, or caused by the acts and omissions of the County, or due to causes within the County's control, and where there is no change in the Work, an itemized accounting of the following direct site overhead expenses will be considered as allowable costs to be used in determining the compensation due the Contractor: site superintendent prorata salary, temporary site office expense, temporary site facilities, and temporary site utilities including basic telephone service, electricity, heat, water, and sanitary/toilets. A fifteen percent (15%) markup of these expenses will be allowed to compensate the Contractor for home office and other direct or indirect overhead expenses.

If the Contractor submits a claim for damages pursuant to this Section, the Contractor shall be liable to the County for a percentage of all costs incurred by the County in investigating, analyzing, negotiating and litigating the claim, which percentage shall be equal to the percentage of the Contractor's total delay claim that is determined through litigation to be false or to have no basis in law or fact (Virginia Code §2.2-4335).

The Contractor's sole relief on any claims for delay which is reasonable, or not caused by the acts or omissions of the County, or due to causes not within the County's control, or Force Majeure, shall be an extension of the Time for Completion provided the Contractor gave the Project Officer timely written notice at the inception of such delay.

No extension of the Time for Completion or additional compensation, if applicable, will be granted for any delay unless the Contractor demonstrates the claimed delay directly impacts the Critical Path of the accepted CPM schedule or bar chart schedule, whichever is applicable, and any float has been consumed. Claims for compensation for direct costs which result from delay must be substantiated by adequate documentation clearly showing that the Work delayed was on the critical path of the approved CPM schedule or on the sequence of Work on the approved bar chart schedule, as modified, and that the additional costs incurred by the Contractor are directly attributable to the delay in the Work claimed.

8. TIME EXTENSIONS FOR WEATHER

The Contractor's sole relief on any claims for delay which is caused by abnormal weather shall be an extension of the Time for Completion provided the Contractor gave the Project Officer written notice no later than five (5) calendar days after the onset of such delay and provided the weather affected the Critical Path. A fully-documented claim for a time extension under this Section must be submitted no later than thirty (30) calendar days after the cessation of the delay. It shall be the Contractor's responsibility to provide the necessary documentation to satisfy the Project Officer that the weather conditions claimed were encountered, which may include daily reports by the

Contractor, copies of notification of weather days to the Project Officer, NOAA backup, and pictures from each day claimed.

The Time for Completion will not be extended due to inclement weather conditions which are normal, as defined below, for Arlington County. The Time for Completion includes an allowance for workdays (based on five (5) day workweek) which according to historical data may not be suitable for construction work. The Contractor may request extension to the Time for Completion if it can demonstrate unusual and disruptive weather conditions per the requirements below:

- a. That one or more of the Weather Conditions listed below was encountered; and,
- b. The occurrence of the Weather Condition(s) resulted in an inability to prosecute work which would have otherwise been performed on the day(s) the Weather Condition(s) occurred; and,
- c. The work which was not able to be completed was on the Critical Path and could not be completed **only** due to the Weather Condition(s) claimed.

The Project Officer will determine the Contractor’s entitlement to an extension of the Time for Completion. A time extension of no more than one (1) day will be granted for one (1) day of lost work which satisfies the requirements above, regardless of the number of Weather Conditions encountered. The Contractor’s sole relief shall be an extension of the Time for Completion and no claim for an increase in Contract Amount will be allowed.

The Weather Conditions listed below will be the only basis for consideration by the County, based upon the requirements listed above, as an extension of the Time for Completion due to inclement weather or weather-related site conditions.

Weather Condition #1: Unusually Heavy Precipitation - Figure 1 illustrates the anticipated monthly inclement weather due to precipitation (Rain Days). If the number of days with precipitation in excess of 0.10”, as recorded at Washington Reagan National Airport, exceeds the anticipated Rain Days, the Contractor will be entitled to an extension of one (1) day on the Time for Completion for every day in excess of the Rain Days illustrated in Figure 1. The anticipated value of Rain Days for partial months at the beginning and end of the Contract shall be evaluated on a pro-rated basis.

FIGURE 1

Average days with precipitation of 0.1” or more

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7	6	7	6	8	6	7	6	6	5	6	6

Weather days are not exclusive to the individual months that they represent in Figure 1. If weather days are not used in a previous month(s) they can be used to offset weather delays in subsequent months. This will be reviewed on a case by case basis and is subject to reconciliation at the end of the Project.

Condition #2: Temperature – The Contractor may be entitled to an additional day for every day that the recorded high temperature at Washington Reagan National Airport is 32 degrees Fahrenheit or less, that has not already been incurred under Weather Condition #1 above. This condition does not apply to vertical construction as defined by the Arlington County Vertical Construction Standards.

9. RELEASE OF LIENS

The County, before making final payment, shall require the Contractor to furnish a complete release of all liens arising out of this Contract. The Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the County, to indemnify him against any lien. If any lien remains unsatisfied after all payments have been made, the Contractor shall refund to the County all money that the latter may be compelled to pay in discharging such lien. However, the County may make payments in part or in full to the Contractor without requiring the releases or receipts, and the payments so made shall not impair the obligations of any Surety or Sureties on any bond or bonds furnished under this Contract.

10. FINAL PAYMENT

After the Contractor has completed all work and corrections to the satisfaction of the Project Officer or designee and delivered all maintenance and operating instructions, schedules, quantities, bonds, certificates of inspection maintenance record documents, and other items required as final payment submittal documents, the Contractor may make application for final payment following the procedure for progress payments. The Final Application for Payment shall be accompanied by all documents required in the Contract, including a complete and signed and notarized copy of the Final Payment Release Form as follows:

RELEASE AND REQUEST FOR FINAL PAYMENT

CONTRACT NUMBER: _____ CONTRACTOR NAME: _____

FINAL PAYMENT AMOUNT: _____

The Contractor hereby requests final payment in the amount indicated on the above referenced Contract. The Contractor agrees that its acceptance of final payment releases and forever discharges Arlington County and its officers, employees, servants and agents from any and all actions, claims, demands and liability of whatever nature now existing or which may hereafter arise as a result of or in connection with the above referenced Contract.

The Contractor certifies that all of the debts for labor, materials, and equipment incurred in connection with the above referenced Contract have been fully paid.

AUTHORIZED SIGNATURE DATE: _____

The date of Final Acceptance is the date on which the County issues the final payment for the work performed.

COMMONWEALTH OF VIRGINIA

COUNTY OF ARLINGTON

On this the ____ day of _____, 20__, before me, personally appeared _____, who acknowledged himself/herself to be _____ in the above instrument, and that he/she, as such _____, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing his/her name by himself/herself as _____.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

My Commission Expires: _____

DOCUMENT 003119 - EXISTING CONDITION INFORMATION

1.1 EXISTING CONDITION INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. Existing drawings that include information on existing conditions including previous construction at Project site are available for viewing at the office of Owner.
- C. Survey information that includes information on existing conditions, prepared by Arlington Department of Environmental Services, Engineering Bureau – Survey Section, dated December 5, 2019, is available for viewing as part of Drawings.
- D. Related Requirements:
 - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - 2. Document 003126 "Existing Hazardous Material Information" for hazardous materials reports that are made available to bidders.
 - 3. Document 003132 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.

END OF DOCUMENT 003119

DOCUMENT 003126 - EXISTING HAZARDOUS MATERIAL INFORMATION

1.1 EXISTING HAZARDOUS MATERIAL INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. An existing hazardous materials report encompassing the building exterior, including asbestos containing materials (ACMs) and lead-based paints (LBPs) as prepared by ECS and entitled LIMITED HAZARDOUS MATERIALS SURVEY - ROOFS AND EXTERIOR AREAS OF VIRGINIA HOSPITAL CENTER, dated November 22, 2019, is available for viewing as appended to this Document.
- C. An existing hazardous materials report encompassing the building interior, including asbestos containing materials (ACMs), lead-based paints (LBPs), and fluorescent fixtures containing mercury vapor lamps (MVL) as prepared by Aerosol Monitoring & Analysis, Inc. (AMA) and entitled HAZARDOUS MATERIALS INSPECTION REPORT OF THE VIRGINIA HOSPITAL CENTER FACILITY, dated November 4, 2019, is available for viewing as appended to this Document.
- D. Related Requirements:
 - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - 2. Document 003119 "Existing Condition Information" for information about existing conditions that is made available to bidders.
 - 3. Section 024116 "Structure Demolition" for notification requirements if materials suspected of containing hazardous materials are encountered.
 - 4. Section 024119 "Selective Structure Demolition" for notification requirements if materials suspected of containing hazardous materials are encountered.

END OF DOCUMENT 003126

LIMITED HAZARDOUS MATERIALS SURVEY



ROOFS AND EXTERIOR AREAS OF VIRGINIA HOSPITAL CENTER

601 S. CARLIN SPRINGS ROAD
ARLINGTON, VIRGINIA 22204

ECS PROJECT NO. 47:1424-A

FOR: ARLINGTON COUNTY

NOVEMBER 22, 2019





November 22, 2019

Mr. Jesus Almario
Arlington County
1400 N. Uhle Street
Room 403
Arlington, Virginia 22201

ECS Project No. 47:1424-A

Reference: Limited Hazardous Materials Survey, Roofs and Exterior Areas of Virginia Hospital Center, 601 S. Carlin Springs Road, Arlington, Virginia

Dear Mr. Almario:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide Arlington County with the results of the above referenced Limited Hazardous Materials Survey performed for select areas of Virginia Hospital Center located at 601 S. Carlin Springs Road in Arlington, Virginia. This report summarizes our observations, analytical results, findings, and recommendations related to the work performed. The work described in this report was performed by ECS in general accordance with the Scope of Services described in ECS Proposal Number 47:12540-EPR and the terms and conditions of the agreement authorizing those services.

ECS appreciates this opportunity to provide Arlington County with our services. If we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,

ECS Mid-Atlantic, LLC

Michael Hamill, CIH
Senior Project Manager
MHamill@ecslimited.com
703-471-8400

Steve Geraci, E.I.T., CHMM
Principal, Environmental Manager
sgeraci@ecslimited.com
2024002173

EXECUTIVE SUMMARY

The subject property is improved with a 138,405 square foot hospital building which was reportedly originally constructed in 1959. ECS's scope of work was limited to the roofs, interior window materials, and exterior areas of the northern one-story and two-story sections of the building. The southern multi-story medical office building was not included in this scope of work. The sample location drawings attached to the report identify which areas of the building are not included in the scope of work. At the time of our survey the northern one-story and two-story sections of the subject building were partially occupied and are currently scheduled to be demolished.

The purpose of the survey was to determine if asbestos-containing materials (ACMs) and lead-based paints (LBPs), are present on the northern one-story and two-story sections of the building. The survey was limited to exterior materials, roof materials, and materials associated with interior windows of the northern one-story and two-story sections of the building.

Based on the laboratory analysis of the bulk samples collected during the survey, the following materials were reported to contain asbestos:

- Roof Flashing Caulk;
- Exterior Window Caulks and Glazing;
- Exterior Door Caulk;
- Exterior Light Shield Insulation;
- Interior Window Glazing.

The lead-based paint survey was performed by a Commonwealth of Virginia licensed Lead Inspector. Painted and/or glazed surfaces were assessed for lead content using a Direct-Read X-Ray Fluorescence (XRF) Spectrometer. Lead-Based Glaze was identified on the following building materials/components:

- Metal Roof Joists;
- Exterior Metal Door Components.

In addition to survey for ACMs and LBPs, ECS surveyed portions of the building for various materials classified as Hazardous Waste or Universal waste which may require special handling or disposal if removed from the building which is referenced below:

- Exterior High-Intensity Discharge Lamps.

The executive summary is an integral portion of this report, however, ECS recommends the report be read in its entirety.

TABLE OF CONTENTS		PAGE
1.0	SITE DESCRIPTION	1
2.0	PURPOSE	1
3.0	METHODOLOGY	1
3.1	Asbestos-Containing Materials	1
3.2	Lead in Paint and Surface Coatings	2
3.3	Universal Waste and Suspect Liquid PCB-Containing Equipment	2
4.0	RESULTS	3
4.1	Asbestos-Containing Materials	3
4.2	Suspect or Assumed Asbestos-Containing Materials	5
4.3	Lead in Paint and Surface Coatings	5
4.4	Universal Waste and Liquid Suspect PCB-Containing Equipment	6
4.4.1	Suspect Polychlorinated Biphenyl (PCB) Containing Ballasts and Equipment	6
4.4.2	Mercury-Containing Components	6
5.0	RECOMMENDATIONS AND REGULATORY REQUIREMENTS	7
5.1	Asbestos-Containing Materials	7
5.2	Lead in Paint and Surface Coatings	8
6.0	LIMITATIONS	8

TABLE OF APPENDICES

Appendix I: Drawings

Appendix II: Site Photographs

Appendix III: Asbestos Bulk Sample Results

Appendix IV: XRF Lead-Based Paint Readings

Appendix V: Laboratory Report(s)

Appendix VI: EPA Generator ID Form 8700-12

Appendix VII: Certifications/Licenses

1.0 SITE DESCRIPTION

The subject property is improved with a 138,405 square foot, hospital building reportedly originally constructed in 1959. The hospital building consists of multiple different wings/additions which appear to have been constructed during different renovation periods.

The two-story section of the building which connects the northern one-story and two-story sections with the southern multiple story section of the building is referred to as the connecting building. The connecting building appeared to be of a unique construction compared to the rest of the northern one-story and two-story sections of the building.

ECS's scope of work was limited to the roofs, interior window materials, and exterior areas of the northern one-story and two-story sections of the building. The attached southern medical office building was not included in this scope of work. The sample location drawings attached to the report identify which areas of the building that are excluded from the scope of work. At the time of our survey the northern one-story and two-story sections of the subject building were partially occupied and are currently scheduled to be demolished.

2.0 PURPOSE

The purpose of the Limited Hazardous Materials Survey was to identify asbestos-containing materials (ACMs), lead-based paint (LBP), universal waste and suspect liquid poly-chlorinated biphenyl (PCB) containing equipment in fixtures on the roofs, interior windows, or exterior portions of the northern one-story and two-story sections of the building which may require special handling and/or disposal prior to the planned demolition of the building..

The identification of ACMs may require trained labor, regulated work practices, and special disposal. The identification of LBP or other lead hazards may require disclosure to contractors and monitoring of lead exposure. The identification of other regulated materials such as universal waste may require personal protective equipment, training, special handling, packaging, and disposal.

3.0 METHODOLOGY

ECS performed the authorized Scope of Services in general accordance with our proposal, standard industry practice(s) and methods specified by regulation(s) for the identification of Asbestos-Containing Materials (ACMs), Lead-Based Paints (LBPs), and universal waste and suspect liquid PCB-containing equipment and fixtures.

3.1 Asbestos-Containing Materials

The non-destructive asbestos survey was performed by an asbestos inspector who has received EPA accredited training and is licensed by the Commonwealth of Virginia. Samples of suspect ACMs were collected utilizing hand tools and placed into individual, labeled plastic bags. Unique bulk suspect ACM samples were submitted to Scientific Analytical Institute, Inc. in Greensboro, North Carolina for analysis via Polarized Light Microscopy (PLM) in accordance with current EPA-600 methodology. Materials consisting of additional layers were analyzed separately. Scientific Analytical Institute, Inc. is

listed as an accredited laboratory by the National Voluntary Laboratory Accreditation Plan (NVLAP) managed by the National Institute of Standards and Technology (NIST) for bulk sample analysis by currently approved EPA methodology by PLM.

During the survey, ECS attempted to identify suspect ACMs in readily accessible areas. However, due to the destructive means required to identify some materials, certain areas were deemed inaccessible (i.e. behind walls or sub grade materials) and were not surveyed for suspect ACMs. Interior materials which are not associated with the window systems were not included in this survey. ECS was not able to access some interior windows due to building occupancy. Unidentified suspect ACMs may be located in these and/or other inaccessible areas.

Samples were collected in general accordance with EPA Standard 40 CFR 763 Subpart E, Asbestos Hazard Emergency Response Act (AHERA) and OSHA Standard 29 CFR 1926.1101 Inspection Protocol. Multiple samples of each unique material were submitted. Samples were analyzed using "Positive Stop" methodology. If one sample of a homogeneous material is reported to contain asbestos, the remaining samples of that material are not analyzed. EPA regulations stipulate that if one sample contains asbestos the entire quantity of that material contains asbestos, regardless of additional analysis.

3.2 Lead in Paint and Surface Coatings

The Lead-Based Paint (LBP) survey was performed by a Commonwealth of Virginia licensed Lead Risk Assessor using a X-Ray Fluorescence (XRF) Spectrometer to identify lead concentrations in painted and glazed surfaces.

The survey was conducted utilizing the U.S. EPA definition of LBP. Under this definition, painted surfaces which contain lead in concentrations equal to or greater than 1.0 milligrams per square centimeter ($\geq 1.0 \text{ mg/cm}^2$) are classified as coated with LBP. Paints with concentrations of lead detectable by the XRF are considered lead-containing paints. Additionally, fixtures or components that are manufactured with a factory applied glazing (i.e., sinks, toilets, ceramic tiles, etc.) are tested as these factory-applied finishes often contain lead. Activities which disturb lead-containing paints and glazing (while not lead-based paints by the U.S. EPA definition) are regulated by OSHA (29 CFR 1926.62).

Because the current or proposed use of the property is not residential or child-occupied, the scope of the LBP survey was not conducted in accordance with HUD Chapter 7 requirements. This representative survey included taking readings from walls, windows, doors, and miscellaneous components. Walls are listed by letter with wall "A" being the entrance of the subject building, proceeding clockwise to "B, C, D", etc.

3.3 Universal Waste and Suspect Liquid PCB-Containing Equipment

ECS performed a visual survey of the building(s) exterior for the presence of universal waste materials and suspect liquid PCB-containing equipment. ECS entered the accessible areas to identify universal waste materials including batteries, stored pesticides, mercury-containing equipment and lamps. Additionally, lamp ballasts suspected of containing PCBs and lead-containing equipment were documented if observed.

No sampling or other characterization was performed as part of this scope of service. Additionally, ECS did not access any energized electrical equipment or other equipment/devices which were in use or that may pose a hazard to ECS personnel or building occupants.

4.0 RESULTS

The following is a summary of laboratory results, findings and observations.

4.1 Asbestos-Containing Materials

An Asbestos-Containing Material (ACM) is defined as any material containing more than one percent (>1%) asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, PLM. Materials are categorized by the U.S. EPA in the following categories:

- Friable ACMs are defined as any ACM that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure. Non-friable ACMs are defined as any ACM that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- Category I non-friable ACM are listed as following: packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than one percent (>1%) asbestos.
- Category II non-friable ACM are listed as any material, excluding Category I non-friable ACM, containing more than one percent (>1%) asbestos.

Regulated Asbestos Containing Materials (RACM) are friable ACM or non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, been pulverized, or reduced to powder in the course of renovation and/or demolition operations.

Six of the bulk samples submitted for analysis were reported to contain asbestos in detectable concentrations. These materials are summarized below. In total, 182 bulk samples were submitted to the laboratory of which 197 layers were analyzed. A complete list of the sampled materials submitted for analysis and sample locations are located in the Appendix of this report. Additional details regarding the overall locations of the materials identified as asbestos-containing are provided further in the report. Photographs of collected samples reported as asbestos-containing are also located in the Appendix of this report.

Summary of Asbestos-Containing Materials Identified

Location	Material Description	Analytical Results	Category	Estimated Quantity
Roof	Multiple Layered Flashing Caulk - Black Caulk Only	7% Chrysotile	Category II Non-Friable	50 LF
Exterior Windows Throughout	Gray Window Glazing	2% Chrysotile	Category II Non-Friable	6,000 LF
Exterior Windows Throughout	Multiple Layered Window Caulk - White Caulk	2% Chrysotile	Category II Non-Friable	3,000 LF
Exterior Doors	Tan Door Caulk	2% Chrysotile	Category II Non-Friable	500 LF
Exterior Soffits	Light Shield Insulation	60% Chrysotile	Friable	6 EA
Interior - Connecting Building Windows	Black Window Glazing	5% Chrysotile	Category II Non-Friable	275 LF

Interior Window Materials:

The section of building which connects the northern one-story and two-story sections with the southern multiple story section of the building appeared to have a distinct window system which is unique to the connecting building. The interior black window glaze on the connecting building windows was reported to contain asbestos. The windows are approximately four feet wide by six feet tall. Including a 20% contingency factor, approximately 275 linear feet of interior black window glazing was observed.

Exterior Materials:

Asbestos-containing multiple layered flashing caulk was observed on the parapet wall adjacent to the southern multiple story section of the building. The asbestos-containing multiple layered flashing caulk appeared to be isolated to the connecting building parapet wall. Including a 20% contingency factor, approximately 50 linear feet of asbestos-containing multiple layered flashing caulk is associated with the parapet wall.

The asbestos-containing exterior gray window glazing was observed on the majority of exterior windows. Including a 20% contingency factor, approximately 6,000 linear feet of asbestos-containing exterior gray window glazing is located on exterior windows of the northern one-story and two-story sections of the building.

The asbestos-containing exterior white window caulk was observed on the majority of exterior windows. Including a 20% contingency factor, approximately 3,000 linear feet of asbestos-containing exterior white window caulk is located on exterior windows of the northern one-story and two-story sections of the building.

The asbestos-containing exterior tan door caulk was observed on several exterior doors. Including a 20% contingency factor, approximately 500 linear feet of asbestos-containing exterior tan door caulk is located on exterior doors around the northern one-story and two-story sections of the building.

An asbestos-containing light shield insulation was observed underneath the several exterior soffits of the building. The asbestos-containing light shield insulation on one of the southeast soffits was observed in a damaged condition. Approximately 6 pieces of light shield insulation were observed on exterior soffits.

4.2 Suspect or Assumed Asbestos-Containing Materials

Due to the inaccessibility or the destructive means that asbestos sampling requires, additional suspect ACMs may remain within the building hidden behind inaccessible areas that include, but are not limited to, sub-grade walls, structural members, topping slabs, sub-grade sealants, flooring located below underlayments, areas behind exterior walls, pipe trenches, and subsurface utilities, etc. These areas were deemed inaccessible and were not assessed.

If these materials are discovered during construction activities, they should be presumed to contain asbestos and be treated as ACMs or be sampled immediately upon discovery and prior to disturbance for asbestos content by a certified asbestos inspector in accordance with 29 CFR 1926.1101.

Based upon our past experience in the identification of ACMs in similarly constructed buildings, the following additional suspect ACMs may also be located in inaccessible areas of the structure:

- Interior Materials within the Northern One-Story and Two-Story Sections of the Building;
- Interior and Exterior Materials of the Southern Multiple Story Section of the Building.

4.3 Lead in Paint and Surface Coatings

Lead-based paint is defined by the Commonwealth of Virginia as any paint or other surface coatings that contain lead greater than or equal to 1.0 mg/cm² by XRF analysis (or 0.5% by weight via bulk paint chip analysis). A list of the materials which were reported to have lead based paint associated with them can be found in the summary table below.

Paint and surface coatings which contain detectable concentrations of lead considered "lead-containing paints". Since OSHA has no specific action level for lead in paint, all paint on the site found to have a measurable concentration of lead should be assumed to be lead containing. Work performed which may disturb lead-containing paint is regulated under OSHA as referenced under 29 CFR 1926.62. A total of 100 readings were collected during the survey, including calibration readings.

Paint and other surface coatings which are defined by applicable regulation as lead-based paints are summarized in the table below and photographs of lead-based paint identified are located in the Appendix.

Summary of XRF Lead-Based Paint Results

Location	Color	Substrate	Component
Roof	Red	Metal	Beam
Exterior	Dark Gray	Metal	Door Face
Exterior	Dark Gray	Metal	Door Face
Exterior	Brown	Metal	Door Face
Exterior	Brown	Metal	Door Face
Exterior	Gray	Metal	Door Face

4.4 Universal Waste and Liquid Suspect PCB-Containing Equipment

The disposal of fixtures and equipment in buildings which contain various substances such as mercury or lead are regulated by local, state, and federal regulation. Collectively most mercury-containing materials and batteries which may contain lead, along with stored pesticides are classified as "Universal Waste". The disposal of lamp ballasts and electrical transformers which contain suspect PCB-containing oils is also regulated at the state and federal level.

4.4.1 Suspect Polychlorinated Biphenyl (PCB) Containing Ballasts and Equipment

Polychlorinated biphenyls (PCBs) are toxic coolants or lubricating oils used in some electrical transformers and capacitors, hydraulically-operated equipment, light ballasts, and other similar equipment.

As part of our survey, ECS attempted to identify potential liquid PCB containing materials and equipment. At the time of the Limited Hazardous Materials Survey, ECS visually observed several electrical transformers, electrical capacitors, and hydraulically-operated equipment which may contain PCBs.

4.4.2 Mercury-Containing Components

The EPA classifies mercury as both hazardous and toxic. The survey included observations for equipment which could contain mercury, such as thermostats, transformers, fluorescent lamps, and switch-containing devices.

Exterior mounted spot lights should be assumed to contain mercury within the lamps.

5.0 RECOMMENDATIONS AND REGULATORY REQUIREMENTS

Based on our understanding of the purpose of the Limited Hazardous Materials Survey, the results of laboratory analysis, and our findings and observations, ECS presents the following recommendations.

5.1 Asbestos-Containing Materials

ECS recommends where a material type has been identified as asbestos containing that other materials with similar color, texture, age and size be assumed to contain asbestos. Please refer to Section 4.1 for a complete list of building materials that were reported positive for asbestos and to Section 4.2 for materials that were assumed to contain asbestos.

Asbestos-containing materials to be disturbed as part of the demolition must be properly removed by a Virginia-licensed asbestos abatement contractor prior to disturbance by construction activities. The Commonwealth of Virginia requires 20 calendar-days notice prior to the removal of friable ACM. The EPA requires 10 working days notice prior to removal of regulated ACM (RACM) in quantities greater than or equal to 160 square feet, 260 linear feet, or 35 cubic feet. Notification requirements in general will be dependent on the means/methods used by the contractor to abate these materials.

Federal, state, and local regulations require asbestos-containing materials be removed prior to disturbance by demolition operations. However If the building is to be demolished, by regulation, Category I non-friable materials and in some instances Category II materials may remain in place during demolition under the following provisions: The Contractor must have appropriate training and/or use certified personnel; must notify appropriate state and federal agencies including US EPA (10 Day Demolition Notification), the debris must remain wet during demolition and cannot become friable; the contractor cannot compact the debris once the building is demolished with Category I/II non-friable materials present. Salvage of materials is also prohibited once the building is demolished and Category I/II non-friable materials are mixed in the debris. The landfill receiving the waste must also be notified in writing that it is receiving Category I/II non-friable materials, and it must acknowledge that it can accept this type of waste.

If ACMs are to be removed, it is recommended that an industrial hygienist monitor the project. This involves collecting air samples from within and outside abatement work areas to monitor the asbestos abatement contractor's work practices over the course of the project. The industrial hygienist should evaluate if the asbestos abatement work is in accordance with project specifications, U.S. EPA regulation 40 CFR Part 61-National Emission Standards for Hazardous Air Pollutants Subpart M: National Emission Standard for Asbestos, and U.S. Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1926.1101 - Asbestos in Construction. The industrial hygienist should assess each work area to monitor the removal of ACMs. Only after the industrial hygienist has determined the identified ACMs have been removed should final clearance air samples be collected (if necessary).

Suspect ACMs not observed due to inaccessibility or not sampled due to the destructive means that sampling would require may also be encountered during construction activities. At the time of the survey, only limited destructive means were used to locate or sample suspect ACMs; therefore, additional suspect ACMs may remain within inaccessible areas that include, but are not limited to, [sub-grade walls, structural members, topping slabs, exterior areas, sub-grade sealants, flooring

located below underlayments, vapor barriers, pipe trenches and other subsurface utilities, etc.] If additional suspect ACMs are uncovered which were not accessible during this survey, it is recommended that these materials either be assumed to contain asbestos or be sampled prior to disturbance upon discovery for asbestos content by an asbestos inspector in accordance with 29 CFR 1926.1101.

Should any identified ACM remain in place, ECS recommends the development and implementation of a site-specific Asbestos Operations and Maintenance Plan detailing routine maintenance and repair operations, contractor notification procedures, and all other requirements under OSHA - reference 29 CFR 1926.1101.

5.2 Lead in Paint and Surface Coatings

6.0 LIMITATIONS

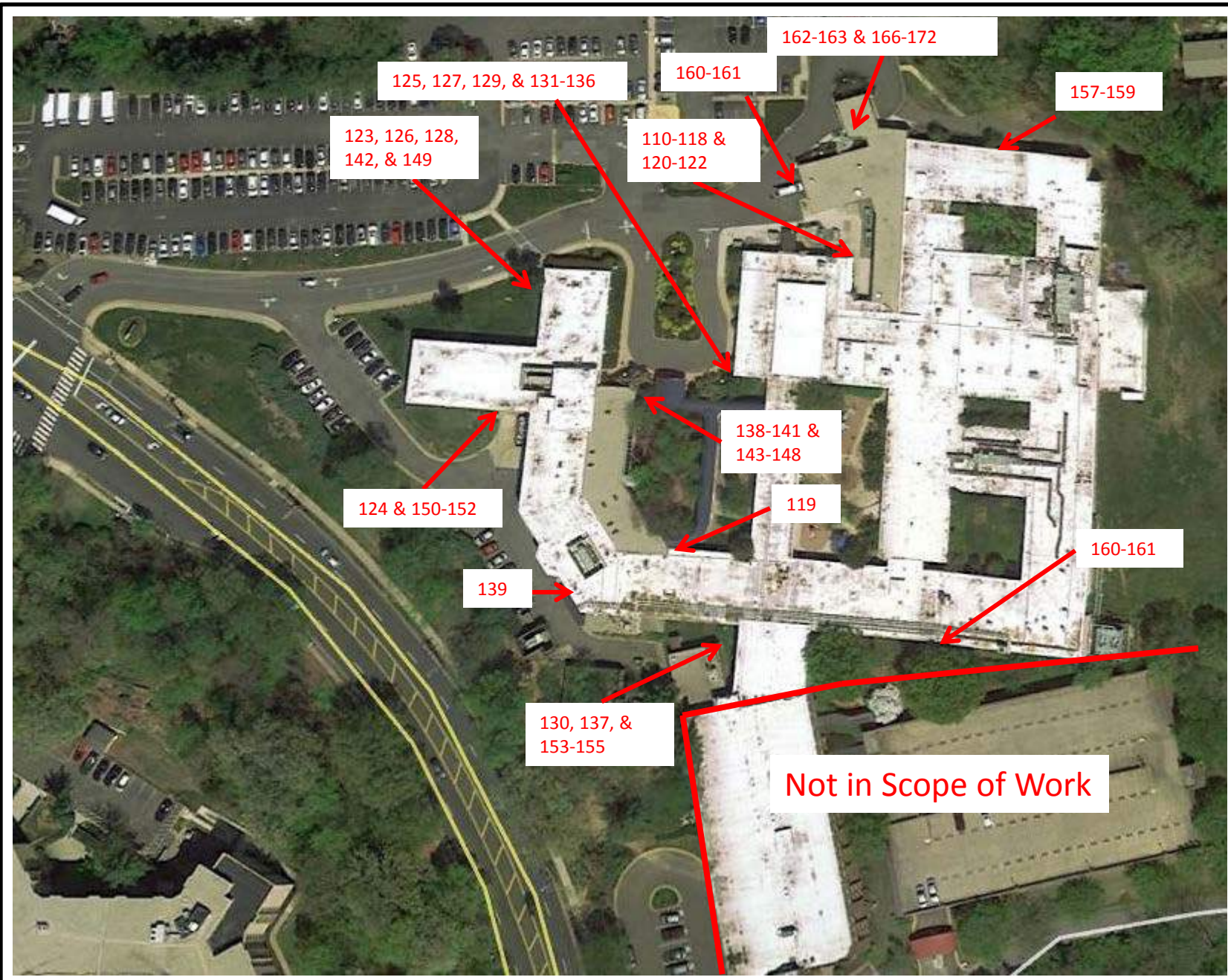
The conclusions and recommendations presented within this report are based upon a reasonable level of assessment within normal bounds and standards of professional practice for a site in this particular geographic setting. ECS is not responsible or liable for the discovery and elimination of hazards that may potentially cause damage, accidents, or injuries.

During this study, samples were submitted for analysis at an accredited laboratory via polarized light microscopy. As with any similar survey of this nature, actual conditions exist only at the precise locations from which samples were collected. Certain inferences are based on the results of this sampling and related testing to form a professional opinion of conditions in areas beyond those from which the samples were collected. No warranty, expressed or implied, is made.

The observations, conclusions, and recommendations pertaining to environmental conditions at the subject site are necessarily limited to conditions observed, and/or materials reviewed at the time this study was undertaken. No warranty, expressed or implied, is made with regard to the conclusions and recommendations presented within this report. This report is provided for the exclusive use of the client. This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties without the written consent of ECS and the client.

Our recommendations are in part based on federal, state, and local regulations and guidelines. ECS does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state, or federal public agencies, any conditions at the site that may present a potential danger to public health, safety, or the environment. Under this scope of services, ECS assumes no responsibility regarding any response actions initiated as a result of these findings. General compliance with regulations and response actions are the sole responsibility of the Client and should be conducted in accordance with local, state, and/or federal requirements.

Appendix I: Drawings



VHC Carlin Spring Property
601 S. Carlin Springs Road
Arlington, VA 22204



Exterior Sampling
Locations
Arlington County -
Environmental Services

SCALE NTS
Project No. 47:1424-A
Site Visits Oct. 17 & 18, 2019

Appendix II: Site Photographs



1 - View of the Northern One-Story and Two-Story Sections of the Building.



2 - View of Asbestos-Containing Multiple Layered Flashing Caulk on the Connecting Building Parapet Wall. Sample No. 61.



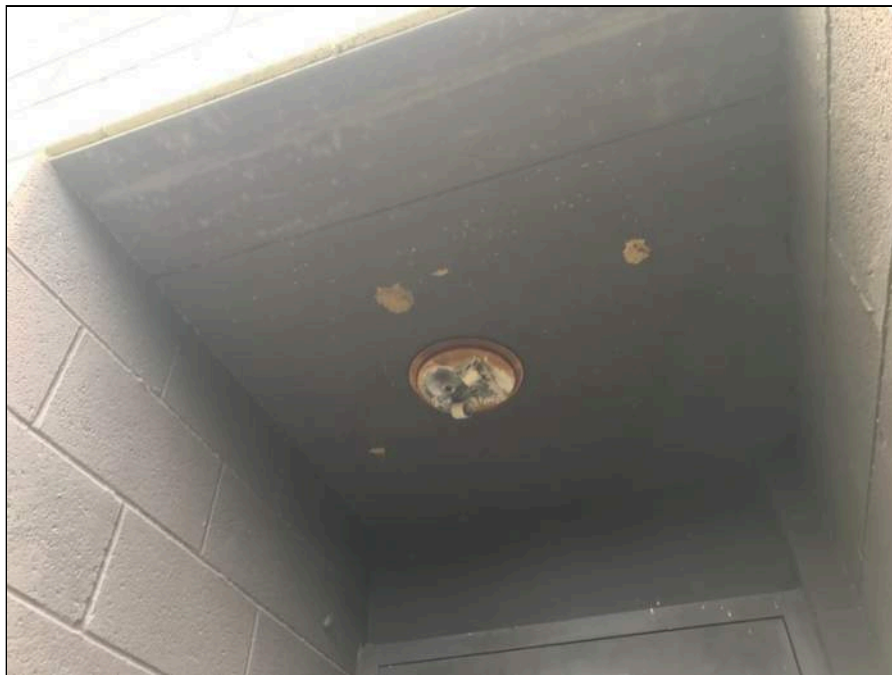
3 - View of Asbestos-Containing Gray Window Glaze on Exterior Windows. Sample No. 125.



4 - View of Asbestos-Containing White Window Caulk on Exterior Windows. Sample No. 127-B.



5 - View of Asbestos-Containing Tan Door Caulk on Exterior Doors. Sample No. 149.



6 - View of Damaged Asbestos-Containing Light Shield Insulation on Exterior Soffits. Sample No. 164.



7 - View of Asbestos-Containing Interior Black Window Glazing on Connecting Building Windows. Sample No. 179.



8 - View of Lead Based Paint on a Red Metal Beam on the Roof. XRF Reading No. 1031.



9 - View of Lead Based Paint on a Dark Gray Metal Door. XRF Reading Nos. 1050 and 1051.



10 - View of Lead Based Paint on a Brown Metal Door. XRF Reading No. 1056.



11 - View of Lead Based Paint on a Brown Metal Door. XRF Reading No. 1077.

Appendix III: Asbestos Bulk Sample Results



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
1 - A	Roof	White Skylight Caulk/Sealant	NAD
1 - B	Roof	Black Skylight Caulk/Sealant	NAD
2	Roof	Black Skylight Caulk/Sealant	NAD
3	Roof	White Vent Caulk	NAD
4	Roof	White Vent Caulk	NAD
5	Roof	Silver and Black Hood Sealant	NAD
6	Roof	Silver and Black Hood Sealant	NAD
7 - A	Roof	Top Stone Roof Membrane Layer (Black TPO)	NAD
7 - B	Roof	Top Stone Roof Membrane Layer (Felt)	NAD
8	Roof	Top Stone Roof Membrane Layer (Felt)	NAD
9	Roof	Second Stone Roof Membrane Layer (White Light Weight Gypsum)	NAD
10	Roof	Second Stone Roof Membrane Layer (White Light Weight Gypsum)	NAD
11	Roof	Bottom Stone Roof Membrane Layer (Tan Light Weight Gypsum)	NAD
12	Roof	Bottom Stone Roof Membrane Layer (Tan Light Weight Gypsum)	NAD
13 - A	Roof	Textured Soffit Plaster - Finish	NAD
13 - B	Roof	Textured Soffit Plaster - Base	NAD
14	Roof	Textured Soffit Plaster - Single Layer	NAD
15	Roof	Textured Soffit Plaster - Single Layer	NAD
16	Roof	CMU Wall Coating	NAD
17	Roof	CMU Wall Coating	NAD
18	Roof	CMU Wall Coating	NAD
19	Roof	Gray HVAC Duct Sealant	NAD
20	Roof	Gray HVAC Duct Sealant	NAD
21	Roof	Gray CMU Wall Flashing Caulk	NAD
22	Roof	Gray CMU Wall Flashing Caulk	NAD
23	Roof	Multiple Layer Brick Wall Flashing Caulk	NAD

Table Notes:

Bold = Asbestos-Containing Materials
N/A = Not Analyzed
NAD = No Asbestos Detected



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
24	Roof	Multiple Layer Brick Wall Flashing Caulk	NAD
25	Roof	White Stucco Sidding	NAD
26	Roof	White Stucco Sidding	NAD
27	Roof	White Stucco Sidding	NAD
28	Roof	Tan Door Caulk	NAD
29	Roof	Tan Door Caulk	NAD
30	Roof	Gray Window Caulk	NAD
31	Roof	Gray Window Caulk	NAD
32	Roof	Top Roof Membrane Layer (White TPO)	NAD
33	Roof	Top Roof Membrane Layer (White TPO)	NAD
34 - A	Roof	Second Roof Membrane Layer (ISO Board) - Felt	NAD
34 - B	Roof	Second Roof Membrane Layer (ISO Board) - Insulation	NAD
35 - A	Roof	Second Roof Membrane Layer (ISO Board) - Felt	NAD
35 - B	Roof	Second Roof Membrane Layer (ISO Board) - Insulation	NAD
36	Roof	Third Roof Membrane Layer (Pitch)	NAD
37	Roof	Third Roof Membrane Layer (Pitch)	NAD
38	Roof	Fourth Roof Membrane Layer (Perlite)	NAD
39	Roof	Fourth Roof Membrane Layer (Perlite)	NAD
40	Roof	Fifth Roof Membrane Layer (Pitch/ISO Board)	NAD
41	Roof	Fifth Roof Membrane Layer (Pitch/ISO Board)	NAD
42	Roof	Sixth Roof Membrane Layer (Gypsum)	NAD
43	Roof	Sixth Roof Membrane Layer (Gypsum)	NAD
44	Roof	Seventh Roof Membrane Layer (Pitch)	NAD
45	Roof	Seventh Roof Membrane Layer (Pitch)	NAD
46	Roof	Bottom Roof Membrane Layer (Gypsum)	NAD
47	Roof	Bottom Roof Membrane Layer (Gypsum)	NAD

Table Notes:

Bold = Asbestos-Containing Materials
N/A = Not Analyzed
NAD = No Asbestos Detected



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
48	Roof	Multiple Layer Stucco Wall Sealant	NAD
49	Roof	Multiple Layer Stucco Wall Sealant	NAD
50	Roof	Black Vent Caulk	NAD
51	Roof	Black Vent Caulk	NAD
52 - A	Roof	Top Connector Roof Membrane (TPO)	NAD
52 - B	Roof	Top Connector Roof Membrane (Sealant)	NAD
53 - A	Roof	Top Connector Roof Membrane (TPO)	NAD
53 - B	Roof	Top Connector Roof Membrane (Sealant)	NAD
54 - A	Roof	Bottom Connector Roof Membrane (ISO Board) - Membrane	NAD
54 - B	Roof	Bottom Connector Roof Membrane (ISO Board) - Insulation	NAD
55 - A	Roof	Bottom Connector Roof Membrane (ISO Board) - Membrane	NAD
55 - B	Roof	Bottom Connector Roof Membrane (ISO Board) - Insulation	NAD
56	Roof	Black Parapet Wall Flashing	NAD
57	Roof	Black Parapet Wall Flashing	NAD
58 - A	Roof	CMU Wall Flashing - Flashing Layer	NAD
58 - B	Roof	CMU Wall Flashing - Felt Layer	NAD
59 - A	Roof	CMU Wall Flashing - Flashing Layer	NAD
59 - B	Roof	CMU Wall Flashing - Felt Layer	NAD
60 - A	Roof	Multiple Layered Flashing Caulk - Black Caulk	NAD
60 - B	Roof	Multiple Layered Flashing Caulk - Gray Caulk	NAD
61	Roof	Multiple Layered Flashing Caulk - Black Caulk Only	Asbestos: 7% Chrysotile
62	Roof	Gray Conduit Penetration Caulk	NAD
63	Roof	Gray Conduit Penetration Caulk	NAD
64	Roof	Black HVAC Duct Insulation Wrap/Sealant	NAD
65	Roof	Black HVAC Duct Insulation Wrap/Sealant	NAD
66	Roof	Black HVAC Duct Insulation Wrap/Sealant	NAD

Table Notes:

Bold = Asbestos-Containing Materials
 N/A = Not Analyzed
 NAD = No Asbestos Detected



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
67	Roof	Top Roof Membrane Layer (TPO)	NAD
68	Roof	Top Roof Membrane Layer (TPO)	NAD
69 - A	Roof	Second Roof Membrane Layer (ISO Board) - Paper Layer	NAD
69 - B	Roof	Second Roof Membrane Layer (ISO Board) - Insulation Layer	NAD
70 - A	Roof	Second Roof Membrane Layer (ISO Board) - Paper Layer	NAD
70 - B	Roof	Second Roof Membrane Layer (ISO Board) - Insulation Layer	NAD
71	Roof	Third Roof Membrane Layer (Pitch)	NAD
72	Roof	Third Roof Membrane Layer (Pitch)	NAD
73	Roof	Bottom Roof Membrane Layer (Gypsum)	NAD
74	Roof	Bottom Roof Membrane Layer (Gypsum)	NAD
75 - A	Roof	Multiple Layered HVAC Wall Duct Sealant - Black Layer	NAD
75 - B	Roof	Multiple Layered HVAC Wall Duct Sealant - Gray Layer	NAD
76	Roof	Multiple Layered HVAC Wall Duct Sealant - Black Layer Only	NAD
77	Roof	Gray HVAC Sub-Insulation Sealant	Not Submitted
78	Roof	Gray HVAC Sub-Insulation Sealant	Not Submitted
79	Roof	Black Electrical Conduit Sealant	NAD
80	Roof	Black Electrical Conduit Sealant	NAD
81	Roof	Gray HVAC Insulation Wrap	NAD
82	Roof	Gray HVAC Insulation Wrap	NAD
83	Roof	Gray HVAC Insulation Wrap	NAD
84	Roof	White Patching Caulk	NAD
85	Roof	White Patching Caulk	NAD
86	Roof	Black and White Chimney Flashing Caulk	NAD
87	Roof	Black and White Chimney Flashing Caulk	NAD
88 - A	Roof	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	NAD
88 - B	Roof	Top Vaulted Roof Membrane Layer (Asphalt Sheeting Felt)	NAD

Table Notes:

Bold = Asbestos-Containing Materials
N/A = Not Analyzed
NAD = No Asbestos Detected



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
89 - A	Roof	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	NAD
89 - B	Roof	Top Vaulted Roof Membrane Layer (Asphalt Sheeting Felt)	NAD
90 - A	Roof	Second Vaulted Roof Membrane Layer (Densdeck Membrane)	NAD
90 - B	Roof	Second Vaulted Roof Membrane Layer (Densdeck Insulation)	NAD
91 - A	Roof	Second Vaulted Roof Membrane Layer (Densdeck Membrane)	NAD
91 - B	Roof	Second Vaulted Roof Membrane Layer (Densdeck Insulation)	NAD
92 - A	Roof	Third Vaulted Roof Membrane Layer (ISO Board Felt)	NAD
92 - B	Roof	Third Vaulted Roof Membrane Layer (ISO Board Insulation)	NAD
93 - A	Roof	Third Vaulted Roof Membrane Layer (ISO Board Felt)	NAD
93 - B	Roof	Third Vaulted Roof Membrane Layer (ISO Board Insulation)	NAD
94	Roof	Fourth Vaulted Roof Membrane Layer (Pitch)	NAD
95	Roof	Fourth Vaulted Roof Membrane Layer (Pitch)	NAD
96	Roof	Bottom Vaulted Roof Membrane Layer (Gypsum)	NAD
97	Roof	Bottom Vaulted Roof Membrane Layer (Gypsum)	NAD
98 - A	Roof	Top Roof Membrane Layer (TPO)	NAD
98 - B	Roof	Top Roof Membrane Layer (Felt Paper)	NAD
99 - A	Roof	Top Roof Membrane Layer (TPO)	NAD
99 - B	Roof	Top Roof Membrane Layer (Felt Paper)	NAD
100	Roof	Bottom Roof Membrane Layer (Densdeck)	NAD
101	Roof	Bottom Roof Membrane Layer (Densdeck)	NAD
102	Roof	Top Roof Membrane Layer (Asphalt Sheet)	NAD
103	Roof	Top Roof Membrane Layer (Asphalt Sheet)	NAD
104	Roof	Second Roof Membrane Layer (Gypsum)	NAD
105	Roof	Second Roof Membrane Layer (Gypsum)	NAD
106	Roof	Third Roof Membrane Layer (Pitch)	NAD
107	Roof	Third Roof Membrane Layer (Pitch)	NAD

Table Notes:

Bold = Asbestos-Containing Materials
N/A = Not Analyzed
NAD = No Asbestos Detected



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
108	Roof	Bottom Roof Membrane Layer (Gypsum)	NAD
109	Roof	Bottom Roof Membrane Layer (Gypsum)	NAD
110	Exterior - Urgent Care	Black Pipe Packing	NAD
111	Exterior - Urgent Care	Black Pipe Packing	NAD
112	Exterior - Urgent Care	Brown Window Caulk	NAD
113	Exterior - West Side of West Wing	Brown Window Caulk	NAD
114	Exterior - Urgent Care	Red Vent Sealant	NAD
115	Exterior - Urgent Care	Red Vent Sealant	NAD
116	Exterior - Urgent Care	Brown Expansion Joint Caulk	NAD
117	Exterior - Urgent Care	Brown Expansion Joint Caulk	NAD
118	Exterior - Urgent Care	Gray Door Caulk	NAD
119	Exterior - East Side of West Wing	Gray Door Caulk	NAD
120	Exterior - Urgent Care	White Door Caulk	NAD
121	Exterior - Urgent Care	White Door Caulk	NAD
122	Exterior - Urgent Care	CMU Block Coating	NAD
123	Exterior - West Side of West Wing	CMU Block Coating	NAD
124	Exterior - West Side of West Wing	CMU Block Coating	NAD
125	Exterior - East Side of West Wing	Gray Window Glaze	Asbestos: 2% Chrysotile
126	Exterior - West Side of West Wing	Gray Window Glaze	N/A - Positive Stop
127 - A	Exterior - East Side of West Wing	Multiple Layered Window Caulk - Clear Caulk	NAD
127 - B	Exterior - East Side of West Wing	Multiple Layered Window Caulk - White Caulk	Asbestos: 2% Chrysotile
128	Exterior - West Side of West Wing	Multiple Layered Window Caulk - White Caulk	N/A - Positive Stop
129	Exterior - East Side of West Wing	Multiple Layered Expansion Joint Caulk	NAD
130	Exterior - South Side of West Wing	Multiple Layered Expansion Joint Caulk	NAD
131	Exterior - East Side of West Wing	Gray HVAC Unit Caulk	NAD
132	Exterior - East Side of West Wing	Gray HVAC Unit Caulk	NAD

Table Notes:

Bold = Asbestos-Containing Materials
 N/A = Not Analyzed
 NAD = No Asbestos Detected



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
135	Exterior - East Side of West Wing	Brick Wall Coating	NAD
136	Exterior - East Side of West Wing	Brick Wall Coating	NAD
137	Exterior - South Side of West Wing	Brick Wall Coating	NAD
138	Exterior - East Side of West Wing	Stucco Siding	NAD
139	Exterior - South Side of West Wing	Stucco Siding	NAD
140	Exterior - East Side of West Wing	Stucco Siding	NAD
141	Exterior - East Side of West Wing	White Wall Packing	NAD
142	Exterior - West Side of West Wing	White Wall Packing	NAD
143	Exterior - East Side of West Wing	Gray Floor Expansion Joint Caulk	NAD
144	Exterior - East Side of West Wing	Gray Floor Expansion Joint Caulk	NAD
147	Exterior - East Side of West Wing	Gray Window Caulk	NAD
148	Exterior - East Side of West Wing	Gray Window Caulk	NAD
149	Exterior - West Side of West Wing	Tan Door Caulk	Asbestos: 2% Chrysotile
150	Exterior - South Side of West Wing	Tan Door Caulk	N/A - Positive Stop
151	Exterior - South Side of West Wing	Multiple Layered Gray Door Caulk	NAD
152	Exterior - South Side of West Wing	Multiple Layered Gray Door Caulk	NAD
153	Exterior - South Side of West Wing	Dark Gray Window Caulk	NAD
154	Exterior - South Side of West Wing	Dark Gray Window Caulk	NAD
155	Exterior - South Side of West Wing	Red Wall Expansion Joint Caulk	NAD
156	Exterior - South Side of West Wing	Red Wall Expansion Joint Caulk	NAD
157	Exterior - North Side of East Wing	Textured Plaster Soffit - Texture Layer Only	NAD
158 - A	Exterior - North Side of East Wing	Textured Plaster Soffit - Texture Layer	NAD
158 - B	Exterior - North Side of East Wing	Textured Plaster Soffit - Base Layer	NAD
159 - A	Exterior - North Side of East Wing	Textured Plaster Soffit - Texture Layer	NAD
159 - B	Exterior - North Side of East Wing	Textured Plaster Soffit - Base Layer	NAD
160	Exterior - Urgent Care	Black Vent Caulk	NAD

Table Notes:

Bold = Asbestos-Containing Materials
 N/A = Not Analyzed
 NAD = No Asbestos Detected



TABLE
SUSPECT ASBESTOS-CONTAINING MATERIALS BULK SAMPLING RESULTS

<u>Sample #</u>	<u>Sampling Location</u>	<u>Material/Description</u>	<u>Analytical Results</u>
161	Exterior - Urgent Care	Black Vent Caulk	NAD
162	Exterior - Urgent Care	Black Door Caulk	NAD
163	Exterior - Urgent Care	Black Door Caulk	NAD
164	Exterior - South Side of East Wing	Light Shield Insulation	Asbestos: 60% Chrysotile
165	Exterior - South Side of East Wing	Light Shield Insulation	N/A - Positive Stop
166	Exterior - Urgent Care Entrance	2' x 4' White Ceiling Tile (New)	NAD
167	Exterior - Urgent Care Entrance	2' x 4' White Ceiling Tile (New)	NAD
168	Exterior - Urgent Care Entrance	2' x 4' White Ceiling Tile (Old)	NAD
169	Exterior - Urgent Care Entrance	2' x 4' White Ceiling Tile (Old)	NAD
170	Exterior - Urgent Care	White and Brown Plaster Soffit	NAD
171	Exterior - Urgent Care	White and Brown Plaster Soffit	NAD
172	Exterior - Urgent Care	White and Brown Plaster Soffit	NAD
173	Interior - Urgent Care	Black Window Glazing	NAD
174	Interior - Urgent Care	Black Window Glazing	NAD
175	Interior - Urgent Care	Gray Window Glazing	NAD
176	Interior - Urgent Care	Gray Window Glazing	NAD
177	Interior - Urgent Care - New Windows	Gray Window Caulk	NAD
178	Interior - Urgent Care - New Windows	Gray Window Caulk	NAD
179	Interior - Connecting Building Windows - #5	Black Window Glazing	Asbestos: 5% Chrysotile
180	Interior - Connecting Building Windows - #5	Black Window Glazing	N/A - Positive Stop
181	Interior - Pediatric Care Windows - #7	White Window Caulk	NAD
182	Interior - Pediatric Care Windows - #7	White Window Caulk	NAD

Table Notes:

Bold = Asbestos-Containing Materials
 N/A = Not Analyzed
 NAD = No Asbestos Detected

Appendix IV: XRF Lead-Based Paint Readings



**TABLE
XRF LEAD PAINT RESULTS**

VHC Carlin Springs Property
ECS Project Number: 47:1424-A
Site Visits: October 17 and 18, 2019

Reading	Room/Location	Side	Color	Substrate	Component	Pb	Pb +/-	Result
October 17, 2019								
1019	Calibration NIST 573					1.0	0.2	Valid
1020	Calibration NIST 573					1.0	0.2	
1021	Calibration NIST 573					1.0	0.2	
1022	Calibration Blank					0.2	0.2	Valid
1023	Calibration Blank					0.1	0.2	
1024	Calibration Blank					0.1	0.2	
1025	Roof	B	White	Brick	Wall	0.1	0.2	Lead-Containing
1026	Roof	B	Red	Metal	Door Face	0.0	0.2	BDL
1027	Roof	B	Red	Metal	Door Frame	0.1	0.2	Lead-Containing
1028	Roof	B	Red	Metal	Beam	0.1	0.2	Lead-Containing
1029	Roof	B	Red	Metal	Beam	0.1	0.2	Lead-Containing
1030	Roof	B	Red	Metal	Beam	0.1	0.2	Lead-Containing
1031	Roof	B	Red	Metal	Beam	5.8	0.2	Lead-Based
1032	Roof	D	Magenta	Brick	Fire Place Chimney Brick	-0.1	0.2	BDL
1033	Roof	D	White	Brick	Fire Place Chimney Brick	-0.1	0.2	BDL
1034	Exterior	A	Black	Metal	Window Frame	0.0	0.2	BDL
1035	Exterior	B	Light Red	Metal	Door Face	0.2	0.2	Lead-Containing
1036	Exterior	B	Light Red	Metal	Door Frame	0.5	0.2	Lead-Containing
1037	Exterior	A	White	Metal	Door Frame	0.0	0.2	BDL
1038	Exterior	A	White	Metal	Door Face	0.0	0.2	BDL
1039	Exterior	A	Brown	Metal	Stair Tread	0.2	0.2	Lead-Containing
1040	Exterior	A	Brown	Metal	Stair Railing	0.0	0.2	BDL
1041	Exterior	A	Brown	Metal	Door Face	0.2	0.2	Lead-Containing
1042	Exterior	A	Brown	Metal	Stair Railing	0.1	0.2	Lead-Containing
1043	Exterior	D	Light Gray	Metal	Door Face	0.1	0.2	Lead-Containing
1044	Exterior	D	Pink	Concrete	Wall	0.0	0.2	BDL
1045	Exterior	D	Light Gray	Metal	Door Face	0.1	0.2	Lead-Containing

Notes: **Bold = Lead Based Paint**
BDL = Below Detection Limit
Pb - Lead per mg/cm2



TABLE
XRF LEAD PAINT RESULTS

VHC Carlin Springs Property
ECS Project Number: 47:1424-A
Site Visits: October 17 and 18, 2019

Reading	Room/Location	Side	Color	Substrate	Component	Pb	Pb +/-	Result
1046	Exterior	D	Light Gray	Metal	Door Frame	0.4	0.2	Lead-Containing
1047	Exterior	C	Brown	Concrete	Wall	0.0	0.2	BDL
1048	Exterior	C	Brown	Metal	Door Face	0.2	0.2	Lead-Containing
1049	Exterior	C	Yellow	Brick	Wall	-0.1	0.2	BDL
1050	Exterior	A	Dark Gray	Metal	Door Face	1.3	0.2	Lead-Based
1051	Exterior	A	Dark Gray	Metal	Door Face	1.2	0.2	Lead-Based
1052	Exterior	B	Dark Gray	Metal	Door Face	0.0	0.2	BDL
1053	Exterior	B	Dark Gray	Metal	Door Face	0.0	0.2	BDL
1054	Exterior	D	Yellow	Concrete	Wall	-0.1	0.2	BDL
1055	Exterior	D	Gray	Metal	Door Face	0.0	0.2	BDL
1056	Exterior	D	Brown	Metal	Door Face	1.2	0.2	Lead-Based
1057	Exterior	D	Brown	Metal	Door Face	1.5	0.2	Lead-Based
1058	Exterior	A	Purple	Metal	Door Face	0.0	0.2	BDL
1059	Exterior	A	Yellow	Metal	Door Face	0.0	0.2	BDL
1060	Exterior	A	Gray	Metal	Door Face	1.5	0.2	Lead-Based
1061	Exterior	D	Gray	Metal	Door Face	0.0	0.2	BDL
1062	Exterior	B	Gray	Metal	Door Face	0.0	0.2	BDL
1063	Exterior	C	White	Metal	Door Face	0.1	0.2	Lead-Containing
1064	Exterior	C	White	Metal	Door Face	0.0	0.2	BDL
1065	Exterior	C	Gray	Metal	Door Face	0.0	0.2	BDL
1066	Exterior	D	Bronze	Metal	Window Frame	0.2	0.2	Lead-Containing
1067	Exterior	D	Bronze	Metal	Window Sill	0.1	0.2	Lead-Containing
1068	Exterior	D	Gray	Metal	Door Face	0.1	0.2	Lead-Containing
1069	Exterior	C	Yellow	Concrete	Wall	0.0	0.2	BDL
1070	Exterior	C	Yellow	Concrete	Wall	-0.2	0.2	BDL
1071	Exterior	C	Light Red	Wood	Door Face	0.9	0.2	Lead-Containing
1072	Exterior	C	Gray	Metal	Door Face	0.1	0.2	Lead-Containing
1073	Exterior	C	Gray	Metal	Stair Railing	0.0	0.2	BDL

Notes: **Bold = Lead Based Paint**

BDL = Below Detection Limit

Pb - Lead per mg/cm²



**TABLE
XRF LEAD PAINT RESULTS**

VHC Carlin Springs Property
ECS Project Number: 47:1424-A
Site Visits: October 17 and 18, 2019

Reading	Room/Location	Side	Color	Substrate	Component	Pb	Pb +/-	Result
1074	Exterior	C	Gray	Metal	Door Face	0.1	0.2	Lead-Containing
1075	Exterior	C	Peach	Concrete	Wall	-0.1	0.2	BDL
1076	Exterior	C	Tan	Metal	Window Frame	-0.1	0.2	BDL
1077	Exterior	B	Brown	Metal	Door Face	1.0	0.2	Lead-Based
1078	Exterior	B	Black	Metal	Window Frame	0.1	0.2	Lead-Containing
1079	Exterior	B	Black	Metal	Door Face	0.1	0.2	Lead-Containing
1080	interior	B	Black	Metal	Window Frame	0.0	0.2	BDL
1081	Interior Reception	B	Black	Metal	Window Sill	-0.1	0.2	BDL
1082	Interior Reception	C	Silver	Metal	Window Sill	-0.2	0.2	BDL
1083	Interior Office	C	Silver	Metal	Window Frame	-0.2	0.2	BDL
1084	Interior Office	C	Silver	Metal	Window Frame	-0.2	0.2	BDL
1085	Interior Office	C	Silver	Metal	Window Frame	-0.1	0.2	BDL
1086	Interior Office	C	Silver	Metal	Window Casing	-0.1	0.3	BDL
1087	Interior Office	C	Silver	Metal	Window Casing	0.2	0.2	Lead-Containing
1088	Interior Hallway	C	Silver	Metal	Window Casing	0.3	0.2	Lead-Containing
1089	<i>Calibration NIST 570</i>					1.0	0.2	<i>Valid</i>
1090	<i>Calibration NIST 571</i>					1.0	0.2	
1091	<i>Calibration NIST 572</i>					0.9	0.2	
1092	<i>Calibration NIST 573</i>					1.0	0.2	
1093	<i>Calibration Blank</i>					0.0	0.2	<i>Valid</i>
1094	<i>Calibration Blank</i>					0.0	0.2	
1095	<i>Calibration Blank</i>					0.0	0.2	
October 18, 2019								
1096	<i>Calibration Blank</i>					0.0	0.2	<i>Valid</i>
1097	<i>Calibration Blank</i>					0.0	0.2	
1098	<i>Calibration Blank</i>					0.1	0.2	
1099	<i>Calibration NIST 571</i>					1.0	0.2	<i>Valid</i>
1100	<i>Calibration NIST 571</i>					1.0	0.2	

Notes: **Bold = Lead Based Paint**
BDL = Below Detection Limit
Pb - Lead per mg/cm2



**TABLE
XRF LEAD PAINT RESULTS**

VHC Carlin Springs Property
ECS Project Number: 47:1424-A
Site Visits: October 17 and 18, 2019

Reading	Room/Location	Side	Color	Substrate	Component	Pb	Pb +/-	Result
1101	Calibration NIST 571					1.0	0.2	
1102	Interior Office	C	Silver	Metal	Window Casing	-0.2	0.2	BDL
1103	Interior Office	C	Silver	Metal	Window Casing	0.1	0.2	Lead-Containing
1104	Interior Office	C	Beige	Wood	Window Casing	-0.1	0.2	BDL
1105	Interior Hallway	C	Silver	Metal	Window Casing	0.1	0.2	Lead-Containing
1106	Interior Office	C	Silver	Metal	Window Casing	0.2	0.2	Lead-Containing
1107	Interior Office	C	Silver	Metal	Window Casing	0.2	0.2	Lead-Containing
1108	Exterior	B	Silver	Metal	Window Frame	0.2	0.2	Lead-Containing
1109	Exterior	C	Silver	Metal	Window Frame	0.3	0.2	Lead-Containing
1110	Exterior	D	Silver	Metal	Window Frame	0.2	0.2	Lead-Containing
1111	Exterior	A	Silver	Metal	Window Frame	0.2	0.2	Lead-Containing
1112	Calibration NIST 573					0.1	0.2	Valid
1113	Calibration NIST 573					0.0	0.2	
1114	Calibration NIST 573					0.0	0.2	
1115	Calibration Blank					1.0	0.2	Valid
1116	Calibration Blank					1.0	0.2	
1117	Calibration Blank					1.0	0.2	

Notes: **Bold = Lead Based Paint**
BDL = Below Detection Limit
Pb - Lead per mg/cm²

Appendix V: Laboratory Report(s)



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
1 - A	Black and White Skylight Caulk/Sealant	None Detected		100% Other	White Non Fibrous Homogeneous
81926927PLM_1	white caulk				Ashed
1 - B	Black and White Skylight Caulk/Sealant	None Detected	2% Cellulose	98% Other	Black Non Fibrous Homogeneous
81926927PLM_181	black caulk				Dissolved
2	Black and White Skylight Caulk/Sealant	None Detected	2% Cellulose	98% Other	Black Non Fibrous Homogeneous
81926927PLM_2	black caulk only				Dissolved
3	White Vent Caulk	None Detected		100% Other	White Non Fibrous Homogeneous
81926927PLM_3					Ashed
4	White Vent Caulk	None Detected		100% Other	White Non Fibrous Homogeneous
81926927PLM_4					Ashed
5	Silver and Black Hood Sealant	None Detected	2% Wollastonite	98% Other	Black, Silver Non Fibrous Homogeneous
81926927PLM_5					Dissolved
6	Silver and Black Hood Sealant	None Detected	2% Wollastonite	98% Other	Black, Silver Non Fibrous Homogeneous
81926927PLM_6					Dissolved
7 - A	Top Stone Roof Membrane Layer (Black TPO with Felt)	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_7	membrane				Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
7 - B	Top Stone Roof Membrane Layer (Black TPO with Felt)	None Detected	95% Synthetic Fibers	5% Other	Black Fibrous Homogeneous
81926927PLM_182	felt				Teased
8	Top Stone Roof Membrane Layer (Black TPO with Felt)	None Detected	95% Synthetic Fibers	5% Other	Black Fibrous Homogeneous
81926927PLM_8	felt only				Teased
9	Second Stone Roof Membrane Layer (White Light Weight Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_9					Teased
10	Second Stone Roof Membrane Layer (White Light Weight Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_10					Teased
11	Bottom Stone Roof Membrane Layer (Tan Light Weight Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_11					Teased
12	Bottom Stone Roof Membrane Layer (Tan Light Weight Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_12					Teased
13 - A	Textured Soffit Plaster	None Detected		70% Other 30% Calcium Carbon	White Non Fibrous Homogeneous
81926927PLM_13	finish				Crushed
13 - B	Textured Soffit Plaster	None Detected		70% Other 30% Quartz	Gray Non Fibrous Homogeneous
81926927PLM_183	base				Crushed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
14	Textured Soffit Plaster	None Detected		70% Other 30% Calcium Carbonate	White Non Fibrous Homogeneous
81926927PLM_14	single layer plaster				Crushed
15	Textured Soffit Plaster	None Detected		70% Other 30% Calcium Carbonate	White Non Fibrous Homogeneous
81926927PLM_15	single layer plaster				Crushed
16	CMU Wall Coating	None Detected	2% Wollastonite	98% Other	Gray Non Fibrous Homogeneous
81926927PLM_16					Dissolved
17	CMU Wall Coating	None Detected	2% Wollastonite	98% Other	Gray Non Fibrous Homogeneous
81926927PLM_17					Dissolved
18	CMU Wall Coating	None Detected	2% Wollastonite	98% Other	Gray Non Fibrous Homogeneous
81926927PLM_18					Dissolved
19	Gray HVAC Duct Sealant	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_19					Dissolved
20	Gray HVAC Duct Sealant	None Detected	10% Wollastonite	90% Other	White Non Fibrous Homogeneous
81926927PLM_20					Dissolved
21	Gray CMU Wall Flashing Caulk	None Detected		100% Other	White Non Fibrous Homogeneous
81926927PLM_21					Teased

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
22	Gray CMU Wall Flashing Caulk	None Detected		100% Other	White Non Fibrous Homogeneous
81926927PLM_22					Ashed
23	Multiple Layer Brick Wall Flashing Caulk	None Detected		100% Other	Gray, White Non Fibrous Homogeneous
81926927PLM_23					Ashed
24	Multiple Layer Brick Wall Flashing Caulk	None Detected		100% Other	Gray, White Non Fibrous Homogeneous
81926927PLM_24					Ashed
25	White Stucco Sidding	None Detected	10% Fiber Glass	60% Other 30% Quartz	Gray Non Fibrous Homogeneous
81926927PLM_25					Crushed
26	White Stucco Sidding	None Detected	10% Fiber Glass	60% Other 30% Quartz	Gray Non Fibrous Homogeneous
81926927PLM_26					Crushed
27	White Stucco Sidding	None Detected		60% Other 40% Quartz	Gray Non Fibrous Homogeneous
81926927PLM_27					Crushed
28	Tan Door Caulk	None Detected		100% Other	Tan Non Fibrous Homogeneous
81926927PLM_28					Ashed
29	Tan Door Caulk	None Detected		100% Other	Tan Non Fibrous Homogeneous
81926927PLM_29					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
30	Gray Window Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_30					Ashed
31	Gray Window Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_31					Ashed
32	Top Roof Membrane Layer (White TPO)	None Detected	10% Fiber Glass	90% Other	White Non Fibrous Homogeneous
81926927PLM_32					Ashed
33	Top Roof Membrane Layer (White TPO)	None Detected	10% Fiber Glass	90% Other	White Non Fibrous Homogeneous
81926927PLM_33					Ashed
34 - A	Second Roof Membrane Layer (ISO Board)	None Detected	60% Cellulose 30% Synthetic Fibers	10% Other	Gray Fibrous Homogeneous
81926927PLM_34	felt				Teased
34 - B	Second Roof Membrane Layer (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_184	insulation				Ashed
35 - A	Second Roof Membrane Layer (ISO Board)	None Detected	60% Cellulose 30% Synthetic Fibers	10% Other	Gray Non Fibrous Homogeneous
81926927PLM_35	felt				Ashed
35 - B	Second Roof Membrane Layer (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_185	insulation				Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
36	Third Roof Membrane Layer (Pitch)	None Detected	30% Cellulose 10% Fiber Glass	50% Other 10% Quartz	Black Non Fibrous Heterogeneous
81926927PLM_36					Dissolved
37	Third Roof Membrane Layer (Pitch)	None Detected	30% Cellulose 10% Fiber Glass	60% Other	Black Non Fibrous Heterogeneous
81926927PLM_37					Dissolved
38	Fourth Roof Membrane Layer (Perlite)	None Detected	50% Cellulose	30% Perlite 20% Other	Gray Fibrous Heterogeneous
81926927PLM_38					Teased
39	Fourth Roof Membrane Layer (Perlite)	None Detected	50% Cellulose	30% Perlite 20% Other	Gray Fibrous Heterogeneous
81926927PLM_39					Teased
40	Fifth Roof Membrane Layer (Pitch/ISO Board)	None Detected	20% Fiber Glass	80% Other	Black Non Fibrous Heterogeneous
81926927PLM_40					Dissolved
41	Fifth Roof Membrane Layer (Pitch/ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_41					Teased
42	Sixth Roof Membrane Layer (Gypsum)	None Detected	5% Cellulose	95% Other	Gray Non Fibrous Homogeneous
81926927PLM_42					Teased
43	Sixth Roof Membrane Layer (Gypsum)	None Detected	5% Cellulose	95% Other	Gray Non Fibrous Homogeneous
81926927PLM_43					Teased

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
44	Seventh Roof Membrane Layer (Pitch)	None Detected	10% Fiber Glass	90% Other	Black Non Fibrous Heterogeneous
81926927PLM_44					Dissolved
45	Seventh Roof Membrane Layer (Pitch)	None Detected	10% Fiber Glass	90% Other	Black Non Fibrous Heterogeneous
81926927PLM_45					Dissolved
46	Bottom Roof Membrane Layer (Gypsum)	None Detected	10% Cellulose	90% Other	Gray Non Fibrous Homogeneous
81926927PLM_46					Crushed
47	Bottom Roof Membrane Layer (Gypsum)	None Detected	10% Cellulose	90% Other	Gray Non Fibrous Homogeneous
81926927PLM_47					Crushed
48	Multiple Layer Stucco Wall Sealant	None Detected		100% Other	Black, Silver Non Fibrous Homogeneous
81926927PLM_48					Dissolved
49	Multiple Layer Stucco Wall Sealant	None Detected		100% Other	Tan Non Fibrous Homogeneous
81926927PLM_49					Dissolved
50	Black Vent Caulk	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_50					Ashed
51	Black Vent Caulk	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_51					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
52 - A	Top Connector Roof Membrane (TPO with Sealant)	None Detected		100% Other	White, Gray Non Fibrous Homogeneous
81926927PLM_52	membrane				Ashed
52 - B	Top Connector Roof Membrane (TPO with Sealant)	None Detected		100% Other	Transparent Non Fibrous Homogeneous
81926927PLM_186	caulk				Dissolved
53 - A	Top Connector Roof Membrane (TPO with Sealant)	None Detected		100% Other	White, Gray Non Fibrous Homogeneous
81926927PLM_53	membrane				Ashed
53 - B	Top Connector Roof Membrane (TPO with Sealant)	None Detected		100% Other	Transparent Non Fibrous Homogeneous
81926927PLM_187	caulk				Dissolved
54 - A	Bottom Connector Roof Membrane (ISO Board)	None Detected	50% Cellulose 10% Synthetic Fibers	40% Other	Gray Fibrous Heterogeneous
81926927PLM_54	membrane				Teased
54 - B	Bottom Connector Roof Membrane (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_188	insulation				Teased
55 - A	Bottom Connector Roof Membrane (ISO Board)	None Detected	50% Cellulose 10% Synthetic Fibers	40% Other	Gray Fibrous Heterogeneous
81926927PLM_55	membrane				Teased
55 - B	Bottom Connector Roof Membrane (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_189	insulation				Teased

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
56	Black Parapet Wall Flashing	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_56					Dissolved
57	Black Parapet Wall Flashing	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_57					Dissolved
58 - A	CMU Wall Flashing	None Detected	20% Cellulose 10% Fiber Glass	70% Other	Black, Silver Non Fibrous Heterogeneous
81926927PLM_58	flashing				Dissolved
58 - B	CMU Wall Flashing	None Detected	40% Fiber Glass	60% Other	Black Non Fibrous Heterogeneous
81926927PLM_190	felt				Dissolved
59 - A	CMU Wall Flashing	None Detected	20% Cellulose 10% Fiber Glass	70% Other	Black, Silver Non Fibrous Heterogeneous
81926927PLM_59	flashing				Dissolved
59 - B	CMU Wall Flashing	None Detected	40% Fiber Glass	60% Other	Black Non Fibrous Heterogeneous
81926927PLM_191	felt				Dissolved
60 - A	Multiple Layered Flashing Caulk	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_60	black caulk				Ashed
60 - B	Multiple Layered Flashing Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_192	grey caulk				Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
61	Multiple Layered Flashing Caulk	7% Chrysotile		93% Other	Black Non Fibrous Homogeneous
81926927PLM_61	black caulk only				Dissolved
62	Gray Conduit Penetration Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_62					Ashed
63	Gray Conduit Penetration Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_63					Ashed
64	Black HVAC Duct Insulation Wrap/Sealant	None Detected	20% Fiber Glass 10% Wollastonite	70% Other	Black Non Fibrous Heterogeneous
81926927PLM_64					Dissolved
65	Black HVAC Duct Insulation Wrap/Sealant	None Detected	20% Fiber Glass 10% Wollastonite	70% Other	Black Non Fibrous Heterogeneous
81926927PLM_65					Dissolved
66	Black HVAC Duct Insulation Wrap/Sealant	None Detected	20% Fiber Glass 10% Wollastonite	70% Other	Black Non Fibrous Heterogeneous
81926927PLM_66					Dissolved
67	Top Roof Membrane Layer (TPO)	None Detected		100% Other	Gray, White Non Fibrous Homogeneous
81926927PLM_67					Ashed
68	Top Roof Membrane Layer (TPO)	None Detected		100% Other	Gray, White Non Fibrous Homogeneous
81926927PLM_68					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
69 - A	Second Roof Membrane Layer (ISO Board)	None Detected	95% Cellulose	5% Other	Brown Fibrous Homogeneous
81926927PLM_69	paper				Teased
69 - B	Second Roof Membrane Layer (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_193	insulation				Teased
70 - A	Second Roof Membrane Layer (ISO Board)	None Detected	95% Cellulose	5% Other	Brown Fibrous Homogeneous
81926927PLM_70	paper				Teased
70 - B	Second Roof Membrane Layer (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_194	insulation				Teased
71	Third Roof Membrane Layer (Pitch)	None Detected	20% Cellulose	75% Other 5% Quartz	Black Non Fibrous Heterogeneous
81926927PLM_71					Dissolved
72	Third Roof Membrane Layer (Pitch)	None Detected	20% Cellulose	75% Other 5% Quartz	Black Non Fibrous Heterogeneous
81926927PLM_72					Dissolved
73	Bottom Roof Membrane Layer (Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_73					Crushed
74	Bottom Roof Membrane Layer (Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_74					Crushed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
75 - A	Multiple Layered HVAC Wall Duct Sealant	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_75	black caulk				Ashed
75 - B	Multiple Layered HVAC Wall Duct Sealant	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_195	grey caulk				Ashed
76	Multiple Layered HVAC Wall Duct Sealant	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_76	black caulk only				Ashed
77	Gray HVAC Sub-Insulation Sealant	Not Submitted			
81926927PLM_77	not submitted				
78	Gray HVAC Sub-Insulation Sealant	Not Submitted			
81926927PLM_78	not submitted				
79	Black Electrical Conduit Sealant	None Detected	5% Cellulose	95% Other	Black Non Fibrous Homogeneous
81926927PLM_79					Dissolved
80	Black Electrical Conduit Sealant	None Detected	5% Cellulose	95% Other	Black Non Fibrous Homogeneous
81926927PLM_80					Dissolved
81	Gray HVAC Insulation Wrap	None Detected	10% Fiber Glass	90% Other	Gray Non Fibrous Homogeneous
81926927PLM_81					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
82	Gray HVAC Insulation Wrap	None Detected	10% Fiber Glass	90% Other	Gray Non Fibrous Homogeneous
81926927PLM_82					Ashed
83	Gray HVAC Insulation Wrap	None Detected	10% Fiber Glass	90% Other	Gray Non Fibrous Homogeneous
81926927PLM_83					Ashed
84	White Patching Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_84					Ashed
85	White Patching Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_85					Ashed
86	Black and White Chimney Flashing Caulk	None Detected		100% Other	White, Black Non Fibrous Homogeneous
81926927PLM_86					Ashed
87	Black and White Chimney Flashing Caulk	None Detected		100% Other	White, Black Non Fibrous Homogeneous
81926927PLM_87					Ashed
88 - A	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	None Detected	20% Cellulose 10% Fiber Glass	70% Other	Black Non Fibrous Heterogeneous
81926927PLM_88	roofing				Dissolved
88 - B	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	None Detected	40% Fiber Glass	60% Other	Black Fibrous Heterogeneous
81926927PLM_196	felt				Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
89 - A	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	None Detected	20% Cellulose 10% Fiber Glass	70% Other	Black Non Fibrous Heterogeneous
81926927PLM_89	roofing				Dissolved
89 - B	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	None Detected	40% Fiber Glass	60% Other	Black Fibrous Homogeneous
81926927PLM_197	felt				Dissolved
90 - A	Second Vaulted Roof Membrane Layer (Densdeck)	None Detected	30% Cellulose	70% Other	Black Non Fibrous Heterogeneous
81926927PLM_90	membrane				Dissolved
90 - B	Second Vaulted Roof Membrane Layer (Densdeck)	None Detected	80% Cellulose	20% Other	Brown Fibrous Homogeneous
81926927PLM_198	insulation				Teased
91 - A	Second Vaulted Roof Membrane Layer (Densdeck)	None Detected	30% Cellulose	70% Other	Black Non Fibrous Heterogeneous
81926927PLM_91	membrane				Dissolved
91 - B	Second Vaulted Roof Membrane Layer (Densdeck)	None Detected	80% Cellulose	20% Other	Brown Fibrous Homogeneous
81926927PLM_199	insulation				Teased
92 - A	Third Vaulted Roof Membrane Layer (ISO Board)	None Detected	40% Cellulose 20% Synthetic Fibers	40% Other	Gray Fibrous Heterogeneous
81926927PLM_92	felt				Teased
92 - B	Third Vaulted Roof Membrane Layer (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_200	insulation				Teased

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
93 - A	Third Vaulted Roof Membrane Layer (ISO Board)	None Detected	40% Cellulose 20% Synthetic Fibers	40% Other	Gray Fibrous Heterogeneous
81926927PLM_93	felt				Teased
93 - B	Third Vaulted Roof Membrane Layer (ISO Board)	None Detected		100% Other	Yellow Non Fibrous Homogeneous
81926927PLM_201	insulation				Teased
94	Fourth Vaulted Roof Membrane Layer (Pitch)	None Detected	10% Fiber Glass	90% Other	Black Non Fibrous Homogeneous
81926927PLM_94					Dissolved
95	Fourth Vaulted Roof Membrane Layer (Pitch)	None Detected	10% Fiber Glass	90% Other	Black Non Fibrous Homogeneous
81926927PLM_95					Dissolved
96	Bottom Vaulted Roof Membrane Layer (Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_96					Crushed
97	Bottom Vaulted Roof Membrane Layer (Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_97					Crushed
98 - A	Top Roof Membrane Layer (TPO with Felt Paper)	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_98	membrane				Ashed
98 - B	Top Roof Membrane Layer (TPO with Felt Paper)	None Detected	90% Synthetic Fibers	10% Other	Black Fibrous Homogeneous
81926927PLM_202	felt				Teased

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
99 - A	Top Roof Membrane Layer (TPO with Felt Paper)	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_99	membrane				Ashed
99 - B	Top Roof Membrane Layer (TPO with Felt Paper)	None Detected	90% Synthetic Fibers	10% Other	Black Fibrous Homogeneous
81926927PLM_203	felt				Teased
100	Bottom Roof Membrane Layer (Densdeck)	None Detected	95% Cellulose	5% Other	Brown Fibrous Homogeneous
81926927PLM_100					Teased
101	Bottom Roof Membrane Layer (Densdeck)	None Detected	95% Cellulose	5% Other	Brown Fibrous Homogeneous
81926927PLM_101					Teased
102	Top Roof Membrane Layer (Asphalt Sheet)	None Detected	10% Cellulose 5% Synthetic Fibers	85% Other	Black Non Fibrous Heterogeneous
81926927PLM_102					Dissolved
103	Top Roof Membrane Layer (Asphalt Sheet)	None Detected	10% Cellulose 5% Synthetic Fibers	85% Other	Black Non Fibrous Heterogeneous
81926927PLM_103					Dissolved
104	Second Roof Membrane Layer (Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_104					Crushed
105	Second Roof Membrane Layer (Gypsum)	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_105					Crushed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
106	Third Roof Membrane Layer (Pitch)	None Detected	10% Fiber Glass	90% Other	Black Non Fibrous Heterogeneous
81926927PLM_106					Dissolved
107	Third Roof Membrane Layer (Pitch)	None Detected	10% Fiber Glass	90% Other	Black Non Fibrous Heterogeneous
81926927PLM_107					Dissolved
108	Bottom Roof Membrane Layer (Gypsum)	None Detected	5% Cellulose	95% Other	Gray Non Fibrous Homogeneous
81926927PLM_108					Crushed
109	Bottom Roof Membrane Layer (Gypsum)	None Detected	5% Cellulose	95% Other	Gray Non Fibrous Homogeneous
81926927PLM_109					Crushed
110	Black Pipe Packing	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_110					Ashed
111	Black Pipe Packing	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_111					Ashed
112	Brown Window Caulk	None Detected		100% Other	Brown Non Fibrous Homogeneous
81926927PLM_112					Dissolved
113	Brown Window Caulk	None Detected		100% Other	Brown Non Fibrous Homogeneous
81926927PLM_113					Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
114	Red Vent Sealant	None Detected		100% Other	Red Non Fibrous Homogeneous
81926927PLM_114					Ashed
115	Red Vent Sealant	None Detected		100% Other	Red Non Fibrous Homogeneous
81926927PLM_115					Ashed
116	Brown Expansion Joint Caulk	None Detected		100% Other	Brown Non Fibrous Homogeneous
81926927PLM_116					Dissolved
117	Brown Expansion Joint Caulk	None Detected		100% Other	Brown Non Fibrous Homogeneous
81926927PLM_117					Dissolved
118	Gray Door Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_118					Ashed
119	Gray Door Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_119					Ashed
120	White Door Caulk	None Detected		100% Other	White Non Fibrous Homogeneous
81926927PLM_120					Ashed
121	White Door Caulk	None Detected		100% Other	White Non Fibrous Homogeneous
81926927PLM_121					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
122	CMU Block Coating	None Detected	3% Wollastonite	97% Other	Gray Non Fibrous Homogeneous
81926927PLM_122					Crushed
123	CMU Block Coating	None Detected	3% Wollastonite	97% Other	Gray Non Fibrous Homogeneous
81926927PLM_123					Crushed
124	CMU Block Coating	None Detected	3% Wollastonite	97% Other	Gray Non Fibrous Homogeneous
81926927PLM_124					Crushed
125	Gray Window Glaze	2% Chrysotile		98% Other	Gray Non Fibrous Homogeneous
81926927PLM_125					Crushed
126	Gray Window Glaze	Not Analyzed			
81926927PLM_126					
127 - A	Multiple Layered Window Caulk	None Detected		100% Other	Transparent Non Fibrous Homogeneous
81926927PLM_127	clear caulk				Ashed
127 - B	Multiple Layered Window Caulk	2% Chrysotile		98% Other	White Non Fibrous Homogeneous
81926927PLM_204	white caulk				Crushed
128	Multiple Layered Window Caulk	Not Analyzed			
81926927PLM_128	white caulk only				

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
129	Multiple Layered Expansion Joint Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_129					Ashed
130	Multiple Layered Expansion Joint Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_130					Ashed
131	Gray HVAC Unit Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_131					Ashed
132	Gray HVAC Unit Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_132					Ashed
135	Brick Wall Coating	None Detected		90% Other 10% Calcium Carbonate	White Non Fibrous Homogeneous
81926927PLM_133					Dissolved
136	Brick Wall Coating	None Detected		90% Other 10% Calcium Carbonate	White Non Fibrous Homogeneous
81926927PLM_134					Dissolved
137	Brick Wall Coating	None Detected		90% Other 10% Calcium Carbonate	White Non Fibrous Homogeneous
81926927PLM_135					Dissolved
138	Stucco Siding	None Detected		80% Other 20% Quartz	Gray Non Fibrous Heterogeneous
81926927PLM_136					Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
139	Stucco Siding	None Detected		80% Other 20% Quartz	Gray Non Fibrous Heterogeneous
81926927PLM_137					Dissolved
140	Stucco Siding	None Detected		80% Other 20% Quartz	Gray Non Fibrous Heterogeneous
81926927PLM_138					Dissolved
141	White Wall Packing	None Detected	2% Cellulose	98% Other	White Non Fibrous Homogeneous
81926927PLM_139					Ashed
142	White Wall Packing	None Detected	2% Cellulose	98% Other	White Non Fibrous Homogeneous
81926927PLM_140					Ashed
143	Gray Floor Expansion Joint Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_141					Ashed
144	Gray Floor Expansion Joint Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_142					Ashed
147	Gray Window Caulk	None Detected	2% Cellulose	98% Other	Gray Non Fibrous Homogeneous
81926927PLM_143					Ashed
148	Gray Window Caulk	None Detected	2% Cellulose	98% Other	Gray Non Fibrous Homogeneous
81926927PLM_144					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
149	Tan Door Caulk	2% Chrysotile		98% Other	Tan Non Fibrous Homogeneous
81926927PLM_145					Dissolved
150	Tan Door Caulk	Not Analyzed			
81926927PLM_146					
151	Multiple Layered Gray Door Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_147					Ashed
152	Multiple Layered Gray Door Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_148					Ashed
153	Dark Gray Window Caulk	None Detected	2% Fiber Glass	98% Other	Gray Non Fibrous Homogeneous
81926927PLM_149					Ashed
154	Dark Gray Window Caulk	None Detected	2% Fiber Glass	98% Other	Gray Non Fibrous Homogeneous
81926927PLM_150					Ashed
155	Red Wall Expansion Joint Caulk	None Detected		100% Other	Red Non Fibrous Homogeneous
81926927PLM_151					Ashed
156	Red Wall Expansion Joint Caulk	None Detected		100% Other	Red Non Fibrous Homogeneous
81926927PLM_152					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
157	Textured Plaster Soffit	None Detected		70% Other 20% Calcium Carbonate 10% Quartz	White Non Fibrous Heterogeneous
81926927PLM_153	texture only				Crushed
158 - A	Textured Plaster Soffit	None Detected		70% Other 20% Calcium Carbonate 10% Quartz	White Non Fibrous Heterogeneous
81926927PLM_154	texture				Crushed
158 - B	Textured Plaster Soffit	None Detected		70% Other 30% Quartz	Gray Non Fibrous Heterogeneous
81926927PLM_179	base				Crushed
159 - A	Textured Plaster Soffit	None Detected		70% Other 20% Calcium Carbonate 10% Quartz	White Non Fibrous Heterogeneous
81926927PLM_155	texture				Crushed
159 - B	Textured Plaster Soffit	None Detected		70% Other 30% Quartz	Gray Non Fibrous Heterogeneous
81926927PLM_180	base				Crushed
160	Black Vent Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_156					Ashed
161	Black Vent Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_157					Ashed
162	Black Door Caulk	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_158					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
163	Black Door Caulk	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_159					Ashed
164	Light Shield Insulation	60% Chrysotile	20% Cellulose	20% Other	Gray Fibrous Heterogeneous
81926927PLM_160					Teased
165	Light Shield Insulation	Not Analyzed			
81926927PLM_161					
166	2' x 4' White Ceiling Tile (New)	None Detected	40% Cellulose 30% Mineral Wool	20% Perlite 10% Other	Beige Fibrous Heterogeneous
81926927PLM_162					Teased
167	2' x 4' White Ceiling Tile (New)	None Detected	40% Cellulose 30% Mineral Wool	20% Perlite 10% Other	Beige Fibrous Heterogeneous
81926927PLM_163					Teased
168	2' x 4' White Ceiling Tile (Old)	None Detected	15% Cellulose 2% Fiber Glass	83% Other	Gray Non Fibrous Heterogeneous
81926927PLM_164					Teased
169	2' x 4' White Ceiling Tile (Old)	None Detected	15% Cellulose 2% Fiber Glass	83% Other	Gray Non Fibrous Heterogeneous
81926927PLM_165					Teased
170	White and Brown Plaster Soffit	None Detected		70% Other 20% Calcium Carbonate 10% Quartz	White Non Fibrous Heterogeneous
81926927PLM_166					Crushed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
 EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
 App.E



Customer: ECS Mid-Atlantic, LLC
 14026 Thunderbolt Place
 Suite 100
 Chantilly, VA 20151

Attn: Michael Hamill
 John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
171	White and Brown Plaster Soffit	None Detected		70% Other 20% Calcium Carbonate 10% Quartz	White Non Fibrous Heterogeneous
81926927PLM_167					Crushed
172	White and Brown Plaster Soffit	None Detected		70% Other 20% Calcium Carbonate 10% Quartz	White Non Fibrous Heterogeneous
81926927PLM_168					Crushed
173	Black Window Glazing	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_169					Ashed
174	Black Window Glazing	None Detected		100% Other	Black Non Fibrous Homogeneous
81926927PLM_170					Ashed
175	Gray Window Glazing	None Detected		80% Other 20% Calcium Carbonate	Gray Non Fibrous Homogeneous
81926927PLM_171					Dissolved
176	Gray Window Glazing	None Detected		80% Other 20% Calcium Carbonate	Gray Non Fibrous Homogeneous
81926927PLM_172					Dissolved
177	Gray Window Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_173					Ashed
178	Gray Window Caulk	None Detected		100% Other	Gray Non Fibrous Homogeneous
81926927PLM_174					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)

Analyst

Approved Signatory



Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 40 CFR, Part 763, Subpart E,
App.E



Customer: ECS Mid-Atlantic, LLC
14026 Thunderbolt Place
Suite 100
Chantilly, VA 20151

Attn: Michael Hamill
John O'Neil

Lab Order ID: 81926927
Analysis ID: 81926927_PLM
Date Received: 10/19/2019
Date Reported: 10/23/2019

Project: VHC Urgent Care Carlin SpringsACM Survey / 47:1424-A

Sample ID	Description	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes
Lab Sample ID	Lab Notes				Treatment
179	Black Window Glazing	5% Chrysotile		95% Other	Black Non Fibrous Homogeneous
81926927PLM_175					Ashed
180	Black Window Glazing	Not Analyzed			
81926927PLM_176					
181	White Window Caulk	None Detected	2% Cellulose	98% Other	White Non Fibrous Homogeneous
81926927PLM_177					Ashed
182	White Window Caulk	None Detected	2% Cellulose	98% Other	White Non Fibrous Homogeneous
81926927PLM_178					Ashed

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested as received and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Matthew Thomas (152)

Rory Porter (52)


Analyst

Approved Signatory

8/19/26 927

Client: Ecs Mid Atlantic
 Contact: Michael P. Hamill
 Address: 14026 Thunderbolt Place
 Phone: (703)-471-8400
 Fax:
 Email: MHamill@ecslimited.com
 JONell@ecslimited.com
 Project: VHC Urgent Care Carlin Springs
 ACM Survey / 47-1424-A
 Client Notes:
 Positive Stop Except for Drywall
 and Joint Compound
 P.O. #: 47-1424-A
 Date Submitted:
 Analysis: PLM EPA 600/R-93/116
 Turnaround Time: 3 Day

Instructions:
 Use Column "B" for your contact info
 To See an Example Click the
 bottom Example Tab
 Enter samples between "<<" and ">>"
 Begin Samples with a "<<" above the first sample
 and end with a ">>" below the last sample.
 Only Enter your data on the first sheet "Steel 1"
 Note: Data 1 and Data 2 are optional
 fields that do not show up on the official
 report, however they will be included
 in the electronic data returned to you
 to facilitate your reintegration of the report data.

Scientific
 Analytical
 Institute

 4604 Dundas Drive
 Greensboro, NC 27407
 Phone: 336.292.3888
 Fax: 336.292.3313
 Email: lab@saiiab.com

Sample Number	Data 1	Sample Description	Data 2
<<			
1		Black and White Skylight Caulk/Sealant	Roof
2		Black and White Skylight Caulk/Sealant	Roof
3		White Vent Caulk	Roof
4		White Vent Caulk	Roof
5		Silver and Black Hood Sealant	Roof
6		Silver and Black Hood Sealant	Roof
7		Top Stone Roof Membrane Layer (Black TPO with Felt)	Roof
8		Top Stone Roof Membrane Layer (Black TPO with Felt)	Roof
9		Second Stone Roof Membrane Layer (White Light Weight Gypsum)	Roof
10		Second Stone Roof Membrane Layer (White Light Weight Gypsum)	Roof
11		Bottom Stone Roof Membrane Layer (Tan Light Weight Gypsum)	Roof
12		Bottom Stone Roof Membrane Layer (Tan Light Weight Gypsum)	Roof
13		Textured Soffit Plaster	Roof
14		Textured Soffit Plaster	Roof
15		Textured Soffit Plaster	Roof
16		CMU Wall Coating	Roof
17		CMU Wall Coating	Roof
18		CMU Wall Coating	Roof
19		Gray HVAC Duct Sealant	Roof
20		Gray HVAC Duct Sealant	Roof
21		Gray CMU Wall Flashing Caulk	Roof
22		Gray CMU Wall Flashing Caulk	Roof
23		Multiple Layer Brick Wall Flashing Caulk	Roof
24		Multiple Layer Brick Wall Flashing Caulk	Roof
25		White Stucco Sidding	Roof
26		White Stucco Sidding	Roof
27		White Stucco Sidding	Roof
28		Tan Door Caulk	Roof
29		Tan Door Caulk	Roof
30		Gray Window Caulk	Roof
31		Gray Window Caulk	Roof
32		Top Roof Membrane Layer (White TPO)	Roof
33		Top Roof Membrane Layer (White TPO)	Roof
34		Second Roof Membrane Layer (ISO Board)	Roof
35		Second Roof Membrane Layer (ISO Board)	Roof
36		Third Roof Membrane Layer (Pitch)	Roof
37		Third Roof Membrane Layer (Pitch)	Roof
38		Fourth Roof Membrane Layer (Perlite)	Roof
39		Fourth Roof Membrane Layer (Perlite)	Roof
40		Fifth Roof Membrane Layer (Pitch/ISO Board)	Roof
41		Fifth Roof Membrane Layer (Pitch/ISO Board)	Roof
42		Sixth Roof Membrane Layer (Gypsum)	Roof
43		Sixth Roof Membrane Layer (Gypsum)	Roof
44		Seventh Roof Membrane Layer (Pitch)	Roof
45		Seventh Roof Membrane Layer (Pitch)	Roof
46		Bottom Roof Membrane Layer (Gypsum)	Roof
47		Bottom Roof Membrane Layer (Gypsum)	Roof
48		Multiple Layer Stucco Wall Sealant	Roof
49		Multiple Layer Stucco Wall Sealant	Roof
50		Black Vent Caulk	Roof
51		Black Vent Caulk	Roof
52		Top Connector Roof Membrane (TPO with Sealant)	Roof
53		Top Connector Roof Membrane (TPO with Sealant)	Roof
54		Bottom Connector Roof Membrane (ISO Board)	Roof
55		Bottom Connector Roof Membrane (ISO Board)	Roof
56		Black Parapet Wall Flashing	Roof
57		Black Parapet Wall Flashing	Roof
58		CMU Wall Flashing	Roof
59		CMU Wall Flashing	Roof
60		Multiple Layered Flashing Caulk	Roof
61		Multiple Layered Flashing Caulk	Roof
62		Gray Conduit Penetration Caulk	Roof
63		Gray Conduit Penetration Caulk	Roof
64		Black HVAC Duct Insulation Wrap/Sealant	Roof
65		Black HVAC Duct Insulation Wrap/Sealant	Roof
66		Black HVAC Duct Insulation Wrap/Sealant	Roof
67		Top Roof Membrane Layer (TPO)	Roof
68		Top Roof Membrane Layer (TPO)	Roof
69		Second Roof Membrane Layer (ISO Board)	Roof
70		Second Roof Membrane Layer (ISO Board)	Roof
71		Third Roof Membrane Layer (Pitch)	Roof
72		Third Roof Membrane Layer (Pitch)	Roof
73		Bottom Roof Membrane Layer (Gypsum)	Roof
74		Bottom Roof Membrane Layer (Gypsum)	Roof
75		Multiple Layered HVAC Wall Duct Sealant	Roof
76		Multiple Layered HVAC Wall Duct Sealant	Roof
77		Gray HVAC Sub-Insulation Sealant	Roof
78		Gray HVAC Sub-Insulation Sealant	Roof
79		Black Electrical Conduit Sealant	Roof
80		Black Electrical Conduit Sealant	Roof
81		Gray HVAC Insulation Wrap	Roof

Accepted
 Rejected

Relinquished By _____

Received By W. H. Street 10/21
 10:30

81926927

82	Gray HVAC Insulation Wrap	Roof
83	Gray HVAC Insulation Wrap	Roof
84	White Patching Caulk	Roof
85	White Patching Caulk	Roof
86	Black and White Chimney Flashing Caulk	Roof
87	Black and White Chimney Flashing Caulk	Roof
88	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	Roof
89	Top Vaulted Roof Membrane Layer (Asphalt Sheeting)	Roof
90	Second Vaulted Roof Membrane Layer (Densdeck)	Roof
91	Second Vaulted Roof Membrane Layer (Densdeck)	Roof
92	Third Vaulted Roof Membrane Layer (ISO Board)	Roof
93	Third Vaulted Roof Membrane Layer (ISO Board)	Roof
94	Fourth Vaulted Roof Membrane Layer (Pitch)	Roof
95	Fourth Vaulted Roof Membrane Layer (Pitch)	Roof
96	Bottom Vaulted Roof Membrane Layer (Gypsum)	Roof
97	Bottom Vaulted Roof Membrane Layer (Gypsum)	Roof
98	Top Roof Membrane Layer (TPO with Felt Paper)	Roof
99	Top Roof Membrane Layer (TPO with Felt Paper)	Roof
100	Bottom Roof Membrane Layer (Densdeck)	Roof
101	Bottom Roof Membrane Layer (Densdeck)	Roof
102	Top Roof Membrane Layer (Asphalt Sheet)	Roof
103	Top Roof Membrane Layer (Asphalt Sheet)	Roof
104	Second Roof Membrane Layer (Gypsum)	Roof
105	Second Roof Membrane Layer (Gypsum)	Roof
106	Third Roof Membrane Layer (Pitch)	Roof
107	Third Roof Membrane Layer (Pitch)	Roof
108	Bottom Roof Membrane Layer (Gypsum)	Roof
109	Bottom Roof Membrane Layer (Gypsum)	Roof
110	Black Pipe Packing	Exterior
111	Black Pipe Packing	Exterior
112	Brown Window Caulk	Exterior
113	Brown Window Caulk	Exterior
114	Red Vent Sealant	Exterior
115	Red Vent Sealant	Exterior
116	Brown Expansion Joint Caulk	Exterior
117	Brown Expansion Joint Caulk	Exterior
118	Gray Door Caulk	Exterior
119	Gray Door Caulk	Exterior
120	White Door Caulk	Exterior
121	White Door Caulk	Exterior
122	CMU Block Coating	Exterior
123	CMU Block Coating	Exterior
124	CMU Block Coating	Exterior
125	Gray Window Glaze	Exterior
126	Gray Window Glaze	Exterior
127	Multiple Layered Window Caulk	Exterior
128	Multiple Layered Window Caulk	Exterior
129	Multiple Layered Expansion Joint Caulk	Exterior
130	Multiple Layered Expansion Joint Caulk	Exterior
131	Gray HVAC Unit Caulk	Exterior
132	Gray HVAC Unit Caulk	Exterior
135	Brick Wall Coating	Exterior
136	Brick Wall Coating	Exterior
137	Brick Wall Coating	Exterior
138	Stucco Siding	Exterior
139	Stucco Siding	Exterior
140	Stucco Siding	Exterior
141	White Wall Packing	Exterior
142	White Wall Packing	Exterior
143	Gray Floor Expansion Joint Caulk	Exterior
144	Gray Floor Expansion Joint Caulk	Exterior
147	Gray Window Caulk	Exterior
148	Gray Window Caulk	Exterior
149	Tan Door Caulk	Exterior
150	Tan Door Caulk	Exterior
151	Multiple Layered Gray Door Caulk	Exterior
152	Multiple Layered Gray Door Caulk	Exterior
153	Dark Gray Window Caulk	Exterior
154	Dark Gray Window Caulk	Exterior
155	Red Wall Expansion Joint Caulk	Exterior
156	Red Wall Expansion Joint Caulk	Exterior
157	Textured Plaster Soffit	Exterior
158	Textured Plaster Soffit	Exterior
159	Textured Plaster Soffit	Exterior
160	Black Vent Caulk	Exterior
161	Black Vent Caulk	Exterior
162	Black Door Caulk	Exterior
163	Black Door Caulk	Exterior
164	Light Shield Insulation	Exterior
165	Light Shield Insulation	Exterior
166	2' x 4' White Ceiling Tile (New)	Exterior - Urgent Care Entrance
167	2' x 4' White Ceiling Tile (New)	Exterior - Urgent Care Entrance
168	2' x 4' White Ceiling Tile (Old)	Exterior - Urgent Care Entrance
169	2' x 4' White Ceiling Tile (Old)	Exterior - Urgent Care Entrance
170	White and Brown Plaster Soffit	Exterior - Loading Dock
171	White and Brown Plaster Soffit	Exterior - Loading Dock
172	White and Brown Plaster Soffit	Exterior - Loading Dock
173	Black Window Glazing	Interior - Brick Building Windows - Urgent Care
174	Black Window Glazing	Interior - Brick Building Windows - Urgent Care
175	Gray Window Glazing	Interior - Brick Windows - Back - Urgent Care - Windows #3
176	Gray Window Glazing	Interior - Brick Windows - Back - Urgent Care - Windows #2
177	Gray Window Caulk	Interior - Brick Building Windows - New Windows #4
178	Gray Window Caulk	Interior - Brick Building Windows - New Windows #4
179	Black Window Glazing	Interior - Connecting Building Windows - #5
180	Black Window Glazing	Interior - Connecting Building Windows - #5
181	White Window Caulk	Interior - Pediatric Care Windows - #7
182	White Window Caulk	Interior - Pediatric Care Windows - #7

**Appendix VI: EPA Generator ID
Form 8700-12**

EPA ID Number

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

8. Site Contact Information

Same as Location Address

First Name	MI	Last Name
Title		
Street Address		
City, Town, or Village		
State	Country	Zip Code
Email		
Phone	Ext	Fax

9. Legal Owner and Operator of the Site

A. Name of Site's Legal Owner

Same as Location Address

Full Name	Date Became Owner (mm/dd/yyyy)
Owner Type <input type="checkbox"/> Private <input type="checkbox"/> County <input type="checkbox"/> District <input type="checkbox"/> Federal <input type="checkbox"/> Tribal <input type="checkbox"/> Municipal <input type="checkbox"/> State <input type="checkbox"/> Other	
Street Address	
City, Town, or Village	
State	Country
Zip Code	
Email	
Phone	Ext
Fax	
Comments	

B. Name of Site's Legal Operator

Same as Location Address

Full Name	Date Became Operator (mm/dd/yyyy)
Operator Type <input type="checkbox"/> Private <input type="checkbox"/> County <input type="checkbox"/> District <input type="checkbox"/> Federal <input type="checkbox"/> Tribal <input type="checkbox"/> Municipal <input type="checkbox"/> State <input type="checkbox"/> Other	
Street Address	
City, Town, or Village	
State	Country
Zip Code	
Email	
Phone	Ext
Fax	
Comments	

10. Type of Regulated Waste Activity (at your site)

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities

<input type="checkbox"/> Y	<input type="checkbox"/> N	1. Generator of Hazardous Waste—If "Yes", mark only one of the following—a, b, c	
<input type="checkbox"/>	a. LQG	-Generates, in any calendar month (includes quantities imported by importer site) 1,000 kg/mo (2,200 lb/mo) or more of non-acute hazardous waste; or - Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lb/mo) of acute hazardous waste; or - Generates, in any calendar month or accumulates at any time, more than 100 kg/mo (220 lb/mo) of acute hazardous spill cleanup material.	
<input type="checkbox"/>	b. SQG	100 to 1,000 kg/mo (220-2,200 lb/mo) of non-acute hazardous waste and no more than 1 kg (2.2 lb) of acute hazardous waste and no more than 100 kg (220 lb) of any acute hazardous spill cleanup material.	
<input type="checkbox"/>	c. VSQG	Less than or equal to 100 kg/mo (220 lb/mo) of non-acute hazardous waste.	
If "Yes" above, indicate other generator activities in 2 and 3, as applicable.			
<input type="checkbox"/> Y	<input type="checkbox"/> N	2. Short-Term Generator (generates from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section.	
<input type="checkbox"/> Y	<input type="checkbox"/> N	3. Mixed Waste (hazardous and radioactive) Generator	
<input type="checkbox"/> Y	<input type="checkbox"/> N	4. Treater, Storer or Disposer of Hazardous Waste—Note: A hazardous waste Part B permit is required for these activities.	
<input type="checkbox"/> Y	<input type="checkbox"/> N	5. Receives Hazardous Waste from Off-site	
<input type="checkbox"/> Y	<input type="checkbox"/> N	6. Recycler of Hazardous Waste	
<input type="checkbox"/>	<input type="checkbox"/>	a. Recycler who stores prior to recycling	
<input type="checkbox"/>	<input type="checkbox"/>	b. Recycler who does not store prior to recycling	
<input type="checkbox"/> Y	<input type="checkbox"/> N	7. Exempt Boiler and/or Industrial Furnace—If "Yes", mark all that apply.	
<input type="checkbox"/>	<input type="checkbox"/>	a. Small Quantity On-site Burner Exemption	
<input type="checkbox"/>	<input type="checkbox"/>	b. Smelting, Melting, and Refining Furnace Exemption	

B. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g. D001, D003, F007, U112). Use an additional page if more spaces are needed.

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes. Please list the waste codes of the State hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**ADDENDUM TO THE SITE IDENTIFICATION FORM:
EPISODIC GENERATOR**



ONLY fill out this form if:

- You are an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves the generator to a higher generator category pursuant to 40 CFR 262 Subpart L. Note: Only one planned and one unplanned episodic event are allowed within one year; otherwise, you must follow the requirements of the higher generator category. Use additional pages if more space is needed.

Episodic Event	
1. Planned <input type="checkbox"/> Excess chemical inventory removal <input type="checkbox"/> Tank cleanouts <input type="checkbox"/> Short-term construction or demolition <input type="checkbox"/> Equipment maintenance during plant shutdowns <input type="checkbox"/> Other _____	2. Unplanned <input type="checkbox"/> Accidental spills <input type="checkbox"/> Production process upsets <input type="checkbox"/> Product recalls <input type="checkbox"/> "Acts of nature" (Tornado, hurricane, flood, etc.) <input type="checkbox"/> Other _____
3. Emergency Contact Phone	4. Emergency Contact Name
5. Beginning Date _____ (mm/dd/yyyy)	6. End Date _____ (mm/dd/yyyy)

Waste 1

7. Waste Description	8. Estimated Quantity (in pounds)				
9. Federal and/or State Hazardous Waste Codes					

Waste 2

7. Waste Description	8. Estimated Quantity (in pounds)				
9. Federal and/or State Hazardous Waste Codes					

Waste 3

7. Waste Description	8. Estimated Quantity (in pounds)				
9. Federal and/or State Hazardous Waste Codes					

EPA ID Number

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**ADDENDUM TO THE SITE IDENTIFICATION FORM:
LQG CONSOLIDATION OF VSQG HAZARDOUS WASTE**

**ONLY fill out this form if:**

- You are an LQG receiving hazardous waste from VSQGs under the control of the same person. Use additional pages if more space is needed.

VSQG 1		
1. EPA ID Number (if assigned)	2. Name	
3. Street Address		
4. City, Town, or Village	5. State	6. Zip Code
7. Contact Phone Number	8. Contact Name	
9. Email		

VSQG 2		
1. EPA ID Number (if assigned)	2. Name	
3. Street Address		
4. City, Town, or Village	5. State	6. Zip Code
7. Contact Phone Number	8. Contact Name	
9. Email		

VSQG 3		
1. EPA ID Number (if assigned)	2. Name	
3. Street Address		
4. City, Town, or Village	5. State	6. Zip Code
7. Contact Phone Number	8. Contact Name	
9. Email		

Appendix VII: Certifications/ Licenses

COMMONWEALTH OF VIRGINIA

Department of Professional and Occupational Regulation

9960 Mayland Drive, Suite 400, Richmond, VA 23233

Telephone: (804) 367-8500

EXPIRES ON

04-30-2020

NUMBER

3303003941

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
ASBESTOS INSPECTOR LICENSE

MICHAEL PETER HAMILL
2111 ARLINGTON TERRACE
ALEXANDRIA, VA 22303



Status can be verified at <http://www.dpor.virginia.gov>

(SEE REVERSE SIDE FOR PRIVILEGES AND INSTRUCTIONS)



Mary Brog Vaughan, Acting Director

DPOR-LIC (02/2017)

COMMONWEALTH OF VIRGINIA

Department of Professional and Occupational Regulation

9960 Mayland Drive, Suite 400, Richmond, VA 23233

Telephone: (804) 367-8500

EXPIRES ON

12-31-2019

NUMBER

3356001140

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
LEAD RISK ASSESSOR LICENSE

MICHAEL PETER HAMILL
2111 ARLINGTON TERRACE
ALEXANDRIA, VA 22303



Status can be verified at <http://www.dpor.virginia.gov>

DPOR


James W. DeBorja
Director

**HAZARDOUS MATERIALS INSPECTION REPORT
OF THE
VIRGINIA HOSPITAL CENTER FACILITY
LOCATED AT
601 S. CARLIN SPRINGS ROAD
ARLINGTON, VIRGINIA**



Prepared for:

Mr. Jesus Almario, P.E.
Arlington County
Department of Environmental Services
1400 North Uhle Street, Suite 403
Arlington, VA 22201

Prepared by:



Aerosol Monitoring & Analysis, Inc.
1331 Ashton Road, P.O. Box 646
Hanover, Maryland 21076
Phone: 410-684-3327
Fax: 410-684-3384

AMA Job#: 19415
Contract #: 678-12
PO #: 273316

November 4, 2019

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	3
1.1	ASBESTOS-CONTAINING MATERIALS	3
1.2	LEAD-BASED PAINT	3
1.3	POLYCHLORINATED BIPHENYL'S	4
1.3.1	PCB BALLAST	4
1.4	MERCURY VAPOR LAMPS	4
1.5	OTHER HAZARDOUS MATERIALS	5
2.0	METHODOLOGY	6
2.1	ASBESTOS-CONTANING MATERIALS	6
2.1.1	SAMPLE COLLECTION	6
2.1.2	BULK SAMPLE ANALYSIS	6
2.1.3	CHAIN OF CUSTODY	6
2.2	LEAD-BASED PAINT	6
2.2.1	TESTING STRATEGY	6
2.2.2	XRF TESTING	7
2.3	POLYCHLORINATED BIPHENYL'S	7
2.3.1	PCB BALLAST	7
2.4	MERCURY VAPOR LAMPS	7
3.0	RESULTS	8
3.1	ASBESTOS-CONTAINING MATERIALS	8
3.2	LEAD-BASED PAINT	8
3.3	POLYCHLORINATED BIPHENYL'S	9
3.3.1	PCB BALLAST	9
3.4	MERCURY VAPOR LAMPS	9
4.0	CONCLUSIONS	11
4.1	ASBESTOS-CONTAINING MATERIALS	11
4.2	LEAD-BASED PAINT	12
4.3	POLYCHLORINATED BIPHENYL'S	12
4.3.1	PCB BALLAST	12
4.4	MERCURY VAPOR LAMPS	13
4.5	OTHER HAZARDOUS MATERIALS	14

TABLE I:	ASBESTOS BULK SAMPLE RESULTS
TABLE II:	POSITIVE XRF READING TABLE
TABLE III:	TOTAL HAZARDOUS MATERIALS INVENTORY TABLE
TABLE IV:	TOTAL HAZARDOUS MATERIALS QUANTITIES SUMMARY

APPENDIX A:	ASBESTOS-CONTAINING MATERIAL DOCUMENTATION
APPENDIX B:	LEAD-BASED PAINT DOCUMENTATION
APPENDIX C:	PHOTOGRAPHS
APPENDIX D:	SITE DRAWING
APPENDIX E:	CERTIFICATIONS/ LICENSES

1.0 EXECUTIVE SUMMARY

Aerosol Monitoring & Analysis, Inc. (AMA) was contracted to perform a hazardous materials survey of the accessible interior areas of the Virginia Hospital Center located at 601 S. Carlin Springs Road, Arlington, VA. Exterior areas to include window and door systems were assessed by others. No sub-grade or destructive assessments were conducted during this investigation. The purpose of the investigation was to identify potential hazardous materials such as asbestos-containing materials (ACM), lead-based paint (LBP), and fluorescent fixtures containing mercury vapor lamps (MVL), that may be disturbed by the proposed demolition to the structures. Between October 7th-31st, 2019 AMA representatives Mr. Bob Bentz, Mr. Bryan Smalls, Mr. Eric Hruska, Mr. Ron Stallard, and Ms. Davidetta Mah were on-site to identify and evaluate ACMs, LBP and MVLs. Refer to Table III (Total Hazardous Materials Inventory) for a tabular listing of the hazardous materials identified and the quantities assessed during the investigation of the Building.

1.1 ASBESTOS-CONTAINING MATERIALS

AMA collected two-hundred four (204) bulk samples of suspect ACMs, which were identified throughout the accessible interior of the Virginia Hospital Center located at 601 S. Carlin Springs Road, Arlington, VA. Of the 204 bulk samples collected, Ten (10) were identified as containing greater than one percent (>1%) asbestos by polarized light microscopy (PLM) analysis. The EPA and the Commonwealth of Virginia have determined that materials containing greater than (>) 1% asbestos are considered asbestos containing materials and must be treated as such.

Based on the inspection results of the Virginia Hospital Center, ACM was identified within the following materials:

- **Black Mastic On Foil Duct Insulation**
- **Black Mastic On Fiberglass Insulation**
- **Mudded Fitting Insulation**
- **Brown Duct Pin Mastic**
- **Black Floor Tile Mastic**

It was observed by AMA at the time of the inspection that certain areas of the Virginia Hospital Center which may contain suspect asbestos-containing materials were not accessible. Therefore, AMA made assumptions on the locations of possible suspect asbestos-containing materials, which may exist in these areas, and they are as follows:

- **Mudded Fitting Insulation (ACM) Assumed Present above fixed ceilings**
- **Pipe and Pipe Fitting Insulation (ACM) Assumed present above fixed ceilings, in wet walls, and throughout crawl space**
- **Elevator Cab and Door Insulation (Assumed ACM) Assumed Present throughout elevator door and cab**
- **Labeled Wood Fire Door (Assumed ACM)**
- **Labeled Metal Fire Door (Assumed ACM)**
- **Freezer Insulation (Assumed ACM)**

1.2 LEAD-BASED PAINT

Two-hundred and two (202) surfaces finished with suspect lead-based paint (LBP) were

tested during the investigation of the Virginia Hospital Center with the use of a Niton XLp 300 x-ray fluorescence analyzer (XRF). Six (6) of the tests/surfaces/building components were determined to contain greater or equal to (≥ 1.0) milligram of lead per square centimeter (mg/cm^2) of surface area tested, the amount defined as a LBP according to the Commonwealth of Virginia and the EPA. The OSHA has determined that surfaces with measurable amounts of lead must be handled in accordance with the OSHA Lead in Construction Standard (29 CFR 1926.62)

In general, the following building components were identified to have LBP:

Virginia Hospital Center

- **Gray/Teal/Pink/Beige Metal Stair Components**
- **Ceramic Wall Tiles**
- **Orange Metal I-Beam**
- **Beige Metal Exit Door**
- **Orange Metal Support Column**
- **Green Metal Tank Hanger**

There is no regulatory requirement to remove components that have lead based or lead containing paint prior to renovation/demolition. However, if these components are to be removed and disposed of, the Resource Conservation and Recovery Act (RCRA), 40 CFR 260-268 requires Toxic Characteristic Leachate Procedure (TCLP) testing of the waste stream for lead in order to determine if the material must be disposed of as a lead hazardous waste. Metal components may be recycled in lieu of disposal, thus eliminating the TCLP testing requirements. Any work that is conducted on painted surfaces with measureable amounts of lead must be done so in accordance with the OSHA Lead in Construction Standard 29 CFR 1926.62.

1.3 POLYCHLORINATED BIPHENYL'S

1.3.1 PCB BALLAST

Small capacitors and fluorescent light ballasts manufactured after 1978 have been labeled "NO PCB's" by the manufacturers. Prior to 1978, small capacitors and fluorescent light ballasts were not labeled as to whether they contained PCBs; therefore, all unlabeled capacitors and ballasts were assumed to contain PCBs.

AMA performed a visual evaluation of representative light fixture ballasts utilizing a random selection method. Any ballast absent of the "No PCB's" label was assumed to contain PCBs. Based on this assessment, the ballasts observed by AMA had the "No PCB" label in various locations at the property. AMA identified approximately **2,700 light ballasts** throughout the property.

1.4 MERCURY VAPOR LAMPS

Reportable quantities of mercury are often found in fluorescent lamps and high intensity discharge (HID) lamps. Because of this fact, the fluorescent lamps and HID's found in the Virginia Hospital Center, should be considered a hazardous waste for mercury under

the Resource Conservation and Recovery Act (RCRA); 40 CFR 261. Based on the observations at the site, it was determined that there are approximately **5,000 fluorescent lamps** throughout the Building.

Unless Toxic Characteristic Leachate Procedure (TCLP) testing for mercury is performed, the light tubes located at the property should be assumed to exceed the regulatory limit of 0.2 milligrams per liter for mercury. These tubes must be disposed of as mercury containing waste unless testing proves otherwise.

1.5 OTHER HAZARDOUS MATERIALS

During the inspection of the Virginia Hospital Center, at 601 S. Carlin Springs Rd, AMA observed Mercury thermostats (2) and Mercury Thermometers (2) throughout the building. In addition, AMA cautions the potential for mercury within the sink traps of past laboratory areas. During the inspection, AMA identified approximately 4 sink traps associated with lab areas.

2.0 METHODOLOGY

2.1 ASBESTOS-CONTAINING MATERIALS

2.1.1 SAMPLE COLLECTION

The initial phase of the evaluation for ACM involved the visual evaluation of the building. After reviewing and compiling documentation pertaining to the materials in the building, a strategy to sample suspect materials was formulated. The sampling involved observing accessible areas of the building and collecting bulk samples of suspect materials. Sample results can be found in Table I, which is attached to this report.

Samples were collected with a core bore or utility knife which was driven through the suspect material to the substrate to obtain a sample containing each discrete layer. The samples were then placed in sterilized “whirl-pak” bags and assigned unique identifiers, which were recorded on the bags and the bulk survey sampling sheets.

2.1.2 BULK SAMPLE ANALYSIS

Bulk samples were submitted to AMA Analytical Services, Inc. in Lanham, Maryland. AMA Analytical Services, Inc. is accredited by the National Institute of Standards and Technology (NIST) through the National Voluntary Laboratory Accreditation Program (NVLAP #101143) for bulk sample analysis and by the American Industrial Hygiene Association (AIHA #8863.)

Samples of bulk material were analyzed using PLM following the EPA, “Method for the Determination of Asbestos in Bulk Building Materials” (EPA/600/R-93-116). PLM is an optical microscopic technique used to distinguish the different types of asbestos fibers by their shape and unique optical properties. The technique is based on the refraction of light from the various crystalline asbestos structures and observing the corresponding color changes through the microscope.

Sample analysis results are listed in Table I of this report.

2.1.3 CHAIN OF CUSTODY

A chain of custody form was completed for the bulk samples. The samples were logged in and assigned unique laboratory numbers. Upon completion of analytical services, AMA Analytical Services, Inc. retained the remaining sample materials.

2.2 LEAD-BASED PAINT

2.2.1 TESTING STRATEGY

The initial phase of the evaluation for LBP involved a visual evaluation of painted surfaces. After reviewing and compiling documentation pertaining to the materials inside the building, a strategy to test suspect surfaces was formulated.

2.2.2 XRF TESTING

The investigation was performed using Niton XLp 300 XRF. The XLp 300 XRF contains a small radioactive source (Cadmium 109), which produces x-rays. The instrument emits radiation only when placed against a surface and the trigger is depressed. If the painted surface contains lead, the radiation will stimulate the lead atoms to emit a fluorescent field, which is sensed by a detector inside the unit. The XRF then converts these signals to a direct reading mg/cm² of surface area. The XLp 300 can detect the presence of lead to a depth of approximately 3/8-inch with a 95% confidence interval.

The XRF was calibrated in accordance with the manufacturer's instructions. Prior to obtaining readings from suspect surfaces, three calibration readings were performed on a National Institute for Science and Technology (NIST) Calibration Test Block and recorded. The NIST Calibration Block contains a known concentration of lead (1.02 mg/cm²) and the XRF must indicate 1.02 mg/cm² with a tolerance of + or - 0.3 mg/cm² for the average of the three readings. If the average of the three calibration readings is within the established tolerance, the unit is working properly. Calibration checks were performed prior to and at the end of the investigation. Surfaces with lead levels ≥ 1.0 mg/cm² are defined as lead containing substances, in the Commonwealth of Virginia.

2.3 POLYCHLORINATED BIPHENYL'S

2.3.1 PCB BALLAST

A visual assessment of equipment and articles that may contain hazardous materials was made by AMA throughout the building. During the assessment, AMA observed and quantified suspect polychlorinated biphenyl containing ballast associated with fluorescent light fixtures. No sampling was performed of the electric fluid within the equipment.

2.4 MERCURY VAPOR LAMPS

A visual assessment of equipment and articles that may contain hazardous materials was made by AMA throughout the building. During the assessment, AMA observed and quantified suspect mercury bulbs and mercury vapor lamps associated with fluorescent light fixtures. No sampling was performed of the electric fluid within the equipment.

3.0 RESULTS

3.1 ASBESTOS-CONTAINING MATERIALS

AMA collected two-hundred four (204) bulk samples of suspect ACMs, which were identified throughout the accessible interior of the Virginia Hospital Center located at 601 S. Carlin Springs Road, Arlington, VA. Of the 204 bulk samples collected, Ten (10) were identified as containing greater than one percent (>1%) asbestos by polarized light microscopy (PLM) analysis. The EPA and the Commonwealth of Virginia have determined that materials containing greater than (>) 1% asbestos are considered asbestos containing materials and must be treated as such.

Based on the inspection results of the Virginia Hospital Center, ACM was identified within the following materials:

- **Black Mastic On Foil Duct Insulation**
- **Black Mastic On Fiberglass Insulation**
- **Mudded Fitting Insulation**
- **Brown Duct Pin Mastic**
- **Black Floor Tile Mastic**

It was observed by AMA at the time of the inspection that certain areas of the Virginia Hospital Center which may contain suspect asbestos-containing materials were not accessible. Therefore, AMA made assumptions on the locations of possible suspect asbestos-containing materials, which may exist in these areas, and they are as follows:

- **Mudded Fitting Insulation (ACM) Assumed Present above fixed ceilings**
- **Pipe and Pipe Fitting Insulation (ACM) Assumed present above fixed ceilings, in wet walls, and throughout crawl space**
- **Elevator Cab and Door Insulation (Assumed ACM) Assumed Present throughout elevator doors and cabs**
- **Labeled Wood Fire Doors (Assumed ACM)**
- **Labeled Metal Fire Doors (Assumed ACM)**
- **Freezer Insulation (Assumed ACM)**

The comprehensive table, contained within this report, lists the sample number, the type of material collected, sample location, and the results of the laboratory analysis (See Table I). For a detailed description of the locations where the bulk samples were collected, refer to the "Bulk Sampling Survey Sheets" located in Appendix A of this report. Asbestos material quantities and locations are located in the attached Total Hazardous Materials Inventory Table III.

3.2 LEAD-BASED PAINT

Two-hundred and two (202) surfaces finished with suspect lead-based paint (LBP) were tested during the investigation of the Virginia Hospital Center with the use of a Niton XLP 300 x-ray fluorescence analyzer (XRF). Twenty-three (23) of the tests/surfaces/building

components were determined to contain greater or equal to (≥ 1.0) milligram of lead per square centimeter (mg/cm^2) of surface area tested, the amount defined as a LBP according to the Commonwealth of Virginia and the EPA. The OSHA has determined that surfaces with measurable amounts of lead must be handled in accordance with the OSHA Lead in Construction Standard (29 CFR 1926.62)

In general, the following building components were identified to have LBP:

Virginia Hospital Center

- **Gray/Teal/Pink/Beige Metal Stair Components**
- **Ceramic Wall Tiles**
- **Orange Metal I-Beam**
- **Beige Metal Exit Door**
- **Orange Metal Support Column**
- **Green Metal Tank Hanger**

There is no regulatory requirement to remove components that have lead based or lead containing paint prior to renovation/ demolition. However, if these components are to be removed and disposed of, the Resource Conservation and Recovery Act (RCRA), 40 CFR 260-268 requires Toxic Characteristic Leachate Procedure (TCLP) testing of the waste stream for lead in order to determine if the material must be disposed of as a lead hazardous waste. Metal components may be recycled in lieu of disposal, thus eliminating the TCLP testing requirements. Any work that is conducted on painted surfaces with measureable amounts of lead must be done so in accordance with the OSHA Lead in Construction Standard 29 CFR 1926.62.

Refer to the Field Forms for a description of the location of the tests, components tested, color of paint, substrate, condition of paint, and results of the tests located in Appendix B of this report. Components finished with LBP are listed in the Positive XRF Readings Table II.

3.3 POLYCHLORINATED BIPHENYL'S

3.3.1 PCB BALLAST

Small capacitors and fluorescent light ballasts manufactured after 1978 have been labeled "NO PCB's" by the manufacturers. Prior to 1978, small capacitors and fluorescent light ballasts were not labeled as to whether they contained PCBs; therefore, all unlabeled capacitors and ballasts were assumed to contain PCBs.

AMA performed a visual evaluation of representative light fixture ballasts utilizing a random selection method. Any ballast absent of the "No PCB's" label was assumed to contain PCBs. Based on this assessment, the ballasts observed by AMA had the "No PCB" label in various locations at the property. AMA identified approximately **2,700 light ballasts** throughout the property.

3.4 MERCURY VAPOR LAMPS

Reportable quantities of mercury are often found in fluorescent lamps. Because of this fact, the fluorescent lamps found in the Virginia Hospital Center, should be considered a

hazardous waste for mercury under the Resource Conservation and Recovery Act (RCRA); 40 CFR 261. Based on the observations at the site, it was determined that there are approximately **5,000 fluorescent lamps** throughout the Building.

4.0 CONCLUSIONS

4.1 ASBESTOS-CONTAINING MATERIALS

The US EPA and Commonwealth of Virginia require an inspection for asbestos be performed prior to renovation activities that may disturb such materials (EPA NESHAP 40 CFR Part 61, Subpart M). In addition, the building or facility owners are required to provide information regarding the presence quantity and location of asbestos containing materials to contractors bidding on or performing work at such facilities (OSHA Asbestos in Construction 29 CFR 1926.1101). Based on the results of the asbestos inspection, the identified materials must be abated if those materials will be impacted by renovation or demolition activities.

In dealing with asbestos materials during demolition projects, the Environmental Protection Agency (EPA) regulation 40 CFR Part 61, Subpart M (NESHAP), the Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1101 (Asbestos in Construction Standard) and the Code of Virginia Title 54.1, Chapter 5 would be the primary regulations impacting the work.

Regulated asbestos-containing material (RACM) means (a) Friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

Within the EPA's National Emissions Standards for Hazardous Air Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M), all regulated asbestos-containing materials must be removed prior to renovation or demolition of a building, if they are to be impacted by the renovation/ demolition activities.

The Occupational Safety and Health Administration (OSHA,) in 29 CFR 1926.1101. "Asbestos in Construction" regulation, defines work involving the removal of asbestos-containing thermal system insulation (TSI) and surfacing material as Class I work. All other asbestos removal work would be defined as Class II work.

Commonwealth of Virginia asbestos regulation requirements, Title 54.1, Chapter 5 must be adhered to during asbestos abatement. In summary, these requirements include licensing of the abatement contractor, supervisor and workers, posting caution signs, establishing a regulated work area, utilization of personal protective equipment, utilization of a decontamination area, and notifying the Virginia Board of Asbestos Licensing twenty calendar days in advance of an abatement project involving the removal of more than ten linear feet of friable ACM.

As the identified or assumed materials will be impacted by the demolition activities, then the asbestos materials would be required to be removed prior to disturbance. The removal would have to be conducted by trained and licensed asbestos abatement personnel utilizing approved engineering controls and personal protective equipment (PPE) established under the regulations.

AMA cautions that additional forms of asbestos may be located within inaccessible areas of the building not typically accessible without demolition occurring. We have included estimated quantities of such materials within our report and inventory tables (Table III), but additional materials may be encountered during renovation/ demolition activities.

4.2 LEAD-BASED PAINT

For projects, which will disturb lead containing paint, the paint must be handled in accordance with the requirements established by the EPA and OSHA.

There is no federal requirement to remove lead paint prior to demolition activities, only that painted components be tested to determine the disposal requirements and that contractors be made aware of the existence of any paint containing lead in detectable amounts (lead containing paint, LCP), so their workers can be adequately protected.

Regulations established in OSHA's "Lead in Construction Standard" (29 CFR 1926.62) must be adhered to during demolition and renovation of the surfaces finished with paint containing lead in detectable amounts. This standard established the permissible exposure level (PEL) for lead at 50 micrograms per cubic meter (ug/m^3) as an eight-hour time weighted average (TWA); the action level has been established at 30 ug/m^3 as an eight-hour TWA. This regulation also requires employers to use engineering controls and special work practices to reduce worker lead exposure to, at, or below the PEL. It also triggers several requirements regarding exposure monitoring, biological monitoring, and employee training when a worker is exposed to airborne lead levels at or above the action level.

All lead-containing waste is to be handled and disposed of as hazardous waste unless TCLP (toxic characteristic leaching procedure) testing is performed and indicates otherwise. The waste shall be considered as hazardous when the concentration of lead exceeds 5 parts per million (ppm) by the TCLP. Metal components should be recycled, and glazed finishes are to be disposed of as general construction debris.

4.3 POLYCHLORINATED BIPHENYL'S

4.3.1 PCB BALLAST

In the event PCB-containing light ballasts are encountered during demolition, they should be disposed of in accordance with current EPA regulations.

There are two primary Federal laws that affect the disposal of PCB ballasts, which are as follows:

- 1) Toxic Substances Control Act (TSCA)
- 2) Superfund Law (Comprehensive Environmental Response, Compensation and Liability Act of "CERCLA")

These two laws can be conflicting and confusing. TSCA states that it is permissible to dispose of non-leaking ballasts in a sanitary landfill, while Superfund prohibits the disposal of more than one pound of PCBs (approximately 16 ballasts) in a sanitary landfill. Prudent policy would follow the more stringent of the two regulations.

Each of these laws is discussed in more detail below. The other Federal regulations that refer to PCBs are discussed toward the end of this section.

TSCA does not regulate the disposal of non-leaking, intact "Small Capacitors", defined as containing less than one kilogram (approximately 3 pounds) of PCB dielectric fluid. Lighting ballasts contain a Small PCB Capacitor and as a result are unregulated for disposal.

The exceptions to this rule are as follows:

- 1) If the Small Capacitor or ballast is leaking PCBs.
- 2) If the ballast is owned by a company which, at any time in the past, manufactured equipment which contained PCBs;
- 3) If the asphalt potting material inside the ballast contains PCBs in excess of 50 ppm.

If a ballast meets any of these criteria, then it must be disposed of by incineration in a TSCA-approved facility or in a chemical waste landfill (after the PCB liquids are drained). The latter is usually impractical for a light ballast. All ballast manufacturers are required to incinerate their ballasts.

Even though it is legal to dispose of ballasts in a sanitary landfill, the EPA encourages disposers of large quantities of PCB ballasts to treat them as if they were a regulated waste. The preamble to the May 31, 1979 PCB Final Rule in the Code of Federal Regulations (40 CFR Part 761), makes it clear that the intent of the Small Capacitor disposal rule was intended for "random disposal" in landfills by "householders and other infrequent disposers". In the case of large quantities (greater than 42 ballasts) of small PCB capacitors by commercial and industrial activities, which "pose a somewhat larger environmental risk"; the EPA strongly encourages the voluntary collection and disposal of small PCB capacitors in chemical waste landfills or high temperature incinerators.

Under the Superfund laws, PCBs are specifically listed as a hazardous substance. The "release" or "threat of release" of more than one pound of PCBs into the environment triggers a Superfund notification and cleanup requirement.

4.4 MERCURY VAPOR LAMPS

The regulatory level for mercury established by the EPA in 40 CFR Part 261 is 0.20 milligrams per liter (mg/l). The fluorescent tubes and HID Lamps observed at the building should be considered a hazardous waste for mercury under the Resource Conservation and Recovery Act (RCRA); 40 CFR 261. When this type of fluorescent tube/lamp is removed, they should be handled, stored, labeled, and disposed of as a hazardous waste. It is possible to reuse the light tubes within the fixtures at other buildings, but this would still require removal and packaging.

There are no specific training requirements for PCB and MVL removal and packaging, however, all workers should be trained in the hazards of mercury, as well as handling procedures.

4.5 OTHER HAZARDOUS MATERIALS

During the inspection of the Virginia Hospital Center, at 601 S. Carlin Springs Rd, AMA observed mercury thermostats (2) and mercury thermometers (2) throughout the building. In addition, AMA cautions the potential for mercury within the sink traps of past laboratory areas as a result of broken thermometers. During the inspection, AMA identified approximately 4 sink traps associated with lab areas. The mercury thermostats and thermometers observed at the building should be considered a hazardous waste for mercury under the Resource Conservation and Recovery Act (RCRA); 40 CFR 261. When this type of thermometer/thermostat is removed, they should be handled, stored, labeled, and disposed of as a hazardous waste.

TABLE I: ASBESTOS BULK SAMPLE RESULTS

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
October 24, 2019			
194151021-01	Rough Plaster (1 st Layer)	AMA-49 Northwest Corner, 15' From North Wall, 10' From West Wall At Ceiling	No Asbestos Detected
194151021-02	Rough Plaster (2 nd Layer)	AMA-49 Northwest Corner, 15' From North Wall, 10' From West Wall At Ceiling	No Asbestos Detected
194151021-03	Rough Plaster (1 st Layer)	AMA-49 Southwest Corner, 6' From West Wall, 6' From South Wall	No Asbestos Detected
194151021-04	Rough Plaster (2 nd Layer)	AMA-49 Southwest Corner, 6' From West Wall, 6' From South Wall	No Asbestos Detected
194151021-05	Rough Plaster (1 st Layer)	AMA-49 Along North Wall 10' From West Wall	No Asbestos Detected
194151021-06	Rough Plaster (2 nd Layer)	AMA-49 Along North Wall 10' From West Wall	No Asbestos Detected
194151021-07	White Pipe Seam Sealant (Old)	AMA-49 18' From North Wall, 6' From West Wall, 6' From Floor	No Asbestos Detected
194151021-08	End Cap Sealant (New)	AMA-49 10' South Of Main Boiler Room Door	No Asbestos Detected
194151021-09	Spray Applied Fire Proofing	AMA-49 Along South Wall, 20' From East Wall	No Asbestos Detected
194151021-10	Spray Applied Fire Proofing	AMA-49 Along South Wall, In Front Of Main Entrance Stairs	No Asbestos Detected
194151021-11	Spray Applied Fire Proofing	AMA-49 Along North Wall, 10' From East Wall	No Asbestos Detected
194151021-12	Spray Applied Fire Proofing	AMA-49 Along North Wall, 10' From West Wall	No Asbestos Detected
194151021-13	Green Canvas Mudded Duct	AMA-49 10' From South Wall, 15' From East Wall, 10' From Floor	No Asbestos Detected
194151021-14	Green Canvas Mudded Duct	AMA-49 10' From South Wall, 15' From East Wall, 10' From Floor	No Asbestos Detected
194151021-15	White Pipe Seam Sealant (New)	AMA-49 10' From North Wall, 15' From East Wall	No Asbestos Detected
194151021-16	End Cap Sealant (Old)	AMA-49 15' From South Wall, 20' From West Wall	No Asbestos Detected
194151021-17	12"X12" White With Gray Specks Floor Tile	AMA-49 Panel Room At Door Threshold	No Asbestos Detected
194151021-18	Black Floor Tile Mastic	AMA-49 Panel Room At Door Threshold	3% Chrysotile
194151021-19	2'x2' Rough Ceiling Tile	AMA-60 14' From East Wall, 6' From North Wall	No Asbestos Detected
194151021-20	Cloth Vibration Dampner	AMA-49 West Of Panel Room	No Asbestos Detected

Table 1-1

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
		Entrance, 4' From Floor	
194151021-21	Cloth Vibration Dampner	AMA-49 West Of Panel Room Entrance, 4' From Floor	No Asbestos Detected
194151021-22	Rough Plaster (1 st Layer)	AMA-61 Northeast Corner, 10' From North Wall, 5' From East Wall	No Asbestos Detected
194151021-23	Rough Plaster (2 nd Layer)	AMA-61 Northeast Corner, 10' From North Wall, 5' From East Wall	No Asbestos Detected
194151021-24	Rough Plaster (1 st Layer)	AMA-61 Northeast Corner, 5' From North Wall, 5' From East Wall	No Asbestos Detected
194151021-25	Rough Plaster (2 nd Layer)	AMA-61 Northeast Corner, 5' From North Wall, 5' From East Wall	No Asbestos Detected
194151021-26	Rough Plaster (1 st Layer)	AMA-61 Northwest Corner, 20' From North Wall, 5' From West Wall	No Asbestos Detected
194151021-27	Rough Plaster (2 nd Layer)	AMA-61 Northwest Corner, 20' From North Wall, 5' From West Wall	No Asbestos Detected
194151021-28	Rough Plaster (1 st Layer)	AMA-319 Northwest Corner, At Ceiling	No Asbestos Detected
194151021-29	Rough Plaster (2 nd Layer)	AMA-319 Southwest Corner At Ceiling.	No Asbestos Detected
194151021-30	Ceramic Tile Grout	AMA-61 Outside North Of Entrance To AMA-62	No Asbestos Detected
194151021-31	Smooth Plaster (1 st Layer)	AMA-61 10' From South Wall, 25' From West Wall	No Asbestos Detected
194151021-32	Smooth Plaster (2 nd Layer)	AMA-61 10' From South Wall, 25' From West Wall	No Asbestos Detected
194151021-33	Smooth Plaster (1 st Layer)	AMA-61 20' From South Wall, 25' From West Wall	No Asbestos Detected
194151021-34	Smooth Plaster (2 nd Layer)	AMA-61 20' From South Wall, 25' From West Wall	No Asbestos Detected
194151021-35	Black Tar Paper Wrap	AMA-12 Above Ceiling, 5' From North Wall	No Asbestos Detected
194151021-36	Black Tar Paper Wrap	AMA-15 Above Ceiling At Door Threshold	No Asbestos Detected
194151021-37	White Pipe Seam Sealant (Old)	AMA-60 Above Ceiling, 10' From West All	No Asbestos Detected
194151021-38	White Pipe Seam Sealant (Old)	AMA-108 Above Ceiling, At Door Threshold	No Asbestos Detected
194151021-39	Transite Window Sill	AMA-60 At Southwest Corner Window	No Asbestos Detected
194151021-40	Transite Window Sill	AMA-359 At North Corner Window	No Asbestos Detected

Table 1-2

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
194151021-41	Drywall	AMA-60 4' East Of Easternmost Entrance 4' From Floor	No Asbestos Detected
194151021-42	Joint Compound	AMA-60 4' East Of Easternmost Entrance 4' From Floor	No Asbestos Detected
194151021-43	Tan Baseboard Mastic	AMA-61 Along North Wall, 15' From West Wall	No Asbestos Detected
194151021-44	12"X12" Tan Mottled Floor Tile	AMA-43 Northeast Corner, At Floor	No Asbestos Detected
194151021-45	Tan Floor Tile Mastic	AMA-43 Northeast Corner, At Floor	No Asbestos Detected
194151021-46	2'x4' Fissured Pinhole Ceiling Tile	AMA-43 6' From North Wall, 6' From West Wall	No Asbestos Detected
194151021-47	2'x4' Crater Pinhole Ceiling Tile	AMA-45 Southeast Corner At Ceiling	No Asbestos Detected
194151021-48	Gray Metal Duct Seam Sealant	AMA-16 Along West Wall, 6' From South Wall	No Asbestos Detected
194151021-49	Smooth Plaster (1 st Layer)	AMA-05 8' From North Wall, 20' From West Wall	No Asbestos Detected
194151021-50	Smooth Plaster (2 nd Layer)	AMA-05 8' From North Wall, 20' From West Wall	No Asbestos Detected
194151021-51	Mudded Fitting	AMA-05 8' From North Wall, 20' From West Wall	5% Chrysotile
194151021-52	Black Mastic On Foil Duct	AMA-06 Above Ceiling, At Door Threshold	5% Chrysotile
194151021-53	Cement Paper Support	AMA-61 20' From South Wall, 25' From West Wall, Above Ceiling	No Asbestos Detected
194151021-54	Black Floor Tile Mastic mixed with yellow carpet mastic	AMA-05 At Westernmost Door Threshold	2% Chrysotile
194151021-55	12"X12" Blue Mottled Floor Tile	AMA-02 At Northeast Corner At Floor	No Asbestos Detected
194151021-56	12"X12" White Floor Tile	AMA-01 At Southwest Corner	No Asbestos Detected
194151021-57	12"X12" White Floor Tile	AMA-01 At Southwest Corner	No Asbestos Detected
194151021-58	12"X12" Gray Mottled Floor Tile	AMA-01 At Southwest Corner	No Asbestos Detected
194151021-59	Drywall	AMA-01 Along South Partition Wall, East Of Double Doors	No Asbestos Detected
194151021-60	Joint Compound	AMA-01 Along South Partition Wall, East Of Double Doors	No Asbestos Detected
194151021-61	Tan Duct Seam Sealant On Foil	AMA-01 Boiler Room, At North End Of Duct	No Asbestos Detected
194151021-62	Tan Duct Seam Sealant On Foil	AMA-01 Boiler Room, At North End Of Duct	No Asbestos Detected
194151021-63	Tan Duct Seam Sealant On Metal	AMA-01 Boiler Room At South End Of Duct	No Asbestos Detected
194151021-64	Tan Duct Seam Sealant On Metal	AMA-01 Boiler Room At South End Of Duct	No Asbestos Detected

Table 1-3

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
194151021-65	Spray Applied Fire Proofing	Along Northeast Corner Of Ceiling	No Asbestos Detected
194151021-66	Red Fire Stop	AMA-01 Boiler Room Along West Wall, 10' From North Wall	No Asbestos Detected
194151021-67	12"X12" White With Pink Specks Floor Tile	AMA-01 Kitchenette 10' From West Wall, 5' From North Wall	No Asbestos Detected
194151021-68	12"X12" White With Pink Specks Floor Tile	AMA-01 Kitchenette, 5' From West Wall, 3' From North Wall	No Asbestos Detected
194151021-69	White Pipe Seam Sealant (Old)	AMA-01 Kitchenette Closet	No Asbestos Detected
194151021-70	Yellow Carpet Mastic	AMA-109 At Door Entrance Under Carpet	No Asbestos Detected
194151021-71	12"X12" White With Green Specks Floor Tile	AMA-107 Along West Wall, 20' From South Wall On Floor	No Asbestos Detected
194151021-72	Tan Floor Tile Mastic	AMA-107 Along West Wall, 20' From South Wall On Floor	No Asbestos Detected
194151021-73	Black Mastic On Fiberglass Pipe	AMA-107 6' From East Wall, 32' From North Wall, Above Ceiling	5% Chrysotile
194151021-74	Black Mastic On Fiberglass Pipe	AMA-02 Along South Wall, 20' From West Wall, Above Ceiling	5% Chrysotile
194151021-75	Tan Baseboard Mastic	AMA-107 Along South Wall	No Asbestos Detected
194151021-76	12"X12" White With Red Specks Floor Tile	AMA-12 3' From West Wall, 12' From North Wall	No Asbestos Detected
194151021-77	12"X12" White With Red Specks Floor Tile	AMA-134 Along South Wall, 20' From East Wall	No Asbestos Detected
194151021-78	White Baseboard Mastic	AMA-114 Along North Wall, 2' From Door	No Asbestos Detected
194151021-79	White Baseboard Mastic	AMA-114 Along North Wall 15' From Door	No Asbestos Detected
194151021-80	Drywall	AMA-107 Along West Wall Above Drop Ceiling	No Asbestos Detected
194151021-81	Joint Compound	AMA-107 Along West Wall Above Drop Ceiling	No Asbestos Detected
194151021-82	Ceramic Tile Grout	AMA-138 Along West Wall	No Asbestos Detected
194151021-83	12"X12" Pink Mottled Floor Tile	AMA-123, Along North Wall, 10' From West Wall	No Asbestos Detected
194151021-84	12"X12" Pink Mottled Floor Tile	AMA-140 In Middle Of Hallway	No Asbestos Detected
194151021-85	Tan Light Mastic	AMA-145 At Light Above Ceiling	No Asbestos Detected
194151021-86	Tan Light Mastic	AMA-148 At Light Above Ceiling	No Asbestos Detected
194151021-87	Drywall	AMA-123 Along South Wall, 6' From West Wall	No Asbestos Detected
194151021-88	2'x4' Smooth Ceiling Tile	AMA-123 Along South Wall, 6' From West Wall	No Asbestos Detected

Table 1-4

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
194151021-89	Joint Compound	AMA-123 Along South Wall, 6' From West Wall	No Asbestos Detected
194151021-90	12"X12" Cream Mottled Floor Tile	AMA-123 Along South Wall, 2' From East Wall At Floor	No Asbestos Detected
194151021-91	Gray Sink Mastic	AMA-123 Along North Wall Under Sink	No Asbestos Detected
194151021-92	Black Floor Tile Mastic	AMA-123 Along South Wall, 2' From East Wall At Floor	5% Chrysotile
194151021-93	12"X12" Cream Mottled Floor Tile	AMA-128 Along Northwest Corner	No Asbestos Detected
194151021-94	12"X12" White With Brown Specks Floor Tile	AMA-121 Along Southeast Corner	No Asbestos Detected
194151021-95	12"X12" White With Brown Specks Floor Tile	AMA-122 Along Northeast Corner	No Asbestos Detected
194151021-96	White Duct Seam Sealant On Metal	AMA- 141 Above Drop Ceiling At Reception Desk	No Asbestos Detected
194151021-97	White Duct Seam Sealant On Metal	AMA-128 Above Drop Ceiling Throughout	No Asbestos Detected
194151021-98	12"X12" Blue Mottled Floor Tile	AMA-11 In Middle Of Hallway	No Asbestos Detected
194151021-99	White Duct Seam Sealant On Foil	AMA-141 Above Drop Ceiling By Reception Desk	No Asbestos Detected
194151021-100	White Duct Seam Sealant On Foil	AMA-243 Above Drop Ceiling By Entrance	No Asbestos Detected
194151021-101	Black Sink Mastic	AMA-120 Along East Under Sink	No Asbestos Detected
194151021-102	Black Sink Mastic	AMA-130 Along East Wall Under Sink	No Asbestos Detected
194151021-103	Smooth Plaster (1 st Layer)	AMA-118 Along North Wall 2' From North Door	No Asbestos Detected
194151021-104	Smooth Plaster (2 nd Layer)	AMA-118 Along North Wall 2' From North Door	No Asbestos Detected
194151021-105	2"X4" Fissured Pinhole Ceiling Tile	AMA-321 Along East Wall, 8' From North Wall	No Asbestos Detected
194151021-106	Smooth Plaster (1 st Layer)	AMA-321 Along East Wall, 8' From North Wall, Above Ceiling	No Asbestos Detected
194151021-107	Smooth Plaster (2 nd Layer)	AMA-321 Along East Wall, 8' From North Wall, Above Ceiling	No Asbestos Detected
194151021-108	Smooth Plaster (1 st Layer)	AMA-321 Southeast Corner Above Ceiling	No Asbestos Detected
194151021-109	Smooth Plaster (2 nd Layer)	AMA-321 Southeast Corner Above Ceiling	No Asbestos Detected
194151021-110	12"X12" Green Mottled Floor Tile	AMA-339 At Middle Of Hallway	No Asbestos Detected
194151021-111	2'x4' Cratered Pinhole Ceiling Tile	AMA-339 Middle Of Hallway At Ceiling	No Asbestos Detected
194151021-112	Black Mastic On Canvas Duct	AMA-339 Along North Wall, 26' From East Wall, Above	No Asbestos Detected

Table 1-5

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
		Ceiling	
194151021-113	Black Mastic On Canvas Duct	AMA-339 Along North Wall, 26' From East Wall, Above Ceiling	No Asbestos Detected
194151021-114	12"X12" Green Mottled Floor Tile	AMA-254 At Middle Of Hallway	No Asbestos Detected
194151021-115	Gray Sink Mastic	AMA-117 Along South Wall Under Sink	No Asbestos Detected
194151021-116	Smooth Plaster (1 st Layer)	AMA-338 At Southeast Corner Of West Side Of Room, 4' From Floor	No Asbestos Detected
194151021-117	Smooth Plaster (2 nd Layer)	AMA-338 At Southeast Corner Of West Side Of Room, 4' From Floor	No Asbestos Detected
194151021-118	2'x2' Textured Ceiling Tile	AMA-303 2' From South Wall, 4' From East Wall At Ceiling	No Asbestos Detected
194151021-119	2'x2' Textured Ceiling Tile	AMA-305 4' From East Wall, 2' From North Wall	No Asbestos Detected
194151021-120	Black Vapor Barrier	AMA-305 4' From East Wall, 2' From North Wall	No Asbestos Detected
194151021-121	Drywall	AMA-305 4' From East Wall, 2' From North Wall Above Drop Ceiling	No Asbestos Detected
194151021-122	Joint Compound	AMA-305 4' From East Wall, 2' From North Wall Above Drop Ceiling	No Asbestos Detected
194151021-123	12"X12" White With Black Specks Floor Tile	AMA-303 4' From West Wall, 2' From South Wall	No Asbestos Detected
194151021-124	12"X12" White With Black Specks Floor Tile	AMA-305 At Northeast Corner	No Asbestos Detected
194151021-125	12"X12" White With Green Specks Floor Tile	AMA-287 At North End Of Hallway	No Asbestos Detected
194151021-126	Spray Applied Fire Proofing	AMA-291 At Southeast Corner Above Drop Ceiling	No Asbestos Detected
194151021-127	Spray Applied Fire Proofing	AMA-291 At Southwest Corner Above Drop Ceiling	No Asbestos Detected
194151021-128	Gray Metal Duct Seam Sealant	AMA-291 4' From East Wall, 9' From North Wall	No Asbestos Detected
194151021-129	Drywall	AMA-291 Along East Wall, 9' From North Wall Above Drop Ceiling	No Asbestos Detected
194151021-130	Joint Compound	AMA-291 Along East Wall, 9' From North Wall Above Drop Ceiling	No Asbestos Detected
194151021-131	2'x2' Fissured Pinhole Ceiling Tile	AMA-292 At Northeast Corner, At Ceiling	No Asbestos Detected
194151021-132	2'x2' Fissured Pinhole Ceiling Tile	AMA-71 At Southwest Corner	No Asbestos Detected

Table 1-6

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
		At Ceiling	
194151021-133	12"X12" Gray Mottled Floor Tile	AMA-292 Along Northeast Corner At Floor	No Asbestos Detected
194151021-134	Black Vapor Barrier	AMA-228 At Door Threshold, Above Ceiling	No Asbestos Detected
194151021-135	Drywall	AMA-225 Above East End Exit Door, Above Ceiling	No Asbestos Detected
194151021-136	Joint Compound	AMA-225 Above East End Exit Door, Above Ceiling	No Asbestos Detected
194151021-137	12"X12" Blue Mottled Floor Tile	AMA-316 Along Southeast Corner	No Asbestos Detected
194151021-138	12"X12" Blue Mottled Floor Tile	AMA-318 Along Northwest Corner, At Floor	No Asbestos Detected
194151021-139	12"X12" Dark Blue Mottled Floor Tile	AMA-315 Along Southwest Corner, At Floor	No Asbestos Detected
194151021-140	12"X12" Dark Blue Mottled Floor Tile	AMA-316 Along Northwest Corner, At Floor	No Asbestos Detected
194151021-141	Mudded Fitting	AMA-320 Along East Wall, 6' From Exit Door At Ceiling	No Asbestos Detected
194151021-142	End Cap Sealant (New)	AMA-320 20' From North Wall, 10' From East Wall	No Asbestos Detected
194151021-143	End Cap Sealant (Old)	AMA-320 6' West Of Exit Door, 2' From North Wall, 8' From Floor	No Asbestos Detected
194151021-144	White Pipe Seam Sealant (New)	AMA-320 15' West Of Exit Door, 2' From North Wall 8' From Floor	No Asbestos Detected
194151021-145	White Duct Seam Sealant On Canvas	AMA-320 6' From West Wall, 10' From South Wall, 6' From Floor	No Asbestos Detected
194151021-146	Brown Duct Pin Mastic	AMA-320 @ Canvas Duct Near Stairwell	No Asbestos Detected
194151021-147	Brown Duct Pin Mastic	AMA-21 @ Duct Along North Wall	40% Chrysotile
194151021-148	12"X12" Gray Squared Floor Tile	AMA-51 Inside Elevator By Main Doors	No Asbestos Detected
194151021-149	12"X12" Gray Squared Floor Tile	AMA-73 At Corner Of Hallway On Floor	No Asbestos Detected
194151021-150	12"X12" Blue Multi Speck Floor Tile	AMA-352 Along South Wall, 6' From West Floor	No Asbestos Detected
194151021-151	12"X12" Blue Multi Speck Floor Tile	AMA- 353 Along North Wall, 5' From East Wall	No Asbestos Detected
194151021-152	12"X12" Black With White Specks Floor Tile	AMA-352 Along South Wall, 6' From West Floor	No Asbestos Detected
194151021-153	12"X12" Black With White Specks Floor Tile	AMA- 353 Along North Wall, 5' From East Wall	No Asbestos Detected
194151021-154	2'x4' Smooth Ceiling Tile	AMA-224 Along South Wall, 6'	No Asbestos Detected

Table 1-7

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
		High	
194151021-155	Brown Stair Tread Mastic	AMA-18 Underneath Stairs	No Asbestos Detected
194151021-156	Brown Stair Tread Mastic	AMA-46 Underneath Stairs	No Asbestos Detected
194151021-157	Paper Cement Support	AMA-62 Along West Wall Above Drop Ceiling	No Asbestos Detected
194151021-158	12"X12" Tan Mottled Floor Tile	AMA-359 Along South Wall 6' From West Wall	No Asbestos Detected
194151021-159	Black Mastic On Foil	AMA-2 Along West Wall 6' From North Wall Above Drop Ceiling	5% Chrysotile
194151021-160	Black Mastic On Foil	AMA-88 Along South Wall, Above Drop Ceiling	5% Chrysotile
194151021-161	Brown Metal Duct Seam Sealant	AMA-21 Along East Wall At Duct	No Asbestos Detected
194151021-162	Brown Metal Duct Seam Sealant	AMA-21 Along South Wall At Duct	No Asbestos Detected
194151021-163	Green Canvas Duct	AMA-21 Along East Wall At Duct	No Asbestos Detected
194151021-164	Green Canvas Duct	AMA-29 Along North Wall 3' From West Wall	No Asbestos Detected
194151021-165	White Duct Seam Sealant On Canvas	AMA-29 Along North Wall At Duct	No Asbestos Detected
194151021-166	2'x4' Small Pinhole Ceiling Tile	AMA-26 Along South Wall 4' From West Wall At Ceiling	No Asbestos Detected
194151021-167	2'x4' Small Pinhole Ceiling Tile	AMA-26 Along North Wall 10' From East Wall At Ceiling	No Asbestos Detected
194151021-168	12"X12" White With Gray Specks Floor Tile	AMA-262 Along North Wall 6' From East Wall At Color	No Asbestos Detected
194151021-169	2'x2' Rough Ceiling Tile	AMA-30 At Door Threshold	No Asbestos Detected
194151021-170	2'x2' Crater Pinhole Ceiling Tile	AMA-54 Along South Wall, 2' From West Wall	No Asbestos Detected
194151021-171	2'x2' Crater Pinhole Ceiling Tile	AMA-297 Along North Wall 4' From East Wall	No Asbestos Detected
194151021-172	Red Fire Stop	AMA-29 Along South Wall By Door	No Asbestos Detected
194151021-173	Green Canvas Tank	AMA-49 Along East Wall At Tank	No Asbestos Detected
194151021-174	Green Canvas Tank	AMA-49 Along East Wall At Tank	No Asbestos Detected
194151021-175	Flange Gaskets	AMA-49 At 2 nd Level Along West Wall	No Asbestos Detected
194151021-176	Flange Gaskets	AMA-49 At 2 nd Level Along West Wall 5' From Crawlspace Door	No Asbestos Detected
194151021-177	Linoleum Sheeting	AMA-36 In Bathroom At Door Threshold	No Asbestos Detected

Table 1-8

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
194151021-178	Gray Linoleum Mastic	AMA-36 In Bathroom At Door Threshold	No Asbestos Detected
194151021-179	Gray Linoleum Mastic	AMA-36 In Bathroom At Door Threshold	No Asbestos Detected
194151021-180	12"X12" White Mottled Floor Tile (1 st Layer)	AMA-64 Along West Wall 3' From North Wall On Floor	No Asbestos Detected
194151021-181	12"X12" White Mottled Floor Tile (1 st Layer)	AMA-64 Along West Wall 3' From North Wall On Floor	No Asbestos Detected
194151021-182	12"X12" Tan Floor Tile (2 nd Layer)	AMA-64 Along West Wall 3' From North Wall On Floor	No Asbestos Detected
194151021-183	12"X12" Tan Floor Tile (2 nd Layer)	AMA-64 Along West Wall 3' From North Wall On Floor	No Asbestos Detected
194151021-184	12"X12" Red Mottled Floor Tile	AMA-280 Along North Wall Towards Middle Of Floor	No Asbestos Detected
194151021-185	12"X12" Red Mottled Floor Tile	AMA-282 Along West Wall Near Middle Of Floor	No Asbestos Detected
194151021-186	12"X12" White With Black Streaks Floor Tile	AMA-344 At Bathroom Threshold	No Asbestos Detected
194151021-187	12"X12" White With Black Streaks Floor Tile	AMA-144 Along North Wall 10' From West Wall	No Asbestos Detected
194151021-188	Drywall	AMA-254 Along North Wall Above Drop Ceiling	No Asbestos Detected
194151021-189	Joint Compound	AMA-254 Along North Wall Above Drop Ceiling	No Asbestos Detected
194151021-190	Drywall	AMA-267 Along North Wall 4' From Bathroom	No Asbestos Detected
194151021-191	Joint Compound	AMA-267 Along North Wall 4' From Bathroom	No Asbestos Detected
194151021-192	2'x4' Smooth Pinhole Ceiling Tile	AMA-308 Along North Wall 6' From West Wall, 6' High	No Asbestos Detected
194151021-193	2'x4' Smooth Pinhole Ceiling Tile	AMA-209 Along South Wall 8' From East Wall, 6' High	No Asbestos Detected
194151021-194	Drywall	AMA-318 Along North Wall 20' From East Wall, Above Drop Ceiling	No Asbestos Detected
194151021-195	Joint Compound	AMA-318 Along North Wall 20' From East Wall, Above Drop Ceiling	No Asbestos Detected
194151021-196	2'x2' Textured Pinhole Ceiling Tile	AMA-295 Along South Wall 6' From West Wall	No Asbestos Detected
194151021-197	2'x2' Textured Pinhole Ceiling Tile	AMA-296 Along North Wall 8' From West Wall	No Asbestos Detected
194151021-198	Drywall	AMA-145 Along West Wall 4' From North Wall In Bathroom	No Asbestos Detected
194151021-199	Joint Compound	AMA-145 Along West Wall 4' From North Wall In Bathroom	No Asbestos Detected
194151021-200	Joint Compound	AMA-180 At Northwest Corner Of Reception Pillar	No Asbestos Detected

Table 1-9

Table I
Asbestos Bulk Sample Results
Arlington County
Virginia Hospital Center
Arlington, Virginia
October 24, 2019

Sample Number	Material Sampled	Sample Location	Sample Result
194151031-01	Yellow Carpet Mastic	Ama-01 3 rd North Room At Door Threshold	No Asbestos Detected
194151031-02	Yellow Carpet Mastic	Ama-08 Or/Anesthesia Room At Door Threshold	No Asbestos Detected
194151031-03	Yellow Carpet Mastic	Ama-21 Telephone Room Business Office At Door Threshold	No Asbestos Detected
194151031-04	Linoleum Sheeting	Ama-17 Across From IOP Conference Room Under Carpet	No Asbestos Detected

TABLE II: POSITIVE XRF READINGS TABLE

Table II
Positive XRF Readings Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Test Number	AMA Area	Area/ Location	Color	Component	Substrate	XRF Result (mg/cm²)
21	Stairwell B	Stairwell	Gray	Newel Post	Metal	4.2
23	Stairwell B	Stairwell	Gray	Stringer	Metal	8
24	Stairwell B	Stairwell	Gray	Riser	Metal	4.5
25	Stairwell B	Stairwell	Gray	Spindle	Metal	5.6
59	Stairwell D	Stairwell	Gray	Newel Post	Metal	6.2
60	Stairwell D	Stairwell	Gray	Stringer	Metal	10.1
61	Stairwell D	Stairwell	Gray	Riser	Metal	4.8
62	Stairwell D	Stairwell	Gray	Riser	Metal	2.7
66	Main Boiler	North	Teal	Handrail	Metal	2
70	Main Boiler	Stairs	Teal	Stringer	Metal	5.3
71	Main Boiler	Stairs	Teal	Stair landing	Concrete	2.3
78	Main Boiler	North	Pink	Handrail	Metal	6.1
90	Kitchen lower level	South	White	Wall tile	Ceramic	3
91	Kitchen lower level	West	White	Wall tile	Ceramic	2.9
112	Radiology scheduling	Ceiling	Orange	I-beam	Metal	1.2
123	OR Room	West	Green	Wall tile	Ceramic	7.8
128	Business Hallway	South	Gray	Window Lintel	Metal	1.7
146	Pediatrics exam room 10 bathroom	North	Tan	Wall tile	Ceramic	3.3
154	Penthouse stairwell exit door #6	South	Beige	Door	Metal	1.6
157	Penthouse stairwell	East	Beige	Stringer	Metal	6.4
180	North boiler room	South	Orange	Support column	Metal	1.5
190	North boiler room	By AHU	Orange	Support column	Metal	2
192	North boiler room	West	Green	Tank Hangar	Metal	6

TABLE III: HAZARDOUS MATERIALS INVENTORY TABLE

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
AMA-01						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	5000	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	155	SF
	ACM /Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	120	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	230	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	130	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	134	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	264	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	8	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	6	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	10	LF
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrstotile	912	LF
	Assumed ACM	Elevator Cab Insulation	Throughout Elevator	Assumed Present	1 @ 7'x10'	Cab
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door
AMA-02						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	3272	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	105	SF
	ACM /Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	110	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	280	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	100	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	83	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	174	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	2	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	9	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	20	LF
	Potential Mercury	Sink/Drain trap	Throughout labs	Not Sampled	4	Sinks

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
	Potential Mercury	Mercury thermostat	North wall	N/A	1	thermostat
	ACM	Brown duct pin mastic	Under Duct Insulation	5% Chyrstotile	50	SF
	ACM/Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrstotile	684	LF
AMA-03						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	12225	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	65	SF
	ACM/Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	360	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	610	LF
	ACM/Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	65	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	134	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	276	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	6	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	5	Doors
	ACM/Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM/Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	45	LF
	Potential Mercury	Sink/Drain trap	Throughout labs	Not Sampled	1	sinks
	Potential Mercury	Mercury Thermometer	Throughout labs	Not Sampled	1	Thermometer
	ACM	Brown duct pin mastic	Under Duct Insulation	5% Chyrstotile	80	SF
	ACM/Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrstotile	672	LF
	Assumed ACM	Elevator Cab Insulation	Throughout Elevator	Assumed Present	1 @ 7'x10'	Cab
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door
AMA-04						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	3700	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	40	SF
	ACM/Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	205	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	300	LF
	ACM/Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	225	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	169	Ballasts

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hosptial Center
Arlington, VA
October 2019

Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	253	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	5	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	18	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	88	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	45	LF
	ACM	Brown duct pin mastic	Under Duct Insulation	5% Chyrsofile	100	SF
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrsofile	1716	LF
AMA-05						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	1608	SF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	58	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	86	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	0	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	3	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrsofile	756	LF
AMA-06						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	1970	SF
	ACM /Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrsofile	80	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrsofile	1245	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrsofile	130	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	209	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	315	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	2	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	14	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	60	LF
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrsofile	1230	LF
	Assumed ACM	Elevator Cab Insulation	Throughout Elevator	Assumed Present	1 @ 7'x10'	Cab
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door
	Assumed ACM	Freezer insulation	Throughout freezer	Assumed ACM	1 @ 10'x10'	Freezer

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hosptial Center
Arlington, VA
October 2019

Room/Area Designation	Potential Mercury Hazmat Description	Mercury thermostat Material Description	North wall Location	N/A Analytical Result	1 Approximate Quantity	thermostat Unit
AMA-07						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	3930	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	25	SF
	ACM /Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	70	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	410	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	90	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	110	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	190	Lights
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	10	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	32	Fittings
	ACM /Assumed Present	Pipe and Pipe Fitting Insulation	Assumed In wet walls	5% Chyrstotile	60	LF
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrstotile	1824	LF
AMA-08						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	4078	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	45	SF
	ACM /Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	225	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	360	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	362	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	360	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	720	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	5	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	17	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	64	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	60	LF
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrstotile	1158	LF
	Assumed ACM	Elevator Cab Insulation	Throughout Elevator	Assumed Present	1 @ 7'x10'	Cab
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
AMA-09 Penthouse						
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	16	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	32	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	6	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	2	Doors
AMA-10						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	5060	SF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	117	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	231	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	4	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	35	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	405	LF
	Potential Mercury	Sink/Drain trap	Throughout labs	Not Sampled	0	sinks
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door
AMA-11						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	5050	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	115	SF
	ACM /Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	30	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	320	LF
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	370	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	15	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	13	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	1243	LF
AMA-12						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	1188	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	162	SF

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	61	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	116	Lights
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	4	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	210	LF
AMA-13						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	2052	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrsofile	250	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrsofile	244	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	76	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	142	Lights
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	5	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	240	LF
AMA-14						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	5132	SF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	63	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	123	Lights
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	30	LF
AMA-15						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	36	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrsofile	70	SF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	12	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	20	Lights
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	5	Doors
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	15	LF
AMA-16						

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	2690	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	1022	SF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	39	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	78	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	2	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	30	LF
AMA-17						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	5573	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	2280	SF
	ACM /Assumed Present	Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrstotile	205	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	1560	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	330	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	313	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	580	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	1	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	7	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	100	LF
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door
AMA-18						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	5835	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	40	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	49	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	103	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	250	Lights

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	19	Doors
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	1	Doors
	ACM/Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM/Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	300	LF
Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
AMA-19						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	375	SF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	61	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	120	Lights
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	4	Doors
	ACM/Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	90	LF
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door
AMA-20						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	80	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrsofile	30	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	36	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	68	Lights
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	1	Doors
	ACM/Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM/Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	15	LF
AMA-21						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	2260	SF
	ACM/Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	40	Fittings
	ACM/Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrsofile	75	LF
AMA-22						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	1144	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrsofile	150	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	24	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	50	Lights

Table III
Total Hazardous Material Inventory Table
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Room/Area Designation	Hazmat Description	Material Description	Location	Analytical Result	Approximate Quantity	Unit
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	2	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	30	LF
	ACM	Black mastic on fiberglass duct insulation	Above Drop Ceilings	3-5% Chrysotile	90	SF
AMA-23						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	4943	SF
	ACM	Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrstotile	162	SF
	ACM	Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrstotile	410	LF
	ACM /Assumed Present	Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrstotile	54	LF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	105	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	223	Lights
	Assumed ACM	Labled wood fire door	Throughout	Assumed ACM	1	Doors
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed throughout crawl space	5% Chyrstotile		LF
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	5	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	40	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	545	LF
	Assumed ACM	Elevator Door Insulation	Throughout Elevator Door	Assumed Present	1 @ 5'x7'	Door
AMA-24 Boiler room						
	ACM	Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	600	SF
	PCB	Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	26	Ballasts
	MVL	Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	52	Lights
	Assumed ACM	Labled metal fire door	Throughout	Assumed ACM	5	Doors
	ACM /Assumed Present	Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrstotile	1	Fittings
	ACM /Assumed Present	Pipe and Pipe fitting insulation	Assumed In wet walls	5% Chyrstotile	100	LF
	ACM	Brown duct pin mastic	Under Duct Insulation	5% Chyrstotile	100	SF

TABLE IV HAZARDOUS MATERIALS QUANTITIES SUMMARY

Table IV
Total Hazardous Materials Summary
Arlington County
Virginia Hospital Center
Arlington, VA
October 2019

Material Description	Location	Analytical Result	Approximate Quantity	Unit	Category
Black floor tile mastic	Throughout floor/Under Non- ACM floor tile and carpet mastic	3-5% Chrysotile	77801	SF	ACM
Black mastic on duct (foil)	Above Drop Ceilings	5% Chyrsofile	4496	SF	ACM
Black mastic on duct (foil)	Assumed present above Fixed Ceilings	5% Chyrsofile	1405	SF	ACM /Assumed Present
Black mastic on fiberglass pipe insulation	Above Drop Ceilings	5% Chyrsofile	6189	LF	ACM
Black mastic on fiberglass pipe insulation	Assumed Present above Fixed Ceilings	5% Chyrsofile	1535	LF	ACM /Assumed Present
Fluorescent light ballasts	Throughout ceilings in fluorescent light fixtures	N/A	2700	Ballasts	PCB
Fluorescent Light Tubes	Throughout ceilings in fluorescent light fixtures	N/A	5000	Lights	MVL
Labled wood fire door	Throughout	Assumed ACM	76	Doors	Assumed ACM
Labled metal fire door	Throughout	Assumed ACM	171	Doors	Assumed ACM
Mudded Fitting insulation	Assumed/Above Fixed Ceilings	5% Chyrsofile	865	Fittings	ACM /Assumed Present
Pipe and Pipe fitting insulation	Assumed In wet walls and above fixed ceilings	Assumed ACM	3728	LF	ACM /Assumed Present
Pipe and Pipe fitting insulation	Assumed throughout crawl space	ACM /Assumed Present	8952	LF	ACM /Assumed Present
Elevator Cab Insulation	Throughout Elevator	Assumed ACM	4 @ 7'x10'	Cab	Assumed ACM
Elevator Door Insulation	Throughout Elevator Door	Assumed ACM	8 @ 5'x7'	Door	Assumed ACM
Mercury thermostat	North wall	N/A	2	thermostats	Potential Mercury
Brown duct pin mastic	Under Duct Insulation	5% Chyrsofile	330	SF	ACM
Sink/Drain trap	Throughout labs	Not Sampled	5	Sinks	Potential Mercury
Black mastic on Canvas Duct	Above Drop Ceilings	3-5% Chrysotile	90	SF	ACM
Freezer insulation	Throughout freezer	Assumed ACM	1 @ 10'x10'	Freezers	Assumed ACM

Table IV
 Total Hazardous Materials Summary
 Arlington County
 Virginia Hospital Center
 Arlington, VA
 October 2019

Lead Based Paint					
Material	Location	Result	Quantity	Unit	Category
Gray Metal Newel Post	Throughout Stair Wells	4.2 mg/cm ²	8	Stair Systems	LBP
Gray Metal Stringer	Throughout Stair Wells	8 mg/cm ²	8	Stair Systems	LBP
Gray Metal Riser	Throughout Stair Wells	4.5 mg/cm ²	8	Stair Systems	LBP
Gray Metal Spindel	Throughout Stair Wells	5.6 mg/cm ²	8	Stair Systems	LBP
Teal Hand Rail	Throughout Main Boiler	2.0 mg/cm ²	1	Stair Systems	LBP
Teal Stringer	Throughout Main Boiler	5.3 mg/cm ²	1	Stair Systems	LBP
Teal Stair Landing	Throughout Main Boiler	2.3 mg/cm ²	1	Stair Systems	LBP
Pink Hand Rail	Throughout Main Boiler	6.1 mg/cm ²	1	Stair Systems	LBP
White Ceramic Wall Tile	Throughout Building	3.0 mg/cm ²	N/A	Wall Tiles	LBP
Green Ceramic Wall Tile	Throughout Building	7.8 mg/cm ²	N/A	Wall Tiles	LBP
Tan Ceramic Wall Tile	Throughout Building	3.3 mg/cm ²	N/A	Wall Tiles	LBP
Orange Metal I-Beam	Throughout Building at Ceilings	1.2 mg/cm ²	N/A	I-Beams	LBP
Gray Metal Window Lintel	Throughout Business Area	1.7 mg/cm ²	N/A	Window Lintel	LBP
Beige Metal Door	Penthouse Stairwell	1.6 mg/cm ²	1	Doors	LBP
Beige Metal Stringer	Penthouse Stairwell	6.4 mg/cm ²	1	Stair Systems	LBP
Orange Metal Support Column	Throughout Boiler	2.0 mg/cm ²	2	Columns	LBP
Green Metal Tank Hanger	Throughout Boiler	6 mg/cm ²	N/A	Tanks	LBP

ACM	Asbestos-Containing Material
MVL	Mercury Vapor Lamp
PCB	Polychlorinated Biphenyls
LBP	Lead-Based Paint
LCM	Lead-Containing Material
SF	Square Feet
LF	Linear Feet

APPENDIX A: ASBESTOS-CONTAINING MATERIAL DOCUMENTATION

CERTIFICATE OF ANALYSIS

Chain of Custody: 311782
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
1331 Ashton Road
Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/21/2019
Date Analyzed: 10/21/2019
Report Date: 10/22/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311782-1	194151021-01	NAD	--	--	--	--	--	--	--	--	--	100	PL	Multi	Homogeneous	SW	
311782-2	194151021-02	NAD	--	--	--	--	--	--	--	--	--	100	PL	Off-White	Homogeneous	SW	
311782-3	194151021-03	NAD	--	--	--	--	--	--	--	--	--	100	PL	Off-White	Homogeneous	SW	
311782-4	194151021-04	NAD	--	--	--	--	--	--	--	--	--	100	PL	Off-White	Homogeneous	SW	
311782-5	194151021-05	NAD	--	--	--	--	--	--	--	--	--	100	PL	Off-White	Homogeneous	SW	
311782-6	194151021-06	NAD	--	--	--	--	--	--	--	--	--	100	PL	Off-White	Homogeneous	SW	
311782-7	194151021-07	NAD	--	--	--	--	--	--	--	--	5	95	PSL	White	Homogeneous	SW	
311782-8	194151021-08	NAD	--	--	--	--	--	--	--	--	5	95	PSL	White	Homogeneous	SW	
311782-9	194151021-09	NAD	--	--	--	--	80	--	--	--	--	20	SPAFP	Gray	Homogeneous	SW	
311782-10	194151021-10	NAD	--	--	--	--	80	--	--	--	--	20	SPAFP	Gray	Homogeneous	SW	
311782-11	194151021-11	NAD	--	--	--	--	80	--	--	--	--	20	SPAFP	Gray	Homogeneous	SW	
311782-12	194151021-12	NAD	--	--	--	--	80	--	--	--	--	20	SPAFP	Gray	Homogeneous	SW	
311782-13	194151021-13	NAD	--	--	--	--	--	--	--	10	--	90	Mud	White	Homogeneous	SW	
311782-14	194151021-14	NAD	--	--	--	--	--	--	--	10	--	90	Mud	White	Homogeneous	SW	
311782-15	194151021-15	NAD	--	--	--	--	--	--	10	--	TR	90	PSL	White	Homogeneous	SW	
311782-16	194151021-16	NAD	--	--	--	--	--	TR	20	--	--	80	EC	White	Homogeneous	SW	
311782-17	194151021-17	NAD	--	--	--	--	--	--	--	--	--	100	FT	Gray	Homogeneous	SW	
311782-18	194151021-18	3	3	--	--	--	--	--	--	--	--	97	MS	Black	Homogeneous	SW	
311782-19	194151021-19	NAD	--	--	--	--	70	--	--	--	--	30	CT	Gray	Homogeneous	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311782
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/21/2019
Date Analyzed: 10/21/2019
Report Date: 10/22/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311782-20	194151021-20	NAD	--	--	--	--	--	--	80	--	--	20	VD	Gray	Homogeneous	SW	
311782-21	194151021-21	NAD	--	--	--	--	--	--	80	--	--	20	VD	Black	Homogeneous	SW	
311782-22	194151021-22	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311782-22A	194151021-22	NAD	--	--	--	--	--	--	--	--	--	100	BC	Gray	Homogeneous	SW	
311782-23	194151021-23	NAD	--	--	--	--	--	--	TR	--	--	100	PL	Gray	Homogeneous	SW	
311782-24	194151021-24	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311782-24A	194151021-24	NAD	--	--	--	--	--	--	--	--	--	100	BC	Gray	Homogeneous	SW	
311782-25	194151021-25	NAD	--	--	--	--	--	--	TR	--	--	100	PL	Gray	Homogeneous	SW	
311782-26	194151021-26	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311782-26A	194151021-26	NAD	--	--	--	--	--	--	TR	--	--	100	BC	Gray	Homogeneous	SW	
311782-27	194151021-27	NAD	--	--	--	--	--	--	TR	--	--	100	PL	Gray	Homogeneous	SW	
311782-28	194151021-28	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311782-28A	194151021-28	NAD	--	--	--	--	--	--	TR	--	--	100	BC	Gray	Homogeneous	SW	
311782-29	194151021-29	NAD	--	--	--	--	--	--	TR	--	--	100	PL	Gray	Homogeneous	SW	
311782-30	194151021-30	NAD	--	--	--	--	--	--	--	--	--	100	Grout	White	Homogeneous	SW	
311782-31	194151021-31	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311782-31A	194151021-31	NAD	--	--	--	--	--	--	--	--	--	100	BC	Brown	Homogeneous	SW	
311782-32	194151021-32	NAD	--	--	--	--	--	--	--	--	--	100	PL	Gray	Homogeneous	SW	
311782-33	194151021-33	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311782
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/21/2019
Date Analyzed: 10/21/2019
Report Date: 10/22/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311782-33A	194151021-33	NAD	--	--	--	--	--	--	--	--	--	100	BC	Brown	Homogeneous	SW	
311782-34	194151021-34	NAD	--	--	--	--	--	--	--	--	--	100	PL	Gray	Homogeneous	SW	
311782-35	194151021-35	NAD	--	--	--	--	--	--	30	--	--	70	Tar P.	Black	Homogeneous	SW	
311782-36	194151021-36	NAD	--	--	--	--	--	--	30	--	--	70	Tar P.	Black	Homogeneous	SW	
311782-37	194151021-37	NAD	--	--	--	--	--	--	--	--	2	98	PSL	White	Homogeneous	SW	
311782-38	194151021-38	NAD	--	--	--	--	--	--	--	--	2	98	PSL	White	Homogeneous	SW	
311782-39	194151021-39	NAD	--	--	--	--	--	--	--	--	--	100	Transite	Black	Homogeneous	SW	
311782-40	194151021-40	NAD	--	--	--	--	--	--	--	--	--	100	Transite	Black	Homogeneous	SW	
311782-41	194151021-41	NAD	--	--	--	--	--	--	--	--	--	100	DW	White	Homogeneous	SW	
311782-42	194151021-42	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311782-43	194151021-43	NAD	--	--	--	--	--	--	--	--	--	100	MS	Brown	Homogeneous	SW	
311782-44	194151021-44	NAD	--	--	--	--	--	--	--	--	--	100	FT	Tan	Homogeneous	SW	
311782-45	194151021-45	NAD	--	--	--	--	--	--	TR	--	--	100	MS	Tan	Homogeneous	SW	
311782-46	194151021-46	NAD	--	--	--	--	30	--	30	--	--	40	CT	Gray	Homogeneous	SW	
311782-47	194151021-47	NAD	--	--	--	--	30	--	30	--	--	40	CT	Gray	Homogeneous	SW	
311782-48	194151021-48	NAD	--	--	--	--	--	--	--	--	--	100	DS	Gray	Homogeneous	SW	
311782-49	194151021-49	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311782-50	194151021-50	NAD	--	--	--	--	--	--	--	--	--	100	PL	Gray	Homogeneous	SW	
311782-51	194151021-51	5	5	--	--	--	35	--	--	--	--	60	MF	Off-White	Homogeneous	SW	
311782-52	194151021-52	5	5	--	--	--	--	--	--	--	--	95	MS	Black	Homogeneous	SW	
311782-53	194151021-53	NAD	--	--	--	--	--	--	80	--	--	20	Paper	Black	Homogeneous	SW	



CERTIFICATE OF ANALYSIS

Chain of Custody: 311782
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
1331 Ashton Road
Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/21/2019
Date Analyzed: 10/21/2019
Report Date: 10/22/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311782-54	194151021-54	2	2	--	--	--	--	--	--	--	--	98	CM	Multi	Homogeneous	SW	
311782-55	194151021-55	NAD	--	--	--	--	--	--	--	--	--	100	FT	Blue	Homogeneous	SW	
311782-56	194151021-56	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311782-57	194151021-57	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311782-58	194151021-58	NAD	--	--	--	--	--	--	--	--	--	100	FT	Gray	Homogeneous	SW	
311782-59	194151021-59	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	
311782-60	194151021-60	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311782-61	194151021-61	NAD	--	--	--	--	--	--	--	--	2	98	DS	Tan	Homogeneous	SW	
311782-62	194151021-62	NAD	--	--	--	--	--	--	--	--	2	98	DS	Tan	Homogeneous	SW	
311782-63	194151021-63	NAD	--	--	--	--	--	TR	--	--	--	100	DS	Tan	Homogeneous	SW	
311782-64	194151021-64	NAD	--	--	--	--	--	--	--	--	--	100	DS	Tan	Homogeneous	SW	
311782-65	194151021-65	NAD	--	--	--	--	--	--	40	--	--	60	SPAFP	Brown	Homogeneous	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311782

Client: Aerosol Monitoring & Analysis, Inc

Address: PO Box 646
1331 Ashton Road
Hanover, MD 21076

Attention: Gary Urban

Job Name: VHC

Job Location: Arlington, VA

Job Number: 19415

P.O. Number: Not Provided

Date Submitted: 10/21/2019

Date Analyzed: 10/21/2019

Report Date: 10/22/2019

Date Sampled: 10/21/2019

Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
-------------------	----------------------	----------------	--------------------	-----------------	---------------------	------------------------	----------------------	--------------------	-----------------	-------------------	---------------	---------------------	-------------	--------------	-------------	------------	----------

The following footnotes only apply to those samples which the total asbestos result is flagged with a note number.

¹ TEM RECOMMENDATION - Please note, due to resolution limitations with optical microscopy and/or interference from matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos. It is recommended that the additional analytical technique of TEM be used to check for asbestos fibers below the resolution limits of optical microscopy.

² MATRIX REDUCTION RECOMMENDATION - Please note, due to interference from the matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos which is obscured from view. It is recommended that the additional preparation technique of gravimetric reduction be performed on this sample to minimize the obscuring effects of matrix components, followed by reanalysis by PLM and/or TEM.

Analysis Method - EPA/600/R-93/116 dated July 1993

NAD = "No Asbestos Detected" TR = "Trace equals less than 1% of this component"

Uncertainty: For samples containing asbestos in range of 1-10% the CV is 0.43, 11-35% CV=0.55, >35 CV=0.23. All results are to be considered preliminary and subject to change unless signed by the Technical Director or Deputy.

Analyst(s): Surat Watson



Technical Director Michael Greenberg

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from us. Sample types, locations, and collection protocols are based upon the information provided by the persons submitting them and, unless collected by personnel of these Laboratories, we expressly disclaim any knowledge and liability for the accuracy and completeness of this information. Residual sample material will be discarded in accordance with the appropriate regulatory guidelines, unless otherwise requested by the client. NVLAP accreditation applies only to polarized light microscopy of bulk samples and transmission electron microscopy of AHERA air samples. This report must not be used to claim, and does not imply product certification, approval, or endorsement by NVLAP or any agency of the Federal Government. All rights reserved. AMA Analytical Services, Inc.



AMA Analytical Services, Inc.

Focused on Results www.amalab.com
 AIHA-LAP (#100470) NVLAP (#101143-0) NY ELAP (10920)
 4475 Forbes Blvd. • Lanham, MD 20706
 (301) 459-2640 • (800) 346-0961 • Fax (301) 459-2643

(Please Refer To This
 Number For Inquiries)

311782

CHAIN OF CUSTODY

Mailing/Billing Information:

- Client Name: AMA
- Address 1: Hanover
- Address 2: _____
- Address 3: _____
- Phone #: _____ Fax #: _____

Submittal Information:

- Job Name: VHC
- Job Location: Arlington Va
- Job #: 19415 P.O. #: _____
- Contact Person: Gracy Jordan Cell: _____
- Collected by: Bob Bentz Cell: _____

Reporting Info (Results provided as soon as technically feasible). If no TAT/Reporting info is provided, AMA will assign defaults of 5-Day and email/fax to contacts on file.

AFTER HOURS (must be pre-scheduled) <input type="checkbox"/> 4 Hours <input type="checkbox"/> Late Night <input type="checkbox"/> Immediate Date Due: _____ <input type="checkbox"/> 24 Hours Time Due: _____ Comments: _____	NORMAL BUSINESS HOURS <input type="checkbox"/> 4 Hours <input type="checkbox"/> 3 Day <input type="checkbox"/> Same Day <input type="checkbox"/> 5 Day + <input type="checkbox"/> Results Required By Noon <input checked="" type="checkbox"/> Next Day Date Due: <u>10/22/19</u> <u>24hr</u> <input type="checkbox"/> 2 Day	REPORT TO: <input checked="" type="checkbox"/> Email: <u>Gracy@AMAConsulting.com</u> <input type="checkbox"/> Email 2: _____ <input type="checkbox"/> Verbal: _____
--	---	---

- Asbestos Analysis**
 *PCM Air - Please Indicate Filter Type: _____
 NIOSH 7400 (QTY)
 Fiberglass (QTY)
 TEM Air* - Please Indicate Filter Type: _____
 AHERA (QTY)
 NIOSH 7402 (QTY)
 Other (specify) _____ (QTY)
 PLM Bulk
 EPA 600 - Visual Estimate 65 (QTY) Pos Stop
 EPA Point Count _____ (QTY)
 NY State Friable 198.1 _____ (QTY)
 Grav. Reduction ELAP 198.6 _____ (QTY)
 Other (specify) _____ (QTY)
 MISC
 Asbestos Soil PLM (Qual) PLM (Quan) PLM/TEM (Qual) PLM/TEM (Quan)
 *It is recommended that blank samples be submitted with all air and surface samples

- TEM Bulk**
 ELAP 198.4/Chatfield _____ (QTY)
 NY State PLM/TEM _____ (QTY)
 Residual Ash _____ (QTY)
 Vermiculite
 TEM Dust*
 Qual. (pres/abs) Vacuum/Dust _____ (QTY)
 Quan. (s/area) Vacuum D5755-95 _____ (QTY)
 Quan. (s/area) Dust D6480-99 _____ (QTY)
 TEM Water
 Qual. (pres/abs) _____ (QTY)
 ELAP 198.2/EPA 100.2 _____ (QTY)
 EPA 100.1 _____ (QTY)
 All samples received in good condition unless otherwise noted.
 (TEM Water samples _____ °C)
 If field data sheets are submitted, there is no need to complete bottom section.

- Metals Analysis**
 Pb Paint Chip _____ (QTY)
 *Pb Dust Wipe (wipe type _____) _____ (QTY)
 *Pb Air _____ (QTY)
 Pb Soil/Solid _____ (QTY)
 Pb TCLP _____ (QTY)
 Drinking Water Pb _____ (QTY) Cu _____ (QTY) As _____ (QTY)
 Waste Water Pb _____ (QTY) Cu _____ (QTY) As _____ (QTY)
 Pb Furnace (Media _____) _____ (QTY)
 Fungal Analysis
 Collection Apparatus for Spore Traps/Air Samples: _____
 Collection Media _____
 *Spore-Trap _____ (QTY) Surface Vacuum Dust _____ (QTY)
 *Surface Swab _____ (QTY)
 *Surface Tape _____ (QTY)
 Other (Specify _____) _____ (QTY)

CLIENT ID #	SAMPLE INFORMATION SAMPLE LOCATION/ ID	DATE/ TIME	VOL (L)/ Wipe Area	ANALYSIS						MATRIX						COMMENTS / SPECIAL INSTRUCTIONS	
				TEM	PCM	PLM	LEAD	MOLD	AIR	BULKY	DUST	WATER AN OTHER	SPORE TRAP	TAPE	SWAB		
194151621-01						X											
194151621-65						X											
	See Sheets																

Relinquished by:	Print Name <u>Bob Bentz</u>	Signature 	Date <u>10/20/19</u>	Time <u>11:30</u>	Shipping Information <input type="checkbox"/> UPS <input checked="" type="checkbox"/> The Person <input type="checkbox"/> Other <input type="checkbox"/> FedEx <input type="checkbox"/> Drop Box <input type="checkbox"/> USPS <input type="checkbox"/> Courier
Received by:			Date <u>10/21/19</u>	Time <u>11:30</u>	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311929
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/22/2019
Date Analyzed: 10/23/2019
Report Date: 10/23/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311929-1	194151021-66	NAD	--	--	--	--	--	5	--	--	--	95	FS	Red	Homogeneous	SW	
311929-2	194151021-67	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311929-3	194151021-68	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311929-4	194151021-69	NAD	--	--	--	--	--	--	--	--	5	95	PSL	White	Homogeneous	SW	
311929-5	194151021-70	NAD	--	--	--	--	--	--	TR	--	--	100	CM	Yellow	Homogeneous	SW	
311929-6	194151021-71	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311929-7	194151021-72	NAD	--	--	--	--	--	--	--	--	--	100	MS	Tan	Homogeneous	SW	
311929-8	194151021-73	5	5	--	--	--	--	5	--	--	--	90	MS	Black	Homogeneous	SW	
311929-9	194151021-74	5	5	--	--	--	--	5	--	--	--	90	MS	Black	Homogeneous	SW	
311929-10	194151021-75	NAD	--	--	--	--	--	--	--	--	--	100	MS	Tan	Homogeneous	SW	
311929-11	194151021-76	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311929-12	194151021-77	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311929-13	194151021-78	NAD	--	--	--	--	--	--	--	--	--	100	MS	White	Homogeneous	SW	
311929-14	194151021-79	NAD	--	--	--	--	--	--	--	--	--	100	MS	White	Homogeneous	SW	
311929-15	194151021-80	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	
311929-16	194151021-81	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311929-17	194151021-82	NAD	--	--	--	--	--	--	--	--	--	100	Grout	Gray	Homogeneous	SW	
311929-18	194151021-83	NAD	--	--	--	--	--	--	--	--	--	100	FT	Pink	Homogeneous	SW	
311929-19	194151021-84	NAD	--	--	--	--	--	--	--	--	--	100	FT	Pink	Homogeneous	SW	
311929-20	194151021-85	NAD	--	--	--	--	--	--	TR	--	--	100	MS	Tan	Homogeneous	SW	
311929-21	194151021-86	NAD	--	--	--	--	--	--	TR	--	--	100	MS	Tan	Homogeneous	SW	
311929-22	194151021-87	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311929
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/22/2019
Date Analyzed: 10/23/2019
Report Date: 10/23/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311929-23	194151021-88	NAD	--	--	--	--	--	--	10	--	--	90	DWC	Multi	Layered	SW	
311929-24	194151021-89	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311929-25	194151021-90	NAD	--	--	--	--	--	--	--	--	--	100	FT	Cream	Homogeneous	SW	
311929-26	194151021-91	NAD	--	--	--	--	--	--	--	--	--	100	SM	Gray	Homogeneous	SW	
311929-27	194151021-92	5	5	--	--	--	--	--	--	--	--	95	MS	Black	Homogeneous	SW	
311929-28	194151021-93	NAD	--	--	--	--	--	--	--	--	--	100	FT	Cream	Homogeneous	SW	
311929-29	194151021-94	NAD	--	--	--	--	--	--	--	--	--	100	FT	Brown	Homogeneous	SW	
311929-30	194151021-95	NAD	--	--	--	--	--	--	--	--	--	100	FT	Brown	Homogeneous	SW	
311929-31	194151021-96	NAD	--	--	--	--	--	--	TR	--	--	100	DS	White	Homogeneous	SW	
311929-32	194151021-97	NAD	--	--	--	--	--	--	TR	--	--	100	DS	White	Homogeneous	SW	
311929-33	194151021-98	NAD	--	--	--	--	--	--	--	--	--	100	FT	Blue	Homogeneous	SW	
311929-34	194151021-99	NAD	--	--	--	--	--	--	--	--	TR	100	DS	White	Homogeneous	SW	
311929-35	194151021-100	NAD	--	--	--	--	--	--	--	--	TR	100	DS	White	Homogeneous	SW	
311929-36	194151021-101	NAD	--	--	--	--	--	--	--	--	--	100	MS	Black	Homogeneous	SW	
311929-37	194151021-102	NAD	--	--	--	--	--	--	--	--	--	100	SM	Black	Homogeneous	SW	
311929-38	194151021-103	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311929-39	194151021-104	NAD	--	--	--	--	--	--	--	--	--	100	BC	Gray	Homogeneous	SW	
311929-40	194151021-105	NAD	--	--	--	--	20	--	40	--	--	40	CT	Multi	Layered	SW	
311929-41	194151021-106	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311929-41A	194151021-106	NAD	--	--	--	--	--	--	--	--	--	100	BC	Gray	Homogeneous	SW	
311929-42	194151021-107	NAD	--	--	--	--	--	--	--	--	--	100	PL	Gray	Homogeneous	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311929
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/22/2019
Date Analyzed: 10/23/2019
Report Date: 10/23/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311929-43	194151021-108	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311929-43A	194151021-108	NAD	--	--	--	--	--	--	--	--	--	100	BC	Gray	Homogeneous	SW	
311929-44	194151021-109	NAD	--	--	--	--	--	--	--	--	--	100	PL	Gray	Homogeneous	SW	
311929-45	194151021-110	NAD	--	--	--	--	--	--	--	--	--	100	FT	Green	Homogeneous	SW	
311929-46	194151021-111	NAD	--	--	--	--	20	--	40	--	--	40	CT	Multi	Layered	SW	
311929-47	194151021-112	NAD	--	--	--	--	--	--	TR	--	--	100	DM	Black	Homogeneous	SW	
311929-48	194151021-113	NAD	--	--	--	--	--	--	TR	--	--	100	DM	Black	Homogeneous	SW	
311929-49	194151021-114	NAD	--	--	--	--	--	--	--	--	--	100	FT	Green	Homogeneous	SW	
311929-50	194151021-115	NAD	--	--	--	--	--	--	TR	--	--	100	SM	Gray	Homogeneous	SW	
311929-51	194151021-116	NAD	--	--	--	--	--	--	--	--	--	100	PL	White	Homogeneous	SW	
311929-51A	194151021-116	NAD	--	--	--	--	--	--	--	--	--	100	BC	Gray	Homogeneous	SW	
311929-51B	194151021-116	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311929-52	194151021-117	NAD	--	--	--	--	--	--	--	--	--	100	PL	Gray	Homogeneous	SW	
311929-53	194151021-118	NAD	--	--	--	--	60	--	--	--	--	40	TC	Off-White	Homogeneous	SW	
311929-54	194151021-119	NAD	--	--	--	--	60	--	--	--	--	40	TC	Off-White	Homogeneous	SW	
311929-55	194151021-120	NAD	--	--	--	--	--	--	--	--	--	100	VpB	Black	Homogeneous	SW	
311929-56	194151021-121	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	
311929-57	194151021-122	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311929-58	194151021-123	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311929
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/22/2019
Date Analyzed: 10/23/2019
Report Date: 10/23/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311929-59	194151021-124	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311929-60	194151021-125	NAD	--	--	--	--	--	--	--	--	--	100	FT	White	Homogeneous	SW	
311929-61	194151021-126	NAD	--	--	--	--	80	--	--	--	--	20	SPAFP	Gray	Homogeneous	SW	
311929-62	194151021-127	NAD	--	--	--	--	80	--	--	--	--	20	SPAFP	Gray	Homogeneous	SW	
311929-63	194151021-128	NAD	--	--	--	--	--	--	--	--	--	100	DS	Gray	Homogeneous	SW	
311929-64	194151021-129	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	
311929-65	194151021-130	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311929-66	194151021-131	NAD	--	--	--	--	20	--	40	--	--	40	CT	Multi	Layered	SW	
311929-67	194151021-132	NAD	--	--	--	--	20	--	40	--	--	40	CT	Multi	Layered	SW	
311929-68	194151021-133	NAD	--	--	--	--	--	--	--	--	--	100	FT	Gray	Homogeneous	SW	
311929-69	194151021-134	NAD	--	--	--	--	--	--	--	--	--	100	VpB	Black	Homogeneous	SW	
311929-70	194151021-135	NAD	--	--	--	--	--	--	TR	--	--	100	DW	Off-White	Homogeneous	SW	
311929-71	194151021-136	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311929-72	194151021-137	NAD	--	--	--	--	--	--	--	--	--	100	FT	Blue	Homogeneous	SW	
311929-73	194151021-138	NAD	--	--	--	--	--	--	--	--	--	100	FT	Blue	Homogeneous	SW	
311929-74	194151021-139	NAD	--	--	--	--	--	--	--	--	--	100	FT	Blue	Homogeneous	SW	
311929-75	194151021-140	NAD	--	--	--	--	--	--	--	--	--	100	FT	Blue	Homogeneous	PC	
311929-76	194151021-141	NAD	--	--	--	--	--	--	--	--	--	100	Fitting	Off-White	Homogeneous	PC	
311929-77	194151021-142	NAD	--	--	--	--	TR	--	--	--	5	95	SLT	White	Homogeneous	PC	
311929-78	194151021-143	NAD	--	--	--	--	2	--	--	--	5	93	SLT	White	Homogeneous	PC	
311929-79	194151021-144	NAD	--	--	--	--	--	--	--	--	--	100	SSL	White	Homogeneous	PC	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311929
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/22/2019
Date Analyzed: 10/23/2019
Report Date: 10/23/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311929-80	194151021-145	NAD	--	--	--	--	--	--	--	--	--	100	SSL	White	Homogeneous	PC	

The following footnotes only apply to those samples which the total asbestos result is flagged with a note number.

¹ TEM RECOMMENDATION - Please note, due to resolution limitations with optical microscopy and/or interference from matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos. It is recommended that the additional analytical technique of TEM be used to check for asbestos fibers below the resolution limits of optical microscopy.

² MATRIX REDUCTION RECOMMENDATION - Please note, due to interference from the matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos which is obscured from view. It is recommended that the additional preparation technique of gravimetric reduction be performed on this sample to minimize the obscuring effects of matrix components, followed by reanalysis by PLM and/or TEM.

Analysis Method - EPA/600/R-93/116 dated July 1993

NAD = "No Asbestos Detected" TR = "Trace equals less than 1% of this component"

Uncertainty: For samples containing asbestos in range of 1-10% the CV is 0.43, 11-35% CV=0.55, >35 CV=0.23. All results are to be considered preliminary and subject to change unless signed by the Technical Director or Deputy.

Analyst(s): Surat Watson, Peerawut Chaikeneee



Technical Director Michael Greenberg

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from us. Sample types, locations, and collection protocols are based upon the information provided by the persons submitting them and, unless collected by personnel of these Laboratories, we expressly disclaim any knowledge and liability for the accuracy and completeness of this information. Residual sample material will be discarded in accordance with the appropriate regulatory guidelines, unless otherwise requested by the client. NVLAP accreditation applies only to polarized light microscopy of bulk samples and transmission electron microscopy of AHERA air samples. This report must not be used to claim, and does not imply product certification, approval, or endorsement by NVLAP or any agency of the Federal Government. All rights reserved. AMA Analytical Services, Inc.



CHAIN OF CUSTODY

(Please Refer To This Number For Inquires)

311929

Mailing/Billing Information:

1. Client Name: AMA
 2. Address 1: Hanover
 3. Address 2:
 4. Address 3:
 5. Phone #: Fax #:

Submittal Information:

1. Job Name: VHC
 2. Job Location: Bedington, VA
 3. Job #: 19415 P.O. #:
 4. Contact Person: Gary Urban Cell:
 5. Collected by: Bob Benz Cell:

Reporting Info (Results provided as soon as technically feasible). If no TAT/Reporting Info is provided, AMA will assign defaults of 5-Day and email/fax to contacts on file.

AFTER HOURS (must be pre-scheduled) <input type="checkbox"/> 4 Hours <input type="checkbox"/> Late Night <input type="checkbox"/> Immediate Date Due: _____ <input type="checkbox"/> 24 Hours Time Due: _____ Comments: _____		NORMAL BUSINESS HOURS <input type="checkbox"/> 4 Hours <input type="checkbox"/> 3 Day <input type="checkbox"/> Same Day <input type="checkbox"/> 5 Day + <input type="checkbox"/> Next Day <input type="checkbox"/> Results Required By Noon <input checked="" type="checkbox"/> 2 Day Date Due: <u>10/24/19</u>		REPORT TO: <input checked="" type="checkbox"/> Email: <u>GUrban@amaconsulting.com</u> <input type="checkbox"/> Email 2: <input type="checkbox"/> Verbal:
--	--	---	--	--

Asbestos Analysis

*PCM Air – Please Indicate Filter Type: _____
 NIOSH 7400 (QTY)
 Fiberglass (QTY)
 TEM Air* – Please Indicate Filter Type: _____
 AHERA (QTY)
 NIOSH 7402 (QTY)
 Other (specify) (QTY)
 PLM Bulk
 EPA 600 – Visual Estimate 80 (QTY) Pos Stop
 EPA Point Count (QTY)
 NY State Friable 198.1 (QTY)
 Grav. Reduction ELAP 198.6 (QTY)
 Other (specify) (QTY)

TEM Bulk

ELAP 198.4/Chatfield (QTY)
 NY State PLM/TEM (QTY)
 Residual Ash (QTY)
 Vermiculite

TEM Dust*

Qual. (pres/abs) Vacuum/Dust (QTY)
 Quan. (s/area) Vacuum D5755-95 (QTY)
 Quan. (s/area) Dust D6480-99 (QTY)

TEM Water

Qual. (pres/abs) (QTY)
 ELAP 198.2/EPA 100.2 (QTY)
 EPA 100.1 (QTY)

All samples received in good condition unless otherwise noted.
 TEM Water samples _____ °C

Metals Analysis

Pb Paint Chip (QTY)
 *Pb Dust Wipe (wipe type) (QTY)
 *Pb Air (QTY)
 Pb Soil/Solid (QTY)
 Pb TCLP (QTY)
 Drinking Water Pb (QTY) Cu (QTY) As (QTY)
 Waste Water Pb (QTY) Cu (QTY) As (QTY)
 Pb Furnace (Media) (QTY)

Fungal Analysis

Collection Apparatus for Spore Traps/Air Samples: _____
 Collection Media _____
 *Spore-Trap (QTY) Surface Vacuum Dust (QTY)
 *Surface Swab (QTY)
 *Surface Tape (QTY)
 Other (Specify) (QTY)

MISC

Asbestos Soil PLM (Qual) PLM (Quan) PLM/TEM (Qual) PLM/TEM (Quan)
 *It is recommended that blank samples be submitted with all air and surface samples

If field data sheets are submitted, there is no need to complete bottom section.

CLIENT ID #	SAMPLE INFORMATION SAMPLE LOCATION/ ID	DATE/ TIME	VOL (L)/ Wipe Area	ANALYSIS						MATRIX						COMMENTS / SPECIAL INSTRUCTIONS	
				TEM	PCM	PLM	LEAD	MOLD	AIR	BULK	DUST	WATER AND OTHER	SPORE TRAP	TAPE	SWAB		
194157021-66						↕											
194151021-745						↕											
	see sheets																

Relinquished by:	Print Name: <u>Bob Benz</u>	Signature: <u>[Signature]</u>	Date: <u>10/22/19</u>	Time: <u>12:05</u>	Shipping Information <input type="checkbox"/> UPS <input checked="" type="checkbox"/> Person <input type="checkbox"/> Other <input type="checkbox"/> FedEx <input type="checkbox"/> Drop Box <input type="checkbox"/> USPS <input type="checkbox"/> Courier
Received by:	<u>[Signature]</u>	<u>[Signature]</u>	<u>10/22/19</u>	<u>12:05</u>	



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 Address: 601 S Carlin Springs Road Company: AMA
 Job Number: 19415 Arlington, VA Telephone Number: (410) 684 - 3327
 Job Site: VHC Contact Person: Gary Urban Samples Taken By: _____
 Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415-1021/111	2x4 Cracked Pinhole Ceiling Tile	AMA-339 Middle of hallway, at ceiling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021/112	Black Mastic on Duct	AMA-339 Along north wall, 26 ft from east wall, above ceiling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021/113	Black Mastic on Duct	AMA-339 Same as # 113	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021/114	2x12 Greeny Mottled Floor Tile	AMA 339 -254 Middle of hallway	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19411-1021/115	Gray Sink Mastic	AMA-117 Under sink along south wall	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	

**ACM Bulk Sampling Survey Sheet**

Date Collected: Oct 2019 **Address:** 601 S Carlin Springs Road **Company:** AMA

Job Number: 19415 Arlington, VA **Telephone Number:** (410) 684 - 3327

Job Site: VHC **Contact Person:** Gary Urban **Samples Taken By:** _____

Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415- 1021 114	Smooth Plaster	AMA-338 Southeast corner of west side of room, 4 ft from floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	First Layer
19415- 1021 117	Smooth Plaster	AMA-338 Same as #116	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	Second Layer
19415- 1021 118	2x2 Textured Ceiling Tile	AMA-303 2 ft from south wall, 4 ft from east wall	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415- 1021 119	2x2 Textured Ceiling Tile	AMA-305 4 ft from west wall, 2 ft from north wall	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19411- 1021 120	Black Vaper Barriers	AMA-305 Same as #119	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	

(Revised 8/01)



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 **Address:** 601 S Carlin Springs Road **Company:** AMA
Job Number: 19415 Arlington, VA **Telephone Number:** (410) 684 - 3327
Job Site: VHC **Contact Person:** Gary Urban **Samples Taken By:** _____
Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415-1021121	Drywall	AMA-305 Same as #119	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021122	Joint Compound	AMA-305 Same as #119	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021123	12x12 White w/ Black streaks Floor Tile	AMA-303 1 ft from west wall, 2 ft from south wall	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021124	12x12 White w/ Black streaks Floor Tile	AMA-305 Northeast corner	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19411-1021125	12x12 White w/ Green streaks Floor Tile	AMA-287 Northend of hallway	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 **Address:** 601 S Carlin Springs Road **Company:** AMA
Job Number: 19415 Arlington, VA **Telephone Number:** (410) 684 - 3327
Job Site: VHC **Contact Person:** Gary Urban **Samples Taken By:** _____
Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415-1021131	2x2 Fissured Pinhole Ceiling tile	AMA-292 Northeast corner, at ceiling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021132	2x2 Fissured Pinhole Ceiling tile	AMA-71 Southwest corner	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021133	12x12 Gray Mottled Floor tile	AMA-292 Northeast corner, at floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021134	Black Vapor Barrier	AMA-228 At door threshold, above ceiling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19411-1021135	Drywall	AMA-225 Above east end exit door, above ceiling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	

(Revised 8/01)



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 **Address:** 601 S Carlin Springs Road **Company:** AMA
Job Number: 19415 Arlington, VA **Telephone Number:** (410) 684 - 3327
Job Site: VHC **Contact Person:** Gary Urban **Samples Taken By:** _____
Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415- 1021 136	Joint Compound	AMA-225 Same as #135	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415- 1021 137	12x12 Blue Mottled Floor Tile	AMA-316 Southeast corner	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415- 1021 138	12x12 Blue Mottled Floor Tile	AMA-318 Northwest corner at floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415- 1021 139	12x12 Dark Blue Mottled Floor Tile	AMA-315 Southwest corner, at floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19411- 1021 140	12x12 Dark Blue Mottled Floor Tile	AMA-316 Northwest corner, at floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	

(Revised 8/01)



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 **Address:** 601 S Carlin Springs Road **Company:** AMA
Job Number: 19415 Arlington, VA **Telephone Number:** (410) 684 - 3327
Job Site: VHC **Contact Person:** Gary Urban **Samples Taken By:** _____
Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415- 141	Mudded Fitting	AMA-320 Along east wall, 6 ft from exit door at ceiling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415- 142	End Cap Sealant	AMA-320 20 ft from north wall, 10 ft from east wall	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	New
19415- 1021 143 149	End Cap Sealant	AMA-320 6 ft west of exit door, 2 ft from north wall, 8 ft from floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	Old
19415- 1021 144	White Pipe Seam Sealant	AMA-320 15 ft west of exit door, 2 ft from north wall, 5 ft from floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	New
19411- 1021 145	White Duct Seam Sealant on Canvas	AMA-320 6 ft from west wall, 10 ft from south wall, 6 ft from floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311789
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
1331 Ashton Road
Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/23/2019
Date Analyzed: 10/25/2019
Report Date: 10/25/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311789-1	19415 1021-146	NAD	--	--	--	--	--	--	40	--	--	60	DM	Gray	Homogeneous	SW	
311789-2	19415 1021-147	40	40	--	--	--	--	--	--	--	--	60	DM	Tan	Homogeneous	SW	
311789-3	19415 1021-148	NAD	--	--	--	--	--	--	--	--	--	100	FT	Gray	Homogeneous	SW	
311789-4	19415 1021-149	NAD	--	--	--	--	--	--	--	--	--	100	FT	Gray	Homogeneous	SW	
311789-5	19415 1021-150	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-6	19415 1021-151	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-7	19415 1021-152	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-8	19415 1021-153	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-9	19415 1021-154	NAD	--	--	--	--	--	TR	10	--	--	90	DWC	Multi	Layered	SW	
311789-10	19415 1021-155	NAD	--	--	--	--	--	--	--	--	--	100	MS	Brown	Homogeneous	SW	
311789-11	19415 1021-156	NAD	--	--	--	--	--	--	--	--	--	100	MS	Brown	Homogeneous	SW	
311789-12	19415 1021-157	NAD	--	--	--	--	--	--	80	--	--	20	Paper	Black	Homogeneous	SW	
311789-13	19415 1021-158	NAD	--	--	--	--	--	--	--	--	--	100	FT	Tan	Homogeneous	SW	
311789-14	19415 1021-159	5	5	--	--	--	--	--	--	--	--	95	MS	Black	Homogeneous	SW	
311789-15	19415 1021-160	5	5	--	--	--	--	--	--	--	--	95	MS	Black	Homogeneous	SW	
311789-16	19415 1021-161	NAD	--	--	--	--	--	--	--	--	--	100	SSL	Brown	Homogeneous	SW	
311789-17	19415 1021-162	NAD	--	--	--	--	--	--	--	--	--	100	SSL	Brown	Homogeneous	SW	
311789-18	19415 1021-163	NAD	--	--	--	--	--	--	70	--	--	30	CVS	Multi	Homogeneous	SW	
311789-19	19415 1021-164	NAD	--	--	--	--	--	--	70	--	--	30	CVS	Multi	Homogeneous	SW	
311789-20	19415 1021-165	NAD	--	--	--	--	--	--	TR	--	--	100	SSL	White	Homogeneous	SW	
311789-21	19415 1021-166	NAD	--	--	--	--	30	--	30	--	--	40	CT	Multi	Layered	SW	
311789-22	19415 1021-167	NAD	--	--	--	--	30	--	30	--	--	40	CT	Multi	Layered	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311789
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/23/2019
Date Analyzed: 10/25/2019
Report Date: 10/25/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311789-23	19415 1021-168	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-24	19415 1021-169	NAD	--	--	--	--	30	--	30	--	--	40	CT	Beige	Homogeneous	SW	
311789-25	19415 1021-170	NAD	--	--	--	--	60	--	--	--	--	40	CT	Multi	Layered	SW	
311789-26	19415 1021-171	NAD	--	--	--	--	60	--	--	--	--	40	CT	Off-White	Homogeneous	SW	
311789-27	19415 1021-172	NAD	--	--	--	--	60	--	--	--	--	40	FS	Red	Homogeneous	SW	
311789-28	19415 1021-173	NAD	--	--	--	--	--	--	70	--	--	30	CVS	Multi	Homogeneous	SW	
311789-29	19415 1021-174	NAD	--	--	--	--	--	--	70	--	--	30	CVS	Multi	Homogeneous	SW	
311789-30	19415 1021-175	NAD	--	--	--	--	--	--	--	--	--	100	GK	Brown	Homogeneous	SW	
311789-31	19415 1021-176	NAD	--	--	--	--	--	--	--	60	--	40	GK	Green	Homogeneous	SW	
311789-32	19415 1021-177	NAD	--	--	--	--	--	--	--	--	--	100	LN	Off-White	Homogeneous	SW	
311789-33	19415 1021-178	NAD	--	--	--	--	--	--	--	--	--	100	MS	Tan	Homogeneous	SW	
311789-34	19415 1021-179	NAD	--	--	--	--	--	--	--	--	--	100	MS	Tan	Homogeneous	SW	
311789-35	19415 1021-180	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-36	19415 1021-181	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-37	19415 1021-182	NAD	--	--	--	--	--	--	--	--	--	100	FT	Tan	Homogeneous	SW	
311789-38	19415 1021-183	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-39	19415 1021-184	NAD	--	--	--	--	--	--	--	--	--	100	FT	Red	Homogeneous	SW	
311789-40	19415 1021-185	NAD	--	--	--	--	--	--	--	--	--	100	FT	Red	Homogeneous	SW	
311789-41	19415 1021-186	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-42	19415 1021-187	NAD	--	--	--	--	--	--	--	--	--	100	FT	Multi	Homogeneous	SW	
311789-43	19415 1021-188	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311789
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/23/2019
Date Analyzed: 10/25/2019
Report Date: 10/25/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
311789-44	19415 1021-189	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311789-45	19415 1021-190	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	
311789-46	19415 1021-191	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311789-47	19415 1021-192	NAD	--	--	--	--	100	--	--	--	--	--	CT	Yellow	Homogeneous	SW	
311789-48	19415 1021-193	NAD	--	--	--	--	100	--	--	--	--	--	CT	Yellow	Homogeneous	SW	
311789-49	19415 1021-194	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	
311789-50	19415 1021-195	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311789-51	19415 1021-196	NAD	--	--	--	--	60	--	--	--	--	40	CT	Multi	Layered	SW	
311789-52	19415 1021-197	NAD	--	--	--	--	60	--	--	--	--	40	CT	Multi	Layered	SW	
311789-53	19415 1021-198	NAD	--	--	--	--	--	--	10	--	--	90	DW	Multi	Layered	SW	
311789-54	19415 1021-199	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	
311789-55	19415 1021-200	NAD	--	--	--	--	--	--	--	--	--	100	JC	White	Homogeneous	SW	

CERTIFICATE OF ANALYSIS

Chain of Custody: 311789
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/23/2019
Date Analyzed: 10/25/2019
Report Date: 10/25/2019
Date Sampled: 10/21/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
-------------------	----------------------	----------------	--------------------	-----------------	---------------------	------------------------	----------------------	--------------------	-----------------	-------------------	---------------	---------------------	-------------	--------------	-------------	------------	----------

The following footnotes only apply to those samples which the total asbestos result is flagged with a note number.

¹ TEM RECOMMENDATION - Please note, due to resolution limitations with optical microscopy and/or interference from matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos. It is recommended that the additional analytical technique of TEM be used to check for asbestos fibers below the resolution limits of optical microscopy.

² MATRIX REDUCTION RECOMMENDATION - Please note, due to interference from the matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos which is obscured from view. It is recommended that the additional preparation technique of gravimetric reduction be performed on this sample to minimize the obscuring effects of matrix components, followed by reanalysis by PLM and/or TEM.

Analysis Method - EPA/600/R-93/116 dated July 1993
 NAD = "No Asbestos Detected" TR = "Trace equals less than 1% of this component"

Uncertainty: For samples containing asbestos in range of 1-10% the CV is 0.43, 11-35% CV=0.55, >35 CV=0.23. All results are to be considered preliminary and subject to change unless signed by the Technical Director or Deputy.

Analyst(s): Surat Watson



Technical Director G. Edward Carney

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from us. Sample types, locations, and collection protocols are based upon the information provided by the persons submitting them and, unless collected by personnel of these Laboratories, we expressly disclaim any knowledge and liability for the accuracy and completeness of this information. Residual sample material will be discarded in accordance with the appropriate regulatory guidelines, unless otherwise requested by the client. NVLAP accreditation applies only to polarized light microscopy of bulk samples and transmission electron microscopy of AHERA air samples. This report must not be used to claim, and does not imply product certification, approval, or endorsement by NVLAP or any agency of the Federal Government. All rights reserved. AMA Analytical Services, Inc.



AMA Analytical Services, Inc.

Focused on Results www.amalab.com
AIHA-LAP (#100470) NVLAP (#101143-0) NY ELAP (10920)
4475 Forbes Blvd. • Lanham, MD 20706
(301) 459-2640 • (800) 346-0961 • Fax (301) 459-2643

CHAIN OF CUSTODY

(Please Refer To This Number For Inquires)

311789

Mailing/Billing Information:

1. Client Name: AMA
2. Address 1: Hanover
3. Address 2:
4. Address 3:
5. Phone #: Fax #:

Submittal Information:

1. Job Name: VHC
2. Job Location: Arlington VA
3. Job #: 19415 P.O. #:
4. Contact Person: Gary Johnson Cell:
Bob Best Cell:

Reporting Info (Results provided as soon as technically feasible). If no TAT/Reporting Info is provided, AMA will assign defaults of 5-Day and email/fax to contacts on file.

AFTER HOURS (must be pre-scheduled) <input type="checkbox"/> 4 Hours <input type="checkbox"/> Late Night <input type="checkbox"/> Immediate Date Due: _____ <input type="checkbox"/> 24 Hours Time Due: _____ Comments: _____		NORMAL BUSINESS HOURS <input type="checkbox"/> 4 Hours <input type="checkbox"/> 3 Day <input type="checkbox"/> Same Day <input type="checkbox"/> 5 Day + <input type="checkbox"/> Results Required By Noon <input type="checkbox"/> Next Day <input checked="" type="checkbox"/> 2 Day Date Due: <u>10/25/19</u>		REPORT TO: <input checked="" type="checkbox"/> Email: <u>Cushen@Amf-CurBulky.com</u> <input type="checkbox"/> Email 2: <input type="checkbox"/> Verbal:
--	--	--	--	---

Asbestos Analysis

*PCM Air - Please Indicate Filter Type: _____

- NIOSH 7400 _____ (QTY)
- Fiberglass _____ (QTY)

TEM Air* - Please Indicate Filter Type: _____

- AHRA _____ (QTY)
- NIOSH 7402 _____ (QTY)
- Other (specify _____) _____ (QTY)

PLM Bulk

- EPA 600 - Visual Estimate 55 (QTY) Pos Stop
- EPA Point Count _____ (QTY)
- NY State Friable 198.1 _____ (QTY)
- Grav. Reduction ELAP 198.6 _____ (QTY)
- Other (specify _____) _____ (QTY)

MISC

- Asbestos Soil PLM (Qual) PLM (Quan) PLM/TEM (Qual) PLM/TEM (Quan)
- *It is recommended that blank samples be submitted with all air and surface samples

TEM Bulk

- ELAP 198.4/Chatfield _____ (QTY)
- NY State PLM/TEM _____ (QTY)
- Residual Ash _____ (QTY)
- Vermiculite

TEM Dust*

- Qual. (pres/abs) Vacuum/Dust _____ (QTY)
- Quan. (s/area) Vacuum D5755-95 _____ (QTY)
- Quan. (s/area) Dust D6480-99 _____ (QTY)

TEM Water

- Qual. (pres/abs) _____ (QTY)
- ELAP 198.2/EPA 100.2 _____ (QTY)
- EPA 100.1 _____ (QTY)

All samples received in good condition unless otherwise noted.
(TEM Water samples _____ °C)

If field data sheets are submitted, there is no need to complete bottom section.

Metals Analysis

- Pb Paint Chip _____ (QTY)
- *Pb Dust Wipe (wipe type _____) _____ (QTY)
- *Pb Air _____ (QTY)
- Pb Soil/Solid _____ (QTY)
- Pb TCLP _____ (QTY)
- Drinking Water Pb _____ (QTY) Cu _____ (QTY) As _____ (QTY)
- Waste Water Pb _____ (QTY) Cu _____ (QTY) As _____ (QTY)
- Pb Furnace (Media _____) _____ (QTY)

Fungal Analysis

- Collection Apparatus for Spore Traps/Air Samples: _____
- Collection Media _____
- *Spore-Trap _____ (QTY) Surface Vacuum Dust _____ (QTY)
- *Surface Swab _____ (QTY)
- *Surface Tape _____ (QTY)
- Other (Specify _____) _____ (QTY)

CLIENT ID #	SAMPLE INFORMATION SAMPLE LOCATION/ ID	DATE/ TIME	VOL (L)/ Wipe Area	ANALYSIS						MATRIX						COMMENTS / SPECIAL INSTRUCTIONS	
				TEM	PCM	PLM	LEAD	MOLD	AIR	BULKY	DUST	WATER AND OTHER	SPORE TRAP	TAPE	SWAB		
<u>19415021-144</u>																	
<u>194151021-200</u>																	
	<u>See</u>																
	<u>Spurte</u>																

Relinquished by:	<u>Bob Best</u>	Signature	<u>[Signature]</u>	Date	<u>10/23/19</u>	Time	<u>11:00</u>	Shipping Information		
Received by:	<u>[Signature]</u>		<u>[Signature]</u>		<u>10/23/19</u>		<u>11:00</u>	<input type="checkbox"/> UPS	<input checked="" type="checkbox"/> In-Person	<input type="checkbox"/> Other
								<input type="checkbox"/> FedEx	<input type="checkbox"/> Drop Box	
								<input type="checkbox"/> USPS	<input type="checkbox"/> Courier	



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 Address: 601 S Carlin Springs Road Company: AMA

Job Number: 19415 Arlington, VA Telephone Number: (410) 684 - 3327

Job Site: VHC Contact Person: Gary Urban Samples Taken By: /

Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415-162/164	2x4 Small pin-hole ceiling tile	AMA-26 Along S. wall 4ft from W. wall @ Ceiling	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No #	
19415-162/167	↓	AMA-26 Along N. wall 10ft from E. wall @ Ceiling	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No #	
19415-162/168	12x12 White floor tile w/ grey specks	AMA-26.2 Along N. wall 4ft from E. wall at floor	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No #	
19415-162/169	2x2 Rough Ceiling tile	AMA-30 right above door threshold	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No #	
19411-162/170	2x2 Crater pinhole Ceiling tile	AMA-54 Along S. wall 2ft W. wall	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No #	



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 Address: 601 S Carlin Springs Road Company: AMA

Job Number: 19415 Arlington, VA Telephone Number: (410) 684 - 3327

Job Site: VHC Contact Person: Gary Urban Samples Taken By: _____

Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415-1621171	ZxZ Crater Pinnole Ceilyite	AmA-297 Along N. wall left from E. wall	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021172	Redfire stop	AmA-29 Along S. wall by door	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021173	green Corros dark	AmA-49 along E. wall @ tank	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19415-1021174	↓	same AS 173	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19411-1021175	Flange gasket	AmA-49 @ 2nd level Along W. wall	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	



ACM Bulk Sampling Survey Sheet

Date Collected: Oct 2019 Address: 601 S Carlin Springs Road Company: AMA

Job Number: 19415 Arlington, VA Telephone Number: (410) 684 - 3327

Job Site: VHC Contact Person: Gary Urban Samples Taken By: _____

Chain of Custody #: _____

Sample Number	Type of Material Sampled	Sample Location	Friable	Condition of Material	Accessibility	Photo	Comments
19415-1021181	12x12 White mottled floor tile	Same AS 180	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	1st layer
19415-1021182	12x12 Tan floor tile	Same AS 181	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	2nd layer
19415-1021183	↓	Same AS 182	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	↓
19415-1021184	12x12 Red mottled floor tile	Area-280 Along N. wall towards middle of floor	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	
19411-1021185	↓	Area-282 - Along W. wall Near middle of floor	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Potentially	<input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Yes <input type="checkbox"/> No #	



CERTIFICATE OF ANALYSIS

Chain of Custody: 312872
Client: Aerosol Monitoring & Analysis, Inc
Address: PO Box 646
 1331 Ashton Road
 Hanover, MD 21076
Attention: Gary Urban

Job Name: VHC
Job Location: Arlington, VA
Job Number: 19415
P.O. Number: Not Provided

Date Submitted: 10/31/2019
Date Analyzed: 11/01/2019
Report Date: 11/01/2019
Date Sampled: 10/31/2019
Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
312872-1	194151031-01	NAD	--	--	--	--	--	--	--	--	--	100	CM	Yellow	Homogeneous	LBP	
312872-2	194151031-02	NAD	--	--	--	--	--	--	--	--	--	100	CM	Yellow	Homogeneous	LBP	
312872-3	194151031-03	NAD	--	--	--	--	--	--	--	--	--	100	CM	Yellow	Homogeneous	LBP	
312872-4	194151031-04	NAD	--	--	--	--	--	--	--	--	--	100	LN	Gray	Homogeneous	LBP	

CERTIFICATE OF ANALYSIS

Chain of Custody: 312872

Client: Aerosol Monitoring & Analysis, Inc

Address: PO Box 646
1331 Ashton Road
Hanover, MD 21076

Attention: Gary Urban

Job Name: VHC

Job Location: Arlington, VA

Job Number: 19415

P.O. Number: Not Provided

Date Submitted: 10/31/2019

Date Analyzed: 11/01/2019

Report Date: 11/01/2019

Date Sampled: 10/31/2019

Person Submitting: Bob Bentz

Summary of Polarized Light Microscopy

AMA Sample Number	Client Sample Number	Total Asbestos	Chrysotile Percent	Amosite Percent	Crocidolite Percent	Other Asbestos Percent	Mineral Wool Percent	Fiberglass Percent	Organic Percent	Synthetic Percent	Other Percent	Particulate Percent	Sample Type	Sample Color	Homogeneity	Analyst ID	Comments
-------------------	----------------------	----------------	--------------------	-----------------	---------------------	------------------------	----------------------	--------------------	-----------------	-------------------	---------------	---------------------	-------------	--------------	-------------	------------	----------

The following footnotes only apply to those samples which the total asbestos result is flagged with a note number.

¹ TEM RECOMMENDATION - Please note, due to resolution limitations with optical microscopy and/or interference from matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos. It is recommended that the additional analytical technique of TEM be used to check for asbestos fibers below the resolution limits of optical microscopy.

² MATRIX REDUCTION RECOMMENDATION - Please note, due to interference from the matrix components of this sample, results which are reported via PLM as negative or trace (<1%) for asbestos may contain a significant quantity of asbestos which is obscured from view. It is recommended that the additional preparation technique of gravimetric reduction be performed on this sample to minimize the obscuring effects of matrix components, followed by reanalysis by PLM and/or TEM.

Analysis Method - EPA/600/R-93/116 dated July 1993

NAD = "No Asbestos Detected" TR = "Trace equals less than 1% of this component"

Uncertainty: For samples containing asbestos in range of 1-10% the CV is 0.43, 11-35% CV=0.55, >35 CV=0.23. All results are to be considered preliminary and subject to change unless signed by the Technical Director or Deputy.

Analyst(s): Lom Butruk



Technical Director G. Edward Carney

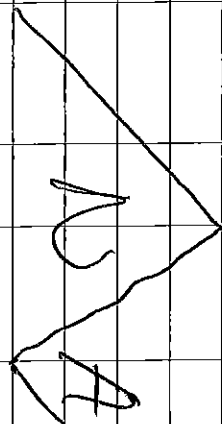
This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from us. Sample types, locations, and collection protocols are based upon the information provided by the persons submitting them and, unless collected by personnel of these Laboratories, we expressly disclaim any knowledge and liability for the accuracy and completeness of this information. Residual sample material will be discarded in accordance with the appropriate regulatory guidelines, unless otherwise requested by the client. NVLAP accreditation applies only to polarized light microscopy of bulk samples and transmission electron microscopy of AHERA air samples. This report must not be used to claim, and does not imply product certification, approval, or endorsement by NVLAP or any agency of the Federal Government. All rights reserved. AMA Analytical Services, Inc.

APPENDIX B: LEAD-BASED PAINT DOCUMENTATION

NITON XLP 300
FIELD FORM

JOB NAME: VHC
ADDRESS: Arlington VA

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm ²)
01	Calibration							001 4.75
02								002 0.9
03								003 1
04								004 1
05	Urgent care triage	S	whit	wall	DW	F		005 0
06		S	white	doorcase	metal	F		006 0.03
07		N	red	windowsill	DW	F		007 0
08		ceiling	white	ceiling	DW	F		008 0
09	urgent care triage kitchen	S E	white	sink	porcelain	F		009 0.28
10		E	white	tab	porcelain	F		010 0
11	urgent care hallway	S	white	wall	DW	F		011 0
12		N	white	door case	metal	F		012 0.08
13		N	↓	wall	plaster	F		013 0
14	Room exams	S	↓	wall	↓	F		014 0
15		ceiling	↓	ceiling	DW	F		015 0
16		fl	white	windowsill	DW	F		016 0
17	Urgent care hallway	ceiling	orange	Iron	metal	F		017 0.6
18	Starwood B	w	blue	wall	any	F		018 0.02
19		w	↓	door	metal	F		019 0.05
20		↓	↓	doorcase	↓	F		020 0.03



JOB# 19415

DATE: 10/16/19

NTON XLP 300
FIELD FORM

JOB NAME: V.H.C.
ADDRESS: Arlington VA

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm2)
21	Stairwell B	Stairs	gray	Post Nail	Metal	I		021 4.2
22	Calibration			Stinger		I	SS	022 4.76
23	Stairwell B	Stairs	gray	Stringer	Metal	I		023 8
24				Nut		I		024 4.5
25				Spigot		I		025 5.6
26				gasket		I		026 0
27	LL Mech Room 3	Wing	white	Wall	Pl	II		027 0
28			gray	Door	Wood	I		028 0.4
29				Door	Metal	I		029 0.04
30				Ceiling	Pl	I		030 0
31	LL Hallway	E	white	Wall	Con	I		031 0.05
32		W	Gray	elctric panel	Metal	II		032 0.09
33		E	Blue	luser	Metal	I		033 0.01
34	Mech Room 4	E	gray	Floor cover		I		034 0.05
35				Floor	concrete	III		035 0.02
36		Floor		Wall	Con	I		036 0
37		S	white	Door	Metal	I		037 0
38	elevator #2	U	Blue	Door	Metal	I		038 0.18
39		U		door		I		039 0.28
40	Specification Room LL	E	Blue	Plaster	Metal	II		040 0
41		Ceiling	white	Ceiling	Pl	I		041 0

JOB# 19415

DATE: 10/16/19

PAGE 2 OF 11

JOB NAME: VHE

ADDRESS: Arlington VA

NITON XLP 300
FIELD FORM

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm2)
42	Specification Room	E	white	wall	CMD	I		042 0
43	LL Restroom	E	↓	wall	Plaster	II		043 0
44		W	Blue	Door	wood	I		044 0.6
45		E	↓	door case	metal	I		045 0
46	Meat Room 5	ceiling	black	truss	metal	I	Calibrations	046 4.57
47	Meat Room 5	ceiling	black	truss	metal	F		047 0.03
48	Calibration	Floor	Red	5 inch steel	metal	I		048 4.84
49	Mech Room 5	Floor	Red	5 inch steel	metal	I		049 0
50		W	green	Canvas Center	Canvas	I		050 0
51		W	gray	Aluminum Keel	metal	I		051 0.02
52	LL Bathroom	W	white	prussell	plastic	I		052 0
53	↓	Ceiling	W	Ceiling	Dus	I		053 0.01
54	Engineering office	S	↓	wall	CMD	I		054 0.06
55		Ceiling	↓	Ceiling	Dus	↓		055 0
56		N.	↓	SNIP	wood	I		056 0
57		S	Red	Cage	metal	I		057 0
58	Stairwell D	S	white	wall	Dus	I		058 0
59		stairs	gray	Wall Post	Metal	↓		059 6.2
60		stairs	↓	Shower	↓	↓		060 10.1
61		stairs	↓	CBAs	↓	↓		061 4.8

JOB# 19415

DATE: 10/16/19

NITON XLP 300
FIELD FORM

JOB NAME: VHS
ADDRESS: Asheboro VA

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm ²)
62	Stairwell	Stairs	gray	Spindel	metal	I	f	062 2.7
63	Maths office	N	blk	W-11	PD	E		063 0
64		D	↓	Quisnel	wood	I		064 0
65		↓	↓	Rubber floor	metal	I		065 0.02
66		N	teal	Rail	↓	NI	f	066 2
67	Math Boilers Room	E	white	well	CMU	I		067 0.01
68		N	blk	Conwalk	metal	I		068 0.01
70		Stairs	teal	springer	↓	BI	↓	070 5.3
71		Stairs	teal	springer	↓	BI	↓	071 2.3
72		E	pepp	skk	metal	I		072 0
73		E	blue	electronic panel	metal	I		073 0.04
75		E	white	pipe	metal	I		075 0.1
74		N	red	water panel	↓	I		076 0
77		N	white	springer	concrete	NI		077 0.09
78		N	gray	floor	M/H	I	f	078 6.1
79		N	blue	door	↓	I		079 0.03
80		N	↓	door casings	↓	I		080 0.05
81		DU	green	pipe	↓	I		081 0.03
82		NE	red	door	↓	I		082 0.5
83	LL Hallway	E	white	ball	DU	F		083 0

JOB# 19415

DATE: 10/16/19

PAGE 4 OF 11

NITON XLP 300
FIELD FORM

JOB NAME: VHC
ADDRESS: Arroyo VA

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm ²)
84	LL Hallway	W.	White	Chair	Wood	I		084 0
85		E	gray	door	wood	I		085 0
86		↓	↓	door	↓	I	Preserved	086 0
87	Kitchen LL	N	White	columns	plstc	I		087 0.01
88		Ceiling	↓	Crky	Plstc	I		088 -0.13
89		W.	↓	Wall	CRD	I		089 0.04
90		W.	↓	General surface	Resin	I		090 3
91		S	↓	Wall	Resin	I		091 2.9
92	Shw Room A	W.	gray	door	Wood	I		092 0.09
93		W	↓	door	metal	I		093 0.12
94	Kitchen LL	Being	Black	truss	metal	I		094 0.01
95	Mechanical Room R	Floor	gray	Floor	concrete	I		095 0.01
96	Outside of house	W.	White	vent	metal	I		096 0.01
97	loading dock Area	S	white	well	CRD	I		097 0.02
98		E	Blk	Refrigerator	Metl	I		098 0
99		E	white	well	plstc	I		099 0
100		E	↓	well	CRD	I		100 0
101	Applicator	Ceiling	Blk	Ceiling	CRD	I		101 0
102		W.	gray	door	Metl	I		102 0.04
103	Mechanical Services Room LL	Ceiling	Blk	truss	Metl	I		103 0.02

JOB# 19415

DATE: 10/14/19

NITON XLP 300
FIELD FORM

JOB NAME: VHC
ADDRESS: Anthonyville

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(Tmg/cm ²)
104	LL Hallway	Ni	white	wall	CMO	NI		104 0
105	CONFERENCE ROOM	Ceiling	Blue	truss	metal	I		105 0
106	Room 320	W	white	door	wood	I		106 0.01
107		W	↓	door case	metal	I		107 0.16
108		W	↓	Wall	PU	F		108 0
109	Radiology Schwabig	Ceiling	Red	Truss	metal	I		109 0.02
110		N	white	column	rod	I		110 0
112		Ceiling	orange	I-beam	metal	I		112 1.2
113		Ceiling	white	Ceiling	rod	I		113 0
114	Tramway	E	gray	door	wood	I		114 0
115		E	↓	door ceiling	metal	I		115 0
117	TOP CONFERENCE ROOM	Ceiling	white	truss	↓	I		117 0
118		Ceiling	↓	Ceiling	rod	I		118 0
119	elcher by classroom 4	W	↓	elcher door	metal	I		119 0.12
120		↓	↓	elcher casing	↓	↓		120 0.3
121		W	↓	Tiger case	↓	↓		121 0
122		E	↓	elcher panel	↓	↓		122 0
123	OR Room	W	green	file	Ceramic	↓		123 7.8
124		E	white	wall	plaster	↓		124 0
125	Main Hallway	E	↓	wall	rod	I		125 0

JOB# 192115

DATE: 10/14/19

PAGE 6 OF 11

NITON XLP 300
FIELD FORM

JOB NAME: VHC
ADDRESS: Adelphi St

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm2)
124	Main Hallway	S ↓	gray ↓	door	Metal	E		126 0
127	↓	↓	↓	door case	↓	↓		127 0
128	Business Hallway	S	gray	windows	↓	↓		128 1.7
129	Hallway into day care	w.	gray	door case	↓	↓	+	129 0.3
130	↓	w.	white	door case	↓	↓		130 0
131	↓	w.	↓	chair	wood	↓		131 0
132	Day Care, Play Room	Ceiling	Blk	Truss	Metal	↓		132 0.01
133	↓	N.Wall	white	Rubbers	↓	↓		133 0
134	Reception Area	Ceiling	Red	I-Beam	↓	↓		134 0
135	↓	W.wall	yellow	Wall	Dvd	↓		135 0
136	↓	Ceiling	white	Ceiling	↓	↓		136 0
137	Men's Room	W.wall	Tan	Wall	Ceramic	↓		137 0.02
138	↓	N.Wall	white	Wall	Dvd	↓		138 0
139	Two's Rm	N.Wall	Beige	Refrigerator	Metal	↓		139 0
140	↓	N.Wall	↓	Door	Wood	↓		140 0
141	↓	↓	Blue	Door Case	Metal	↓		141 0
142	Pediatrics, Reception	Center of Open	White	Column	Dvd	↓		142 0
143	↓	N.Wall	↓	Door	Wood	↓		143 0
144	↓	↓	↓	Door Case	Metal	↓		144 0
145	↓	↓	↓	Elevator Door	↓	↓		145 0.5

JOB# 19415

DATE: 10/14/19

NITON XLP 300
FIELD FORM

JOB NAME: VHC
ADDRESS: Arlington VA

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm ²)
146	Pediatrics, Exam 10, Bathroom	N. Wall	Tan	Wall Tile	Ceramic	F	Older Tile	146 3.3
147		↓	Pink	↓	↓			147 0.1
148		N. Wall	Gray	Door Case	Metal			148 0
149		E. Wall	Pink	Wall	Plastic			149 0
150		W. Wall	White	Window Sill	DW			150 0
151	Reception Area	S. Wall	Beige	Electrical Panel	Metal			151 0
154	Perthouse Stairwell	↓		Door	Metal		Exit Door #6	154 1.4
156		S. Wall		Door Case				156 0.01
157		E. Wall		Stair Stringer				157 6.4
158		↓	off white	Wall	Plastic			158 0
159	Rm 4	S. Wall	↓	↓	DW			159 0
160	Hall	↓	Beige	Door Case	Metal			160 0
161		W. Wall	↓	Elevator Door Sill	↓			161 0.2
162		↓	off white	Door Sill	DW			162 0
163	Accounting Dept., Air Air Area	N. Wall	White	Wall	BW			163 0
164	↓	↓	↓	Door Case	Metal			164 0
165	Training Area Outside Kitchen	E. Wall	Brown	Door	↓		Exit Door	165 0
166	↓	N. Wall	White	Door Case	↓			166 0.01
167	Billing Corridor, Outside Restroom	S. Wall	Gray	Wall	DW			167 0
168	↓	↓	↓	Door	Wood			168 0

JOB# 19415

DATE: 12/16/19

PAGE 8 OF 11

NITON XLP 300
FIELD FORM

JOB NAME: VHC
ADDRESS: Perlogen Va

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT (mg/cm ²)
169	11A	Billings Corridor, by Estroom	Gray	Door Case	Metal	I		169 0.03
170	170	E. Wall	↓	Door	Wood			170 0
171	171	↓	↓	Door Case	Metal			171 0
172	172	North Wall	Yellow	Wall Tile	Ceramic			172 0.01
173	173	South Wall	White	Wall	DW			173 0
174	174	E. Wall	Gray	Door	Metal			174 0
175	175	↓	↓	Door Case	↓			175 0.01
176	176	N. Wall	White	Wall	DW			176 0
177	177	S. Wall	Gray	Door Case	Metal			177 0
178	178	Tan	Door	↓				178 0.13
179	179	↓	↓	Door Case	↓			179 0.12
180	180	S. Side	Orange	Support Column	↓			180 1.5
181	181	S. Wall	White	Wall	Plaster			181 0
182	182	↓	↓	Dirt	↓			182 0.01
183	183	↓	↓	Elevating Platform	↓			183 0
184	184	S. Side	Orange	Support Column	↓			184 0.4
185	185	At Stair	Blue	Pipe	↓			185 0
186	186	Blue	Door	Wood				186 0.03
187	187	↓	↓	Door Case	Metal			187 0.13
188	188	↓	Tan	Wall	Plaster	NI		188 0.05

JOB# 19415

DATE: 10/16/19

NITON XLP 300
FIELD FORM

JOB NAME: VHE
ADDRESS: Arlington VA

TEST	ROOM	LOCATION	COLOR	COMPONENT	SUBSTRATE	CONDITION	COMMENTS	TEST NO./RESULT(mg/cm ²)
189	N. Side Boiler Room, Room	N. Side	yellow	Gas paper	Metal	I		189 0
190	Attic Area	by Awn	Gray	Support Column		I		190 2
191		W. Side	white	Electrical Panel		NI		191 0
192			Green	Tank Hanger		I	Tank Hanger	192 6
193				TANK		I		193 0.03
194	Lower Level Hallway	Exit door #19	Blue	Door Case		I		194 0.02
195		Exit door #13	Gray	Door Case		I		195 0.04
196		Exit door #11	Gray	Door Case		I		196 0
197		Exit door #11	Gray	Door Case		I		197 0
198	Lower Level, Kitchen		Gray	Door Case		I		198 0
199			Gray	Sink guard		I		199 0.01
200		N. Wall	Gray	Door Case		I		200 0
201		Exit door #10		Door Case		I		201 0.04
202		Exit door #17		Door Case		I		202 0.17
203	Stairway B	Exit door #20		Door Case		I		203 0.02
204		Exit door #20		Door Case		I		204 0.05
205	Boiler Level, By Locksmith Shop			Door Case		I		205 0.11
206				Door Case		I		206 0.14
207		Mech. Rm 1	Brown	Door		I		207 0
208		S. Side	Gray	Floor	Concrete	I		208 0

JOB# 19415

DATE: 6/16/19

APPENDIX C: PHOTOGRAPHS

Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019



Photo #1
Material: 12"x12" White Mottled Floor Tile
Sample Result: No Asbestos Detected

Photo #2
Material: Drywall Joint Compound
Sample Result: No Asbestos Detected



Photo #3
Material: Fissure Pinhole Ceiling Tile
Sample Result: No Asbestos Detected

Photo #4
Material: Mercury Thermostat
Sample Result: Not Sampled

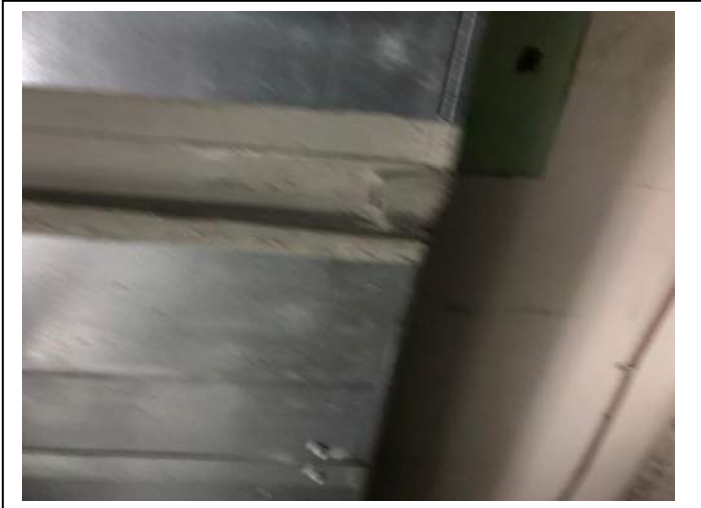
**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



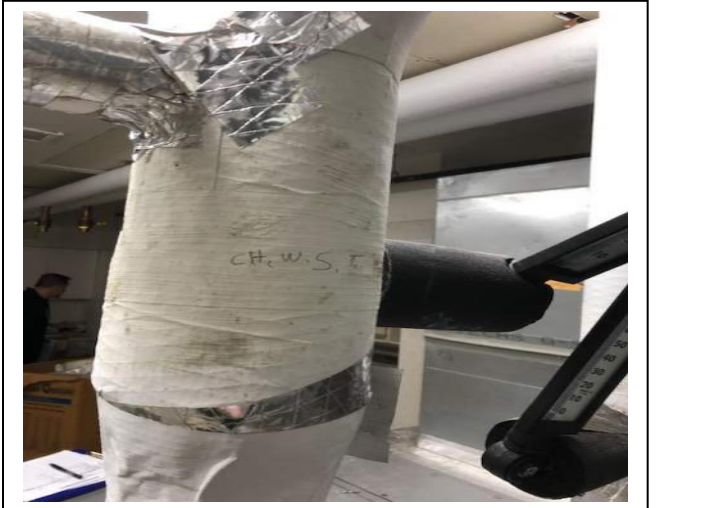
**Photo #5
Material: 12"x12" Tan Mottled Floor Tile
Sample Result: No Asbestos Detected**



**Photo #6
Material: Transite Fume Hood
Sample Result: Not Sampled**



**Photo #7
Material Gray Duct Seam Sealant
Sample Result: No Asbestos Detected**



**Photo #8
Material: White Pipe Seam Sealant
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #9
Material: Tan Baseboard Mastic
Sample Result: No Asbestos Detected**



**Photo #10
Material: 12"X12" White With Black Streaks
Sample Result: No Asbestos Detected**

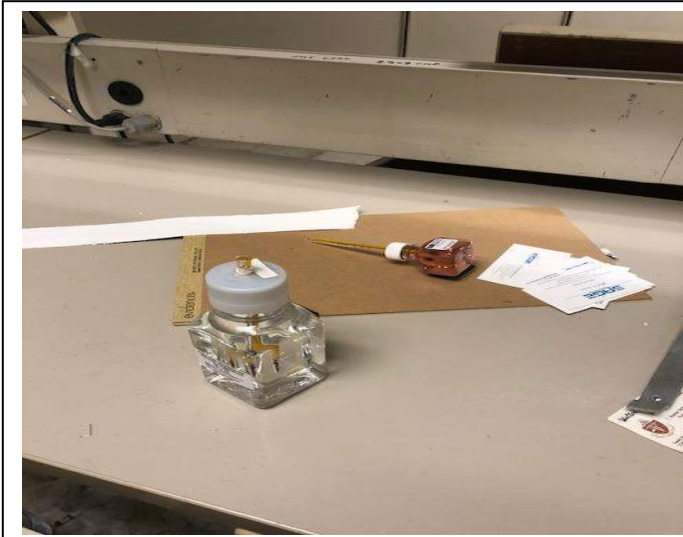


**Photo #11
Material: Sample Result: Brown Stair Tread
Mastic
Sample Result: No Asbestos Detected**



**Photo #12
Material: Brown Pin Mastic
Sample Result: 40% Chrysotile**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #13
Material: Mercury Thermometers
Sample Result: Not Sampled**



**Photo #14
Material: Brown Metal Duct Seam Sealant On
Metal
Sample Result: No Asbestos Detected**



**Photo #15
Material: 2'x4' small pinhole ceiling tile
Sample Result: No Asbestos Detected**



**Photo #16
Material: 2'x2' Rough Ceiling tile
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #17
Material: 12"x12" White With Red Specks
Floor Tile
Sample Result: No Asbestos Detected**



**Photo #18
Material: Green Canvas Duct
Sample Result: No Asbestos Detected**



**Photo #19
Material: White Pipe Seam Sealant (New)
Sample Result: No Asbestos Detected**

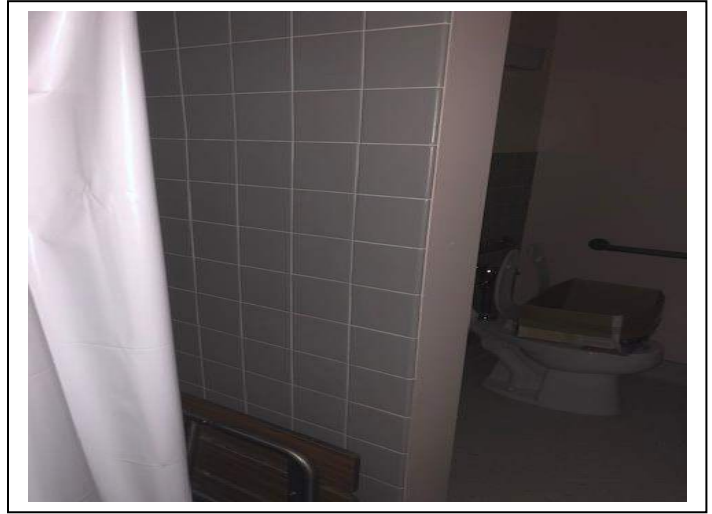


**Photo #20
Material: Linoleum Sheetting With Gray Mastic
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #21
Material: 2'x4' Smooth Ceiling Tile
Sample Result: No Asbestos Detected**



**Photo #22
Material: Ceramic Tile Grout
Sample Result: No Asbestos Detected**



**Photo #23
Material: Green Canvas Mudded Duct
Sample Result: No Asbestos Detected**

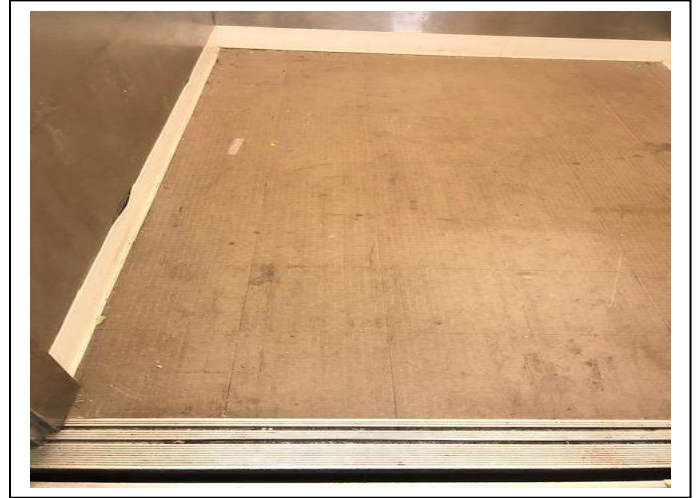


**Photo #24
Material: Spray Applied Fire Proofing
Sample Result: No Asbestos Detected**

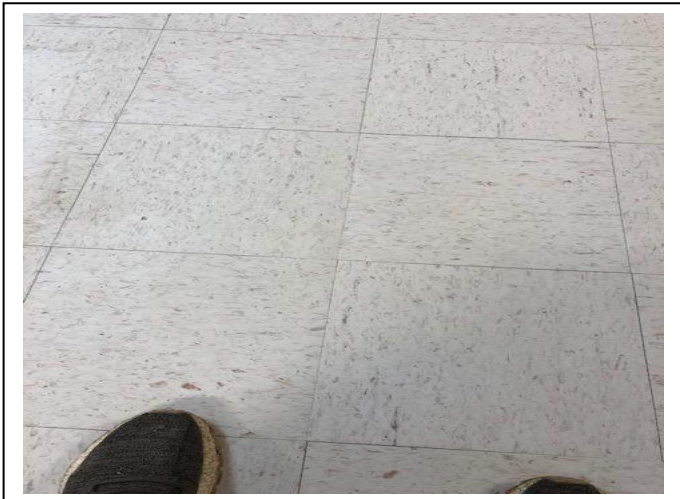
**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo # 25
Material: Muddied Fitting
Sample Result: 5% Chrysotile**



**Photo #26
Material 12"x12" Gray Square Floor Tile
Sample Result: No Asbestos Detected**



**Photo #27
Material: 12"x12" White with Brown Specks
Floor tile
Sample Result: No Asbestos Detected**



**Photo #28
Material: 12"x12" White With Black Specks
Floor Tile
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #29
Material: 12"x12" Gray Mottled Floor Tile
Sample Result: No Asbestos Detected**

**Photo #30
Material: Tan Duct Seam Sealant on Metal
Sample Result: No Asbestos Detected**



**Photo #31
Material: Rough Plaster
Sample Result: No Asbestos Detected**

**Photo #32
Material: White Pipe Seam Sealant (Old)
Sample location:**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #33
Material: End Cap Sealant (New)
Sample Result: No Asbestos Detected**



**Photo #34
Material: Green Canvas Tank
Sample Result: No Asbestos Detected**



**Photo #35
Material: 12"x12" White Floor Tile
Sample Result: No Asbestos Detected**



**Photo #36
Material: Black Floor Tile Mastic
Sample Result: 3-5% Chrysotile**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #37
Material: Cloth Vibration Dampner
Sample Result: No Asbestos Detected**



**Photo #38
Material: 12"x12" Pink Floor Tile
Sample location:**



**Photo #39
Material: Black Mastic On Fiberglass Insulation
Sample Result: 5% Chrysotile**



**Photo #40
Material: Transite Window Sill
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #41
Material: Smooth Plaster
Sample Result: No Asbestos Detected**



**Photo #42
Material: Tan Floor Tile Mastic
Sample Result: No Asbestos Detected**



**Photo #43
Material: Gray Metal Duct Seam Sealant
Sample Result: No Asbestos Detected**

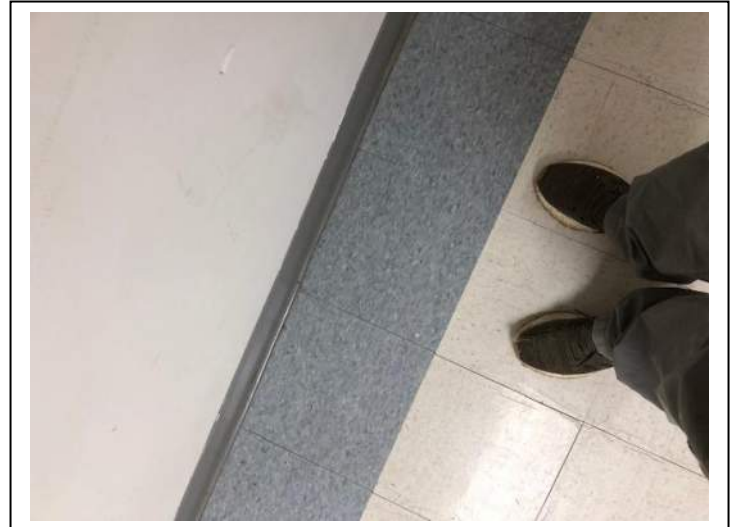


**Photo #44
Material: 12"x12" Pink Mottled Floor Tile
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #45
Material: Black Mastic Underneath Yellow
Carpet Mastic
Sample Result: 2% Chrysotile**



**Photo #46
Material: 12"x12" Blue Mottled Floor Tile
Sample Result: No Asbestos Detected**



**Photo #47
Material: 12"x12" Tan Floor Tile
Sample Result: No Asbestos Detected**



**Photo #48
Material: Tan Duct Seam Sealant on foil
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #49
Material: Tan Duct Seam Sealant On Metal
Sample Result: No Asbestos Detected**



**Photo #50
Material: Non-PCB Ballast
Sample Result: Not sampled**



**Photo #51
Material: 12"x12" White With Green Specks
Floor Tile
Sample Result: No Asbestos Detected**



**Photo #52
Material: 12"x12" White With Pink Specks
Floor Tile
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #53
Material: White Baseboard Mastic
Sample Result: No Asbestos Detected**



**Photo #54
Material: 12"x12" Green Mottled Floor Tile
Sample Result: No Asbestos Detected**



**Photo #55
Material: 12"x12" White With Gray Specks
Floor Tile
Sample Result: No Asbestos Detected**



**Photo #56
Material: White Duct Seam Sealant On Metal
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



Photo #57

**Material: White Duct Seam Sealant on Foil
Sample Result: No Asbestos Detected**

Photo #58

**Material: 12"x12" Red Mottled Floor Tile
Sample Result: No Asbestos Detected**



Photo #59

**Material: 12"x12" Cream Mottled Floor Tile
Sample Result: No Asbestos Detected**



Photo #60

**Material: Gray Sink Mastic
Sample Result: No Asbestos Detected**

Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019



Photo #61
Material: Smooth Pinhole Ceiling Tile
Sample Result: No Asbestos Detected

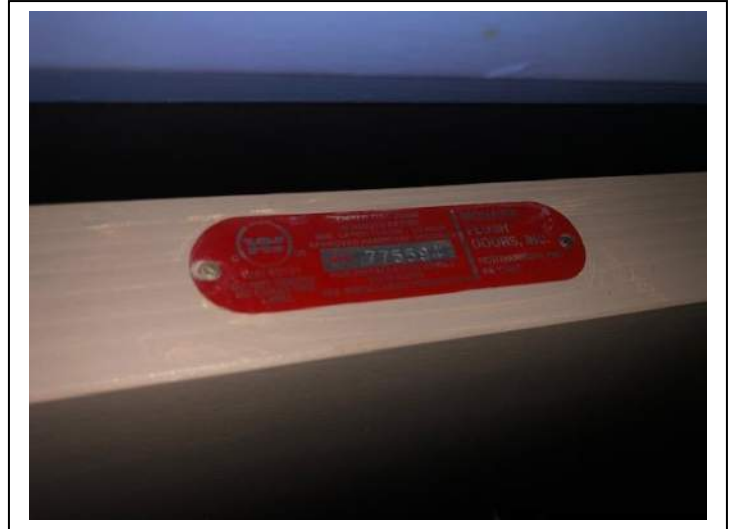


Photo #62
Material: Labeled Metal Fire Door
Sample Result: Assumed ACM



Photo #63
Material: Cratered Pinhole Ceiling Tile
Sample Result: No Asbestos Detected



Photo #64
Material: Black Mastic On Foil Duct
Sample Result: 5% Chrysotile

Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019



Photo #65
Material: Black Mastic On Canvas Duct
Sample Result: 5% Chrysotile



Photo #66
Material: Sink Trap
Sample Result: Potential Mercury



Photo #67
Material: Textured Ceiling Tile
Sample Result: No Asbestos Detected



Photo #68
Material: 12"x12" White with Black Specks
Sample Result: No Asbestos Detected

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #69
Material: Black Vapor Barrier
Sample Result: No Asbestos Detected**



**Photo #70
Material: 12"x12" Blue Mottled Floor Tile
Sample Result: No Asbestos Detected**



**Photo #71
Material: 12"x12" Dark Blue Mottled
Sample Result: No Asbestos Detected**



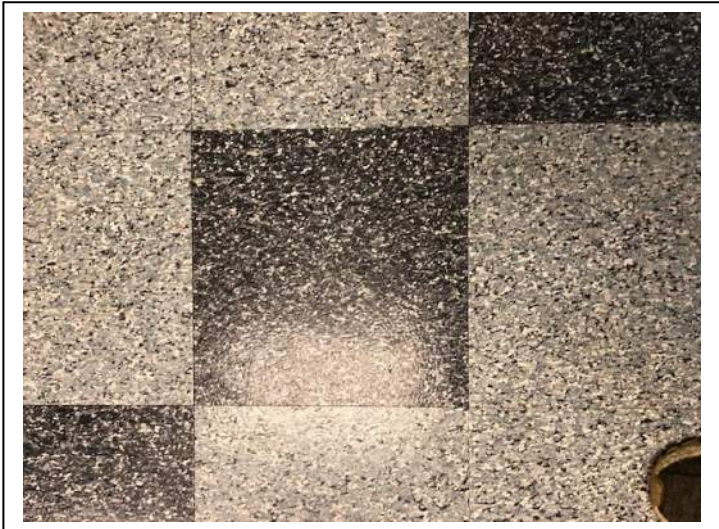
**Photo #72
Material: End Cap Sealant (Old)
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #73
Material: Yellow Carpet Mastic
Sample loc Sample Result: No Asbestos Detected**

**Photo #74
Material: Labeled Wooden Fire Door
Sample Result: Assumed ACM**

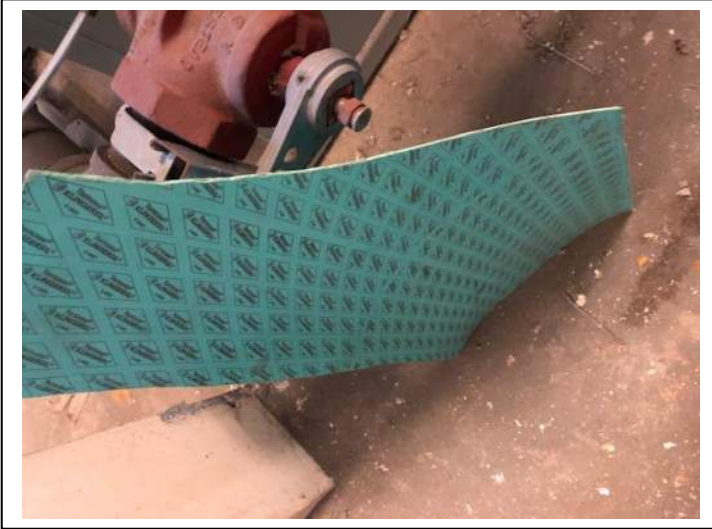


**Photo #75
Material: 12"x12" Black With White Specks
Floor Tile
Sample Result: No Asbestos Detected**



**Photo #76
Material: 12"x12" Blue Multi-Speck Floor Tile
Sample Result: No Asbestos Detected**

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



**Photo #77
Material: Flange Gasket Material
Sample Result: No Asbestos Detected**



**Photo #78
Material: Flange Gasket
Sample Result: No Asbestos Detected**



**Photo #79
Material: 12"x12" Pink Floor Tile
Sample Result: No Asbestos Detected**



**Photo #80
Material: Tan Light Mastic
Sample Result: No Asbestos Detected**

Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019



Photo #81
Material: Red Fire Stop
Sample Result: No Asbestos Detected



Photo #82
Material: Cement Paper Support
Sample Result: No Asbestos Detected



Photo #83
Material: Elevator Door Insulation
Sample Result: Assumed ACM



Photo #84
Material: Elevator Cab Insulation
Sample Result: Assumed ACM

**Photo Log
Arlington County
Virginia Hospital Center
601 S. Carlin Springs Road
Arlington, VA
October 2019**



Photo #85

**Material: White Duct Seam Sealant On Canvas
Sample Result: No Asbestos Detected**



Photo #86

**Material: Freezer Insulation
Sample Result: Assumed ACM**

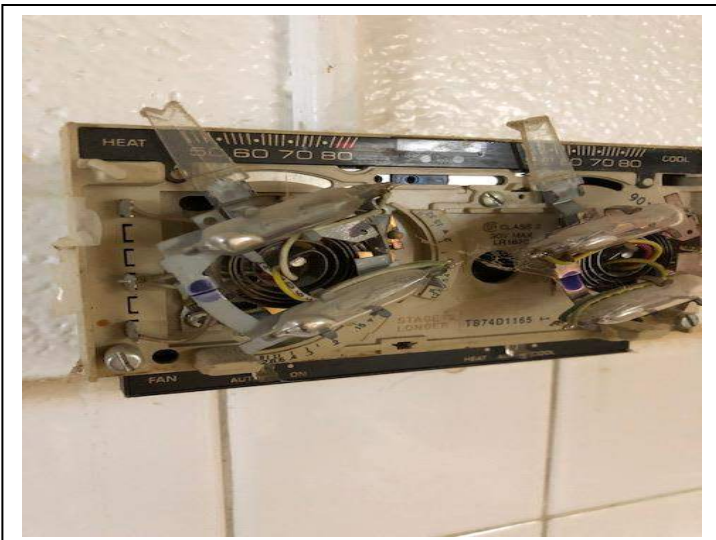


Photo #87

**Material: Mercury Tubes
Sample Result: Potential Mercury**

APPENDIX D: SITE DRAWINGS

HAZMAT KEY

ACM'S

- A. BLACK FLOOR TILE MASTIC
- B. BLACK MASTIC ON FIBERGLASS PIPE INSULATION
- C. BLACK MASTIC ON FOIL DUCT INSULATION
- D. BLACK MASTIC ON FIBERGLASS DUCT INSULATION
- E. MUDDIED FITTING INSULATION
- F. BROWN DUCT PIN MASTIC

ACM/ASSUMED PRESENT ABOVE FIXED CEILINGS

- G. MUDDIED FITTING INSULATION
- H. BLACK MASTIC ON DUCTS AND FIBERGLASS INSULATION

ACM/ ASSUMED PRESENT IN WET WALLS

- I. PIPE AND PIPE FITTING INSULATION

ACM/ ASSUMED PRESENT IN CRAWL SPACE

- J. PIPE AND PIPE FITTING INSULATION

ASSUMED ACM'S

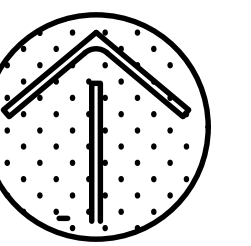
- K. METAL LABELED FIRE DOORS
- L. WOODEN LABELED FIRE DOORS
- M. ELEVATOR DOOR INSULATION
- N. ELEVATOR CAB INSULATION

LEAD BASED PAINT

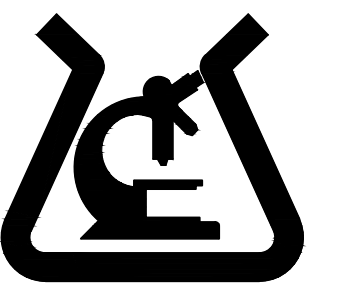
- O. METAL STAIRWELL COMPONENTS
- P. ORANGE I-BEAMS
- Q. WHITE/TAN CERAMIC WALL TILE
- R. GRAY WINDOW LINTEL
- S. ORANGE METAL SUPPORT COLUMNS
- T. BEIGE EXIT DOOR
- U. GREEN TANK HANGARS

OTHER

- V. PCB BALLAST
- W. MERCURY VAPOR LAMPS
- X. MERCURY THERMOSTATS
- Y. MERCURY THERMOMETERS
- Z. SINK TRAPS



CONSULTANTS:



AEROSOL MONITORING
& ANALYSIS, INC.
1331 ASHTON ROAD, P.O. BOX 646
HANOVER, MARYLAND 21076
WEBSITE: WWW.AMACONSULTING.COM
PHONE: 410-684-3327
FAX: 410-684-3384

PROJECT:

Virginia HOSPITAL CENTER
601 S. CARLIN SPRINGS ROAD
ARLINGTON, VA
hAZMAT

PROJ. NO: 19415
DATE: 10/24/2019
SCALE: NOT TO SCALE
REVISION:

hAZMAT
KEY

SHEET NO. ___ OF ___

KEY



○ – AMA AREA DESIGNATION



CONSULTANTS:



PROJECT:

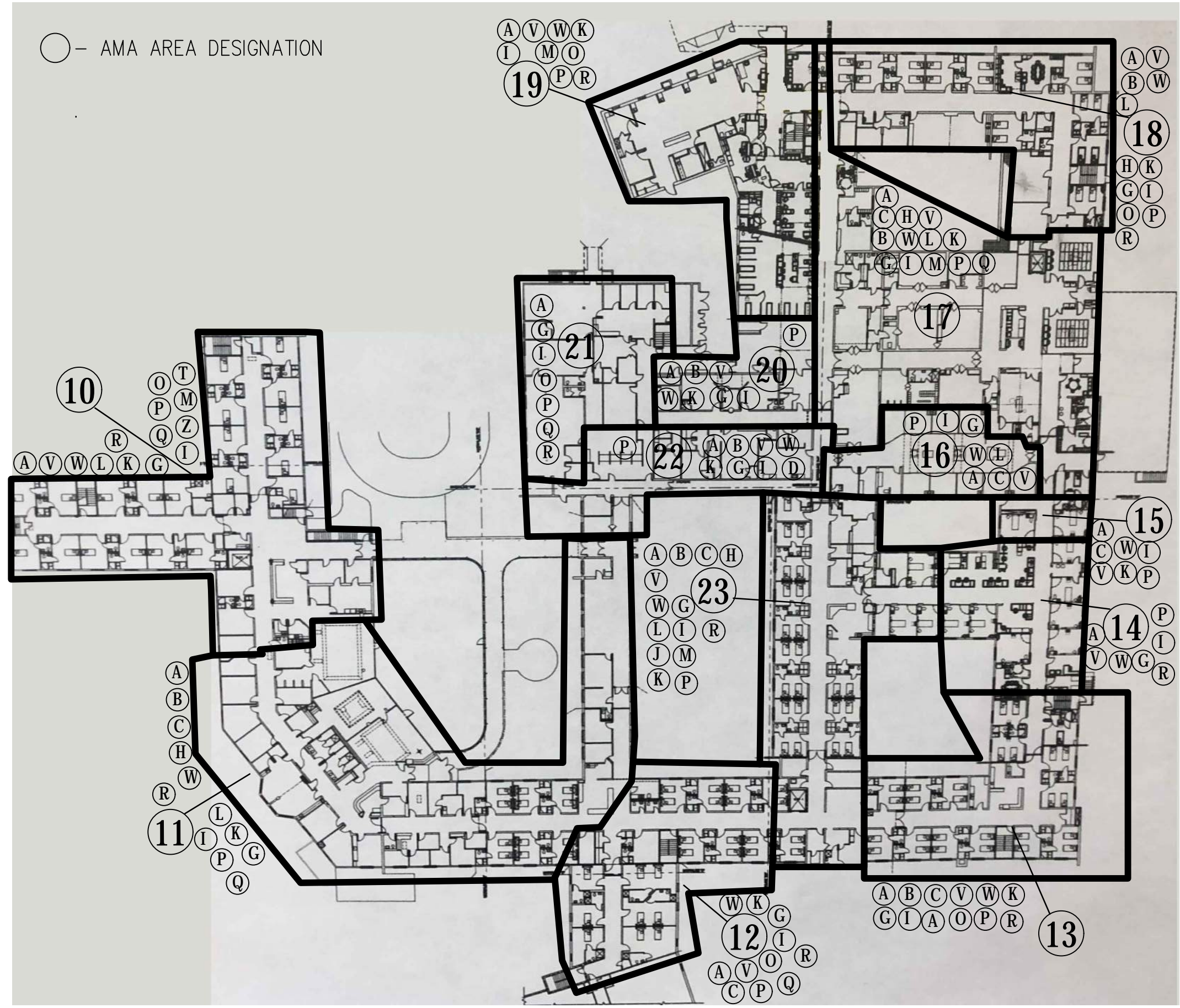
Virginia HOSPITAL CENTER
601 S. CARLIN SPRINGS ROAD
ARLINGTON, VA
hAZMAT

PROJ. NO.:	19415
DATE:	10/24/2019
SCALE:	NOT TO SCALE
REVISION:	

hAZMAT
PLAN

SHEET NO. ___ OF ___
hAZ1

○ - AMA AREA DESIGNATION



CONSULTANTS:



AEROSOL MONITORING
& ANALYSIS, INC.
1331 ASHTON ROAD, P.O. BOX 648
HANOVER, MARYLAND 21078
WEBSITE: WWW.AMAONLINE.COM
PHONE: 410-884-3327
FAX: 410-884-3384

PROJECT:

Virginia HOSPITAL CENTER
601 S. CARLIN SPRINGS ROAD
ARLINGTON, VA
hAZMAT

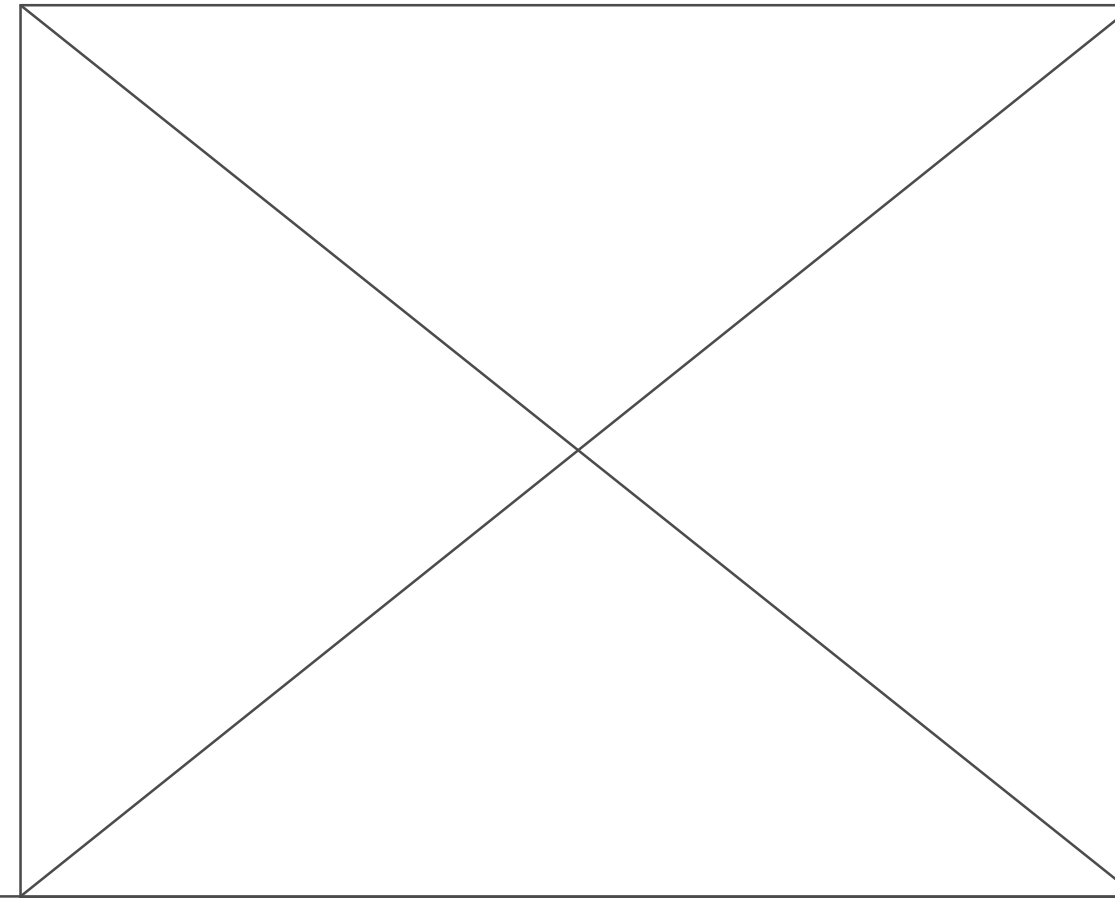
PROJ. NO: 19415
DATE: 10/24/2019
SCALE: NOT TO SCALE
REVISION:

hAZMAT PLAN

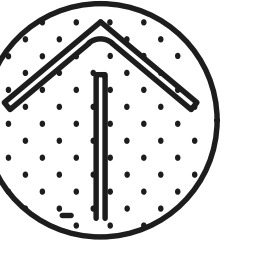
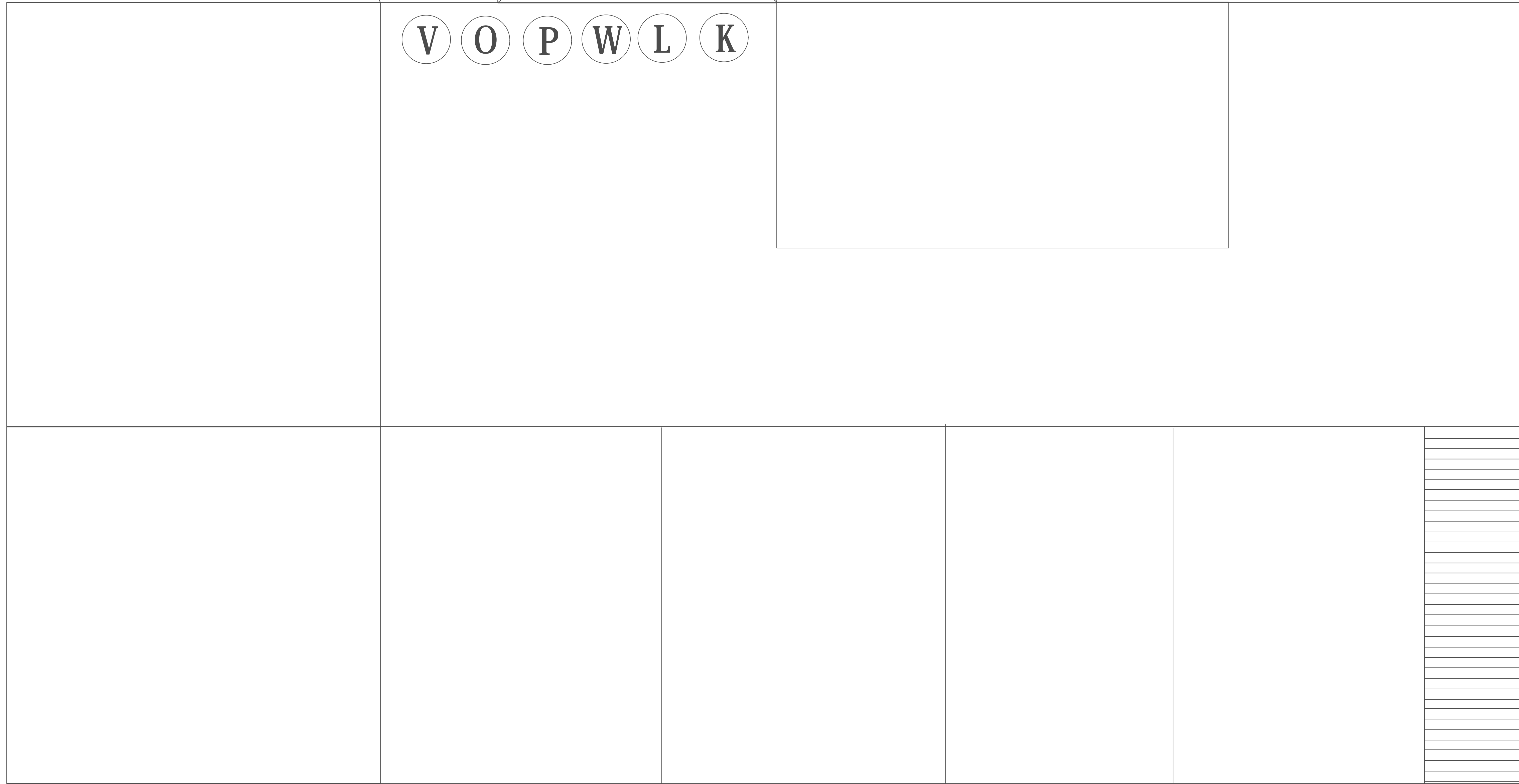
SHEET NO. ___ OF ___
hAZ2

AMA AREA DESIGNATION

09



V O P W L K



CONSULTANTS:



AEROSOL MONITORING & ANALYSIS, INC.
 1331 ASHTON ROAD, P.O. BOX 646
 HANOVER, MARYLAND 21076
 WEBSITE: WWW.AMACONSULTING.COM
 PHONE: 410-684-3327
 FAX: 410-684-3384

PROJECT:

Virginia HOSPITAL CENTER
 601 S. CARLIN SPRINGS ROAD
 ARLINGTON, VA
 hAZMAT

PROJ. NO: 19415
 DATE: 10/24/2019
 SCALE: NOT TO SCALE
 REVISION:

hAZMAT
 PLAN

SHEET NO. ___ OF ___
 hAZ3

APPENDIX E: CERTIFICATIONS/ LICENSES

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that

BRYAN SMALLS

has met the attendance requirements and successfully completed
the course entitled

3-DAY EPA ASBESTOS INSPECTOR

07/15/2019 to 07/17/2019

Course Date

07/17/2019

Exam Date

7/17/2020

Expiration Date

DAN TWILLEY

Principal Instructor

AJ07152019-14

Certification No.



E. Rush Barnett

Course Director

1331 Ashton Road

P.O. Box 646

Hanover, MD 21076

P: 410-684-3327

F: 410-684-3724

www.amatraining.com

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that
ERIC HRUSKA

has met the attendance requirements and successfully completed
the course entitled

3-DAY EPA ASBESTOS INSPECTOR

08/12/2019 to 08/14/2019

Course Date

08/14/2019

Exam Date

8/14/2020

Expiration Date

STEVE STERACKI

Principal Instructor

Steve Steracki

AI08122019-5

Certification No.

E. Rush Barnett

Course Director

E. Rush Barnett

1331 Ashton Road

P.O. Box 646

Hanover, MD 21076

P: 410-684-3327

F: 410-684-3724

www.amatraining.com



Asbestos License

Bryan Smalls
Name

Signature

Inspector Initial
Course Title

19024781



Course Date: 07/15/2019

Exp Date: 07/17/2020

Exam Date: 09/19/2019

STATE OF MARYLAND

Asbestos License



Eric Hruska
Name

Signature

Inspector Initial
Course Title



Course Date: 08/12/2019
Exp Date: 08/14/2020
Exam Date: 10/01/2019

19025231

STATE OF MARYLAND

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that

DAVIDETTA MAH

has met the attendance requirements and successfully completed
the course entitled

4-HOUR EPA ASBESTOS INSPECTOR REFRESHER

For Accreditation Under TSCA Title II

09/27/2019

Course Date

09/27/2019

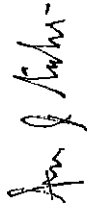
Exam Date

9/27/2020

Expiration Date

STEVE SIERACKI

Principal Instructor



AIR09272019-8

Certification No.

VAAIR09272019-8

Virginia Certification No.

E. Rush Barnett

Course Director



1331 Ashton Road

P.O.Box 646

Hanover, MD 21076

P: 410-684-3327

F: 410-684-3724

www.amatraining.com



Asbestos License

Robert Bentz
Name

Signature

Inspector Review
Course Title



Course Date: 07/22/2019

Exp Date: 07/22/2020

Exam Date: 08/08/2019

19021171

STATE OF MARYLAND

MARYLAND LEAD PAINT TRAINING

NAME BRYAN SMALLS

DOB 5 / 6 92

CLASS CODE IT

PROVIDER'S NAME AMA

EXPIRATION DATE 7 / 24 / 21

[Signature] 01

TRAINER'S SIGNATURE NUMBER

[Signature]
CARDHOLDER'S SIGNATURE

STATE OF MARYLAND CARD#



NOTE: This is not proof of accreditation

107788

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that

RONALD STALLARD

644 TANGLEWOOD DRIVE
ELDERSBURG, MD 21784

has met the attendance requirements and successfully completed
the course entitled

1-DAY LEAD INSPECTOR REFRESHER

This Training Meets the Certification Requirements for DC, MD & VA

05/09/2019

Course Date

05/09/2019

Exam Date

5/9/2021

MD Expiration Date

5/9/2022

VA Expiration Date

5/9/2021

DC Expiration Date

RUSH BARNETT

Principal Instructor

E. Karl Barnett

107431

Certification No.

VA107431

VA Certification No.

107431

DC Certification No.

E. Rush Barnett

Course Director

E. Karl Barnett

DC Lead Training Provider Accreditation No. DC18-001-1-R

1331 Ashton Road

P.O. Box 646

Hanover, MD 21076

P: 410-684-3327

F: 410-684-3724

www.amatrainig.com

MARYLAND LEAD PAINT TRAINING

NAME RONALD STALLARD

DOB 7 / 10 / 84

CLASS CODE ITR

PROVIDER'S NAME AMA

EXPIRATION DATE 5 / 9 / 21

TRAINER'S SIGNATURE [Signature] NUMBER 01

CARDHOLDER'S SIGNATURE [Signature]
STATE OF MARYLAND

NOTE: This is not proof of accreditation

CARD# **107431**

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that
ROBERT BENTZ

414 HILLVIEW DR
APT 103
LINTHICUM, MD 21090

has met the attendance requirements and successfully completed
the course entitled

1-DAY LEAD INSPECTOR REFRESHER

This Training Meets the Certification Requirements for DC, MD & VA

<u>07/08/2019</u> Course Date	<u>07/08/2019</u> Exam Date		<u>E. Rush Barnett</u>
<u>7/8/2021</u> MD Expiration Date	<u>7/8/2022</u> VA Expiration Date	<u>7/8/2021</u> DC Expiration Date	<u>RUSH BARNETT</u> Principal Instructor
<u>107791</u> Certification No.	<u>VA107791</u> VA Certification No.	<u>107791</u> DC Certification No.	<u>E. Rush Barnett</u> Course Director

DC Lead Training Provider Accreditation No. DC18-001-I-R

1331 Ashton Road

P.O.Box 646

Hanover, MD 21076

P: 410-684-3327

F: 410-684-3724

www.amatraining.com

MARYLAND LEAD PAINT TRAINING

NAME ROBERT BENTZ

DOB 4 / 6 / 93

CLASS CODE ITR

PROVIDER'S NAME AMA

EXPIRATION DATE 7 / 8 / 21

[Signature] 01

TRAINER'S SIGNATURE NUMBER

[Signature]

CARDHOLDER'S SIGNATURE

STATE OF MARYLAND



NOTE: This is not proof of accreditation

CARD# **107791**

MARYLAND LEAD PAINT TRAINING

NAME BRYAN SMALLS

DOB 5 / 6 / 92

CLASS CODE RA

PROVIDER'S NAME AMA

EXPIRATION DATE 7 / 26 / 21

TRAINER'S SIGNATURE _____ NUMBER 01

CARDHOLDER'S SIGNATURE _____ STATE OF MARYLAND CARD#



NOTE: This is not proof of accreditation

107837

THIS IS TO CERTIFY THAT
Ronald Allen Stallard

HAS MET THE LEAD PAINT SERVICES
ACCREDITATION REQUIREMENTS FOR

Inspector Technician

EXPIRATION DATE 06 15 2020

**Aerosol Monitoring & Analysis,
Inc.**

TRAINING PROVIDER

COURSE DATE 05 03 2017


**ADMINISTRATOR, LEAD PAINT ACCREDITATION
MARYLAND DEPARTMENT OF THE ENVIRONMENT**

7/27/18
DATE

STATE OF MARYLAND

Certificate # 4357

Application for reaccreditation shall be submitted to MDE 60 days prior to accreditation expiration indicated on this certificate.

THIS IS TO CERTIFY THAT
Robert John Bentz, III

HAS MET THE LEAD PAINT SERVICES
ACCREDITATION REQUIREMENTS FOR

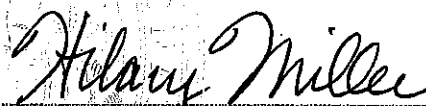
Inspector Technician

EXPIRATION DATE 12 07 2019

**Aerosol Monitoring & Analysis,
Inc.**

TRAINING PROVIDER

COURSE DATE 09 25 2017



ADMINISTRATOR, LEAD PAINT ACCREDITATION
MARYLAND DEPARTMENT OF THE ENVIRONMENT

12/8/19
DATE

STATE OF MARYLAND

Certificate # 16742

Application for reaccreditation shall be submitted to MDE 60 days prior to accreditation expiration indicated on this certificate.

COMMONWEALTH of VIRGINIA

Department of Professional and Occupational Regulation

9960 Mayland Drive, Suite 400, Richmond, VA 23233

Telephone: (804) 367-8500

EXPIRES ON

06-30-2020

NUMBER

3303004402

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
ASBESTOS INSPECTOR LICENSE



ROBERT JOHN BENTZ III
414 HILLVIEW DR
APT. 103
LINTHICUM, MD 21090



Mely Broc-Vaughan
Mely Broc-Vaughan, Acting Director

Status can be verified at <http://www.dpor.virginia.gov>

(SEE REVERSE SIDE FOR PRIVILEGES AND INSTRUCTIONS)

DPOR-LIC (02/2017)

(DETACH HERE)



BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
ASBESTOS INSPECTOR LICENSE

NUMBER: 3303004402 EXPIRES: 06-30-2020

ROBERT JOHN BENTZ III
414 HILLVIEW DR
APT. 103
LINTHICUM, MD 21090



(FOLD)

Status can be verified at <http://www.dpor.virginia.gov>

DPOR-PC (02/2017)

COMMONWEALTH of VIRGINIA

Department of Professional and Occupational Regulation

9960 Mayland Drive, Suite 400, Richmond, VA 23233

Telephone: (804) 367-8500

EXPIRES ON
09-30-2020

NUMBER
3355000491

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
LEAD INSPECTOR LICENSE



RONALD ALLEN STALLARD
644 TANGLEWOOD DRIVE
ELDERSBURG, MD 21784-0000



Mary Brock Vaughn
Mary Brock Vaughn, Acting Director

Status can be verified at <http://www.dpor.virginia.gov>

(SEE REVERSE SIDE FOR PRIVILEGES AND INSTRUCTIONS)

DPOR-LIC (02/2017)

(DETACH HERE)

DPOR COMMONWEALTH of VIRGINIA
Department of Professional and Occupational Regulation

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
LEAD INSPECTOR LICENSE
NUMBER: 3355000491 EXPIRES: 09-30-2020

RONALD ALLEN STALLARD
644 TANGLEWOOD DRIVE
ELDERSBURG, MD 21784-0000



(FOLD)

Status can be verified at <http://www.dpor.virginia.gov>

DPOR-PC (02/2017)

SECTION 011100 - SUMMARY OF WORK**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Furnish all labor, new materials, tools, equipment, supplies and services for all work as indicated, in accordance with provisions of the Contract Documents.
- B. Although such work is not specifically indicated, furnish and install all supplementary, miscellaneous, incidental items, tests and inspections, appurtenances and devices incidental to, or necessary for, a sound, secure and complete installation.
- C. The Work shall be complete, and all work, materials, and services not expressly called for in the Specifications which may be necessary for complete and proper construction to carry out the Contract in good faith, shall be performed, furnished, and installed by the Contractor at no additional cost to the Owner. Qualified, careful and experienced workers shall execute the Work in the best and most workmanlike manner.

1.2 SUMMARY OF WORK

- A. This project is the first phase of a two-phase demolition of the Virginia Hospital Center. The VHC hospital complex is located at 601 S Carlin Springs Road and consists of a two-story, 163,000 sf building. The adjacent 5 story medical office building located at 611 S Carlin Springs Road is connected at the parcel boundary with an egress stair tower shared between the two structures. The two structures align with the Hospital Center floor levels aligned with the fourth and fifth floors of the Medical Office Building. Phase 1 of the project includes demolition of select portions of the Hospital Center in order to separate it from the adjacent Doctor's Office Building, and renovation of the Doctor's Office Building where impacted by the demolition. Phase 2 includes the demolition of the remainder of the 2-story hospital and will be performed under a separate contract.
- B. The summary of Work described herein is an overall summary of the responsibilities of the Contractor and his relation to the Owner. It does not supersede the specific requirements of the Contract Documents.

1.3 WORK SITE INSPECTION

- A. The Contractor is responsible for examination of the work site and a thorough acquaintance with the details and requirements of the Contract Documents including obstacles likely to be encountered in the performance and completion of the Work. No allowance will be made, subsequent to completion of the bidding process, for any error or negligence, inadvertent or otherwise, on the part of the Contractor, for failure to comply with documented contract requirements.

1.4 PROJECT INFORMATION

- A. **Project Identification:** Virginia Hospital Center Demolition
- B. **Project Location:**
 - a. Hospital: 601 South Carlin Springs Road, Arlington, Virginia 22204
 - b. Doctor's Office Building: 611 South Carlin Springs Road, Arlington, Virginia 22204
- C. **Owner:**
Arlington County, Facilities Design & Construction
1400 N Uhle St.
Arlington, VA 22201

P: 703.228.4509

D. Architect:

RRMM Architects, PC
2900 South Quincy Street, Suite 710
Arlington, VA 22206
P: 703.998.0101

E. Civil Engineer:

AMT ENGINEERING
800 King Farm Blvd.
Rockville, MD, 20850
P: 301.881.2545

F. MEPS Engineers:

GPI Engineering
8001 Braddock Road, Suite 200
Springfield, VA 22151
P: 703.978.0100

1.5 CONTRACTOR'S USE OF SITE

A. Use of Site:

- a. Phase 1 - Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as required for access to the area of Work.
 - b. Phase 2 - Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Condition of Existing Building:** Maintain portions of existing buildings affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.6 COORDINATION WITH OCCUPANTS

- A. Occupancy: The existing adjacent Doctor's Office Building will be fully occupied for the duration of the Project. Cooperate with building occupants during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with day-to-day operations. Maintain existing exits and all life safety systems unless otherwise indicated.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from owner and approval of authorities having jurisdiction.
- C. Notify owner not less than 72 hours in advance of activities that will affect owner's operations.

1.7 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - a. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.

- C. Existing Utility Interruptions: Do not interrupt utilities serving occupied facilities unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
- D. Notify Owner not less than seven days in advance of proposed utility interruptions.
- E. Obtain Owner's written permission before proceeding with utility interruptions.
- F. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to occupied building with owner.
- G. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Project site is not permitted.
- H. Employee Screening: Comply with Owner's requirements for drug screening of Contractor personnel working on Project site.
- I. Contractor is responsible for examination of the work site and a thorough acquaintance with the details and requirements of the Contract Documents including obstacles likely to be encountered in the performance and completion of the Work. No allowance will be made, subsequent to completion of the bidding process, for any error or negligence, inadvertent or otherwise, on the part of the Contractor, for failure to comply with documented contract requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 011100

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue [**through Construction Manager**] supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on [**AIA Document G710**] [**form included in Project Manual**] [**web-based Project management software**].

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: [**Architect**] [**Construction Manager**] will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by [**Architect**] [**Construction Manager**] are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within [**time specified in Proposal Request**] [**or**] [**20 days, when not otherwise specified,**] < **Insert number of days** > after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times,

and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use **[forms provided by Owner. Sample copies are included in Project Manual] [forms acceptable to Architect] [form provided as part of web-based Project management software]**.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to **[Architect] [Construction Manager]**.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use **[form provided by Owner. Sample copy is included in Project Manual] [form acceptable to Architect] [form provided as part of web-based Project management software]**.
- 1.5 ADMINISTRATIVE CHANGE ORDERS
- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
 - B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.
- 1.6 CHANGE ORDER PROCEDURES
- A. On Owner's approval of a Work Change Proposal Request, **[Architect] [Construction Manager]** will issue a Change Order for signatures of Owner and Contractor on **[AIA Document G701] [AIA Document G701CMa] [form included in Project Manual] [form provided as part of web-based Project management software]**.
- 1.7 CONSTRUCTION CHANGE DIRECTIVE
- A. Construction Change Directive: **[Architect] [Construction Manager]** may issue a Construction Change Directive on **[AIA Document G714] [AIA Document G714CMa] [form included in Project Manual] [form provided as part of web-based Project management software]**. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.8 WORK CHANGE DIRECTIVE

- A. Work Change Directive: **[Architect] [Construction Manager]** may issue a Work Change Directive on **[EJCDC Document C-940] [form included in Project Manual] [form provided as part of web-based Project management software]**. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
 - 1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.
- B. The Contractor's Construction Schedule and Submittal Schedule are included in Section "Submittals".

1.3 SCHEDULE OF VALUES

- A. The General Contractor shall coordinate preparation of its Schedule of Values for its part of the Work with preparation of the Contractors' Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's construction schedule.
 - b. Application of Payment form.
 - c. List of subcontractors.
 - d. List of products.
 - e. List of principal's suppliers and fabricators.
 - f. Schedule of submittals.
 - 2. Submit the Schedule of Values to the Project Officer at the earliest feasible date, but in no case later than 7 days before the date scheduled for submittal of the initial Application for Payment.
- B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values. Also include all items shown on the drawings but not included in a particular specification section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed; provide a line item and schedule value for each

specification section at a minimum. Where the architect requests that a line item be broken down into further subcategories the contractor shall comply

- a. Generic name.
 - b. Related Specification Section.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that have affected value.
 - g. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
 4. Round amounts off to the nearest whole dollar; the total shall equal the Contract sum.
 5. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 6. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
 - a. At the Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense.
 7. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT:

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Construction Manager and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application or Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA G-702 - Latest Edition.
- D. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction

- Schedule. Use updated schedules if revisions have been made.
2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Please submit five (5) completed copies of the AIA G-702, Schedule of Values and Certificate of Payment. These forms may be xeroxed but the signatures of the Contractor's representative must be original. Page 2 of the Schedule of Values should be complete and, if applicable, the original signatures of the architect/engineer should be obtained before the schedule is submitted to the Owner.
- F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment (within 30 days of Notice to Proceed) include the following:
1. List of subcontractors.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values.
 4. Contractor's Construction Schedule (90-day) detailed-Schematic of Balance.
 5. Schedule of principal products.
 6. Schedule of unit prices.
 7. Submittal Schedule. (preliminary, if not final).
 8. List of Contractor's staff assignments and their resumes
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from governing authorities for performance of the Work.
 12. Initial progress report.
 13. Report of pre-construction meeting.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
 17. Initial settlement survey and damage report.
- H. Second Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the second Application for Payment (within 45 to 60 days of Notice to Proceed).
1. Detailed CPM Schedule for entire project.
- I. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portion of the Work.
- J. Administrative actions and submittals that shall proceed or coincide with this application include:
1. Occupancy permits and similar approvals.
 2. Warranties, guarantees, and maintenance agreements.
 3. Test/adjust/balance records.
 4. Maintenance instructions.
 5. Meter readings.
 6. Start-up performance reports.
 7. Change-over information related to Owner's occupancy, use, operation and maintenance.

8. Final Cleaning.
 9. Application for reduction of retainage, and consent of surety.
 10. Advice on shifting insurance coverages.
 11. Final progress photographs.
 12. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- K. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Assurance that unsettled claims will be settled.
 4. Assurance that Work not complete and accepted will be completed without undue delay.
 5. Transmittal of required Project construction records to Owner.
 6. Certified property survey.
 7. Proof that taxes, fees and similar obligations have been paid.
 8. Removal of temporary facilities and services.
 9. Removal of surplus materials, rubbish and similar elements.
 10. Change of door locks to Owner's access.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012900

SECTION 013000 – SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;
 - 1. Contractor's construction schedule
 - 2. Submittal schedule
 - 3. Project Submittals (Product Data, Shop Drawings, Samples, etc.)
 - 4. Daily Construction Reports
 - 5. Administrative Submittals: Refer to other Division-1 Section 010201 and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
 - a. Permits.
 - b. Performance and Payment Bonds
 - c. Insurance Certificates
 - d. List of Subcontractors
- B. The Schedule of Values submittal is included in Section 012900 "Applications for Payment."

1.3 SUBMITTAL PROCEDURES

- A. Coordinate preparation and processing of submittals with the order of construction activities. Upload and transmit each submittal via e-mail sufficiently in advance of the performance of related construction activities to avoid construction delays. Timely submission of submittals shall be a condition for approval of all progress payments to the Contractor. All submittals required by Divisions 1-33 shall comply with the requirements of Division 1 including, but not limited to:
 - 1. Schedule of Values
 - 2. Project schedule and updates
 - 3. Major subcontractors and suppliers' milestones
 - 4. Submittal schedule
- B. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
- C. Coordinate submission of separate submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
- D. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- E. Processing:

1. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals
 2. Allow fifteen (15) working days, exclusive of transit time, for initial review. Allow additional time if processing must be delayed permitting coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 3. If subsequent submittals are necessary, process the same as the initial submittal.
 4. Allow three weeks for reprocessing each submittal
 5. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- F. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. See General Conditions for information on label.
- G. Submittal Transmittal:
1. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect via e-mail using a transmittal form. Each submittal must have a separate transmittal form. Multiple submittals received on one transmittal form will be returned unreviewed. All submittals not in accordance with the requirements of this section will be immediately returned "Not Reviewed". Submittals received from sources other than the Contractor will be returned without action.
 2. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
 3. Substitutions must be clearly identified on submittal.
- H. Submittal Timeline Requirements: The contractor shall transmit all submittals to the architect within ninety (90) calendar days after the issuance of the Notice to Proceed. The Owner shall have the right to withhold progress payments until all submittals are made.
- I. Electronic (CAD) Files
1. The Architect will make electronic (CAD) files of the drawings available to the contractor under the following conditions:
 - a. The contractor shall sign and abide by the architect's Graphic Files Agreement. A copy of the agreement will be provided to the contractor upon request.
 - b. The contractor shall pay the architect for the files as follows:
 1. The cost of preparing the CADD files for use by the Contractor requires that the Architect charge a nominal fee for their use. The following schedule is to be used to provide the Contractor with copies in one of two electronic formats:

1 to 10 drawings	\$200.00 set-up charge + \$25 per drawing
------------------	---

10 to 100 drawings \$500.00 set-up charge + \$10 per drawing
 101 to 500 drawings \$1,000.00 set-up charge + \$5 per drawing

2. The cost of converting the CADD files from .dwg (native AutoCAD) to .dxf for use with other drafting programs is as follows:

1 to 500 drawings \$200.00 set-up charge + \$5 per drawing

3. The cost of providing electronic file media, based on estimated cost of the media, is as follows:

CD \$200.00 set-up charge + \$50 / CD

1.4 SUBMITTAL NAMING/NUMBERING CONVENTION

A. The following submittal naming and numbering convention shall be followed for all Contractor submittals. Using Section 033000, "Cast-In-Place Concrete" as the example, the submittal number, 033000-01-01 would be defined as follows:

6-digit spec. section #	2-digit Sequential #	2-digit iteration
033000	01	01

B. The first six-digit field refers to the specification section for the product, in this case, 'Concrete'. The second 2-digit field is to indicate the sequential submittal #. In this particular example, the submittal is for the first submittal of division 03300 to be transmitted. The final 2-digit iteration field is to identify successive reviews of the same submittal, i.e. 01 = first submittal, 02 = second, etc. Contractor submittals are to follow this naming convention for submittals called for by the individual Specification sections. The specification submittal types are defined in the following paragraphs.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. See Section 013200 Construction Schedule for submittal requirements.

1.6 SUBMITTAL SCHEDULE

A. A preliminary submittal schedule is to be submitted 15 days after the Notice of Award.

B. After the acceptance of the Contractor's construction schedule, prepare a final submittal schedule to be submitted with the CPM 30 days after Notice to Proceed. The final schedule will be subject to review by the Architect.

C. Distribution: Following response to initial submittal, print and distribute copies to the Architect, Owner and subcontractors.

1.7 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report, recording the following information concerning events at the site; Keep the daily construction reports in a binder in the project trailer and make available to the owner / architect when requested:

1. List of subcontractors at the site.
2. Approximate count of personnel at the site.
3. High and low temperatures, general weather conditions.
4. Accidents and unusual events.

5. Meetings and significant decisions.
6. Stoppages, delays, shortages losses
7. Meter readings and similar recordings.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change orders received, implemented.
11. Services connected, disconnected.
12. Equipment or system tests and start-ups.
13. Partial completions, occupancies.
13. Substantial completions authorized.

1.8 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered to be a Shop Drawing.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
 1. Dimensions.
 2. Identification of products and materials included.
 3. Compliance with specified standards. Notation of dimensions established by field measurement.
- C. Submittal:
 1. Submit one PDF file for the architect's review. If the PDF is illegible, the entire submittal will be returned unchecked. The re-submittal will have the same review time as the contractor's original submittal. Once the architect has reviewed the submittal and all corrective actions have been made by the contractor the contractor shall submit 2 printed copies of the submittal to Fairfax County for their records.
 2. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.9 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
- B. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information.
 1. Manufacturer's printed recommendations.
 2. Compliance with recognized trade association standards.
 3. Application of testing agency labels and seals.
 4. Notation of dimensions verified by field measurement.

- C. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- D. Environmental Requirement Verification: Submit verification (i.e. manufacturer's letter of certification, highlighted product information, independent test reports, etc...) as required by each specification section.
- E. Material Safety and Data Sheets
 - 1. Provide MSDS (Material Safety and Data Sheets) for all products submitted and used on the project.
 - 2. Provide and highlight VOC information on all MSDS sheets and identify compliance with requirements.

1.10 SUBMITTALS:

- A. Submit as required by 1.8.C above.
- B. Distribution: Furnish copies of final submittal to installers, subcontractors, and suppliers required for performance of construction activities. Show distribution on transmittal forms.
- C. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
- D. Do not permit use of unmarked copies of Product Data in connection with construction.

1.11 ARCHITECT'S ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.
- B. Compliance with specified characteristics is the Contractor's responsibility.
- C. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
 - 1. Where submittals are marked "Reviewed," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 - 2. When submittals are marked "Furnish as Corrected, " that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 - 3. When submittal is marked "Revise and Resubmit" or "Rejected," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
- 3. Do not permit submittals marked "Rejected, Revise and Resubmit" to be used at the Project site, or

elsewhere where Work is in progress.

4. Re-submittals: All re-submittals shall have the same review times as the contractor's initial submittal.

1.12 SUBMITTAL REQUIREMENTS FOR COMMISSIONING

A. Data for Commissioning.

1. The Contractor will receive a written request from the Commissioning Authority requesting specific information needed about each piece of commissioned equipment or system.
2. Typically, this will include detailed manufacturer installation and start-up, operating, troubleshooting, and maintenance procedures, full details of any owner-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority.
3. The Commissioning Authority may request further documentation necessary for the commissioning process.
4. This data request may be made prior to normal submittals.
5. Much of this information is contained in the regular O&M manual submittals normally submitted in the project. Typically, this information is required prior to the regular formal O&M manual submittals.

- B. Contractor's responsibility for deviations in submittals from the requirements of the contract Documents is not relieved by the Commissioning Authority's review.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013000

SECTION 013100 - PROJECT MEETINGS**PART 1 - GENERAL**

1.1 Furnish all labor, materials, and services for all required meetings in accordance with contract provisions.

1.2 RELATED REQUIREMENTS

- A. Project Coordination
- B. Scheduling
- C. Construction Quality Control Meetings
- D. Safety Meetings
- E. Project Closeout

PART 2 - PRODUCTS (NOT USED)**PART 3 EXECUTION****3.1 PRE-CONSTRUCTION MEETING**

- A. The Pre-Construction Meeting is to be scheduled by the Owner within fifteen (15) days after the Notice of Award and prior to the start of construction. The conference will be held at a location/time to be determined by the Owner. Minutes of the meeting will be prepared by the Owner/Architect and shall become a part of the Contract file.
- B. Attendance:
 - 1. Owner
 - 2. Architect (and consultants)
 - 3. General Contractor
 - 4. Major Subcontractors
 - 5. Utility Company and VDOT representatives (as applicable)
 - 6. General Contractor's representatives for Safety, Quality, and LEED
- C. Agenda:
 - 1. Allow each attendee to present their role in the project and any special requirements they may have.
 - 2. Discuss Traffic Control and procedures for open cut and road closures, if applicable, with VDOT representative.
 - 3. Discuss Contractor's safety plan, quality control, housekeeping, temporary facilities, jobsite security, and emergency procedures.
 - 4. Discuss the status and schedule of all utility relocations or new services and ensure that the utility companies have been authorized to provide the relocation or new services.
 - 5. Establish contract protocols regarding communications, submittals, RFIs, Payment Application, Schedule, testing, inspections, etc.
 - 6. Transmit contract required construction sets of drawings, specifications and permits to the Contractor.
 - 7. Review the status of Labor and Material Bonds, Performance Bond, Insurance Certificates, List of proposed subcontractors, and other relevant information needed from the Contractor.
 - 8. Disseminate the Notice to Proceed (NTP) date.
 - 9. Obtain Emergency Contact information for the Contractor and other parties as required.

3.2 PROGRESS MEETINGS

A. Project progress meetings will be held once every two weeks or at a frequency directed by the Owner. Meeting location prior to mobilization to the site will be at Owner discretion but meetings will be held at the project site once the site office trailers are established. The Owner/Architect will prepare the agenda, chair the meeting, and prepare meeting minutes.

B. Meeting Attendance:

1. County Project Engineer
2. County Site/Building QC Inspectors
3. Project Manager (County Design Agency)
4. A/E Project Manager and consultants as required for a particular meeting
5. Contractor Project Manager
6. Contractor Superintendent
7. Contractor Safety and QC Engineers
8. User Agency Representatives/Coordinator

C. Meeting Agenda:

1. Review and approve minutes of previous meeting.
2. Review Construction Schedules, review work progress since last meeting, review planned progress during next work period.
3. Review Old Business from previous meetings.
4. Document any field observations, questions and decisions.
5. Review regulatory inspection status.
6. Review Deficiency Log.
7. Review ADA compliance.
8. Review Submittal Log and identify key submittals that require action.
9. Review status of RFIs / ASIs and identify those key RFIs / ASIs that require action.
10. Review status of Change Orders, PCO's, and Pending PCO's or Construction Change Directives, RFPs, and FOs.
11. Review Pay Application Status.
12. Review Contractor Safety Plan and discuss any observed concerns.
13. Review Q/C or Quality Management Plan and discuss any concerns.
14. Discuss New Business.

3.3 PRE-INSTALLATION or PRE-DEMOLITION CONFERENCES

A. Conduct conferences at the Project site before the start of each construction activity as specified in the Specifications or otherwise directed by the Owner.

B. Attendees: Subcontractors, installers and representatives of manufacturers involved with or affected by the installations shall attend the meeting. The Contractor shall advise the Owner/Architect of scheduled meeting dates.

C. Agenda: Review progress of construction activities and preparations for the particular activity, including requirements for the following:

1. The applicable contract document requirements.
2. Related RFIs / Change Orders
3. Purchases / Deliveries
4. Submittals / Review of mockups

5. Possible conflicts (space, access, compatibility issues)
 6. Time schedules
 7. Temporary facilities and controls
 8. Inspections/Quality control
 9. Safety (Protection of construction, equipment, and personnel)
 10. Installation procedure(s)
 11. Coordination with other work
- D. The Contractor is to keep a written record of each meeting and produce/distribute minutes recording discussions and agreements for items above to all attendees.
- E. Do not proceed with installation if the conference has not been successfully concluded.
- F. ADA Compliance: Compliance with ADA requirements shall be discussed at the preconstruction meetings for the following activities:
1. Framing rough-in
 2. Masonry construction
 3. Plumbing rough-in
 4. Electrical rough-in
 5. Casework/millwork installation
 6. Exterior sidewalk and paving installation

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION SCHEDULE**PART 1 - GENERAL****1.1 GENERAL SCHEDULING REQUIREMENTS**

- A. Pursuant to Article 4.11 of the General Conditions of this Contract, the following additional scheduling requirements are a part of this Contract.
- B. Work under this section shall consist of furnishing and maintaining a Construction Schedule utilizing a computer based network analysis scheduling program such as Primavera Project Planner (P6) or equal. The schedule shall be prepared in a precedence format and show in detail how the Contractor plans to execute and coordinate the Work. The Construction Schedule shall be based on and incorporate the Contract Milestone(s) and Completion Dates specified and shall show the order in which the Contractor shall perform the Work. In addition, the Construction Schedule shall indicate the planned dates of submittal preparation and review, start-up and testing for equipment, systems and subsystems; and all interface activities and matters involving mutual support between the Contractor, Subcontractors, Suppliers, Code Enforcement Inspections, and the Owner. The Contractor shall use this schedule in the planning, scheduling, direction, coordination and execution of the Work.
- C. Reporting Format

The Contractor's scheduling software shall have the capability of furnishing data reports or sorts in the following formats:

1. Activity listing by activity;
2. Activity listing by early and late start dates;
3. Activity listing by early and late finish dates;
4. Critical path activities;
5. Activity listing by responsibility code, Subcontractor, or division;
6. Activity listing by total float;
7. Computer produced time scaled network diagram; and
8. Computer produced bar chart.

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION****3.1 GENERAL**

- A. The Construction Schedule shall be cost loaded and used as the basis for determining the Schedule of Values, Payment Schedule, and Progress Payments. The Owner shall be under no contractual obligation and shall have no responsibility to process Contractor's application for payment until the Contractor has submitted an acceptable Construction Schedule in accordance with the requirements of the Contract Documents.
- B. The Contractor agrees to adjust network logic, activity sequences or inactivity durations subject to the A/E review and approval, including, but not limited to, adjustments as required to maintain progress to ensure completion within the Contract Time, and to absorb within his schedule slippages, delays, changes in sequence required by project conditions, labor inefficiency and resource unavailability subject only to any time extension justified under the Contract Documents.

- C. The Contractor shall provide written documentation signed by all major Subcontractors and suppliers of the major equipment that demonstrates they concur with the elements of the Construction Schedule and will perform in accordance with it. The written documentation must be submitted with the schedule or immediately following execution of a contract with the Subcontractor and supplier of major equipment. Any modifications to the schedule which impacts major Subcontractors and equipment suppliers must also be accompanied by written documentation signed by the major Subcontractors and equipment suppliers which demonstrates that they concur with the updated schedule and will perform in accordance with it.
- D. Float or slack is defined as the amount of time between the early start date and the late start date or the early finish date and the late finish date of any of the activities in the Construction Schedule. Float or slack is not time for the exclusive use or benefit of either the Owner or the Contractor. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, unspecified milestones, and extended activity times are prohibited and use of float time disclosed or implied by use of alternative float-suppression techniques shall be shared to the benefit of Owner and Contractor. Use of such float suppression techniques shall be cause for rejection of the schedule and any revisions or updates.
- E. The schedule shall clearly identify the critical path activities leading to the Substantial Completion and Final Completion dates as set forth in the Contract Documents. If the schedule indicates an earlier completion date than that set forth in the Contract Documents, the difference between the Schedules and the Contract Document dates shall be considered to be part of the total float available. This float is a resource available to both the Owner and the Contractor and may not be used as a basis of claim by the Contractor for additional compensation for actual project completion after the early completion schedule date but before the Substantial Completion or Final Completion dates.
- F. The schedule as developed shall show the sequence and interdependence of activities required for complete performance of the work. The Contractor shall be responsible for ensuring all work sequences are logical and the schedule shows a coordinated plan of the work.
- G. Failure by the Contractor to include any element of work required for performance of the Contract or failure to properly sequence the work shall not excuse the Contractor from completing all work within the Contract Time.
- H. The work shall be executed at such a rate as will ensure meeting the specified Substantial Completion date in the Contract. By execution of the Contract, the Contractor represents it has analyzed the work, the materials and methods involved, the systems of the building, availability of qualified labor, restrictions of the site, constraints imposed, workload and capacity to perform the work, and agrees that the specified times are reasonable considering the existing conditions prevailing in the locality of the work, including weather conditions, and other factors, with reasonable allowance for variations from average or ideal conditions.
- I. The Substantial Completion date provided is considered essential to the satisfactory performance of the Contract and to the coordination of all work on the project. The Owner reserves the right to require the Contractor to execute the work in accordance with the specified Substantial Completion dates.
- J. The Contractor is to provide the operations, manpower, resources, materials, and all items and work necessary to complete the work and meet the Substantial Completion and Final Completion dates provided. The Contractor understands and agrees that: the Substantial Completion, Final Completion, actual start and completion dates, rate of progress, and coordination are essential conditions of this project. The Contractor must include in this schedule any contractual special conditions including, but not limited to, phased work, work restrictions/access/shift work, and work being performed by separate

Contractors. The Contractor is prohibited from assigning milestones that are not consistent with key dates shown in the Contract Documents.

- K. It is understood and agreed that TIME IS OF THE ESSENCE and the Contractor agrees to diligently follow and adhere to the schedule with due diligence so as to execute the work within the Substantial Completion and Final Completion dates stipulated in the Contract Documents. The Contractor shall, at no additional cost, take all necessary steps, including overtime, double shifts, weekends, and holiday work to complete this work and meet the Substantial Completion and Final Completion dates stipulated in the Contract Documents.

3.2 PRELIMINARY CONSTRUCTION SCHEDULE

- A. The Contractor shall submit a Preliminary Construction Schedule within 15 calendar days after the Notice of Award.
- B. The Preliminary Construction Schedule is required before the start of construction activities and shall consist of four (4) prints of a Network Diagram and two (2) sets of the program data files on an electronic exchange media such as a compact disk. The Contractor's Submittal shall indicate which days of the week will be planned work days and the dates of all scheduled non-work days.
- C. The Preliminary Construction Schedule shall depict major components of the Work and the sequence relations between major components and subdivisions of major components with further detail/attention to construction and procurement activities to be performed or which are being performed during the first 90 days of the project.
- D. The Preliminary schedule shall include those activities that are necessary to properly indicate:
 - 1. The approach to the overall Work. The Work for each phase or area must be represented by a least one Summary Activity, such that the activities cumulatively indicate the entire Construction Schedule.
 - 2. Summary Activities shall be replaced and expanded with detailed activities when the Preliminary Schedule is incorporated into the Construction Schedule.
- E. The schedule shall be computerized and presented in the form of bar charts and shall consist of horizontal lines, or bars plotted along a daily time scale. The horizontal bars shall indicate the start and finish dates for each work activity depicted.
- F. The Preliminary Construction Schedule will be superseded upon approval of the Construction Schedule described below.
- G. The Owner, A/E, and Contractor shall meet within ten (10) days of receipt of the Contractor's proposed Preliminary Schedule for a joint review and any correction or adjustment of the proposed Interim Schedules. Acceptance by the Owner of the Contractor's Preliminary Schedule creates neither a warranty, expressed or implied, nor acknowledgement of admission of the reasonableness of the activities, logic, durations, manpower or cost loading the Interim Schedule.

3.3 CONSTRUCTION SCHEDULE

- A. The Contractor shall submit a detailed Construction Schedule within 30 calendar days of the Notice to Proceed. If the Construction Schedule is not submitted in a complete and acceptable manner by the next payment application the Owner shall be under no contractual obligation and shall have no responsibility

to process Contractor's application for payment until the Contractor has submitted an acceptable schedule in accordance with the requirements of the Contract Documents.

- B. The Construction Schedule shall consist of two parts: a computer-drawn time-scaled network diagram and a computer-generated network analysis or printout. The submission shall include four (4) prints of the Network Diagram, four (4) sets of computer produced Schedules and Reports, and two (2) sets of the program data files on an electronic exchange media such as a compact disc. The Construction Schedule shall cover the entire Contract Time and include all revisions reviewed and accepted by the Owner. Each major component and subdivision component shall be accurately plotted on time scale sheets on reproducible paper not to exceed 30 inches by 42 inches in size.
- C. The initial Construction Schedule submittal shall reflect the Contractor's plan for the performance of all of the Work as of the date of the Notice to Proceed and shall not reflect the actual progress of any of the Work. The Contractor's Construction Schedule shall consist of but not be limited to the following:
 - 1. Procurement Activities, including preparation and review of submittals, ordering, manufacturing, fabrication, and delivery of long-lead equipment or materials, and any required off-site testing by the Owner or A/E. Long-lead items include equipment or materials requiring more than one month between ordering and delivery to the job site.
 - 2. Construction Activities, including A/E review of samples, mock-ups, curing, code enforcement inspections, and required testing and/or commissioning.
 - 3. The Construction Schedule shall indicate the sequence of the Work and the time of starting and completing each activity.
- D. All restraints and contract milestones shall be clearly indicated in the Construction Schedule. The Construction Schedule shall be used as the basis for reporting progress, schedule controlling and schedule forecasting, as required herein, and shall be sufficiently detailed so as to allow the Owner to evaluate the Contractor's planned schedule and to monitor Contractor's Progress on a day-to-day basis during performance.
- E. The Construction Schedule as approved shall be the Baseline Schedule against which all progress shall be measured. It shall be used by the Contractor and the A/E as the basis for evaluating changes and claims and, in conjunction with the schedule of values, for evaluation of the Application for Payment. The Schedule of Values (Article 9.2 of the General Conditions) and the Payment Schedule (Article 9.6.3 of the General Conditions) shall be developed using the values indicated in the Construction Schedule as a guideline.
- F. Should A/E or Owner reject Contractor's Construction Schedule, or any subsequent update or revision, as not being in accordance with the Contract Documents, Contractor shall, within fourteen (14) calendar days of receipt of the A/E's rejection, make the changes or revisions required to conform to the Contract Documents, or as directed by Owner should A/E and Contractor not agree to the revisions required.
- G. Activity Depiction
 - 1. Activity numbers shall be unique and shall not change as revisions are made to the schedule.
 - 2. Activity shall have a concise description of the Work represented by the activity. The Work related to each activity shall be limited to one work trade and one construction area.
 - 3. Activities shall be cost loaded to show its dollar value as a part of the whole.
 - 4. The durations of activities shall be expressed in whole working days, with no single activity in excess of fourteen (14) calendar days or a value exceeding \$25,000 without prior acceptance of the A/E or Owner. Non-construction activities such as concrete curing, mobilization, shop drawings and sample

- submittals, fabrication of materials, and delivery of materials and equipment, may have values in excess of fourteen (14) calendar days and values over \$25,000 unless otherwise directed by the A/E.
5. Activities shall be assigned separate activity codes to create a Work breakdown structure and, as a minimum, shall include:
- a. An activity code (maximum five characters) to define specific performance responsibility by discipline or Subcontractor as acceptable to the A/E. All abbreviations shall be fully described in a legend attached to the Construction Schedule.
 - b. An activity code (maximum five characters) to define concise Work area (e.g. floor or elevation, location of yard piping, location of site electrical, paving locations). All abbreviations shall be fully described in legend attached to the Construction Schedule. As requested by the Owner or A/E, either prior or subsequent to the acceptance of the Construction Schedule, the Contractor shall provide, without additional cost to the Owner, on prints of the Contract Drawings graphic illustrations of the relationships of construction activities to intended Work areas as identified by the Contractor.
 - c. An activity code (maximum five characters) to identify the project phase of each activity as it relates to the phases identified in these documents.
 - d. An activity code (maximum five characters) to identify the Structure or building as defined on the contract drawings.
 - e. An activity code (maximum five characters) to identify the Specification for the activity.
- H. The Construction Schedule shall indicate that the project will begin on the date given in the Notice to Proceed and will be completed within the number of calendar days specified in the Contract Documents.
- I. The Contractor shall ensure that the schedule represents an accurate, efficient, reasonable and feasible plan and method for accomplishing the Work throughout the time of performance. While the owner and A/E will review the Construction Schedule, the schedule itself is the Contractors' who has full responsibility for its preparation, content, revisions and updating in accordance with the requirements of the Contract Documents.
- J. It is to be expressly understood and agreed by the Contractor that the Owner does not guarantee that Contractor can start work activities on the "early start" or "late start" date or complete work activities on the "early finish" or "late finish" date shown in the baseline schedule, or any subsequent updates or revisions. If Contractor's schedule indicates that Owner or a separate Contractor is to perform an activity by a specific date, or within a certain duration, Owner or any separate Contractor under contract with Owner shall not be bound to said date or duration unless Owner expressly and specifically agrees in writing to same; the Owner's or A/E's overall review and approval or acceptance of the schedule does not constitute any agreement to specific dates or durations for activities or the Owner of any separate Contractor.
- K. The construction schedule shall indicate the following:
1. Procurement activities such as submittals and fabrication for critical materials and equipment.
 2. Off-site activities.
 3. Inspections, start up, testing and balancing, mobilization, and demobilization.
 4. Interfaces with the work of outside Contractors such as utility companies.
 5. Description of activity and activity number.
 6. Planned and remaining duration time for each activity.
 7. Early start date for each activity.
 8. Late start date for each activity.
 9. Early finish date for each activity.
 10. Late finish date for each activity.
 11. Float available for each path of activities containing float.

12. Actual start date for each activity begun.
 13. Actual finish date for each activity completed.
 14. Identification of all critical path activities in the network analysis.
 15. The critical path for the project, with said path of activities being clearly and easily recognizable on the time-scaled network diagram. The relationship between all non-critical activities and activities on the critical path shall be clearly shown on the network diagram.
 16. The percent complete of each activity in progress or completed.
- L. The Contractor shall submit a narrative report with the Construction Schedule indicating anticipated allocation of the following resources and work shifts to be utilized on the project:
1. Labor resources;
 2. Equipment resources;
 3. Whether work will be performed on a shift basis and whether it is to be done on a 5-, 6- or 7-day work week.
- M. Monthly anticipated adverse weather days as established in General Conditions, Article 8.6, TIME EXTENSIONS FOR WEATHER, shall be considered and included in the planning and scheduling of all-weather affected Work activities in order to complete all Work within the Contract Time.
- N. Custom calendars should be developed by the Contractor to identify the differing holiday, weather, workweek, and other work calendars on which specific work activities will be performed. Each activity should be assigned to the calendar corresponding with its work activity, weather, or season.
- O. The Owner, A/E, and the Contractor shall meet, within 20 days of receipt by the Owner of the Contractor's proposed Construction Schedule, to perform a joint review of, and make corrections or adjustments to the proposed Construction Schedule. If the A/E or Owner questions the Contractor's proposed activities, logic, or durations, the Contractor shall, within seven (7) days of receipt of any A/E or Owner request, provide a satisfactory revision to or adequate justification for such to the A/E and Owner. The A/E or Owner may at any time as part of its review, acceptance and subsequent monthly updating process, request that additional details be included in the Construction Schedule. The Contractor shall, at no additional cost, provide the details requested to the satisfaction of A/E and Owner. In the event the Contractor fails to define any element of work, activity or logic, such omission or error, when discovered, shall be corrected by the Contractor in the next monthly Construction Schedule Update without effect on the Contract Time. Within fourteen (14) days after the joint review between the Contractor, A/E, and Owner, the Contractor shall revise the Construction Schedule in accordance with agreements reached or direction given during the joint review and submit diagrams, printouts and electronic copies as already specified. Acceptance by the Owner of the Contractor's Construction Schedule does not relieve the Contractor of any of his responsibility whatsoever for the accuracy or feasibility of the Construction Schedule, or of the Contractor's ability to meet Substantial Completion and Final Completion requirements of the Contract, and such acceptance also creates neither a warranty, expressed or implied, nor an acknowledgement or admission of the practicability of the Contractor's Construction Schedule.

3.4 NETWORK DIAGRAM REQUIREMENTS

- A. The Network Diagram shall be computer generated, in a time scaled format, on sheets no larger than 30" X 42" and no smaller than 11" x 17", printed in color, and with font sizes no smaller than 8 point.
- B. The Network Diagram shall be organized by grouping activities related to specific phases or areas of the Project together for ease of understanding and simplification.

C. The following shall be depicted on the Network Diagram for each activity:

1. Activity number
2. Description of Work
3. Activity duration
4. Designation of critical path where applicable.

3.5 COMPUTER PRODUCED SCHEDULE REPORT REQUIREMENTS

A. Schedule reports shall include, for each activity depicted in the Construction Schedule, the following information:

1. Activity Number
2. Description of the Work
3. Original Duration
4. Remaining Duration
5. Percent complete (time)
6. Work phase / area / floor codes as applicable
7. Responsibility code
8. Early Start and Finish dates
9. Actual Start and Finish dates
10. Total Float

B. The Contractor shall submit a Schedule Calculation Summary Report which includes listings of constraints, open-ends, out-of-sequence work, and scheduling statistics. This report is computer-generated when the Project Schedule is calculated after updating activity progress at the month end processing.

3.6 UPDATES

A. The Construction Schedule shall be updated every month to reflect the actual as-built data and the update shall be utilized as an essential part of the payment application review. Three (3) print copies and two (2) sets of the program data files on an electronic exchange media, such as a compact disc, of the monthly Construction Schedule update are to be submitted with the submission of each monthly Application for Payment with proposed updates and revisions marked thereon. If the Construction Schedule updates and revisions are not submitted in a complete and acceptable manner by the next subsequent payment application, then the Owner shall be under no contractual obligation and shall have no responsibility to process Contractor's application for payment until the Contractor has submitted an acceptable schedule update in accordance with the requirements of the Contract Documents. The updated construction schedule shall indicate the following:

1. Those activities in progress or to be performed in the future, and the percentage complete of each activity;
2. The critical path for the project based upon the latest update data;
3. Tabular reports sorted as follows: 1) by Activity ID, and 2) by Total Float by Early Start.
4. All activities affected by approved time extensions, including but not limited to revised Contract Completion dates and milestones.

B. Progress Reports

The Contractor shall forward to the Owner and A/E with each application for payment a narrative monthly summary report, in a form acceptable to the Owner and A/E of the progress of the Work including but not limited to the following information:

1. The progress of the Contract Work, whether in the mills, shops, or in the field, stating the existing status, rate of progress, estimated time of completion and cause of delays, if any.
 2. Description of work accomplished since submission of previous progress schedule and work planned during the next period.
 3. Comparison of the actual status of the Work with Contractor's Construction Schedule as previously submitted to the A/E or as previously updated or revised in accordance with the review of the Owner.
 4. Status of equipment and materials deliveries and shop drawing preparation and review.
 5. Changes or additions to Contractor's supervisory personnel since the preceding progress report.
 6. Causes of any delays.
 7. Changes in logic, sequence, or durations or activities and the reasons, therefore.
 8. Actions proposed by Contractor to restore schedule (including what is being done, or is planned to be done, in problem areas).
 9. What problems or changes are anticipated or expected by Contractor and what is Contractor's plan to deal with same so as to minimize or prevent any delay to completion.
 10. Changes in the Payment Schedule.
- C. Neither the updating or revision of Contractor's Construction Schedule nor the submission, updating, change or revision of any report or schedule submitted to A/E by Contractor under the Contract nor Owner's review or non-objection of any such report or schedule shall have the effect of amending or modifying, in any way, the Contract Time, any Contract Completion Date, or Contract Milestone Dates or of modifying or limiting in any way Contractor's obligations under this Contract.

3.7 REVISIONS

- A. If, as a result of the monthly construction schedule update, it is the opinion of the A/E and Owner that the Construction Schedule no longer represents the actual planned prosecution and the actual progress of the Work, the A/E or Owner may request that the Contractor revise the Construction Schedule to reflect its current planning. The Contractor shall submit to the A/E and Owner in writing, a schedule analysis illustrating the influence, if any, of the proposed schedule revision on Contract Time. Each such schedule analysis shall be submitted to the satisfaction of the A/E and Owner prior to the next Construction Schedule Update. Compliance with such submittal requirements shall be a condition precedent to any obligation of the Owner to consider any Application for Payment.
- B. If the schedule update indicates that the Substantial Completion date will be later than that required by the Contract the Contractor shall be required to prepare a Schedule Recovery Plan for regaining the time that the Project is behind schedule. The Schedule Recovery Plan shall be submitted within five (5) working days and should indicate in both narrative form and in a detailed time-scaled bar chart schedule with logic the following information:
1. Amount of time the activity is late.
 2. Reason for lateness
 3. Proposed method for recovering the time and achieving any/all required project Substantial Completion deadline(s).
- C. The Contractor may also request reasonable revisions to the Construction Schedule in the event that its planning for the Work is revised. If the Contractor desires to make changes in the Schedule to reflect revisions in its planned methods of operating and scheduling of the Work, the Contractor shall notify the

A/E and Owner in writing, stating the reason for the proposed revisions and submit to the A/E and Owner a schedule analysis illustrating the influence, if any, of the proposed schedule revision on Contract Time. Each such schedule analysis shall demonstrate how the Contractor would incorporate the proposed schedule revision into the Construction Schedule. The schedule analysis shall demonstrate the time impact of the proposed schedule revision to be initiated, reflecting the projected status of the Work at that point in time, and provide the event time computations of all affected activities if the proposed revisions were to be accepted by the A/E and Owner. Accepted revisions will be incorporated into the Construction Schedule at the next monthly Construction Schedule Update Meeting.

3.8 REQUESTED TIME ADJUSTMENT SCHEDULE

- A. If Contractor believes he is entitled to an extension of the Contract Time under the Contract documents, Contractor shall submit to A/E and Owner as a Proposed Change Order (PCO), a separate schedule analysis (entitled "Requested Time Adjustment Schedule") indicating suggested adjustments in the Contract Time which should, in the opinion of the Contractor, be made in accordance with the Contract Documents due to changes, delays, or conditions which are expected or contemplated by Contractor (whether such conditions are excusable under the Contract or are due to Contractor fault). This separate schedule shall be time-scaled utilizing a computer generated and computer-drawn network analysis schedule and shall be accompanied by a formal time extension request as required by the Contract Documents and a detailed narrative justifying the time extension requested.
- B. Time extensions for weather delays during a given month will be allowed only for actual work days in excess of those numbers provided by General Conditions Article 8.6, TIME EXTENSIONS FOR WEATHER, and only when those excess days of delay affect the current critical path(s) leading to the specified Substantial Completion or Contract Completion dates.
- C. The time adjustment request shall include schedule forecasts that predict the proposed Project Completion Date and a forecast of the achievement of milestones listed in the Owner-Contractor Agreement.
- D. The "Requested Time Adjustment Schedule" shall clearly and accurately reflect Contractor's actual intention and proposed time adjustments as of the latest update. It shall also reflect any adjustments made by Contractor in the logic, sequence or duration of any activities in the Construction Schedule, and any time extensions previously granted by Owner, along with actual and expected progress.
- E. Owner shall not have any obligation to consider any time extension request unless the requirements of the Contract Documents, and specifically, but not limited to these requirements, are complied with; and Owner shall not be responsible or liable to Contractor for any constructive acceleration due to failure of Owner to grant time extensions under the Contract Documents should Contractor fail to substantially comply with the submission requirements and the justification requirements of this Contract for time extension requests. Contractor's failure to perform in accordance with the Construction Schedule shall not be excused, nor be chargeable to Owner, because Contractor has submitted time extension requests.
- F. Extensions of time for performance as described in the Contract Documents will be granted only to the extent that time adjustments for the activity or activities affected exceed the total float along the path of activities affected at the time of Notice to Proceed of a change order or the commencement of any delay or condition for which an adjustment is warranted under the Contract Documents.
- G. Change Orders: If an extension or contraction of any milestone or completion date is authorized by a change order issued by the A/E and Owner the Contractor shall revise his Construction Schedule, milestone, and completion dates accordingly. Any and all activities impacted by a change to the milestone or completion date shall likewise be adjusted to reflect the revised requirements.

- H. All of the Contractor's detailed calculations, documents and Subcontractor data supporting or providing the basis for any schedules, reports and forecasts shall be made available within seven (7) days of A/E's request.

3.9 TWO-WEEK LOOK AHEAD SCHEDULE

- A. The Contractor shall prepare and distribute a two-week "look ahead" bar chart schedule at each progress meeting. The look ahead shall be in a format acceptable to the A/E and represent the Contractor's and Subcontractors' work plans for construction activities to occur during the following two (2) week period. The bar chart shall reference the specific activities as defined in the Construction Schedule and shall indicate locations of Work, quantities of materials to be installed and planned durations of activities.

END OF SECTION 013200

SECTION 013233 - PROJECT REPORTING AND PHOTOGRAPHS**PART 1 - GENERAL**

- 1.1** The Contractor, as a minimum, shall submit daily field reports, monthly progress reports, and project photographs to the Owner and AE for review, status and record purposes as indicated below.

PART 2 - PRODUCTS (NOT USED)**PART 3 – EXECUTION****3.1 PRE-CONSTRUCTION PHOTOGRAPHS**

- A. The Contractor shall be responsible for the production of pre-construction photographs prior to start on any work on-site. Pre-construction photographs shall document the condition of all existing surface features and structures within the project limits. The Contractor shall provide pre-construction photographs via CD in these areas prior to commencement of work.
- B. The Contractor is to identify all photographs with project name, Contractor's name, Project Number, Contract Number, date taken, and view/vantage point.

3.2 DAILY FIELD REPORTS

- A. The Contractor shall submit, in a format acceptable to the Owner, a Daily Field Report for all Contractor and Subcontractor activities for each day of the Contract from NTP to Substantial Completion. Each report shall be received by the Owner and AE no later than three calendar days after the date to which the report pertains. Each report shall contain the following data:
1. Project Name, Project Number, and Contract Number.
 2. The number of workers (by trade and company) and the hours worked by each worker.
 3. Work being performed, referenced to work location and associated CPM activity number(s).
 4. Weather
 5. Situations or circumstances which could delay work or give cause for claims for extension of time or added cost.
 6. Name and affiliation of all visitors to the site. Record their observations and/or reason for the site visit.
 7. Equipment utilized or on site and idle. Provide the serial numbers or other identifying features and hours worked for each piece of equipment utilized on that day.
 8. Report on any recordable or reportable safety issues.
 9. Report on any quality issues discovered or corrected.
- B. Non-Compliance - Failure to complete and submit the required reports may have an impact on approval of the Contractor's monthly payment application.

3.3 MONTHLY PROGRESS REPORTS

- A. The requirement for a formal monthly progress report will be satisfied by submission of required monthly progress photographs, the Contractor's Quality Control Plan with monthly updates (per specification 014000), schedule updates (per specification 013200) and a completed Contractor's Application for Payment. Should circumstances arise where the Owner feels that such documentation is not sufficiently addressing all issues taking place in the prosecution of the work, the Owner, at his discretion may direct the Contractor to provide additional information, photographs and/or narrative.

3.4 PROGRESS PHOTOGRAPHS

- A. Progress photographs shall be furnished by the Contractor in digital format, acceptable to the Owner, with sufficient pixilation to allow enlargement without noticeable loss of resolution.
- B. Depending on the size of the project and at the discretion of the Owner/Architect, a minimum of twelve (12) to a maximum of twenty-five (25) progress photographs shall be taken each month and shall be submitted with each Application for Payment (i.e. on or about the first day of each month) until project Substantial Completion.
- C. Photographs shall be taken from the same interior and exterior vantage points as directed by the Owner/Architect. Photos shall not be edited, modified, or enhanced in any way without the Owner's advanced approval in writing.
- D. The Contractor shall transmit these photographs via CD (one for Owner and one for Architect) with each month's Application for Payment. The Contractor is to identify all photographs with project name, Contractor's name, Project Number, Contract Number, date taken, and view or vantage point.

3.5 OTHER REPORTS

- A. As required and/or as specified in various Division 1, Technical Specifications, or Owner direction.

END OF SECTION 013233

SECTION 013523 - SAFETY AND SECURITY**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Furnish all labor, materials, tools, equipment and services for effective project safety and security operations to meet all regulatory requirements in accordance with applicable codes and contract provisions.
- B. The Contractor is to furnish and install any supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a safe and secure project operation. The types of security and protection provisions required include, but are not limited to worker PPE, fire protection, barricades, warning signs/lights, site enclosure fence, sidewalk bridges, building enclosure/lockup, 24/7 site access control, environmental protection, and similar provisions intended to minimize property losses, personal injuries and claims for damages at the project site. No part of such provision(s) shall become the subject of a claim for extension of time or for excess costs or damages by the Contractor.
- C. The Contractor is required to submit a project/site specific safety and security plan to the Owner for review/approval no later than the earlier of thirty (30) calendar days after Notice to Proceed or mobilization to site.

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION****3.1 SAFETY STANDARDS**

- A. The Contractor shall comply with Federal, State, and local safety and fire codes and regulations and the applicable provisions of the following:
 - 1. Occupational Safety and Health Standards issued by the Secretary of Labor pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970 and as amended.
 - 2. Virginia Occupational Safety and Health Standards for the construction industry.
 - 3. NFPA 70 E – Standards for Electric Safety at Workplace as referenced in OSHA 29 CFR 1926, sub-part K for safety measures, PPE protection from arc flash from electric equipment.
- B. Where requirements conflict, the most stringent requirement shall apply.

3.2 ACCIDENT REPORTS

- A. The Contractor shall maintain an accurate record of, and shall immediately report orally to the Owner, any accidents resulting in death, traumatic injury, occupational disease, or damage of property, materials, supplies, and equipment incident to Work performed under this Contract. The Contractor shall provide a written preliminary accident report to the Owner within 24 hours of occurrence and a complete written report within 7 calendar days.

3.3 PERSONAL PROTECTIVE EQUIPMENT AND EMPLOYEE IDENTIFICATION

- A. The Contractor is responsible for enforcing the use of Personal Protective Equipment (PPE) as required by OSHA and the Virginia Occupational Safety and Health program of the Department of Labor and Industry for General Industry and for the Construction Industry by all personnel and visitors to the site. PPE shall include, as appropriate, eye and face protection, foot protection, hand protection, head

protection, hearing protection, and respiratory protection. At a minimum, all personnel and visitors on site shall have the following:

1. Hard Hat.
 2. Safety Glasses.
 3. Safety Vest.
 4. Safety toe footwear.
- B. Hard hats shall be required at the construction site from start to completion of Work. Each Contractor, employee, and visitor at the construction site shall be required to wear a hard hat. The Contractor shall provide hard hats for visitors as necessary and shall enforce the wearing of hard hats by Contractor employees and visitors. Individuals found not wearing hard hats will not be permitted to remain on site. The Contractor shall be responsible for advising all individuals who will be working on the site of this requirement.
- C. All Contractor and Subcontractor employees are required to provide employee and company identification on their hard hats or shall carry a separate ID card.

3.4 HOUSEKEEPING

- A. The Contractor shall, at all times, keep the site and surrounding property clean and free of unnecessary and hazardous debris. Any damage to surrounding property shall be repaired upon notification by the Owner at no expense to the Owner.
- B. The Contractor shall provide all items required to ensure safety of individuals and property on site.

3.5 FIRE PROTECTION

- A. The Contractor is responsible for compliance with OSHA requirements and local fire codes and regulations as enforced by the governing Fire Marshall or his designated representative. Attention should be called, but not limited to, the following:
5. Proper storage and removal of volatile waste
 6. Proper storage of bottled gasses
 7. On-site storage of fuels
 8. Establishment of smoking areas
 9. Placement of temporary portable fire extinguishers
 10. Employee training
- C. Adequate precautions against fire shall be taken throughout all operations. Flammable material shall be kept at an absolute minimum and shall be properly handled and stored. Fires or open salamanders shall not be permitted in any part of the Work
- D. Construction practices, including cutting and welding and protection during construction, shall be in accordance with the published standards of the National Fire Protection Association.
- E. Store gasoline and other flammable liquids in Underwriters Laboratories-listed safety containers in conformance with the National Board of Fire Underwriters recommendations. Storage, however, shall not be within a building.
- F. Make arrangements for periodic inspection of all construction areas by local fire protection authorities and insurance underwriters. Cooperate with these authorities and promptly carry out their recommendations.

3.6 HAZARDOUS MATERIALS

- A. Hazard Communication Programs: Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with Laws or Regulations.

3.7 POLLUTION CONTROL

- A. The Contractor is responsible for compliance with governing anti-pollution laws and ordinances relative to on-going construction, clean-up, and disposal operations. On-site incineration or burial of items is not allowed.

3.8 SECURITY

- A. The Contractor is responsible for overall security of the construction site. This includes but is not necessarily limited to:
1. Preservation of all property adjacent to the work, the removal or destruction of which is not part of the work of the project. The Contractor shall be responsible, at no additional cost, for all damage or injury to property of any character during the prosecution of the work and he shall restore such property to a condition at least similar and equal to that existing before such damage or injury was done by repairing, rebuilding, or restoring, as may be directed.
 2. Establishing and maintaining perimeter fencing and access gate(s).
 3. Positive site access control including effective use and maintenance of a Visitor Log.
 4. Securing of work in progress and materials stored on site from damage by weather, theft, or vandalism.
 5. Coordination with local police authorities when high value construction material/equipment is expected to be stored on site.

END OF SECTION 013523

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.4 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections attached to this Section, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY CONSTRUCTION FACILITIES, UTILITIES AND CONTROLS**1.1 REQUIREMENTS**

- A. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure, and complete installation.
- B. Site Utilization Plan - Prior to the start of work and no later than 30 days after Notice to Award the Contractor shall submit a Site Utilization Plan for Owner review/approval. The plan shall show the locations and dimensions of any area(s) to be fenced and used by the Contractor, the number of trailers and/or sheds to be used, any equipment and material storage areas, access and haul routes, any areas to be graveled, construction entrance(s), trash dumpsters, temporary sanitary facilities, worker parking, project sign, and project bulletin board.
- C. Community Impact - The Contractor shall schedule operations with a minimum of disruption of affected, or neighboring, properties during construction. Consideration shall be given to property access, driveway maintenance, parking, pedestrian traffic, and overall public safety to the maximum extent possible. The Contractor shall abide by all governing ordinances in effect at the job site at the time of construction.

1.2 TEMPORARY UTILITY SERVICES

- A. All utility service accounts whether for temporary or permanent service shall be in the name of the Contractor until the date of Substantial Completion.
- B. Electricity - The Contractor shall furnish and install all temporary electrical facilities as required and shall arrange and pay for all electrical usage until date of Substantial Completion. All temporary facilities shall remain the property of the Contractor and be removed after permanent connections have been completed. Electrical wiring, conduit or equipment which are part of the permanent electrical systems shall not be used for temporary electrical facilities unless specifically approved by the Owner. The Contractor shall be responsible for any damage to equipment and materials, or injury to personnel caused by temporary electrical installations. Costs for materials and installation of temporary electrical facilities shall be at the Contractor's expense.
- C. Water - The Contractor shall make all arrangements to install and pay for all temporary equipment, piping, water meters and outlets for an adequate supply of clean water for construction purposes until date of Substantial Completion. Point of tie-in, meter(s) and hose bibs shall be indicated on the site utilization plan. Contractor shall furnish drinking water for all Contractor and Owner personnel.
- D. Telephone - The Contractor shall make arrangements for and pay all costs associated with telephone service for the temporary site office(s).
- E. Toilets - The Contractor shall provide temporary toilet facilities for the use of Contractor and Owner personnel. Facilities shall comply with local and State sanitary laws and OSHA regulations. The Contractor shall be responsible for maintaining such facilities in a clean, sanitary condition (including provision of adequate supplies of toilet paper and hand sanitizer) throughout the duration of the construction contract.
- F. Heat

1. The Contractor, at his expense, shall furnish, install, and maintain temporary heat and enclosures during contract activities and shall, as applicable, provide heat for specific operations as follows:
 - a. At all times during placing, setting, and curing of concrete and masonry, provide sufficient heat to insure heating of all surrounding spaces involved to not less than 50 degrees F or as specified in the technical specifications.
 - b. From beginning of application of plaster and during the setting and curing period, provide sufficient heat to produce a temperature in spaces involved of not less than 50 degrees F or as specified in the technical specifications.
 - c. For a period of ten (10) days prior to placing interior finishes, and until final acceptance of work or until full occupancy by Owner, provide sufficient heat to produce a temperature in spaces involved of not less than 50 degrees F or as specified in the technical specifications.
 - d. For a period of forty-eight (48) hours previous to installation of floor finishes, provide sufficient heat to produce a temperature of not less than 70 degrees F; maintain this temperature during installation and maintain 55 degrees F temperature for at least 48 hours after installation or as specified in the technical specifications.
 - e. Maintain such heat as practicable to provide satisfactory working conditions for all trades.
2. The Contractor, at his cost, shall provide heat, enclosures, fuel, and services to protect all work and materials against damage from dampness and cold until final acceptance of all work and materials in the Contract, unless the building is occupied by Owner prior to such acceptance.
3. If the Contractor desires operation of the permanent heating system to properly proceed with work, he shall request permission of Architect/Owner in writing. If permission is granted, the Contractor shall accept full responsibility for damage or undue wear to the system and that the one-year warranty will not begin until final acceptance of the project by the Owner.
4. The use of open salamanders and other temporary heating devices which cause smoke and damage will not be permitted. Fuel, equipment, and method of heating shall be satisfactory to the Architect and meeting all regulatory requirements.

1.3 TEMPORARY CONTROLS

A. General

1. Contractor shall provide and maintain methods, equipment, and temporary construction, as required to provide controls over environmental conditions at the construction site and adjacent areas. Remove physical evidence of temporary facilities at completion of the Work.
2. Contractor shall obtain all applicable City, County and State permits required for the construction of all Work, including but not limited to, Hazardous Material Management, and Earth Moving/ Dust Control.

- B. Noise Control - Contractor's vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the Work of the Owner or others. The Contractor shall also comply with the Fairfax County Noise Ordinance.

C. Dust Control

1. Dust shall be kept down at all times, including non-working hours, weekends, and holidays. Soil at the site, haul roads, and other areas disturbed by the Contractor's operations and materials stockpiled for the project shall be treated with dust suppressors or covered to control dust. No dry power brooming will be permitted. Vacuuming, wet mopping, wet sweeping, or wet power brooming shall be used instead. Air blowing will be permitted only for cleaning off non-particle

debris, such as that from reinforcing bars. Only wet cutting of concrete block, concrete, and asphalt will be permitted.

2. The Contractor shall comply with applicable provisions of the National Emission Standards for Asbestos (40 CFR 61 Subpart B).
3. The Contractor shall inspect vehicles for dirt prior to their leaving the construction site. Dirt, soil, and rubble likely to be dislodge during transit shall be removed from the trucks and other vehicles prior to leaving site.
4. The Contractor shall ensure that material that may become airborne is covered during transport to and from the site. Dump trucks hauling material from the construction site shall be covered with an appropriate covering device.

D. Water Control

1. Provide methods to control surface water and water from excavations and structures to prevent damage to the Work, the Site, or adjoining properties. Control fill, grading and ditching to direct water away from excavations, pits, tunnels and other construction areas and to direct drainage to proper runoff courses so as to prevent any erosion, damage or nuisance.
2. Provide, operate and maintain equipment and facilities of adequate size to control surface water.
3. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the Site or to adjoining areas and in conformance with all environmental requirements.

E. Pollution Control

1. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
2. Provide equipment and personnel, perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids. Excavate and dispose of any contaminated earth offsite and replace with suitable compacted fill and/or topsoil.
3. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.
4. Provide systems for control of atmospheric pollutants, prevent toxic concentrations of chemicals, and prevent harmful dispersal of pollutants into the atmosphere.
5. All Contractors' equipment used during construction shall conform to all current federal, state and local laws and regulations.

1.4 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY BOARD

A. Bulletin Board - Immediately upon beginning site work the Contractor shall provide and install a weatherproof, glass-covered bulletin board that is a minimum of three (3) feet high by five (5) feet wide having not less than two (2) hinges or sliding glass doors with provisions for locking. The bulletin board shall be located in a conspicuous place at the project site as approved by the Owner and be easily accessible to all employees. The Contractor shall post all information required by law and the Owner. Information shall remain legible during the course of the Contract. The bulletin board shall remain the property of the Contractor and shall be removed by him upon completion of the Contract.

B. Project Sign - The Owner shall furnish, erect, and maintain a project sign within the limits of the project site. No other signs of any character will be permitted on the premises without written permission granted by the Owner.

- C. Project Safety Board - The Contractor shall erect and maintain a Project Safety Board in a conspicuous and easily accessible place at the project site. The board shall be sized to accommodate OSHA required/recommended postings.

1.5 PROTECTION AND MAINTENANCE OF TRAFFIC

- A. Except as otherwise specifically directed by the Owner, the Contractor shall maintain and protect traffic on all affected roads during the construction period to ensure the traveling public is protected from damage to person or property. Measures for the protection, maintenance, and diversion of traffic shall meet all the requirements of VDOT and Fairfax County. The Contractor shall be responsible to submit a Maintenance of Traffic (MOT) Plan to VDOT for approval prior to any work in the VDOT right-of-way. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads, the allowable load limit on these roads, and be responsible for the repair of any damage to roads caused by construction operations.
- B. Access Roads - The Contractor shall provide and maintain temporary access to the building site and will accomplish this per methods as approved by the Architect and the Owner so as not to interfere with work of others. When this access is no longer required the Contractor will be responsible for restoration to original or final design state.
- C. Dust, Dirt, and Mud Control - At all points where vehicles leave the project site and enter adjacent paved streets, the Contractor shall maintain a wash rack installation and crew to prevent any mud from being carried onto such adjacent paved streets. The Contractor is responsible for daily cleanup of all debris, materials, etc. that fall from vehicles entering or leaving the site.
- D. Barricades - The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. The barricades shall be securely placed, clearly visible, and have adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.6 TEMPORARY OFFICE FACILITIES

- A. The Contractor shall provide field office(s) for his use and use of the Owner and Architect. The field office(s) should be of adequate size to comfortably accommodate meetings in a single location for twelve (12) people with adequate table space and chairs. The office(s) shall be equipped to maintain a temperature of 72° F at all times during the course of the Contract.

1.7 TEMPORARY SITE PARKING

- A. Construction personnel will not at any time park on any private property without the prior express consent of the property owner. Contractor will be restricted to public parking or space on site as available. Off-site parking should be made in accordance with local laws. Contractor personnel violating this stipulation do so at their own risk and should be aware that their vehicles may be towed at offender's expense.

1.8 TEMPORARY CONSTRUCTION AIDS

- A. Construction Elevators and Hoists - The Contractor shall provide cranes, hoists, towers and other lifting devices for proper and efficient movement of materials and shall provide properly trained and licensed operating personnel for the equipment. Equipment shall be provided with guys, bracing, and other safety devices in accordance with local and Commonwealth of Virginia codes. Remove towers and

hoisting equipment when no longer needed or as directed. All lifting devices and hoisting facilities must be approved by Fairfax County prior to use on the job site.

- B. Scaffolding and Platforms - Provide, erect, maintain, and remove when directed, all scaffolding, staging, platforms, temporary runways, temporary flooring, guards, railings, stairs, etc., as required by local agencies having jurisdiction for protection of workmen and public. Construction inspection and maintenance of these items shall comply with all safety codes and regulations as applicable to the project.
- C. Temporary Fences and Barricades - The Contractor shall furnish, install, and maintain all necessary temporary fences, barricades, trench and hole covers, warning lights and all other safety devices necessary to prevent injury to persons and damage to property. The Contractor shall furnish, install, and maintain all temporary barricades at the excavations of the building and openings through floor slabs. The Contractor shall secure the site with a temporary six foot (6'-0") chain link fence and a minimum of two gates for security and safety purposes. This fence should be indicated on the Site Utilization Plan for Owner approval. Contractor shall maintain ownership of the fence and remove it upon completion of the project. Any adjustment to the fence or gate locations during construction to facilitate site access or construction operations will be done at no additional cost to the Owner.
- D. Temporary Pumping - The Contractor shall provide all temporary pumping and dewatering necessary for Contract performance.

1.9 TEMPORARY ENCLOSURES

- A. General Contractor shall furnish and install temporary enclosures, doors and transparent plastic windows required to protect building from damage due to vandalism, or the elements, or to maintain suitable temperature during installation or finishing work.
- B. Provide all items required to ensure safety of individuals on site.

1.10 CLEANUP

- A. All construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Should the Contractor not keep the site clean to Owner's satisfaction, the Owner reserves the right to have the site cleaned by a third party and recover the cost of such operation through back charges to the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 015000

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Requirements:
 - 1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
 - 2. Section 311000 "Site Clearing" for removing existing trees and shrubs.

1.3 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape at a height 6 inches (150 mm) above the ground for trees up to and including 4-inch (100-mm) size at this height and as measured at a height of 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.
- B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches (1372 mm) above the ground line.
- C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
 - b. Arborist's responsibilities.
 - c. Quality-control program.
 - d. Coordination of Work and equipment movement with the locations of protection zones.

- e. Trenching by hand or with air spade within protection zones.
- f. Field quality control.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
 - 2. Detail fabrication and assembly of protection-zone fencing and signage.
 - 3. Indicate extent of trenching by hand or with air spade within protection zones.
- C. Samples: For each type of the following:
 - 1. Organic Mulch: 1-pint volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 - 2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
 - 3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- D. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
 - 1. Species and size of tree.
 - 2. Location on site plan. Include unique identifier for each.
 - 3. Reason for pruning.
 - 4. Description of pruning to be performed.
 - 5. Description of maintenance following pruning.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For arborist and tree service firm.
- B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Use sufficiently detailed photographs or video recordings.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- E. Quality-control program.

1.7 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA and Licensed arborist in jurisdiction where Project is located.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.8 FIELD CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Moving or parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Backfill Soil: Stockpiled soil from location shown on Drawings or Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
 - 1. Planting Soil: Planting soil as specified in Section 329113 "Soil Preparation".
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
 - 1. Type: Shredded hardwood.
 - 2. Size Range: 3 inches maximum, 1/2 inch minimum.
 - 3. Color: Natural.

- C. Protection-Zone Fencing: Fencing fixed in position and as noted on drawings.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as noted on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches (1372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.3 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 - 1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
 - 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
 - 3. Access Gates: Install; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced as shown on drawings.
- C. Maintain protection zones free of weeds and trash.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.
- B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

- A. Prune tree roots that are affected by temporary and permanent construction. Prune roots [as shown on Drawings.

3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.
 1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
 2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
 3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
- B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.
- C. Cut branches with sharp pruning instruments; do not break or chop.
- D. Do not paint or apply sealants to wounds.
- E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.

- F. Chip removed branches and dispose of off-site.

3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that are more than **25** percent dead or in an unhealthy condition or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 015639

SECTION 016310 - PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals."
- C. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.
- D. Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment."

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:
 - 1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and construction methods included in Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 60 days after award of contract. Requests received more than 60 days after award of contract may be considered or rejected at the discretion of the Architect and Owner.
 - 1. E-mail each request for substitution for consideration to the Owner and the Architect. Submit requests in the form and in accordance with procedures required for Change Order proposals.
 - 2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the

following information, as appropriate:

- a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
3. Architect's Action: Within ten days of receipt of the request for substitution, the Architect will request additional information or documentation necessary for evaluation of the request. Within three weeks of receipt of the request, or one week of receipt of the additional information or documentation, whichever is later, the Architect will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.
1. Revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 6. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of

- other construction by the Owner or separate Contractors, and similar considerations.
7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 8. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
 9. The Contractor shall provide appropriate credit for substitute material, equipment, labor etc. if the substitution is acceptable to the Architect, Engineer and County.
- B. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 016310

SECTION 017329 - CUTTING AND PATCHING**PART 1 – GENERAL****1.1 QUALITY ASSURANCE**

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
- B. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
- C. Operational Limitations: do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction exposed on exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic or visual qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction that was cut and patched in a visually unsatisfactory manner.
- E. Warranty or existing warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

1.2 DESCRIPTION

- A. Install Work in such a manner and sequence as to preclude or minimize cutting and patching of new Work.
- B. Execute cutting (including excavation), fitting or patching of Work, required to:
 - 1. Make several parts fit properly.
 - 2. Uncover Work to provide for installation of ill-timed Work.
 - 3. Remove and replace defective Work.
 - 4. Remove and replace non-conforming Work.
 - 5. Remove samples of installed Work for testing.
 - 6. Install specified Work in existing construction.
 - 7. Provide rerouting penetrations of non-structural surfaces for installation of piping and electrical conduit.
 - 8. Patch and repair fireproofing damaged after installation of other Work or demolition activities.
 - 9. Remove and finish construction at connections to other structures.
 - 10. Remove existing materials where required by new Work, and patch to match existing adjacent materials to remain.
- C. Do not endanger any Work or any Work of other Contractors, by cutting, excavating, or otherwise altering any Work except with written consent of Contractor subject to review by Architect.
- D. Do not cut into or cut away any structural concrete or other structural members or other concrete, and do not dig under any foundations or into structural walls or other parts, or in any case do not allow same to be done without full knowledge and written consent of Architect.
- E. Correct damage resulting from violation of these provisions.
- F. Use only firms or individual trades qualified to perform Work required under this Section.

1.3 JOB CONDITIONS

- A. Before start of Work, obtain and pay for all permits required by all authorities having jurisdiction and notify all interested utilities companies.
- B. Obtain approval of Owner and authorities having jurisdiction for Work which affects existing exitways, exit stairs, means of egress, or access to, or exit from, areas. Review with and obtain approval of authorities for any temporary construction that affects such areas.
- C. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- E. Avoid cutting existing utilities, pipe, conduit or ductwork serving the building but scheduled to be removed or relocated until alternate provisions have been provided.
- F. Items to be salvaged and delivered to Owner shall be carefully removed and properly stored in an area easily accessible for removal by Owner.

1.4 PAYMENT FOR COSTS

- A. Costs associated with repair or replacement of non-coordinated or defective Work, or Work not conforming to Contract Documents, shall be paid by Contractor.

PART 2 - PRODUCTS

1.5 MATERIALS - GENERAL

- A. Use materials identical to existing materials.
- B. For exposed surfaces, use materials that visually match existing adjacent surfaces or use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used.
- C. Use materials whose installed performance will equal or surpass that of existing materials.
- D. Where applicable, comply with specifications for type of Work to be performed.

PART 3 - EXECUTION

1.6 INSPECTION

- A. Prior to the bid, Contractor shall review all existing facilities that are related to this contract and shall be familiar with all utility requirements and construction.
Existing facility documents may be available through the Owner for review.
- B. Perform preliminary investigations as required to ascertain extent of Work.
Conditions that would be apparent by such investigation will not be allowed as cause for claims for extra costs.
- C. Inspect existing conditions for work, including elements subject to movement or damage during:
 - 1. Cutting and patching.
 - 2. Excavating and backfilling.
- D. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
- E. Before proceeding, meet at Project Site with parties involved in cutting and patching, including mechanical and electrical trades.
 - 1. Review areas of potential interference and conflict.
 - 2. Coordinate procedures and resolve potential conflicts before proceeding.

- F. After uncovering existing conditions for Work, inspect conditions affecting installation of new products or Work.

1.7 PREPARATION PRIOR TO CUTTING

- A. Provide adequate shoring, bracing and support as required to maintain structural integrity of Project.
- B. Provide protection for other portions of Project that may be affected.
- C. Provide protection from adverse weather conditions.

1.8 CUTTING AND REMOVAL - GENERAL

- A. Execute fitting and adjustment to provide finished installation to comply with specified tolerances and finishes.
- B. Execute cutting by methods that will prevent damage to existing or other Work and will provide proper surfaces to receive installation of new Work.
- C. Perform backfilling as specified in applicable sections.
- D. Neatly cut and remove materials, and prepare all openings to receive new work.
- E. Remove masonry or concrete in small sections.
- F. Provide shoring, bracing, and other supports to prevent movement, settlement, or collapse of remaining or adjacent wall areas, structure, or facilities.
- G. Arrange shoring, bracing, and supports to prevent overloading of structure.
- H. Take all precautions necessary to prevent damage to existing remaining work or to adjacent facilities.
- I. Execute Work using methods that will prevent interference with use of remaining and adjacent facilities by Owner.
- J. Remove existing work indicated to be removed, or as necessary for installation of new Work.
- K. Provide for cutting, fitting, repairing, patching and finishing of Work disturbed by installation of new Work.
- L. Do not remove or damage fireproofing materials.
 - 1. Install hangers, inserts, supports, and anchors prior to installation of fireproofing.
 - 2. Repair or replace fireproofing damaged.

1.9 CUTTING IN CONCRETE CONSTRUCTION

- A. Do not cut into nor core drill openings or holes in beams, joists, and columns without prior written approval of Architect. When written approval is obtained, comply with additional requirements and instructions of Architect.
- B. In members other than beams, joists, and columns; where an opening larger than 10 inches in any dimension is required, or where dimension between 2 openings is less than 2 times maximum dimension of largest opening, and condition is not shown on architectural or structural drawings, obtain prior written approval of Architect.
 - 1. At floor slabs and walls to be core drilled or cut, contractor shall find and mark all reinforcing in both faces located by means of x-ray, pach-ometer, or prof-ometer. Submit sketch showing location of rebar and proposed cuts or cores for review.
 - 2. When written approval is obtained, comply with additional requirements and instructions of Architect.

1.10 CUTTING IN POST TENSIONED CONCRETE CONSTRUCTION

- A. Do not cut into nor core drill openings or holes in beams or joists.
- B. Do not cut into nor core drill openings or holes in slabs without prior written approval of Architect. When approval is obtained, comply with additional requirements and instructions of Architect.
- C. Openings not greater than 6 inches in any dimension are permitted in flat slab portions of construction except that such openings shall not interfere with or disturb strands. Do not place closer than 12 inches to any column face, or closer than 24 inches to any post tensioning strand anchor.

1.11 CUTTING IN PRECAST/PRESTRESSED CONCRETE CONSTRUCTION

- A. Do not cut openings or core drill vertically or horizontally through stems of members.
- B. Openings smaller than 6 inches diameter or 6 inches maximum dimension may be cut in flanges of units after obtaining prior written approval of Architect. When approval is obtained, comply with instructions of Architect.

1.12 CUTTING IN STEEL FRAME AND METAL DECK CONSTRUCTION

- A. Do not cut nor drill holes in webs and flanges of columns, beams, purlins, and joists without prior written approval of Architect. When approval is obtained, comply with requirements and instructions of Architect and provide reinforcing at such locations when required.
- B. When openings are cut into metal decks having cast-in-place concrete slab over metal deck:
 - 1. No reinforcing of holes is required for circular openings or sleeves up to 6 inches diameter and for rectangular openings having no side dimension greater than 6 inches.
 - 2. Reinforce openings greater than 6 inches.
 - 3. Obtain prior written approval of Architect for openings not shown on architectural or structural drawings. Comply with additional requirements and instructions of Architect.
- C. When openings are cut into metal roof decks that have lightweight insulating cementitious roof fill or no concrete cast-in-place over deck:
 - 1. No reinforcing of holes is required for circular openings less than 6 inches diameter and for rectangular openings having no side dimension greater than 6 inches.
 - 2. Reinforce openings between 6 inches and 12 inches, with 20 Gauge flat steel sheet 12 inches greater in dimension than opening; fusion weld to top surface of deck at each corner and on each side midway between corners.
 - 3. Do not cut openings greater than 12 inches without prior written approval of Architect. Comply with requirements and instruction of Architect.

1.13 MATCHING AND PATCHING

- A. Where items are removed from existing walls, ceilings, floors or partitions to remain, repair wall, ceiling, floor or partition disturbed by removal.
- B. Where walls, ceilings, floors or partitions are removed, repair abutting walls, ceilings or floors disturbed by removal.
- C. Where existing construction is cut, removed or otherwise disturbed to permit installation of new Work, match and patch existing disturbed construction.
- D. Use methods and materials similar in appearance, and equal in quality to areas or surfaces being repaired.
- E. Restore Work that has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.

- F. Patch Work must in every way possible match existing work and adjacent surfaces.
- G. Re-finish entire surfaces as necessary to provide an even finish to match adjacent finishes.
 - 1. Continuous surfaces: To nearest intersections.
 - 2. Assembly: Entire refinishing.
- H. In existing areas remove and replace existing ceilings and finishes for installation of Work, if not shown to be removed on Architectural Drawings and Schedules.
 - 1. If existing ceiling cannot be satisfactorily reinstalled, replace with like materials and construction.
 - 2. Replace damaged construction with like materials.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

- 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 15 days of the Notice to Proceed.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

- 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, both estimated and actual in tons.
 - 5. Quantity of waste recycled, both estimated and actual in tons.
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Universal certified by EPA-approved certification program.

- B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 024116 "Structure Demolition" and section 024119 "Selective Demolition."
 - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
 - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Comply with requirements in Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition" for salvaging demolition waste.
- B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items for Sale and Donation: Permitted on Project site.
- D. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site designated by Owner.
 - 5. Protect items from damage during transport and storage.
- E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

- G. Plumbing Fixtures: Separate by type and size.
- H. Lighting Fixtures: Separate lamps by type and protect from breakage.
- I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 4-inch size.
 - 2. Crush concrete and screen to comply with requirements in Section 312000 "Earth Moving" for use as satisfactory soil for fill or subbase.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 1-1/2-inch size.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.

- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- H. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- J. Carpet Tile: Remove debris, trash, and adhesive.
 - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- K. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.
- L. Conduit: Reduce conduit to straight lengths and store by material and size.
- M. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

- D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.
- C. Burning: Do not burn waste materials.

END OF SECTION 017419

SECTION 017700 - SUBSTANTIAL COMPLETION**PART 1 - GENERAL**

- 1.1 The Contractor is to furnish all labor, materials, and data necessary to achieve substantial completion in accordance with applicable Contract provisions.
- 1.2 Impacts resulting from the Contractor's failure to meet Substantial Completion per Contract requirements shall in no part become the subject of a claim for extension of time or for excess costs or damages by the Contractor.

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION****3.1 PREREQUISITES**

- A. The Contractor shall have completed all of the following items of work prior to requesting the Owner's Substantial Completion Inspection:
 1. Obtain a Non-Residential Use Permit for the Project or designated portion thereof.
 2. Equipment Demonstration and Owner Personnel Instruction.
 3. Maintenance Materials, Specialty Tools and Spare Parts
 - a. The Contractor shall provide any "special" or "proprietary" tools which may be required for general maintenance and service of equipment and systems.
 - b. In addition to the requirements of the technical specification sections the Contractor is to provide all materials, spare parts, tools, and "attic supplies" necessary for general operations and maintenance during the warranty period. Such items shall be packed in boxes clearly identifying:
 - I. The trade name and stock number
 - II. Where item material is to be used
 - III. The name, address and phone number of closest supplier
 - IV.
 4. Operation/Maintenance and Warranty Manuals (ref Specification 017823)
 5. If required by Contract, submission of LEED Certification Documentation (as detailed in Division 1 of the project specifications).
 - a. LEED documentation collected by the Contractor shall be assembled in a 3-ring binder in a format similar to the requirements for Operation/Maintenance and Warranty Manuals.
 - b. All LEED information shall be submitted two weeks prior to the date of Substantial Completion.
 6. Submission of As-Built drawings and specifications (ref Specification 017839)
 7. Submission of certificate of final inspection from city, county and/or state agencies in accordance with applicable codes, laws, and ordinances to include but not limited to:
 - a. VDOT
 - b. Contractor's Certified Arborist, if one is required
 - c. Fire Marshal

- d. For projects subject to the Fairfax County Special Inspections program, assure that the Special Inspections Engineer of Record has completed the Final Report of Special Inspections prior to seeking final building inspection.

8. Final Cleaning

- a. All items/surfaces shall be free of stains, dirt, damage, labels, foreign materials or other defects
 - b. Wash, sweep, polish or vacuum all finished wall surfaces, floors, windows, hardware, mirrors, lighting fixtures and items of equipment
 - c. Replace damaged or defaced items and re-clean items not acceptable to Owner/Architect
 - d. As appropriate broom clean exterior paved surfaces and rake clean other surfaces within the limits of the project site
 - e. As appropriate, clean ducts, blowers, coils, and replace air conditioning filters in all operating HVAC system(s)
 - f. Remove any remaining waste, surplus materials and/or rubbish from the site
 - g. Reference individual technical specifications for additional cleaning requirements
 - h. Final cleaning operations are to be conducted by a company experienced and licensed in such a service. Owner/Architect shall have right of review/approval of the cleaning subcontractor.
 - i. Coordinate cleaning materials/methods with the LEED requirements specified elsewhere.
9. Submission of a Non-Use of Asbestos Affidavit.
 10. Submission of final reports to the Owner/Architect for the testing, adjusting and environmental systems including, but not limited to: air distribution systems, hot water heating systems, chilled water systems, condenser water systems and the equipment and apparatus connected thereto.
 11. Demonstration in the Owner's off-site location that the Building Automation System graphics have been installed and that the systems can be remotely controlled/monitored. For the purpose of obtaining Substantial Completion, the Commissioning Agent shall verify the graphics and remote control are functional and that all systems are in general conformance with contract requirements. Note that detailed commissioning on a seasonal basis may not be complete at this time.
 12. All commissioning functional testing shall be completed satisfactorily prior to the issuance of substantial completion.

3.2 REQUEST FOR SUBSTANTIAL COMPLETION INSPECTION

- A. Upon completion of the Pre-Requisites for Substantial Completion the Contractor shall:
 1. Submit written certification to the Owner that the Project, or, subject to Owner approval, a designated portion of the Project, is substantially complete
 2. Submit a listing to the Owner/Architect of all items yet to be completed or to be corrected. If the Owner/Architect determines that the list of such items is incomplete or too extensive, the Owner reserves the right to delay the substantial completion inspection. Such delay shall have no cost impact to the Owner.
- B. Substantial Completion Inspection should start no later than five (5) working days after the Contractor's request and Owner/Architect concurrence of readiness. Inspection shall be made with representatives of the Contractor and the Owner/Architect.
 1. Should the joint inspection find that work is substantially complete the Owner/Architect shall prepare a punch list of items to be completed or corrected by the Contractor in conformance with the Contract documents.

The final punch list shall also include those items from all city, county and/or state agencies including but not limited to those identified in 3.1.A.7 above.

2. Should the joint inspection find that work is not substantially complete:
 - a. The Owner/Architect shall immediately notify the Contractor accordingly and follow up such notice in writing stating the reasons. In order to expedite the completion process a punch list of items to be completed or corrected may be also issued at this time. The Contractor shall complete all items on this punch list within forty five (45) calendar days after issuance and send a second written notice to the Owner certifying that the Project, or subject to Owner approval, a designated portion of the Project, is substantially complete.
 - b. Owner/Architect shall schedule a second inspection.

3.3 ISSUANCE OF CERTIFICATE OF SUBSTANTIAL COMPLETION

- A. The Architect shall prepare and issue a Certificate of Substantial Completion, AIA G704, for the signatures of Owner and Contractor, accompanied by a list of items remaining to be completed or corrected.
- B. The Contractor shall have thirty (30) calendar days after the established date of Substantial Completion to complete all items on the final punch list. The Owner shall have the option to correct or conclude by others any punch list item not completed by the Contractor by the 45th day. The cost of the work by others shall be deducted from the final payment to the Contractor.
- C. If the Contractor completes all items of work on the final punch list within the specified forty five (45) calendar days the date of the Certificate of Substantial Completion shall be the date from which all warranties and guarantees commence.
- D. If all items are not complete within forty five (45) calendar days, then all warranties and guarantees required in these specifications will become effective upon issuance of final payment for the project. It shall also state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the work, and insurance.
- E. The issuance of the Certificate of Substantial Completion does not indicate final acceptance of the project by the Owner and the Contractor is not relieved of any responsibility for the project except those outlined in the document.

END OF SECTION 017700

SECTION 017800 - CLOSE-OUT AND WARRANTY PERFORMANCE**PART 1 - GENERAL**

- 1.1 The Contractor is to furnish all labor, materials, and data necessary to support project close-out activities in accordance with applicable Contract provisions.
- 1.2 Impacts resulting from the Contractor's failure to achieve timely close-out shall in no part become the subject of a claim for extension of time or for excess costs or damages by the Contractor.
- 1.3 **RELATED SPECIFICATION SECTIONS**
 - A. Section D General Conditions
 - B. 017839 As-Built Documentation
 - C. 017700 Substantial Completion

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION****3.1 FINAL INSPECTION**

- A. The Contractor shall request final inspection once all Contract work has been confirmed as complete. Completion of work shall also include those items identified from all city, county and/or state agencies including but not limited to those identified in Section 017700 paragraph 3.1.A.7.
- B. Final Inspection should occur no later than ten (10) working days after the Contractor's request and Owner/Architect concurrence of readiness. Inspection(s) shall be made with representatives of the Contractor, state and local agencies and the Owner/Architect.
- C. Should the joint Final Inspection find that work is not complete:
 1. The Owner/Architect shall immediately notify the Contractor accordingly and follow up such notice in writing stating the reasons. In order to expedite the completion process, a punch list of items to be completed or corrected may be also issued at this time. The Contractor shall complete all items on this punch list within Seven (7) calendar days after issuance and send a second written notice to the Owner certifying that the Project is complete. The Owner has the right to complete any items not completed within time frames stated above and deduct all related costs from the Contract.
 2. Owner/Architect shall schedule a second inspection.

3.2 FINAL APPLICATION FOR PAYMENT

- A. Prior to submitting the Request for Final Payment, the Contractor shall submit the "Contractors Certificate of Final Completion" and all documents required therein. See Appendix A for a copy of the required Certificate.
- B. When the Owner/Architect notifies the Contractor that they find the work acceptable under the Contract documents and the Contract fully performed, and the Contractor has satisfactorily submitted the "Contractors Certificate of Final Completion" and all documents required therein, he may submit a Final Certificate for Payment.

3.3 WARRANTY PERFORMANCE

- A. The Contractor's Performance Bond shall remain effective throughout the life of all warranties and warranty extensions. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Owner will have the work performed by others, and after completion of the work, will charge any remaining contract funds for expenses incurred by the Owner while performing the work, including, but not limited to administrative expenses. In the event sufficient funds are not available to cover the construction warranty work performed by the Owner at the Contractor's expense, the Owner will have the right to recoup expenses from the Contractor's Bonding Company.
- B. Following oral or written notification of the required construction warranty repair work, the Contractor shall respond within one working day of his intentions/actions in pursuit of the warranty repair. The Owner will follow any oral instructions with written verification. Failure of the Contractor to respond will be cause for the Owner to proceed against the Contractor.
- C. Warranty Repair Priority
1. The severity of the warranty issue will be evaluated by the Owner and a Response Priority assigned to the notice as followings:
 - a. First Priority Code 1 – Contractor to provide on-site inspection to evaluate the situation and determine the course of action within four (4) hours, initiate the work within six (6) hours and work continuously to completion or relief.
 - b. Second Priority Code 2 – Perform on-site inspection to evaluate the situation and determine the course of action within eight (8) hours, initiate the work within 24 hours and work continuously to completion or relief
 - c. Third Priority Code 3 – Necessary work to be initiated within three working days and work performed during standard work hours each subsequent day to completion or relief.
- D. Contractor's Response to Construction Warranty Requirements
1. Following the oral or written notification by the Owner, the Contractor shall respond to construction warranty service requirements in accordance with the assigned Response Priority code. The Contractor shall submit a report within seven (7) calendar days after completion of activities on any warranty item that has been repaired during the warranty period. The report shall include:
 - a. The cause of the problem
 - b. The date/time reported
 - c. The assigned Response Priority Code
 - d. Corrective action taken
 - e. When repairs were completed
- E. If the Contractor does not perform the construction warranty items within the time frames specified above, the Owner retains the right to perform the work and recover all costs from the Contractor.

END OF SECTION 017800

SECTION 017839 - AS-BUILT DOCUMENTATION**PART 1 - GENERAL**

- 1.1 The Contractor is to furnish all labor, materials, and data necessary to maintain and produce project As-Built drawings and specifications in accordance with applicable Contract provisions.
- 1.2 Impacts resulting from the Contractor's failure to meet As-Built requirements shall in no part become the subject of a claim for extension of time or for excess costs or damages by the Contractor.
- 1.3 The terms 'drawings', "contract drawings", "drawing files", "working as-built drawings", and "final as-built drawings" all refer to contract drawings which are revised to be used for final as-built drawings.
- 1.4 **RELATED SPECIFICATION SECTIONS**
 - A. Section B GENERAL CONDITIONS
 - B. Section 017700 SUBSTANTIAL COMPLETION
 - C. Section 017800 CLOSE-OUT AND WARRANTY PERFORMANCE

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION****3.1 AS-BUILT POSTING DURING CONSTRUCTION**

- A. The Contractor shall revise paper drawings and specifications by red-line process to show the as-built conditions during the execution of the project. These working as-builts shall be kept current on a weekly basis and at least one set shall be available for review at the jobsite at all times. Changes from the contract documents which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes on the drawings. The working as-built documents will be jointly reviewed for accuracy and completeness by the Owner/Architect and the Contractor prior to each of the Contractor's monthly Applications for Payment.

3.2 PAYMENT

- A. Final payments will be held until the complete set of red-line drawings are submitted to and approved by the Project Officer.

3.3 CONTENT

- A. The As-Built packages shall be submitted as follows:
 1. As-Built Site Plan (Phase 2 Only)
 - a. The Contractor shall submit an as-built site plan prepared by a licensed Land Surveyor or licensed Professional Engineer, for review, and obtain approval by local authorities having jurisdiction for conformance with the approved site plan. Submission shall be one (1) mylar transparency and seven (7) black line printed copies and one (1) electronic copy. The as-built site plan shall be in accordance with the requirements of the Fairfax County Zoning Ordinance 17-300 for As-Built Site Plans. The Contractor shall pay any required filing, correction, and

resubmission fees at no additional cost to the Owner. Notify the Owner in writing when plan is submitted and when the local authorities have approved the submission.

- b. The Contractor shall confirm all project required storm sewer systems are properly installed and acceptable to the Owner prior to the site as-built submission. The Contractor shall video all pipes, structure, and other system components and obtain approval from the Owner for the storm sewer systems. The Contractor shall provide the Owner with two copies of the final approved videos on disk for all storm sewer components.
 - c. Submission information should minimally include the following:
 - 1) Boundary of the site
 - 2) Dimensional location/size of all building(s)
 - 3) All storm sewer, sanitary sewer, and fire hydrants, showing pipe sizes,
 - 4) lengths, top and invert elevations and percent of slope of pipe
 - 5) Deed book and page number of any dedication and all easements
 - 6) Location and cross-sectional survey of any storm water or bio retention areas(s)
 - 7) Certification by the engineer or surveyor indicating that the as-builts conform with the approved site plan except as shown and that it represents the actual conditions on the site, and bearing his signature and Virginia Registration Number
 - 8) Curb and gutter and/or ditch elevations
 - 9) Survey and record topographic elevations for all paving, sidewalks, stairs, ramps, and entrances to verify conformance with contract requirements. The County will use this specific information to confirm ADA accessibility for the site.
 - 10) Any other pertinent information as determined by the Owner/Architect
2. Sanitary Sewer As-Built Plan (Phase 2 Only)
- a. The Contractor shall submit a separate sanitary sewer as-builts for review and obtain approval by local authorities having jurisdiction. Submission shall be one (1) mylar transparency, seven (7) black line printed copies and one (1) electronic copy. The sanitary sewer as-built plan shall be in accordance with the requirements of the Fairfax County Public Facilities Manual 10-0104.6 Sanitary Sewer As-Built Plans. The Contractor shall pay any required filing, correction, and resubmission fees at no additional cost to the Owner. Notify the Owner in writing when plan is submitted and when the local authorities have approved the submission.
 - b. The Contractor is responsible to confirm all required sanitary sewer systems are properly installed and acceptable to the Owner prior to the sanitary sewer as-built submission. The Department of Public Works, Line Maintenance Division, shall video the sanitary sewer system to determine acceptability. The Contractor shall correct any and all deficiencies found in during this or other inspections at no cost to the Owner.
3. Project Record As-Built Plans (Phase 1 and 2)
- a. The Contractor shall submit two paper sets and two (2) electronic copies of red-lined Contract drawings and specifications for review and approval of the Owner/Architect. The documents should be marked to reflect actual civil, architectural, structural, electrical, plumbing, mechanical, and other trades final as-built conditions of the project.
 - b. Label each set of documents "RECORD AS-BUILTS". Have skilled draftspersons and typists transfer all changes, corrections, and entries.
 - c. Submission information should minimally include the following:
 - 1) Changes in details of design or additional information obtained from working drawings and specifications including but not limited to fabrication, erection, material changes/substitutions, installation plans and placing details, etc.
 - 2) Where contract drawings or specifications present options, only the option selected for construction shall be shown.

- 3) Changes or modifications resulting from the substantial completion or final inspections.
- 4) Changes or modifications brought about as a result of a Request for Information, Architect's Supplemental Instructions, Field Order, or Change Order.
- 5) Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
- 6) Final location and depth of all utilities on the property.
- 7) Field changes of dimension and/or detail.

END OF SECTION 017839

SECTION 024116 - STRUCTURE DEMOLITION**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of buildings and site improvements.
2. Removing or Abandoning in-place below-grade construction as indicated.
3. Disconnecting, capping or sealing, and removing site utilities.
4. Salvaging items for reuse by Owner.

B. Related Requirements:

1. Section 011000 "Summary" for use of the premises and phasing requirements.
2. Section 013233 "Project Reporting and Photographs" for preconstruction photographs taken before building demolition.
3. Section 024119 "Selective Demolition" for partial demolition of buildings, structures, and site improvements.
4. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of building demolition.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review structural load limitations of existing structures.
 - 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review and finalize protection requirements.
 - 5. Review procedures for noise control and dust control.
 - 6. Review procedures for protection of adjacent buildings.
 - 7. Review items to be salvaged and returned to Owner.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
 - 1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.
- D. Schedule of Building Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping of utility services.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before the Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

1.9 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: Hazardous materials are present in the existing building. The contractor shall remove and dispose of all hazardous materials in accordance with all federal state and local laws.
 - 1. The extent of the hazardous materials is outlined in the attached documents:
 - a. Report dated 11/22/2019 by ECS titled "LIMITED HAZARDOUS MATERIALS SURVEY: ROOFS AND EXTERIOR AREAS OF VEIRGINIA HOSPITAL CENTER."
 - b. Report dated 11/4/2019 by AMA, Inc. titled "HAZARDOUS MATERIALS INSPECTION REPORT OF THE VIRGINIA HOSPITAL CENTER FACILITY LOCATED AT 601 S. CARLIN SPRINGS ROAD ARLINGTON, VIRGINIA."
 - 2. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 3. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- E. On-site storage or sale of removed items or materials is not permitted.

1.10 COORDINATION

- A. Arrange demolition schedule so as not to interfere with operations of adjacent occupied buildings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

2.2 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.
- B. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Utilities to be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
 - 1. Owner will arrange to shut off utilities when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 4. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
 - 5. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.4 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.
- C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 - 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 - 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.5 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 - 2. Maintain fire watch during and for at least 1 hours after flame-cutting operations.
 - 3. Maintain adequate ventilation when using cutting torches.
 - 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
 - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

3.6 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- D. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures within the building footprint and beyond to the extent shown.
- E. Hydraulic Elevator Systems: Demolish and remove elevator systems, including cylinder, plunger, well assembly, steel well casing and liner, oil supply lines, and tanks.

3.7 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with according to backfill requirements in Section 312000 "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.8 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn demolished materials.

3.10 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
 - 1. Clean roadways of debris caused by debris transport.

END OF SECTION 024116

SECTION 024119 - SELECTIVE DEMOLITION**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
- B. Related Requirements:
 - 1. Section 011100 "Summary of Work" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before selective demolition, Owner will remove the following items:
 - a. All furniture and equipment.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- D. Hazardous Materials: Hazardous materials are present in the existing building. The contractor shall remove and dispose of all hazardous materials in accordance with all federal state and local laws. The extent of the hazardous materials is outlined in the attached documents:
1. Report dated 11/22/2019 by ECS titled "LIMITED HAZARDOUS MATERIALS SURVEY: ROOFS AND EXTERIOR AREAS OF VEIRGINIA HOSPITAL CENTER."
 2. Report dated 11/4/2019 by AMA, Inc. titled "HAZARDOUS MATERIALS INSPECTION REPORT OF THE VIRGINIA HOSPITAL CENTER FACILITY LOCATED AT 601 S. CARLIN SPRINGS ROAD ARLINGTON, VIRGINIA."
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch, as required by Owner, after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.

- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.8 SELECTIVE DEMOLITION SCHEDULE

- A. See Demolition drawings.

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Slabs-on-grade.
 - 2. Grade beams and foundations.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag; subject to compliance with requirements.

1.4 PERFORMANCE REQUIREMENTS

- A. Contractor shall not proceed with manufacture or procurement of cast-in-place or precast concrete elements until applicable shop drawings and mix designs are approved.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site. No water shall be added in the field unless identified in the submitted mix designs and marked on the batch ticket.
 - 2. Mix designs shall be prepared by and the submittal shall be signed and sealed by a professional engineer registered in the Commonwealth of Virginia in accordance with PWC-SIM.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1. Steel reinforcement drawings shall be prepared by and the submittal shall be signed and sealed by a professional engineer registered in the Commonwealth of Virginia in accordance with PWC-SIM.
- D. Formwork Shop Drawings: Placing and installation drawings that detail construction, bracing, and layout.
1. Formwork drawings shall be prepared by and the submittal shall be signed and sealed by a professional engineer registered in the Commonwealth of Virginia detailing fabrication, assembly, and support of formwork.
- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
1. Location of construction joints is subject to approval of the Architect.

1.6 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
 2. Admixtures.
 3. Steel reinforcement and accessories.
 4. Curing compounds.
 5. Bonding agents.
 6. Adhesives.
 7. Vapor retarders.
 8. Joint-filler strips.
 9. Repair materials.
- B. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- C. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- D. Field quality-control reports.
- E. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- G. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

- a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- F. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.
- 2.2 STEEL REINFORCEMENT
- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- D. Deformed-Steel Wire: ASTM A 496/A 496M.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- 2.3 REINFORCEMENT ACCESSORIES
- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

2. Blended Hydraulic Cement: ASTM C 595, Type IS, portland blast-furnace slag.

- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

- C. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.

- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings & Waterproofing, Inc.; Blackline 400.
 - b. Fortifiber Building Systems Group; Moistop Ultra 15.
 - c. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
 - d. Insulation Solutions, Inc.; Viper VaporCheck 16.
 - e. Meadows, W. R., Inc.; Perminator 15 mil.
 - f. Raven Industries Inc.; Vapor Block 15.
 - g. Reef Industries, Inc.; Griffolyn Type-105 15 mil Green.
 - h. Stego Industries, LLC; Stego Wrap 15 mil Class A.
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.8 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 - 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4000 psi at 28 days.
 - 2. Minimum Cementitious Materials Content: 540 lb/cu. yd..
 - 3. Slump Limit: 4 inches, plus or minus 1 inch.
 - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
 - 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
- B. Grade beams: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 4000 psi at 28 days.
 - 2. Minimum Cementitious Materials Content: 540 lb/cu. yd..
 - 3. Slump Limit: 4 inches, plus or minus 1 inch.
 - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
- C. Utility Trench Backfill: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 2500 psi at 28 days.
 - 2. Slump Limit: 4 inches, plus or minus 1 inch.

2.10 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 07920 "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
 - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces to receive trowel finish.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects or irregularities.
1. Apply a trowel finish to surfaces exposed to view.
 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Specified overall values of flatness, F_F 25; and of levelness, F_L 20; with minimum local values of flatness, F_F 17; and of levelness, F_L 15.
- D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Refer to Section 03360 for curing interior slabs-on-grade. Elsewhere, cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
 - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete

surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the Arlington County Special Inspections Manual. For building related concrete installations.
- B. Inspections:
1. Steel reinforcement placement.
 2. Verification of use of required design mixture.
 3. Concrete placement, including conveying and depositing.
 4. Curing procedures and maintenance of curing temperature.
 5. Verification of concrete strength before removal of shores and forms from beams/slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 6. Compression Test Specimens: ASTM C 31/C 31M.

- a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
- a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 033000

SECTION 04200 - UNIT MASONRY**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. 4", 6" 8", and 12" hollow and solid, concrete unit masonry.
2. Brick Masonry Units.
3. Masonry reinforcing.
4. Masonry accessories.
5. Weep system.
6. Mortars.
7. Grout.

- B. Related Sections: The following sections contain requirements that relate to this Section:

1. Section 076200 "Flashing and Sheet Metal" for exposed sheet metal flashing installed in masonry.

- C. Products installed but not furnished under this Section include the following:

1. Steel lintels in unit masonry are specified in Division 5 Section "Metal Fabrications" or on the structural lintel schedule.
2. Wood nailers and blocking built into unit masonry are specified in Division 6 Section "Rough Carpentry."
3. Hollow metal frames in unit masonry openings are specified in Division 8 Section "Hollow Metal Doors and Frames."

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following installed compressive strengths (f'm):

1. For concrete masonry units: f'm - 1900 psi
2. All masonry work shall conform with the requirements set forth on the structural drawings.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data: submit product data for each different masonry unit, accessory, and other manufactured product indicated.
- C. Samples: for initial selection purposes of the following:

1. Unit masonry samples in small-scale form showing full extent of colors and textures available for each different exposed masonry unit required.
 2. Colored masonry mortar samples showing full extent of colors available.
- D. Samples of the following for verification purposes:
1. Full-size units for each different exposed masonry unit required showing full range of exposed color, texture, and dimensions to be expected in completed construction.
 2. Colored masonry mortar samples for each color required showing the full range of colors expected in the finished construction. Label samples to indicate type and amount of colorant used.
 3. Accessories embedded in the masonry.
- E. Material certificates: for the following signed by manufacturer and Contractor certifying that each material complies with requirements.
1. Each different cement product required for mortar and grout including name of manufacturer, brand, type, and weight slips at time of delivery.
 2. Each material and grade indicated for reinforcing bars.
 3. Each type and size of joint reinforcement.
 4. Each type and size of anchors, ties, and metal accessories.
- F. Product data: cold-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard. BIA Technical Notes 1 and 1A.
- G. Product data: hot-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.
- H. Product Data: qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, telephone numbers, names of Architects and Owners, and other information specified.
- I. Material certificates: manufacturer of each type of block must submit a certified letter from an independent testing lab stating that for each block their is a max. shrinkage of 3%.

1.5 QUALITY ASSURANCE

- A. Unit Masonry Standard: Comply with ACI 530.1/ASCE 6 "Specifications for Masonry Structures," except as otherwise indicated.
1. Revise ACI 530.1/ASCE 6 to exclude Sections 1.4 and 1.7; Parts 2.1.2, 3.1.2, and 4.1.2; and Articles 1.5.1.2, 2.1.1.2, and 2.3.3.9. Articles 1.5.1.3 and 2.1.1.1 and Article 2.1.1.4 to remain.
 2. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, units will be tested for strength, absorption, and moisture content per ASTM C 140.
 3. Mortar properties will be tested per property specification of ASTM C 270.
 4. Mortar composition and properties will be evaluated per ASTM C 780.
 5. Grout compressive strength will be tested per ASTM C 1019.
- B. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related

surfaces.

- C. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.
- C. Store cementitious materials off the ground, under cover, and in dry location.
- D. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.
- D. Cold-Weather Construction: Comply with referenced unit masonry standard for cold-weather construction and the following:
 - 1. Do not lay masonry units that are wet or frozen.
 - 2. Remove masonry damaged by freezing conditions.
- E. Hot-Weather Construction: Comply with referenced unit masonry standard.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.

2.2 CONCRETE MASONRY UNITS

- A. Hollow Load-Bearing CMU's: ASTM C90, Grade N, normal weight, unit compressive strength of 1900 psi, Type I (moisture control units), max. shrinkage shall not exceed 3%.

1. 3-5/8" x 7-5/8" x 15-5/8".
2. 5-5/8" x 7-5/8" x 15-5/8".
3. 7-5/8" x 7-5/8" x 15-5/8".
4. 9-5/8" x 7-5/8" x 15-5/8".
5. 11-5/8" x 7-5/8" x 15-5/8".
6. All of the above shall include:
 - a. Bond beam units
 - b. Square edge units for outside corners.
 - c. Control joint units.
 - d. Bull nose units at corners.
 - e. Special shapes required by building configuration.

- B. Fire rated CMU shall conform to UL618 standards. Supply certificates for UL certification.

2.3 BRICK MASONRY UNITS

- A. All Exposed face brick shall match in color range, texture, and size the existing brick found on the building.

1. Existing brick is engineering size 3 5/8" deep, 2 3/4" high, and 7 5/8" long.

- B. Salvaged Brick: Contractor may reuse existing brick salvaged from demolition operations for repair and infill of exterior brick to remain.

1. Salvaged brick must be carefully removed, thoroughly cleaned and sorted.

2.4 MORTAR AND GROUT

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce required mortar color.

- B. Hydrated Lime: ASTM C 270, Type S.

- C. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.

- D. Aggregate for Grout: ASTM C 404.

- E. Water: Clean and potable, free of acids, alkalies and organic material.
- F. Antifreeze Compounds: Liquids, salts, etc., are not permitted.

2.5 REINFORCING STEEL (DOWELS)

- A. General: Provide reinforcing steel complying with requirements of referenced unit masonry standard and this article.
- B. Steel Reinforcing Bars:
 - 1. Billet steel complying with ASTM A 615 and ASTM A 775.
 - 2. Grade 60.

2.6 JOINT REINFORCEMENT

- A. General: Provide hot dipped galvanized joint reinforcement complying with requirements of referenced unit masonry standard and this article, formed from the following:
- B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and wire Diameter for Side Rods: 0.1483 inch (9 gage). Wire Diameter for Cross Rods: 0.1483 inch (9 gage).
 - 1. For single-wythe masonry provide type as follows with single pair of side rods: truss design with continuous diagonal cross rods spaced not more than 16 inches o.c.
 - 2. For multi-wythe masonry provide type as follows: Truss design with diagonal cross rods spaced not more than 16 inches o.c.
- C. Manufacturers: Subject to compliance with requirements, provide joint reinforcement by one of the following:
 - 1. AA Wire Products Co.
 - 2. Dur-O-Wal, Inc.
 - 3. Hohmann & Barnard, Inc.
 - 4. Masonry Reinforcing Corp. of America.
 - 5. National Wire Products Industries.
 - 6. Wire bond.

2.7 TIES AND ANCHORS, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AA Wire Products Co.
 - 2. Dur-O-Wal, Inc.
 - 3. Hohmann & Barnard, Inc.
 - 4. Masonry Reinforcing Corp. of America.
 - 5. National Wire Products Industries.
 - 6. Wire bond.
- B. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch

cover on outside face.

- C. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
- 1 Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
 - 2 Galvanized-Steel Sheet: ASTM A653/A653M, Commercial Steel, G60 zinc coating.
- D. Adjustable Masonry-Veneer Anchors:
- 1 General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
 - 2 Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
 - 3 Fabricate wire ties from 0.187-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.

2.8 POST-INSTALLED ANCHORS

- A. Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.

2.9 EMBEDDED FLASHING MATERIALS

- A. Sheet Metal Flashing: Fabricate from the following metal specified in Division 7 Section "Flashing and Sheet Metal" and below:
1. Stainless Steel

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Nonmetallic Expansion Joint Strips: Premolded filler strips complying with ASTM D 1056, Type 2 (closed cell), Class A (cellular rubber and rubber-like materials with specific resistance to petroleum base oils), Grade 1 (compression-deflection range of 2-5 psi), compressible up to 35 percent, of width and thickness indicated, formulated from the following material:
1. Neoprene.
- B. Preformed Control Joint Gaskets: Material as indicated below, designed to fit standard block and to maintain lateral stability in masonry wall; size and configuration as indicated.
1. Styrene-Butadiene Rubber Compound: ASTM D 2000, Designation 2AA-805.
- C. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use the following unless otherwise indicated:
1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- 1) Heckmann Building Products Inc.; No. 85 Cell Vent.
- 2) Hohmann & Barnard, Inc.; Quadro-Vent.
- 3) Wire-Bond; Cell Vent.

2.11 MASONRY CLEANERS

1. Sure Klean
2. MUREX by EUCLID Chemical Co.
3. BONSAL - Wr. Bonsal Co.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification for job-mixed mortar and ASTM C 1142 for ready-mixed mortar, of types indicated below:
 1. For masonry below grade and in contact with earth, and where indicated, use **Type S**.
 2. For reinforced masonry below grade and where indicated, use **Type S**.
 3. For exterior, above-grade loadbearing and nonloadbearing walls and parapet walls use **Type N**.
 4. For interior loadbearing walls; for interior nonloadbearing partitions, and for other applications where another type is not indicated, use **Type N**.
- C. Colored Mortar: Mortar color for exposed brick infills shall match the existing wall mortar color.
- D. Grout for Unit Masonry: Comply with ASTM C 476 and referenced unit masonry standard.

2.13 AIR AND WATER RESISTIVE BARRIER

- A. Apply an air and water resistive barrier to the exterior face (cavity side) of all CMU backup walls.
- B. Product shall be provided and installed in accordance with Division 07 Section "Fluid Applied Membrane Air Barriers".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with referenced unit masonry standard and other requirements indicated applicable to

each type of installation included in Project.

- B. Thickness: Build cavity walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.
- C. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.
- D. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.
- E. Cut masonry units with motor-driven saws to provide clean, sharp, non-chipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting where possible.

3.3 CONSTRUCTION TOLERANCES

- A. Comply with construction tolerances of referenced unit masonry standard. ACI 5301.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.
- B. Lay up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.
- C. Bond Pattern for Exposed Masonry: Lay exposed masonry in a running bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- E. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.
- F. Built-In Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
 - 1. At exterior frames insert closed cell neoprene insulation around perimeter of frame in thickness indicated but not less than 3/8 inch to act as a thermal break between frame and masonry.
 - 2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod grout into core.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.
 2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
 3. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- B. Set brick masonry units in full bed of mortar with all vertical joints slushed full. Fill dowel, anchor, and similar holes solid. Wet brick joint surface thoroughly before setting; clean bedding and exposed surfaces with fiber brush.
- 3.7 CAVITIES/AIR SPACES
- A. Keep cavities/air spaces clean of mortar droppings and other materials during construction. Strike joints facing cavities/air spaces flush.
- 3.8 SINGLE WYTHE HORIZONTAL JOINT REINFORCEMENT
- A. General: Provide continuous horizontal joint reinforcement as indicated. Install truss so that the longitudinal side rods are in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches. Install every 16" vertically.
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.
- 3.9 ANCHORING MASONRY TO STRUCTURAL MEMBERS
- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
 2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.
- 3.10 MOVEMENT (CONTROL AND EXPANSION) JOINTS
- A. General: Install control and expansion joints in unit masonry where indicated. Build in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.
- B. Form control joints in concrete masonry as follows:
1. For exterior walls, install preformed control joint gaskets designed to fit between standard sash block and concrete column. Install backer rod and caulk on both sides of cavity wall.

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide lintels where shown and wherever openings of more than 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide precast lintels where shown. Cure precast lintels before handling and installation.
 - 1. For hollow concrete masonry unit walls, use specially formed bond beam units with reinforcement bars placed as indicated and filled with coarse grout where shown.
- C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.12 FLASHING/WEEP HOLES

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
- B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer before covering with mortar.
- C. Install flashing as follows:
 - 1. At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 8 inches, and through the inner wythe to within 1/2 inches of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches at end to form pan, unless otherwise indicated.
 - 2. At heads and sills, extend flashing as specified above unless otherwise indicated.
 - 3. Install flashing in masonry veneer walls as specified above but carry flashing up face of sheathing at least 8 inches and behind air infiltration barrier/building paper.
 - 4. Interlock end joints of ribbed sheet metal flashings by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer and seal lap with elastomeric sealant complying with requirements of Division 7 Section "Joint Sealers" for application indicated.
 - 5. Turn down sheet metal flashings at exterior face of masonry to form drip.
 - 6. Cut off thru-wall flashing flush with face of wall after masonry wall construction is completed.
- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashings and as follows:
 - 1. Form weep holes with product specified in Part 2 of this Section.
 - 2. Space weep holes 24 inches o.c. if plastic tubes are used
 - 3. In insulated cavities/air spaces cover cavity/air space side of open plastic tube weep holes with copper or plastic insect screening.

3.13 INSTALLATION OF REINFORCED UNIT MASONRY

- A. General: Install reinforced unit masonry to comply with requirements of referenced unit masonry standard.
- B. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction if needed.
- C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
- D. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.14 FIELD QUALITY CONTROL

- A. Testing Frequency: Tests and evaluations listed in this article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.
 - 1. Mortar properties will be tested per property specification of ASTM C 270.
 - 2. Grout compressive strength will be sampled and tested per ASTM C 1019.

3.15 BRICK INFILL AT WINDOW OPENINGS

- A. At locations indicated, remove partial bricks at ends of existing openings. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.
 - 1. When removing single bricks, remove material from center of brick and work toward outside edges.
 - 2. Support and protect remaining masonry that surrounds removal area.
- B. Retain existing lintels, flashings, and weeps. Ensure existing weeps are clear and draining.
- C. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for brick replacement.
- D. Install infill brick into bonding and coursing pattern of existing brick.
 - 1. Maintain joint width for replacement units to match existing joints.
 - 2. Use setting buttons or shims to set units accurately spaced with uniform joints.
- E. Lay brick with rebuilding (setting) mortar and with completely filled bed, head, and collar joints. Butter ends with enough mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.) Use wetting methods that ensure that units are nearly saturated, but surface is dry when laid.
 - 1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
 - 2. When mortar is hard enough to support units, remove shims and other devices interfering with pointing of joints.

3.16 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings, and adjacent

construction to provide a neat, uniform appearance, prepared for application of sealants.

- C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent concrete and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
- D. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION 04200

SECTION 05 1200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY Special

A. Section Includes:

- 1. Structural steel.
- 2. Grout.

B. Related Sections:

- 1. Section 014000 "Quality Requirements" for independent testing agency procedures and administrative requirements.
- 2. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.

1.3 PERFORMANCE REQUIREMENTS

- A. Contractor, fabricator, detailer, and engineer shall comply with all requirements of the AISC.

- B. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.

- 1. Select and complete connections using schematic details indicated and AISC 360.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Show fabrication of structural-steel components.

- 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
- 2. Include embedment drawings.
- 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
- 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
- 5. Indicate locations and dimensions of protected zones.
- 6. Identify demand critical welds.
- 7. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
 - 1. Power source (constant current or constant voltage).
 - 2. Electrode manufacturer and trade name, for demand critical welds.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates. Note that no welders are allowed to work on this project without a submitted and approved certification.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Mill test reports for structural steel, including chemical and physical properties.
- D. Mill test reports for Product Test Reports: For the following:
 - 3. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 4. Direct-tension indicators.
 - 5. Tension-control, high-strength bolt-nut-washer assemblies.
 - 6. Shear stud connectors.
 - 7. Shop primers.
 - 8. Non-shrink grout.
- E. Source quality-control reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. ACSE for advanced certified steel erectors, CSE for certified steel erectors.
- C. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE.
- F. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P3 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- G. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- H. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 341 and AISC 341s1.
 - 3. AISC 360.

4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - I. Preinstallation Conference: Conduct conference at Project site.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
 - B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.
- 1.8 COORDINATION
 - A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
 - B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

- 2.1 STRUCTURAL-STEEL MATERIALS
 - A. W-Shapes: ASTM A 992/A 992M Grade 50.
 - B. Channels, Angles: ASTM A 36/A 36M.
 - C. Plate and Bar: ASTM A 36/A 36M.
 - D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
 - E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 1. Weight Class: Standard unless noted otherwise on drawings.
 2. Finish: Black except where indicated to be galvanized.
 - F. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.
 - G. Steel Forgings: ASTM A 668/A 668M.

H. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.

B. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.

1. Nuts: ASTM A 563 heavy-hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436, Type 1, hardened carbon steel.
4. Finish: Plain.

C. Threaded Rods: ASTM A 36/A 36M.

1. Nuts: ASTM A 563 heavy-hex carbon steel.
2. Washers: ASTM F 436, Type 1, hardened or ASTM A 36/A 36M carbon steel.
3. Finish: Plain.

2.3 PRIMER

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

C. Galvanizing Repair Paint: ASTM A 780.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
 - C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
 - D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
 - E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according SSPC-SP 3, "Power Tool Cleaning."
 - F. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated.
 - G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
- 2.6 SHOP CONNECTIONS
- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
 - B. Weld Connections: Comply with AWS D1.1/D1.1M[and AWS D1.8/D1.8M] for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.
- 2.7 SHOP PRIMING
- A. Primer is not considered a finish coat where exposed or finished metals are required.
 - B. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 4. Galvanized surfaces.
 - C. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 3, "Power Tool Cleaning."
- D. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- E. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.
- 2.8 GALVANIZING
- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
 2. Galvanize lintels, shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.
- 2.9 SOURCE QUALITY CONTROL
- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports in accordance with Arlington County Special Inspection requirements.
1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 3. Ultrasonic Inspection: ASTM E 164.
 4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of baseplate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with Arlington County Special Inspections Manual. For building related concrete installations.
- B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.
 - 1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 - 2. Primer is not considered a finish coat where exposed or finished metals are required.

END OF SECTION 051200

SECTION 05 4000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Exterior non-load-bearing wall framing.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Contractor's Superintendent
 - 2. Independent Testing Agency for Special Inspections
 - 3. Light gage material Supplier & Installer

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

- 1. Cold-formed steel framing materials.
 - 2. Exterior non-load-bearing wall framing.
 - 3. Vertical deflection clips.
 - 4. Single deflection track.
 - 5. Double deflection track.
 - 6. Drift clips.
 - 7. Post-installed anchors.
 - 8. Power-actuated anchors.
 - 9. Sill sealer gasket.
 - 10. Sill sealer gasket/termite barrier.

- B. Shop Drawings:

- 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.

2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Delegated-Design Submittal with calculations: For cold-formed steel framing. Signed and sealed by Professional Engineer in the Commonwealth of Virginia.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Product Certificates: For each type of code-compliance certification for studs and tracks.
- D. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
1. Steel sheet.
 2. Expansion anchors.
 3. Power-actuated anchors.
 4. Mechanical fasteners.
 5. Vertical deflection clips.
 6. Horizontal drift deflection clips
 7. Miscellaneous structural clips and accessories.
- E. Research Reports:
1. For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
 2. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated on Drawings.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of the wall height.
 - 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
 - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1/2 inch (13 mm).
 - 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
 - 1. Floor and Roof Systems: AISI S210.
 - 2. Wall Studs: AISI S211.
 - 3. Headers: AISI S212.
 - 4. Lateral Design: AISI S213.
- D. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

2.2 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G90 (Z275) or equivalent.

- B. Steel Sheet for Vertical Deflection Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
1. Grade: As required by structural performance.
 2. Coating: G90 (Z275).

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
 2. Flange Width: 1-5/8 inches (41 mm) or 2 inches (51 mm).
 3. Section Properties: as required by design.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: Matching steel studs.
 2. Flange Width: 1-1/4 inches (32 mm).
- C. Vertical Deflection Clips: Manufacturer's standard bypass and/or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
 2. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
 - b. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications.
 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
 - b. Flange Width: Dimension equal to sum of outer deflection track flange width plus 1 inch (25 mm).
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Gusset plates.
 - 8. Stud kickers and knee braces.
 - 9. Joist hangers and end closures.
 - 10. Hole-reinforcing plates.
 - 11. Backer plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction.
 - 1. Uses: Securing cold-formed steel framing to structure.
 - 2. Type: Adhesive anchor.
 - 3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20.

- B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Non-shrink Grout: Factory-packaged, nonmetallic, noncorrosive, non-staining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multi=monomer, non=leaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.
- F. Sill Sealer Gasket/Termite Barrier: Minimum 68-mil (1.7-mm) nominal thickness, self-adhering sheet consisting of 64 mils (1.6 mm) of rubberized asphalt laminated on one side to a 4-mil- (0.10-mm-) thick, polyethylene-film reinforcement, and with release liner on adhesive side[; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction].
 - 1. Physical Properties:
 - a. Peel Adhesion: 17.0 lb/in of width (2.9 N/mm of width) when tested in accordance with ASTM D412.
 - b. Low-Temperature Flexibility: Pass at minus 25 deg F (minus 32 deg C) when tested in accordance with ASTM D146/D146M.
 - c. Water Vapor Permeance: 0.05 perm (0.44 ng/Pa x s x sq. m) maximum when tested in accordance with ASTM E96/E96M, Method B.
 - d. Resistance to Termite Penetration: Comply with ICC-ES AC380.

2.7 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:
1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.
- E. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- 3.4 INSTALLATION OF EXTERIOR NONLOADBEARING WALL FRAMING
- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to [top and] bottom track unless otherwise indicated. Space studs as follows:
1. Stud Spacing: 12 inches (305 mm) or 16 inches (406 mm) as required by design.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
1. Install single deep-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
 4. Connect drift clips to cold-formed steel framing and anchor to building structure.

- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 1. Install solid blocking at centers indicated on Shop Drawings.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.6 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes the following metal fabrications:
 - 1. Rough hardware.
 - 2. Loose steel lintels.
 - 3. Applications where framing and supports are not specified in other sections.
 - 4. Steel pipe railings at site stairs, guardrails and other locations.
 - 5. Steel framing and supports for mechanical and electrical equipment.

1.3 DEFINITIONS

- A. Definitions in ASTM E 985 for railing-related terms apply to this section.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Structural Performance of Handrails and Railing Systems: Design, engineer, fabricate, and install handrails and railing systems to comply with requirements of VSUBC 1 ASTM E 985 for structural performance based on testing performed in accordance with ASTM E 894 and E 935.
- B. Guardrail Design and Construction: Guardrails shall be designed and constructed to withstand the following loads.
 - 1. Concentrated load of 200 lbf applied at any point non-concurrently, vertically downward, or horizontally.
 - 2. Combined 100 lbf vertical uniform loading plus 50 lbf horizontal uniform loading.
- C. Handrails Not Serving as Guardrails: Capable of withstanding the following loads applied as indicated:
 - 1. Concentrated load of 200 lbf applied at any point non-concurrently, vertically downward or horizontally.
 - 2. Uniform load of 50 lbf per linear foot applied non-concurrently, vertically downward or horizontally
- D. Infill Area of Guardrail Systems shall be designed and constructed to withstanding a horizontal concentrated load of 200 lbf applied to one sq. ft. at any point in the system including panels, intermediate rails balusters, or other elements composing the infill area.
 - 1. Above load need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress on guard.
- E. Engineer engaged in design shall be licensed in the State of Virginia.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1

Specification Sections.

- B. Product data: for products used in miscellaneous metal fabrications, including paint products and grout.
- C. Shop drawings: detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
- D. Samples representative of materials and finished products as may be requested by Architect.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.
- F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, and other information specified.
- G. Environmental certifications as required by 1.8.A&B below.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Installer Qualifications: Arrange for installation of metal fabrications specified in this section by same firm that fabricated them.
- C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code - Aluminum."
- D. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. All metal fabrications provided for this job shall be Manufactured within 500 miles of the jobsite. The fabricator shall submit a written certification verifying this fact.
- B. All metal fabrications provided for this job shall contain a minimum of 90% recycled material (75% post-consumer steel). The fabricator shall submit a written certification verifying this fact.

PART 2 - PRODUCTS

2.1 FERROUS METALS

METAL FABRICATIONS

- A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Bars for Gratings: ASTM A 569 or ASTM A 36.
- D. Wire Rod for Grating Cross Bars: ASTM A 510.
- E. Steel Tubing: Product type (manufacturing method) and as follows:
 - 1. Cold-Formed Steel Tubing: ASTM A 500, Grade A.
 - a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.
- F. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:
 - 1. Black finish, unless otherwise indicated.
 - 2. Galvanized finish for exterior installations and where indicated.
 - 2. Type F, standard weight (schedule 40), unless otherwise indicated, or another weight, type, and grade required by structural loads.

2.2 GROUT AND ANCHORING CEMENT

- A. Heavy-duty Nonshrink Metallic Grout: Premixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C 621, specifically recommended by manufacturer for heavy duty loading applications of type specified in this section.
- B. Erosion-Resistant Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include but are not limited to the following:
 - 1. Nonshrink Metallic Grouts:
 - a. "Metox RM"; Chem-Masters Corp.
 - b. "Hi Mod Grout"; Euclid Chemical Co.
 - c. "Embeco 885 and 636"; Master Builders.
 - 2. Interior Anchoring Cement:
 - a. "Bonsal Anchor Cement"; W. R. Bonsal Co.
 - b. "Por-Rok"; Minwax Construction Products Division.
 - c. EMBECO products.

2.3 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- C. Lag Bolts: Square head type, ASTM-A27.
- D. Machine Screws: Cadmium plated steel, ASTM-307.
- E. Wood Screws: Flat head carbon steel, ASTM-307.
- F. Plain Washers: Round, carbon steel, ASTM-A325.
- G. Drilled-In Expansion Anchors: Expansion anchors complying with Group VIII (anchors, expansion, [nondrilling]), Type I (internally threaded tubular expansion anchor); and machine bolts complying with ASTM-A354 Grade 5.
- H. Lock Washers: Helical spring type carbon steel, ASTM-A325.

2.4 PAINT

- A. Shop Primer for Ferrous Metal: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of SSPC-Paint 11.
- B. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and complying with SSPC-Paint-20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.
- D. Zinc Chromate Primer: SSPC-Paint 11.

2.5 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 100 degrees F (55.5 degrees C).
- D. Shear and punch metals cleanly and accurately. Remove burrs.

- E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld corners and seams continuously to comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water.

2.6 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.7 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. See lintel schedule on structural drawings.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of one inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.

2.8 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - 2. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide x 1/4-inch x 8 inches long.
- C. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior and interior locations where indicated.
 - 2. Refer to structural drawings for additional information.

2.9 STEEL PIPE RAILINGS AND HANDRAILS

- A. General: Fabricate pipe railings and handrails to comply with requirements indicated for design dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 - 1. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
- C. Form changes in direction of railing members as follows:
 - 1. By insertion of prefabricated elbow fittings.
 - 2. By radius bends.
- D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
- F. Close exposed ends of pipe by welding 3/16-inch-thick steel plate in place or by use of prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4 inch or less.
- G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.
 - 1. For railing posts set in concrete fabricate sleeves from steel pipe not less than 6 inches long and with an inside diameter not less than 1/2 inch greater than the outside diameter

- of post, with steel plate closure welded to bottom of sleeve.
2. Provide friction fit, removable covers designed to keep sleeves clean and hold top edge of sleeve 1/2 inch below finished surface of concrete. Weld and grout smooth and level with the surface of the concrete.
- H. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.
- I. For interior steel railings and handrails formed from steel pipe with galvanized finish, galvanize fittings, brackets, fasteners, sleeves, and other ferrous components.
- J. For interior steel railings formed from steel pipe with black finish, provide nongalvanized ferrous metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
- K. All exterior handrails and guardrails shall be galvanized using the hot dip process and then field painted in accordance with Division 09 "Painting". Field painting shall provide a "Heavy Duty" finish. Paint color shall be as directed by the architect.
- 2.10 FINISHES, GENERAL
- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
 - B. Finish metal fabrications after assembly.
- 2.11 STEEL FINISHES
- A. Galvanizing: For those items indicated for galvanizing, apply zinc-coating by the hot-dip process compliance with the following requirements:
 1. ASTM A 153 for galvanizing iron and steel hardware.
 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.
 - B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.3 INSTALLATION OF STEEL PIPE RAILINGS AND HANDRAILS

- A. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
- B. Anchor posts in concrete by core drilling holes not less than 5 inches deep and 3/4 inch greater than outside diameter of post. Clean holes of all loose material, insert posts and fill annular space between post and concrete with the nonshrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's directions.
 - 1. Cover anchorage joint with a round steel flange attached to post by set screws.
 - 2. Anchor posts to steel by welding with steel oval flanges, angle type or floor type as required by conditions.
 - 3. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
 - 4. Anchor rail ends to steel with steel oval or round flanges welded to rail ends and welded to steel weld plates, unless otherwise indicated.
- C. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:

1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 2. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
 3. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 4. For hollow masonry anchorage, use toggle bolts having square heads.
 5. For steel framed gypsum board assemblies, fasten brackets directly to steel framing or concealed anchors using self-tapping screws of size and type required to support structural loads.
- D. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of posts.
- 3.4 ADJUSTING AND CLEANING
- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.
1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061023 – MISCELLANEOUS ROUGH CARPENTRY**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

This Section includes the following:

- 1. Wood grounds, nailers, and blocking.
- 2. Wood furring interior and exterior.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use as well as design values approved by the Board of Review of American Lumber Standards Committee.
- C. Wood treatment data, including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material.
 - 1. Warranty of chemical treatment manufacturer for each type of treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.
 - 1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- C. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

D. All exterior wood (blocking and nailers, etc.) shall be pressure treated.

2.2 LUMBER

A. Exterior framing, blocking, equipment cribbing, roof cants: No. 2 dimension Southern Yellow Pine.

B. Interior furring, framing, blocking: No. 2 dimension Southern Yellow Pine.

C. Telephone and equipment mounting panels: CD Int APA, 3/4 in. thick.

1. Interior: Grade A exposed and Grade D concealed American Plywood Association Standards (APA).

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: ASTM-C 514

C. Power Driven Fasteners: National Evaluation Report NER-272.

D. Wood Screws: ANSI B18.6.1.

E. Lag Bolts: ANSI B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.4 PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS

A. General: All exterior lumber or plywood shall be preservative-treated wood to comply with applicable requirements of AWWA Standards C2 (Lumber) and C9 (Plywood). Mark each treated item with the AWPB or SPIB Quality Mark Requirements.

B. Pressure-treat above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. For interior uses, after treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood floor plates installed over concrete slabs directly in contact with earth.

- C. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.
- E. Countersink nail heads on exposed carpentry work and fill holes.
- F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Install blocking to attach upper casework. See drawings for cabinet locations. Coordinate with casework man for installation.
- C. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

3.3 WASTE MANAGEMENT

- A. Separate wood waste in accordance with the waste management plan.
- B. Separate the following categories for salvage or reuse on site:
 - 1. Sheet materials larger than 2 Sq. Ft.
 - 2. Framing members larger than 16"
 - 3. Multiple offcuts of any size larger than 12"
- C. The following categories may be used in the manufacture of particle board or medium density fiberboard:

1. Composite wood (for example, plywood, OSB, LVL, I-Joist, Parallel strand, laminated strand, MDF, particle-board.
 2. Clean dimensional lumber
- D. Set aside damaged wood for acceptable alternative uses; for example, use as bracing, blocking, cripples or ties.
- E. Do not burn Lumber.
- F. Separate the following categories for disposal and place in designated areas for hazardous materials.
1. Treated, stained, painted or chemically contaminated wood.
- G. Sequence the work to minimize the use of temporary HVAC to dry out building and control humidity.

END OF SECTION 061000

SECTION 061600 – SHEATHING**PART 1 – GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Sheathing at framed exterior walls and soffits as shown on the drawings.
- B. Related Sections include the following:
 - 1. Division 7 section "Fluid Applied Membrane Air Barriers" for building wrap applied over sheathing

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WALL AND SOFFIT SHEATHING

- A. Manufacturers shall be one of the following and shall comply with the requirements in Part B below.
 - 1. Georgia Pacific - Dens Glass
 - 2. National Gypsum – Extended Exposure Sheathing
 - 3. United States Gypsum – Sheetrock gypsum sheathing panels
- B. Product requirements
 - 1. Thickness: Not less than 5/8" inch (16mm).
 - 2. Width: 4'-0"
 - 3. Length: 8'-0", 9'-0" or 10'-0"
 - 4. Weight (lbs/M sq. ft., nominal): 2500
 - 5. Surfacing: Fiberglass mat
 - 6. Racking strength (lbf./ft. (dry): < or = 650
 - 7. Flexural strength, parallel, lbf. (4' direction): 100
 - 8. Humidified deflection, inches: 2/8"
 - 9. Permeance (perms): 12

10. R-value: .67
11. Linear variation with change in moisture (in./in./%RH): 6.25×10^{-6}
12. Bending radius: 8'
13. Compressive strength: Min. 500 PSI.

2.2 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
- B. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

2.3 FASTENERS

- A. General: Provide stainless steel screws min 2" long.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 1. NES NER-272 for power-driven fasteners.
 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
- D. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting.
- E. Coordinate wall and soffit sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.
- H. Install all wall and soffit sheathing in strict accordance with the sheathing manufacturer's published procedures and recommendations.

END OF SECTION 061600

SECTION 072100 - BUILDING INSULATION**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Extruded polystyrene foam-plastic board for vertical perimeter slab insulation.
 - 2. Mineral-wool board insulation for formed metal wall panels.
 - 3. Glass fiber blanket insulation for exterior stud walls.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Section 075423 "Thermoplastic-Polyolefin (TPO) Roofing" for roof insulation.
 - 2. Section 092900 "Gypsum Board and Framing" for thermal insulation and sound attenuation insulation installed as part of metal-framed wall and partition assemblies. See drawings for partition types.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data for each type of insulation product specified.
- C. Samples of insulation for initial selection purposes.

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristic: ASTM E 84.
 - 2. Fire Resistance Ratings: ASTM E 119.
 - 3. Combustion Characteristics: ASTM E 136.
- B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's recommendations for handling, storage, and protection during installation.
- B. Protect plastic insulation as follows:
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time.
 - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2- PRODUCTS

2.1 VERTICAL PERIMETER INSULATION

- A. Extruded Polystyrene Board Insulation: ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.
- B. Rigid, cellular polystyrene thermal insulation with closed-cells and integral high-density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for type indicated; with 5-year aged r-values, per inch, of 5.4 and 5 at 40 and 75 deg F, respectively. Material provided shall be 2" thick, **R-10.0**.
- C. Acceptable Manufacturers
 - 1. Amoco Foam Products Company
 - 2. Owens Corning
 - 3. Dow Chemical company

2.2 BOARD INSULATION FOR FORMED METAL WALL PANELS

- A. Mineral-Wool Board Insulation, Unfaced: ASTM C612, Types IA and IB; passing ASTM E136 for combustion characteristics.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Rockwool International.
 - c. Thermafiber, Inc.; an Owens Corning company.
- C. Nominal Density: 4 lb/cu. ft..
- D. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
- E. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
- F. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.3 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Reinforced-Foil Faced <Insert drawing designation>: ASTM C665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. CertainTeed Corporation.

- b. Johns Manville; a Berkshire Hathaway company.
- c. Knauf Insulation.
- d. Owens Corning.
- C. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.4 UNDERSLAB VAPOR BARRIER / RETARDER

- A. See Division 03 Section "Cast In Place Concrete".

2.5 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation or mechanical anchors securely to substrates indicated without damaging or corroding either insulation, anchors, or substrates.
- B. Adhesively Attached Pin Anchors: Perforated plate, 2 inches square, welded to projecting pin, with self-locking washer, complying with the following requirements:
 - 1. Plate: Zinc-plated steel, 0.106 inch thick.
 - 2. Pin: Copper-coated low carbon steel, fully annealed, 0.106 inches in diameter, length to suit depth of insulation indicated and, with washer in place, to hold insulation tightly to substrate behind insulation.
 - 3. Self-Locking Washer: Mild steel, 0.016-inch-thick, size as required to hold insulation securely.
 - a. Where spindles will be exposed to human contact after installation, protect ends with capped self-locking washers.
- C. Protection Board: Premolded, semi-rigid asphalt/fiber composition board, 1/4-inch-thick, formed under heat and pressure, standard sizes.
- D. Protective Coating: Premixed, ready-to-use, 100% acrylic protective coating for rigid foam foundation insulation.
 - 1. Trowel applied with reinforcing mesh.
 - 2. Product: Styro Industries Tuff II or approved equal.

2.6 BATT INSULATION IN EXTERIOR STUD WALLS

- A. Manufacturers:
 - 1. Knauf – EcoBatt – Basis of design
 - 2. Owens Corning
 - 3. Johns Manville

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions with Installer present, for compliance with requirements of the Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.
- B. Extend insulation full thickness as indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement.
- C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- c. Stuff glass fiber insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume (to a density of approximately 2.5 pcf).

3.5 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation and waterproofing
- B. Protect below-grade insulation on vertical surfaces (from damage during back-filling) by application of protection board if necessary. Set in adhesive in accordance with recommendations of manufacturer of insulation.

3.6 INSTALLATION OF FORMED METAL WALL PANELS INSULATION

- A. Mineral-Wool Board Insulation: Install insulation fasteners 4 inches from each corner of board insulation, at center of board, and as recommended by manufacturer.
 - a. Fit courses of insulation between Z girts, with edges butted tightly in both directions, and with faces flush.
 - b. Press units firmly against inside substrates.

3.7 INSTALLATION OF BLANKET INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - a. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - b. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - c. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - d. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
 - i. Exterior Walls: Set units with facing placed toward interior of construction.

3.8 PROTECTION

- A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Vapor-retarding, fluid-applied air barriers.
- B. Vapor-permeable, fluid-applied air barriers.

1.2 RELATED SECTIONS

- A. Section 061600 "Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.

1.3 REFERENCES

- A. ASTM E96-00e1 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
- B. ASTM E2178-01 - Standard Test Method for Air Permeance of Building Materials.
- C. ASTM E2357 - 05 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

1.4 SUBMITTALS

- A. Comply with Division 01 Section "Submittals".
- B. Qualification Data: For Installer
- c. Submit manufacturer's product data and application instructions.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Air Barrier Installer shall be currently accredited under the Air Barrier Association of America (ABAA) and ensure applicators are certified in accordance with the ABAA Quality Assurance Program.
 - 2. Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the air barrier.
 - a. Air Barrier Installer performing Work shall be approved by air barrier membrane manufacturer.
- B. Obtain air/vapor barrier materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.

- C. Store at temperatures above 32° F (0° C), free from contact with cold or frozen surfaces.
- D. Protect materials during handling and application to prevent damage or contamination.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not proceed with product application during rain or inclement weather.
- C. Do not apply membrane when air or surface temperatures are below 30° F (-1° C).
- D. Do not apply to frozen substrate.

PART 2 PRODUCTS

1.1 MATERIALS

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

1.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.3 AIR BARRIERS, VAPOR RETARDING

- A. Vapor-Retarding Air Barrier: Synthetic polymer membrane for installation over CMU walls in formed metal wall panel walls.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Henry Company; Air-Bloc 32MR
 - b. Tremco Incorporated; ExoAir 130.
 - c. W.R. Meadows, Inc; Air-Shield LM.
 - 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.
 - b. Vapor Permeance: Maximum 0.1 perm; ASTM E96/E96M, Desiccant Method.
 - c. Ultimate Elongation: Minimum 500 percent; ASTM D412, Die C.
 - d. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D4541.
 - e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

1.4 AIR BARRIERS, VAPOR PERMEABLE

- A. Vapor-Permeable Air Barrier: Synthetic polymer membrane for installation over gypsum sheathing in brick veneer on metal stud walls.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
- a. Henry Company; Air-Bloc® 31MR.
 - b. Tremco Incorporated; ExoAir 230.
 - c. W.R. Meadows, Inc; Air-Shield LMP.
2. Physical and Performance Properties:
- a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.
 - b. Vapor Permeance: Minimum 10 perms; ASTM E96/E96M, Desiccant Method, Procedure A.
 - c. Ultimate Elongation: Minimum 200 percent; ASTM D412, Die C.
 - d. Adhesion to Substrate: Minimum 16 lbf/sq. in. <Insert value> when tested according to ASTM D4541.
 - e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

1.5 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
 - 3. Verify that substrates are visibly dry and free of moisture.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge isolation joints discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

- A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
 - 3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 - 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

- E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
 - 1. Transition Strip: Roll firmly to enhance adhesion.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal strips and transition strips around ties and penetrations with termination mastic.
- H. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

- A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.
 - 1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
 - 2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 - 3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.
- B. Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
 - 1. Vapor-Retarding, High-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 35 mils, applied in one or more equal coats.
 - 2. Vapor-Permeable, High-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 35 mils, applied in one or more equal coats.
- C. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components

3.4 PROTECTION

- A. Cover air/vapor barrier membrane as soon as possible, since it is not designed for permanent exposure.

END OF SECTION 072726

SECTION 074213 - FORMED METAL WALL PANELS**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. A. Exposed fastener metal wall panels.

B. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

C. Shop Drawings:

- 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.

- 1. Include Samples of trim and accessories involving color selection.

E. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:

- 1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings.
 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed, exposed fastener panels with interconnecting side joints, fastened to supports with exposed fasteners, with field-applied sealants in side laps when required to meet performance requirements.
- B. Profile: Ribbed profile with lap joint.
 - 1. Panel Coverage: 36 inches.
 - 2. Panel Height: 1.50 inches.
 - 3. Rib Spacing: 5 at 7.20 inches o.c.
- C. Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - 1. AEP Span; A BlueScope Steel Company; HR-36.
 - 2. CENTRIA Architectural Systems; BR5-36.
 - 3. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company; 7.2 Panel.
- D. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - 1. Nominal Thickness: 0.034 inch.
 - 2. Exterior Finish: Two-coat fluoropolymer.
 - 3. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.4 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.3 INSTALLATION

- A. General: Install metal wall panels in accordance with manufacturer's written instructions and approved shop drawings. Install metal wall panels in orientation, sizes, and locations indicated. Anchor metal wall panels and other components securely in place.

- B. Attach panels to metal framing using recommended screws, fasteners, sealants, and adhesives indicated on approved shop drawings.
 - 1. Fasteners for Steel Wall Panels: Stainless-steel for exterior locations and locations exposed to moisture; carbon steel for interior use only.
 - 2. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
 - 3. Dissimilar Materials: Where elements of metal wall panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.
- C. Joint Sealers: Install joint sealants where indicated on approved shop drawings.
- D. Accessory Installation: Install accessories with positive anchorage to building and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- E. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
 - 1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213

SECTION 074633 - VINYL SIDING**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Vinyl siding.
 - 2. Water resistive barriers
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for wood furring, grounds, nailers, and blocking.

1.3 COORDINATION

- A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Initial Selection: For vinyl siding including related accessories.
- C. Samples for Verification:
 - 1. 12-inch-long-by-actual-width Sample of siding.
 - 2. 12-inch-long-by-actual-width Samples of trim and accessories.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For vinyl siding Installer.
- B. Product Certificates: For each type of vinyl siding.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with labels intact until time of use.
- B. Store materials under cover.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

2.2 VINYL SIDING

- A. Vinyl Siding: Integrally colored product complying with ASTM D3679.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Alside.
 - 2. CertainTeed Corporation.
 - 3. Gentek Building Products, Inc.
- C. Horizontal Pattern: 8-inch exposure in plain, double, 4-inch board style.
- D. Texture: Smooth.
- E. Nominal Thickness: 0.040 inch.
- F. Minimum Profile Depth (Butt Thickness): 1/2 inch.
- G. Nailing Hem: Double thickness.
- H. Colors: As selected by Architect from manufacturer's full range of colors.

2.3 WATER-RESISTIVE BARRIER

- A. Building Paper: ASTM D226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.

2.4 ACCESSORIES

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
 - 1. Provide accessories made from same material as adjacent siding unless otherwise indicated.
- B. Vinyl Accessories: Integrally colored vinyl accessories complying with ASTM D3679 except for wind-load resistance.
 - 1. Texture: Smooth.
- C. Fasteners:
 - 1. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch, or three screw-threads, into substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of vinyl siding and related accessories.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

3.3 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
 - 1. Apply barrier to cover vertical flashing with a minimum 4-inch (100-mm) overlap unless otherwise indicated.
- C. Building Paper: Apply horizontally with a 2-inch (50-mm) overlap and a 6-inch (150-mm) end lap; fasten to sheathing with galvanized staples or roofing nails.

3.4 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
 - 1. Center nails in elongated nailing slots without binding siding to allow for thermal movement.

- B. Install vinyl siding and related accessories according to ASTM D4756.
 - 1. Install fasteners for horizontal vinyl siding no more than 16 inches o.c.
- C. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

3.5 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074633

SECTION 075419 - POLYVINYL-CHLORIDE (PVC) ROOFING**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Adhered Polyvinyl-Chloride (PVC) roofing system.
2. Substrate board.
3. Roof insulation.
4. Cover board.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashing, metal coping, and roof drainage.
3. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Tapered insulation layout, thickness, and slopes.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples: For the following products:

1. Roof membrane and flashings, of color required.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of compliance with performance requirements.
2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Research reports.

D. Field quality-control reports.

- E. Sample warranties.
- 1.4 CLOSEOUT SUBMITTALS
- A. Maintenance data.
 - B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.
- 1.5 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A qualified manufacturer that is UL Listed for roofing system identical to that used for this Project.
 - B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- 1.6 WARRANTY
- A. Provide manufacturer's 20-year Total System Warranty, covering both labor and material, with no dollar limitation. The maximum wind speed coverage shall be 110 miles per hour measured at 10 meters above ground level. Certification is required with the submittal package indicating the manufacturer has reviewed and agreed to such wind coverage.

PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS
- A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.
 - 1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
 - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
 - B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
 - C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897.
 - D. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - E. Fire-Resistance Ratings: Provide products and assembly that comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.
 - 1. Roof/Ceiling assembly: UL P214.

2.2 POLYVINYL-CHLORIDE (PVC) ROOFING

- A. PVC Keytone Ethylene Ester (KEE) Alloy Sheet: ASTM D4434/D4434M, Type III.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle SynTec Incorporated.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Versico Roofing Systems.
 2. Thickness: 80 mils, nominal.
 3. Exposed Face Color: White.

2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet..
- C. Bonding Adhesive: Manufacturer's standard, water based.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- F. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 ROOF INSULATION

- A. General: Preformed roof insulation boards the comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.
- B. Mineral Wool Insulation - Single Density: ASTM C726, Type II, Class 1, comprising monolithic fibrous material having 12.5-lb/cu. ft. density.
1. Thermal Resistance: R-value of 4.0 per inch (25.4 mm).
 2. Size: 48 by 48 inches (1219 by 1219 mm).
 3. Thickness: Install in two layers with total R-Value of 30.
- C. Tapered Insulation: Provide factory-tapered insulation boards.
1. Material: Match roof insulation.
 2. Minimum Thickness: 1/4 inch.

3. Slope:
 - a. Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

2.5 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer:
- D. Cover Board: ASTM C1289 Type II, Class 4, Grade 1, 1/2-inch-thick polyisocyanurate, with a minimum compressive strength of 80 psi.

EXECUTION

2.6 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

2.7 PREPARATION

- A. Clean existing roof deck by blowing off with compressed air so all dirt, debris and scale is removed.
- B. Repair any existing holes in roof deck using similar deck or sheet metal of a similar thickness.

2.8 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Install roofing system to comply with the fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.
- D. Install roof membrane and auxiliary materials to tie into existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

2.9 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so that insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
 1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.

- a. Locate end joints over crests of decking.
- b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
- c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
- d. Fill gaps exceeding 1/4 inch with insulation.
- e. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- f. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
- g. Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

2.10 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. Cut and fit cover board tight to nailers, projections, and penetrations.
 3. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - a. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

2.11 ADHERED ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel
- D. Accurately align roof membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

2.12 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.

- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
 - C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
 - D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
 - E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- 2.13 PROTECTING AND CLEANING
- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
 - B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
 - C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200 - FLASHING AND SHEET METAL**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Metal counter flashing and base flashing.
 - 2. Formed low-slope roof sheet metal fabrications: Copings, Downspouts, Scuppers and Conductor Heads.
- B. Roofing accessories installed integral with roofing membranes are specified in roofing system sections as roofing work (except counter flashing).

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data, Flashing, Sheet Metal, and Accessories: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.
- C. Samples of the following flashing, sheet metal, and accessory items:
 - 1. 8-inch-square samples of specified sheet materials to be exposed as finished surfaces.
- D. Shop drawings showing layout, profiles, methods of joining, and anchorages details, including major counter-flashings, copings, downspouts, and scuppers. Provide layouts at 1/4-inch scale and details at 3-inch scale.

1.4 PROJECT CONDITIONS

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. Stainless steel: 0.025" (24 GA.) ASTM A240 Type 304.
 - 1. Provide stainless steel for concealed flashings. Provide hemmed drip edge where through wall flashing penetrates the outer wythe of masonry.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet in accordance with ASTM A792/A792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating

process to comply with ASTM A755/A755M.

1. Surface: [Smooth, flat] [Embossed] [and mill phosphatized for field painting] [and with manufacturer's standard clear acrylic coating on both sides].
2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Color: Match existing exposed coping color.

2.2 Miscellaneous Materials and Accessories:

- A. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
- B. Bituminous Coating: SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
- C. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealers."
- D. Paper Slip Sheet: 5-lb. rosin-sized building paper.
- F. Reglets: Metal units of type and profile indicated, compatible with flashing indicated, noncorrosive.
- G. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

2.3 FABRICATED UNITS

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.
- E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by

coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

2.4 COPINGS, SCUPPERS, DOWNSPOUTS AND CONDUCTOR HEADS

- A. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Shop fabricate interior and exterior corners.
1. Coping Profile: As shown to match existing profile and fascia exposure.
 2. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate.
 3. Fabricate from the following materials:
 - i. Metallic-Coated Steel Sheet: 0.040 inch (20 ga.) thick.
- B. Downspouts: Fabricate rectangular, smooth downspouts, SMACNA 1-32B, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors.
1. Metallic-Coated Steel Sheet, 0.040 inch (20 ga.) thick.
 2. Downspout hanger design: SMACNA 1-35G.
 3. Splash blocks: Provide one 12" x 24" x 3" thick concrete splash block at the base of each downspout.
- C. Parapet Scuppers: Fabricate scuppers of dimensions shown on the drawings with closure flange trim to the exterior, 4" wide wall flanges to the interior and base extending 4" beyond cant or tapered strip into field of roof.
1. Material: Stainless steel 26 ga.
 2. Standard: Comply with SMACNA figure 1-26
- D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape indicated on the drawings with outlet tubes and exterior flange trim.
1. Metallic-Coated Steel Sheet, 0.027 inch (24 ga.) thick.
 3. Standard: Comply with SMACNA figure 1-25F

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Copings: Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.
1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.
 2. Anchor interior leg of coping with gasketed screw fasteners through slotted holes at 24-inch centers.
- D. Parapet Scuppers:

1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, and under roofing membrane.
 2. Solder exterior wall scupper flanges into back of conductor head.
- D. Downspouts:
1. Join sections with 1-1/2-inch telescoping joints.
 2. Provide hangers with fasteners designed to hold downspouts securely to walls.
 3. Locate hangers at top and bottom and at approximately 60 inches o.c.
 4. Provide mitered elbows at base of downspout to direct water away from building.
- G. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper discharge.
- D. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.2 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Protection: Contractor shall protect flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION 076200

SECTION 078100 - APPLIED FIRE PROTECTION**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sprayed fire-resistive materials.
- B. Field Verification: Contractor shall field verify that existing construction to receive spray fire-resistive materials meets the proposed UL Design requirements. Deviations shall be reviewed by the spray fire-resistive materials manufacturer and alternative Design or an engineering judgement shall be applied at no additional cost.

1.3 DEFINITIONS

- A. SFRM: Sprayed fire-resistive materials.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Sprayed fire-resistive material.
 - 2. Substrate primers.
 - 3. Bonding agent.
 - 4. Metal lath.
 - 5. Reinforcing fabric.
 - 6. Reinforcing mesh.
 - 7. Sealer.
 - 8. Topcoat.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of sprayed fire-resistive material.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by sprayed fire-resistive material manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fire protection when ambient or substrate temperature is 44 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fire protection, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fire protection dries thoroughly.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Assemblies: Provide fire protection, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fire protection for each fire-resistance design from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- D. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

- A. UL Fire resistance Directory Design Designations: Provide Sprayed Fire-Resistive Materials complying with Underwriters Laboratory listing that matches the existing construction.
 - 1. Fifth floor at landing: 1-hour rating UL G701 or similar.
 - 2. Roof at landing: 1-hour rating UL P701 or similar.
- B. Sprayed Fire-Resistive Material: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application or conveyed in a dry state and mixed with atomized water at place of application.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. GCP Applied Technologies Inc.; Grace Construction Products; Monokote MK-6 Series.

- b. [Isolatek International](#); Cafco 300.
 - c. [Southwest Fireproofing Products Co.](#); Type 5GP.
2. Bond Strength: Minimum 150-lbf/sq. ft. cohesive and adhesive strength based on field testing according to ASTM E736.
3. Density: Not less than density specified in the approved fire-resistance design, according to ASTM E605.
4. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E605, whichever is thicker, but not less than 0.375 inch.
5. Combustion Characteristics: ASTM E136.
6. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 10 or less.
7. Corrosion Resistance: No evidence of corrosion according to ASTM E937.
8. Deflection: No cracking, spalling, or delamination according to ASTM E759.
9. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours according to ASTM E859.

2.3 AUXILIARY MATERIALS

- A. Provide auxiliary materials that are compatible with sprayed fire-resistive material and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by sprayed fire-resistive material manufacturer and complying with one or both of the following requirements:
 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for sprayed fire-resistive material and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E736.
- C. Bonding Agent: Product approved by sprayed fire-resistive material manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and sprayed fire-resistive material manufacturer's written instructions. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive sprayed fire-resistive material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.

1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fire protection with substrates under conditions of normal use or fire exposure.
 2. Verify that objects penetrating fire protection, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 3. Verify that substrates receiving fire protection are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fire protection application.
- B. Conduct tests according to sprayed fire-resistive material manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Cover other work subject to damage from fallout or overspray of fire protection materials during application.
- B. Clean substrates of substances that could impair bond of fire protection.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by sprayed fire-resistive material manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fire protection.
- 3.3 APPLICATION
- A. Construct fire protection assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fire protection Work.
- B. Comply with sprayed fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fire protection; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fire protection with other construction to minimize need to cut or remove fire protection.
1. Do not begin applying fire protection until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
 2. Defer installing ducts, piping, and other items that would interfere with applying fire protection until application of fire protection is completed.
- D. Metal Decks:
1. Do not apply fire protection to underside of metal deck substrates until concrete topping, if any, is completed.

2. Do not apply fire protection to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fire protection.
 - E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and sprayed fire-resistive material manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by sprayed fire-resistive material manufacturer.
 - F. Spray apply fire protection to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by sprayed fire-resistive material manufacturer.
 - G. Extend fire protection in full thickness over entire area of each substrate to be protected.
 - H. Install body of fire protection in a single course unless otherwise recommended in writing by sprayed fire-resistive material manufacturer.
 - I. Provide a uniform finish complying with description indicated for each type of fire protection material and matching finish approved for required mockups.
 - J. Cure fire protection according to sprayed fire-resistive material manufacturer's written instructions.
 - K. Do not install enclosing or concealing construction until after fire protection has been applied, inspected, and tested and corrections have been made to deficient applications.
- 3.4 FIELD QUALITY CONTROL
- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 1. Test and inspect as required by the IBC, as indicated on Schedule of Special Inspections.
 - B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fire protection for the next area until test results for previously completed applications of fire protection show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
 - C. Fire protection will be considered defective if it does not pass tests and inspections.
 1. Remove and replace fire protection that does not pass tests and inspections, and retest.
 2. Apply additional fire protection, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
 - D. Prepare test and inspection reports.
- 3.5 CLEANING
- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

3.6 PROTECTION

- A. Protect fire protection, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fire protection is without damage or deterioration at time of Substantial Completion.

3.7 REPAIRS

- A. As installation of other construction proceeds, inspect fire protection and repair damaged areas and fire protection removed due to work of other trades.
- B. Repair fire protection damaged by other work before concealing it with other construction.
- C. Repair fire protection by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 079200 - JOINT SEALANTS**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes joint sealants for the following locations:
1. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
 - a. Control joints in unit masonry.
 - b. Perimeter joints at windows and door frames.
 - c. Other joints as indicated.
 2. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
 - a. Perimeter joints of exterior openings where indicated.
 - b. Other joints as indicated.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 076200 "Flashing and Sheet Metal" for sealing joints related to flashing and sheet metal for roofing.
 2. Section 074213 "Formed Metal Wall Panels" for panel sealants used with exterior metal wall panels.
 3. Section 321373 "Concrete Paving Joint Sealants" for exterior joints in concrete and asphalt paving.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data from manufacturers for each joint sealant product required.
- C. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products presenting manufactures product color sample, for each product exposed to view where required.
- D. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- E. All final submittal must be accompanied with the manufacture's Published Safety Data information.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance. Must demonstrate a certificate of education from the manufacturer of materials used.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.
- C. Preconstruction Field Testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:
 - 1. Locate test joints where indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect one week in advance of the dates and times when mock-ups will be erected.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4.4 deg C).
 - 2. When joint substrates are not wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.
- D. Do not fill any joints that exceed 2 inches with liquid sealants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealants to comply with the following:
 - 1. Provide custom colors to match Architect's samples where required.
 - 2. Samples must be approved by Architect before installation.
 - 3. All Sealants shall be packaged in recyclable containers.
 - 4. All empty containers shall be collected and placed for recycling.

2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses.
- B. Available Products: Subject to compliance with requirements, elastomeric sealants that may be incorporated in the Work include, but are not limited to, the products specified in each Elastomeric Sealant Data Sheet.
- c. ALL Exterior Joins shall meet the following ASTM Standards:
 - a. ASTM C920
 - b. ASTM C794
 - c. ASTM C1087 (to all attached substrates)
 - d. ASTM C1135 and D412 50%+-
 - e. ASTM 1248 – non-staining determination
 - f. ASTM C793
 - g. ASTM C603
- d. All sealants used on interior walls for Rest Rooms, Janitor Closets, Areas of Food Preparations, or medical treatment areas must demonstrate the following standards:
 - 1. ASTM C661 with a Shore A hardness rating or higher
 - 2. Fungi Resistance – “No Growth” per CDPH v1.1-2010 or later
 - 3. ASTM D-412

2.3 LATEX JOINT SEALANTS (interior application only)

- A. General: Provide manufacturer's standard one-part, non-sag, fungi-resistant, paintable latex sealant of formulation indicated that is recommended for exposed applications on interior and protected exterior locations and that accommodates indicated percentage change in joint width existing at time of installation without failing either adhesively or cohesively.
- B. Acrylic-Latex Sealant: Provide product complying with ASTM C 834 that accommodates joint movement of not more than 7.5 percent in both extension and compression for a total of 15 percent movement.
- C. ASTM Materials Standards for interior latex based sealants are:

- a. ASTM C732 (100% modulus psi 60 or more)
 - b. ASTM C736 (Adhesion loss of 0.5 or less)
 - c. ASTM D412
 - d. ASTM C734
 - e. ASTM 02203
 - f. ASTM C733 (no greater than 28)
- D. Available Products: Subject to compliance with requirements, latex joint sealants that may be incorporated in the Work include, but are not limited to, the following:
1. Acrylic-Emulsion Sealant:
 - a. "AC20," Pecora Corp.
 - b. "Sonolac," Sonneborn Building Products Div., ChemRex, Inc.

2.4 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834 and the following requirements:
- B. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90.
- C. Product has flame spread and smoke developed ratings of less than 25 per ASTM E 84.
- D. Sealant must be tested in accordance of ASTM C919 and demonstrate assembly reference equal to ASTM E 90
- E. Must demonstrate Sound Transmission Class of 48 or better
- F. All through penetrations shall not have 0 clearance to all acoustical sound rated walls.
- G. Available Products: Subject to compliance with requirements, acoustical joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 1. Acoustical Sealant:
 2. "SHEETROCK Acoustical Sealant," United States Gypsum Co.
 3. "AIS 919," Pecora Corp.
- H. Acoustical Sealant for Concealed Joints:
 1. "AIS 919" Pecora Corp.
 2. "Tremco Acoustical Sealant," Tremco, Inc.
 3. Acoustical Sealant, General Electric Company

2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, non-outgassing in unruptured state.
- C. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26 deg F (-32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIAL

- i. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.
- ii. All primers, if necessary, must be applied on the mock-up with associated sealant and tested per ASTM C1193 per section 1.5.2
- iii. Primers must be non-staining to any substrate they are applied to.
- iv. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces and formulated to promote optimum adhesion of sealants with joint substrates.
- v. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints. (Remove tape immediately after sealant application.)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint

- substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
 2. Install band breakers tape between sealants where backer rods are not used between sealants and joint fillers or back of joint.
- E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

- F. Tooling of Non-Sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents.
 - 1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 2. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
 - 3. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth 1 and at locations indicated.

3.4 CLEANING

- A. Clean adjacent surfaces of excess sealant and sealant droppings as the work progresses, using solvents or cleaning agents recommended by the manufacturer for the specific surfaces to be cleaned.
- B. Upon completion of sealant installation, remove all associated debris, empty containers and surplus sealant from the jobsite. Do not leave "Attic Stock" on the premises.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

PART 4 – MEASUREMENT AND PAYMENT

- A. Payment will be made on the basis of the lump sum bid prices and shall constitute full compensation for all materials, equipment, labor and incidentals necessary to complete the work of this Section as drawn and specified.

PART 5 - JOINT SEALER SCHEDULE

Designation	Joint Sealer	Location where joint sealer is typically applied (see note below)
ES 1	One-Part STPU	Painted exterior joints or around exterior fenestrations that are to be painted.
ES 2	Silicone Sealant	One-Part Fluid Free Non- Staining Nonacid-Curing exterior and interior joints in vertical surfaces of concrete and masonry; between metal and concrete, mortar, or stone; interior and exterior perimeter joints of metal frames in exterior walls; and exterior overhead joints.
LS	Acrylic-Emulsion Sealant	Interior joints in field-painted vertical and overhead surfaces at perimeter of hollow metal door frames; in gypsum drywall, and concrete, or concrete masonry; and all other interior joints

not indicated otherwise.

Note: Install joint sealer indicated in joints fitting descriptions and locations listed as well as in locations identified on Drawings.

ELASTOMERIC JOINT SEALANT DATA

Elastomeric Joint Sealant Designation: ES 1

Base Polymer: STPU

Type: S (single component).

Grade: NS (non-sag).

Class: 25.

Additional Movement Capability: 25 percent movement in extension and 25 percent in compression for a total of 50 percent movement.

Use[s] Related to Exposure: T (traffic) and NT (nontraffic).

Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

Use O Joint Substrates: Galvanized steel, brick, CMU, and ceramic tile.

Available Products:

1. NR-201 or Dynatrol 1-XL, Pecora Corp.
2. Or Equal

Warranty – 5 years

ELASTOMERIC JOINT SEALANT DATA

Elastomeric Joint Sealant Designation: ES 2

Base Polymer: Neutral-curing fluid-free, non-staining silicone.

Type: S (single component).

Grade: NS (non-sag).

Class: 50

Additional Movement Capability: 50 percent movement in extension and 50 percent in compression for a total of 100 percent movement.

Use[s] Related to Exposure: NT (nontraffic).

Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

Use O Joint Substrates: Galvanized steel, brick, masonry, ceramic tile, and wood.

Field Tintable; Color to be submitted to Architect for approval.

Available Products:

1. 790 - Dow Corning
2. 890FTS (versions) - Pecora Corp.

Warranty – 20 years

ELASTOMERIC JOINT SEALANT DATA

Elastomeric Joint Sealant Designation: LS

Base Polymer: Acrylic Latex (or Latex/silicone blend)

TYPE: S (single component)

Class: 12.5

Uses: NT (Non-Traffic)

Interior joints in field-painted vertical and overhead surfaces at perimeter of hollow metal door frames; in gypsum drywall, and concrete, or concrete masonry; and all other interior joints not indicated otherwise.

Available Products

1. AC20 – Pecora Corporation
2. Or Equal

Warranty – 5 years

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

- 1. Work under this section covers furnishing of commercial grade hollow metal doors and frames.

B. Related Documents

- 1. Related documents, drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 specification section apply to this work.

C. Related Sections

- 1. Division 8 Section – “Door Hardware”
- 2. Division 9 Section – “Painting”

1.3 REFERENCES

A. Products supplied in this section must comply with standards as established by:

- 1. ANSI/SDI 100 – Recommended Specifications for Standard Steel Doors and Frames (ANSI/A250.8)
- 2. A.S.T.M. A366 – Specifications for Steel, Carbon, Cold Rolled Sheet, Commercial Quality
- 3. A.S.T.M. A568 – Specifications for Steel, Carbon and High Strength Low Alloy Hot Rolled Strip, and Cold Rolled Sheet, General Requirements
- 4. A.S.T.M. A924 – Specifications for Steel Sheet, Zinc Coated (galvanized) by the Hot Dip Process, General Requirements
- 5. A.S.T.M. A653 – Specifications for Steel Sheet, Zinc Coated (galvanized) by the Hot Dip Process, Commercial Quality
- 6. NFPA 80 – Standard for Fire Doors and Fire Windows, 1999
- 7. SDI 105 – Recommended Erection Instructions for Steel Frames, current edition
- 8. SDI 107 – Hardware on Steel Doors, current edition
- 9. UL 10C – Fire Listed Products, 1998

1.4 SUBMITTALS

A. General Requirements

- 1. Submit copies of the hollow metal door and frame shop drawings in accordance with Division 1, General Requirements.

B. Product Data

1. Submit shop drawings for fabrication and installation of hollow metal doors and frames in accordance with Section 013000 "Submittals". Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements and details of joints and connections. Show anchorage and necessary items required for installation. Submit manufacturers technical product data substantiating that products comply with the requirements.

C. Shop Drawings

1. Shop drawings should include the following information:
 - a. Material thickness and/or gauge
 - b. Door core material
 - c. Mortises and reinforcements
 - d. Anchorage types
 - e. Location of exposed fasteners
 - f. Mounting locations of standard hardware

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications

1. Obtain doors and frames from a single manufacturer, although several may be indicated as offering products complying with requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver doors cardboard wrapped or crated to provide protection during transit and jobsite storage.
- B. Mark all doors and frames with opening numbers as shown on the contract documents and shop drawings.
- C. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided refinished items are equal in all respects to new work and acceptable to the architect. Otherwise, remove and replace damaged goods as directed.
- D. Direct factory shipments will not be allowed unless coordinated between the supplier and general contractor. Upon receipt of a direct factory shipment, a qualified representative from the supplier shall visit the jobsite and assist the general contractor in verifying that the material is both complete and correct.
- E. Store doors and frames at building site under cover. Place units on minimum four-inch-high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create a humidity chamber. If cardboard wrapper on doors becomes wet, remove carton immediately. Provide ¼" spaces between stacked doors to promote air circulation.

1.7 WARRANTY

- A. All doors and frames shall be warranted in writing from the manufacturer against defects and workmanship for a period of one (1) year commencing on the date of final completion and acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. All doors and frames shall be as manufactured by Curries Company. The following list of manufacturers is acceptable by submitting compliance test data information certifying products as equal to Curries performance standards.
1. Ceco Corporation
 2. Curries Company
 3. Republic Steel Products
 4. Steelcraft

2.2 MATERIALS

- A. All doors and frames to be manufactured of commercial quality, stretcher leveled flatness cold rolled steel per A.S.T.M. A366 and A568 general requirements or galvanized steel sheet shall be as per A.S.T.M. A924 or A653 hot dip galvanized to A60 minimum coating weight standard. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per A.S.T.M. A569.
- B. Supports and anchors shall be fabricated of not less than 16-gauge steel sheet, galvanized where galvanized frames are used.

2.3 FRAMES

- A. Comply with A.N.S.I./A250.8. Provide metal frames for doors of types and styles as shown in contract drawings and schedules. Conceal fastenings unless otherwise indicated. Frame types, anchor requirements and locations shall be detailed on plans. Frames shall comply with A.N.S.I./S.D.I. A250.5-1994 Level A, one million cycle swing test performance for a 4070-door frame.
- B. All exterior frames minimum 14-gauge and to be galvanized (A60). Provide steel mortar boxes, welded to frame, at back of hardware cutouts where installed in masonry openings. Protect inside throat of each frame in grout filled wall conditions or where antifreeze additives are used in fill, with a waterproof undercoating type material minimum 1/8" thick, field applied by the installer.
- C. Fabricate frames with mitered and face welded corners, ground smooth and re-primed at welded areas. All welds to be flush with neatly mitered or butted material cuts. Provide temporary shipping bars to be removed prior to setting frames.
- D. All frames shall have minimum seven-gauge hinge reinforcements, 14-gauge lock strike reinforcing, and 12-gauge closer reinforcements as required.
- E. Except on frames with weather-stripping, drill stops to receive three (3) silencers on strike jambs of single frames and two (2) silencers on heads of double frames.
- F. All frames shall be bonderized and finished as standard with one coat of baked-on prime paint.

2.4 DOORS

- A. Comply with A.N.S.I./A250.8/S.D.I. 100. Provide 1-3/4" thick metal doors as specified on plans and in accordance with performance levels defined in A.N.S.I./A250.8/S.D.I. 100 and A.N.S.I./S.D.I. A250.4-1994 Test Procedure and Acceptance Criteria for Physical Endurance. Door size cycle tested to be 4070 to minimum Level A performance for 18-gauge or 16-gauge door. Door gauge and core material shall be as follows:

1. Exterior doors (707):

- a. Exterior doors shall be minimum 16-gauge and to be galvanized (A60) with polyurethane core permanently bonded to the inside of each face sheet providing rigidity, insulating and sound deadening properties to the door.
- B. All doors shall have one-piece lock edge reinforcing, full height, 14-gauge channel. Door hinge edge reinforcing shall be one-piece full height 14-gauge channel at standard doors and 12-gauge at reinforced sound transmission classification metal doors, formed and tapped for hinges. Both hinge and lock channels to be welded to each face sheet of the door and may have an exposed seam, in the center, at interior doors and welded, filled and ground smooth the full height of the door at exterior locations.
- C. Top and bottom of doors shall be closed with a minimum 16-gauge steel channel, welded to the face sheets. At exterior locations the top of all doors shall be closed flush by the addition of a 16-gauge screwed-in top cap to prevent water infiltration. The top of the door at reinforced metal openings shall be flush with an additional 16-gauge channel welded in place.
- D. All doors shall have a beveled (1/8" in 2") lock edge and square hinge edge.
- E. All doors shall be bonderized and finished as standard with one coat of baked-on prime paint.

2.5 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Where practical, fit and assemble units in manufacturers plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with A.N.S.I./S.D.I. 100 requirements.
 1. Clearances shall be no more than 1/8" at jambs and heads. There shall be not more than 3/4" clearance at the bottom of doors.
- B. Fabricate exposed faces of doors and panels from only cold rolled steel sheet.
- C. Tolerances shall comply with S.D.I.-117 Manufacturing Tolerances Standard Steel Doors and Frames.
- D. Fabricate concealed stiffeners, reinforcements, edge channels, louvers and moldings from either cold or hot rolled steel sheet.
- E. Unless otherwise specified, provide exposed fasteners with countersunk flat or oval heads for exposed screws and bolts.
- F. Prepare doors and frames to receive mortised and concealed hardware according to the approved and final door hardware schedule and templates provided by the hardware supplier. Comply with applicable requirements of S.D.I.-107 and A.N.S.I.-A115 Series specifications for door and frame preparation for hardware.
- G. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface applied hardware may be done at the Project site. Provide internal reinforcements for all doors to receive door closers and exit devices.
- H. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institutes (DHI) Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.

- I. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers and other panels in doors.
- J. Provide hat, flat or "Z" astragals as required, at pairs of doors, to prevent tampering with the lockset latch bolt from the secure side of the opening.
- K. Provide screw-applied, removable glazing beads on inside of glass and other panels in doors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install steel doors, frames and accessories according to shop drawings, manufacturers data and as specified.
- B. Comply with provisions of S.D.I.-105 Recommended Erection Instructions for Steel Door Frames, unless otherwise indicated. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set to wall construction. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 1. Except for frames located in existing concrete, masonry or gypsum board assembly construction, place frames prior to constructing enclosing walls and ceilings.
 - 2. In masonry construction, install at least three (3) wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
 - 3. Fit doors to frames and floors with proper clearances and to achieve the maximum operational effectiveness and appearance of each unit. Use S.D.I. 122-90 Installation and Troubleshooting Guide for Standard Steel Doors and Frames or The Installation of Commercial Steel Doors and Frames as published by Door and Hardware Institute (DHI) as recommended guidelines.

3.2 ADJUSTING AND CLEANING

- A. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air drying prime paint.
- B. Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 081113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Electrified door hardware for the following:
 - a. Exterior swinging door.
- B. Contractor shall verify existing conditions and existing hardware in the building. New hardware shall match existing types and manufacturers for operating hardware, including electronic access control and keying system.
- C. Electrified door hardware shall be coordinated with and report to the building Owner's security monitoring company.
 - 1. Monitoring company: SETEC.
 - 2. Telephone number: 703-818-8141.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Door hardware schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Exit Devices: Two years from date of Substantial Completion.
 - b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- B. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 CONTINUOUS HINGES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height.
 1. Acceptable Manufacturers:
 - a. Ives.
 - b. Markar Products.
 - c. McKinney Products.
 - d. Pemko Manufacturing.
 2. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
 3. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
 4. Install hinges with fasteners supplied by manufacturer.

2.3 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
 1. Manufacturers: Subject to compliance with requirements, provide the following:
 - a. Allegion plc.
 - 1) Von Duprin series 98.
- B. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 1. Provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar.
 3. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 4. Lock Trim Design: Provide finishes and designs to match that of the specified locksets.
 5. Rail Sizing: Provide exit device rails factory sized for proper door width application.

- C. Electrical Modifications:
 - 1. Exit devices specified to be electrified shall be factory modified to electrically lock or electrically unlock, as indicated, upon receipt of a 24V signal and will remain in this mode until signal is interrupted.
 - 2. Provide complete system including power supply as required. Field-connect electrified exit devices to associated power transfer units. Coordinate electrical connection and installation with Divisions 26 and 28.

- 2.4 POWER TRANSFER PIVOTS:
 - A. Architectural Builders Hardware, Securitron or Von Duprin.
 - 1. Concealed PTFE-jacketed wires secured at each leaf and continuous through sleeve.

- 2.5 Magnetic Door Contacts:
 - A. Magnetic door contacts as furnished by the Owner's security company. Furnish templates for products indicated so doors and frames are properly factory-machined to receive material without field-modification.

- 2.6 LOCK CYLINDERS
 - A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 - 1. Provide lock cylinder to match existing: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.

- 2.7 KEYING
 - A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock.
 - 1. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 - b. Re-key Owner's existing master key system into new keying system.
 - B. Keys: Brass.

- 2.8 OPERATING TRIM
 - A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allegion plc.
 - b. Hager Companies.
 - c. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

2.9 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allegion plc.
 - b. Hager Companies.
 - c. SARGENT Manufacturing Company; ASSA ABLOY.

2.10 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Allegion plc.
 - b. Hager Companies.
 - c. SARGENT Manufacturing Company; ASSA ABLOY.

2.11 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. National Guard Products, Inc.
 - b. Pemko; an ASSA ABLOY Group Company.
 - c. Reese Enterprises, Inc.
 - d. Zero International; an Allegion brand.
- B. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 0.3-inch wg, as follows:
1. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.

2.12 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. National Guard Products, Inc.
 - b. Pemko; an ASSA ABLOY Group Company.
 - c. Reese Enterprises, Inc.
 - d. Zero International; an Allegion brand.

2.13 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Allegion plc. – Ives Protection Plates.
 - b. Don-Jo Mfg., Inc.
 - c. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

2.14 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
- C. Hinges: Install types and in quantities indicated in door hardware schedule.
- D. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- E. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- F. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- G. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.2 ADJUSTING

- A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.3 DOOR HARDWARE SCHEDULE

A. Hardware Set 1: Each door to have the following:

Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	Continuous Hinge	MCK-25HD x 83"	Clear	Mc Kinney
1	Electrified Exit Device	RX-98L x E996L - FAIL SECURE	US32D	Von Duprin
1	Power transfer pivot	EPT-10		Von Duprin
1	Magnetic door contact	Per Owner's security company		
1	Proximity card reader	Per Owner's security company		
1	Cylinder	Match existing system		
1	Closer	P4041-CUSH	689	Norton
1	Kickplate	K1050 8" x 2" LDW 4BE CSK	US32D	Rockwood
1	Overhead Stop	59XS x 90 deg	US26D	Sargent
1	Threshold	171 A x DOW x MS & ES25		Pemko
1	Gasketing (Set)	316 AS x DOW x DOH		Pemko
1	Door Bottom Seal	345 AV x DOW		Pemko
1	Drip Strip	346 C x DOW + 4"		Pemko

B. Hardware Set 2: Each door to have the following:

Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	Hinge	MPB91 4.5 X 4.5	652	Mc Kinney
1	Passage Set	ND10S RHO	626	Schlage
1	Closer	P4041-CUSH	689	Norton
1	Kick Plate	K1050 8" x 2" LDW 4BE CSK	US32D	Rockwood
1	Wall Stop	400	630	Rockwood

END OF SECTION 087100

SECTION 092900 - GYPSUM BOARD & FRAMING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS:**

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

1.2 SUMMARY:

- A. Extent of each type of gypsum drywall construction required is indicated on Drawings.
- B. This Section includes the following types of gypsum board construction:
 - 1. Steel framing members to receive gypsum board.
 - 2. Gypsum board screw-attached to steel framing and furring members.
- D. Load-bearing steel studs and "C" shaped steel joists for structural framing are specified in Division-5 Section "Cold-Formed Metal Framing."

1.3 DEFINITIONS:

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.
- B. Refer to ASTM C-1278 for fiber reinforced gypsum board.

1.4 SUBMITTALS:

- A. Product data from manufacturers for each type of product specified.

1.5 QUALITY ASSURANCE:

- A. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
 - 1. Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File No's. in GA-600 "Fire Resistance Design Manual" or to design designations in U.L. "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.
- B. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.7 PROJECT CONDITIONS:

- A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
- B. Minimum Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously thereafter until drying is complete.
- C. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
 - 1. Steel Framing and Furring:
 - a. Dietrich Metal Framing
 - b. Cemco
 - c. Marino / WARE
 - 2. Grid Suspension Systems:
 - a. Chicago Metallic Corp.
 - b. National Rolling Mills Co.
 - c. United States Gypsum Co.
 - 3. Gypsum Boards and Related Products:
 - a. Georgia-Pacific Corp.
 - b. National Gypsum Co.
 - c. United States Gypsum Co.

2.2 STEEL FRAMING FOR WALLS AND PARTITIONS:

- A. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 deg and doubled over to form 3/16" minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
 - 1. Stud Depth: 3-5/8 inches, 20 gages (33 Mil.) unless otherwise indicated.
- B. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth and minimum thickness of base (uncoated) metal as follows:
 - 1. Depth: 7/8 inch.

2. Thickness: 0.0179 inch, unless otherwise indicated.
- C. Furring Brackets: Serrated-arm type, adjustable, fabricated from corrosion-resistant steel sheet complying with ASTM C 645, minimum thickness of base (uncoated) metal of 0.0329 inch, designed for screw attachment to steel studs and steel rigid furring channels used for furring.
- D. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, complying with ASTM C 645 for base metal, finish and widths of face and fastening flange, fabricated to form 1/2-inch-deep channel of the following configuration:
 1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single slotted leg (web).
- E. Z-Furring Members: Manufacturer's standard zee-shaped furring members with slotted or non-slotted web, fabricated from hot-dip galvanized steel sheet complying with ASTM A 525, Coating Designation G60; with a minimum base metal (uncoated) thickness of 0.0179-inch, face flange of 1-1/4-inch, wall-attachment flange of 7/8 inch, and of depth required to fit insulation thickness indicated.
- F. Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for applications indicated.

2.3 GYPSUM BOARD:

- A. General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end joints.
 1. Thickness: Provide gypsum board in thicknesses indicated, or if not otherwise indicated, in 5/8-inch thicknesses to comply with ASTM C 840 for application system and support spacing indicated.
- B. Gypsum Wallboard: ASTM C 36, and as follows:
 1. Type: Regular, unless otherwise indicated.
 2. Type: Type X for fire-resistance-rated assemblies.
 3. Edges: Tapered and featured (rounded or beveled) for prefilling.
 4. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work where Type X gypsum wallboard is indicated include, but are not limited to, the following:
 5. Products: Subject to compliance with requirements, provide one of the following products where Type X gypsum wallboard is indicated:
 1. " Toughrock Fireguard, Georgia Pacific
 2. "Fire-Shield G"; Gold Bond Building Products Div., National Gypsum Co.
 3. "SHEETROCK Brand FIRECODE 'C' Gypsum Panels"; United States Gypsum Co.
- C. Gypsum Backing Board for Multi-Layer Applications: ASTM C 442 or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C 36, and as follows:

1. Type: Regular, unless otherwise indicated.
2. Type: Type X for fire-resistance-rated assemblies.
3. Edges: Square, non-tapered; or V-tongue and groove.

2.4 TRIM ACCESSORIES:

- A. Cornerbead and Edge Trim for Interior Installation: Provide corner beads, edge trim and control joints which comply with ASTM C 1047 and requirements indicated below:
1. Material: Formed metal, complying with the following requirement:
 - a. Sheet steel zinc-coated by hot-dip process.
 2. Edge trim shapes indicated below by reference to designations of Fig. 1 in ASTM C 1047:
 - a. "L" Bead where indicated – Fry Reglet DRMW-625-625
 - b. "U" Bead where indicated – Fry Reglet DRM-625-625
 - c. "J" Bead where indicated – Fry Reglet JDM-625
 3. One-Piece Control Joint: Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable strip.
 4. Resilient clips as required. See partition Type on Drawings.
- B. Metal Cornerbead and Edge Trim for Exterior Ceilings: Comply with the following requirements:
1. Edge trim complying with ASTM C 1047, formed from rolled zinc, shape "LC" Bead per Fig. 1, unless otherwise indicated.

2.5 GYPSUM BOARD JOINT TREATMENT MATERIALS:

- A. General: Provide materials complying with ASTM C 475, ASTM C 840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.
- B. Joint Tape: Paper reinforcing tape, unless otherwise indicated.
1. Use pressure sensitive or staple-attached open-weave glass fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.
- C. Setting-Type Joint Compounds: Factory-prepackaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
1. Where setting-type joint compounds are indicated for use as taping and topping compounds, use formulation for each which develops greatest bond strength and crack resistance and is compatible with other joint compounds applied over it.
 2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer for this purpose.
- D. Drying-Type Joint Compounds: Factory-prepackaged vinyl-based products complying with the following requirements for formulation and intended use.

1. Ready-Mix Formulation: Factory-premixed product.
2. Taping compound formulated for embedding tape and for first coat over fasteners and flanges of corner beads and edge trim.
3. Topping compound formulated for fill (second) and finish (third) coats.
4. All-purpose compound formulated for use as both taping and topping compound.

2.6 MISCELLANEOUS MATERIALS:

- A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
- B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum boards.
- C. Spot Grout: ASTM C 475, setting-type joint compound of type recommended for spot grouting hollow metal door frames.
- D. Fastening Adhesive for Wood: ASTM C 557.
- E. Fastening Adhesive for Metal: Special adhesive recommended for laminating gypsum boards to steel framing.
- F. Gypsum Board Screws: ASTM C 1002.
- G. Gypsum Board Nails: ASTM C 514.
- H. Asphalt Felt: ASTM D 226, Type I (No. 15).
- I. Concealed Acoustical Sealant: Nondrying, nonhardening, non-skinning, non-staining, non-bleeding, gunnable sealant complying with requirement specified in Division-7 section "Joint Sealers."
- J. Sound Attenuation Blankets: Unfaced mineral fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing); and as follows:
 1. Friction fit insulation blanket. See partition types Drawing A6.1.
- K. Thermal Insulation: Material indicated below, of thickness and width to fill voids formed by Z-furring members:
 1. Extruded Polystyrene Board Thermal Insulation: Rigid, cellular thermal insulation with closed cells and integral high-density skin; formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for Type IV; with a flame spread and smoke developed ratings of, respectively, not more than 25 and 450 per ASTM E 84.
- L. Polyethylene Vapor Retarder: ASTM D 4397, thickness and maximum permeability rating as follows:
 1. 6.0 mils, 0.13 perms.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.
 - 1. Furnish concrete inserts and other devices indicated, to other trades for installation well in advance of time needed for coordination with other construction.
- B. Before sprayed-on fireproofing is applied (if used in project), attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed-on fireproofing. Where offset anchor plates are required provide continuous units fastened to building structure not more than 24 inches o. c. and to ceiling runners.
- C. After sprayed-on fireproofing has been applied (if used in project), remove only as much fireproofing as needed to complete installation of drywall construction. Protect fireproofing that remains from damage.

3.3 INSTALLATION OF STEEL FRAMING, GENERAL:

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer or, if none are available, with "Gypsum Construction Handbook" published by United States Gypsum Co.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to comply with details shown on Drawings:
 - 1. Where edges of suspended ceilings abut building structure horizontally at ceiling perimeters or penetration of structural elements.
 - 2. Where partition and wall framing abut overhead structure.
 - a. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
- D. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

3.4 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS:

- A. Install runners (tracks) at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other construction.

1. Where studs are installed directly against exterior walls, install asphalt felt strips between studs and wall.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surface do not vary more than 1/8 inch from plane of faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
- D. Terminate partition framing at suspended ceilings where indicated.
- E. Install steel studs and furring in sizes and at spacings indicated but not less than that required by referenced steel framing installation standard.
 1. For single layer construction: 16 inches on center at interior locations.
- F. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.
- G. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- H. Frame openings other than door openings to comply with details indicated, or if none indicated, in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
- I. Install thermal insulation as follows:
 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches on center.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches on center.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation panel and continue in regular manner. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
 4. Until gypsum board is installed hold insulation in place with 10-inch staples fabricated from 0.0625-inch (16 gage) diameter tie wire and inserted through slot in web of member.
- J. Install polyethylene vapor retarder on interior of framing members of exterior insulated walls to comply with the following requirements:
 1. Extend vapor retarder to extremities of exterior insulated walls and to cover miscellaneous voids in in insulated substrates, including those which have been stuffed with loose thermal insulation.

2. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges, at perimeter of wall openings, and at lap joints; space fasteners 16 inches on center.
3. Seal joints in vapor retarder caused by pipes, conduits, electrical boxes and similar items penetrating vapor retarders with cloth or aluminized tape which bonds permanently to vapor retarder.
4. Repair any tears or punctures in vapor retarder immediately before concealment by application of gypsum board or other construction.

3.5 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:

- A. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840.
- B. Install sound attenuation blankets where indicated, prior to gypsum board unless readily installed after board has been installed.
- C. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- D. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.
- E. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.
- F. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.
- G. Locate either edge or end joints over supports, except in horizontal applications here intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
- H. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
- I. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- J. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32 inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.
- K. Form control joints as required and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.
- L. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are braced internally.
 1. Except where concealed application is indicated or required for sound, fire, air or smoke

- ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area and may be limited to not less than 75 percent of full coverage.
2. Fit gypsum board around ducts, pipes, and conduits.
 3. Where partitions intersect open concrete coffers, cut gypsum board to fit profile of coffers and allow 1/4 to 1/2-inch-wide joint for sealant.
- M. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2-inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.
- N. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum board over wood framing, with "floating" internal corner construction.
- O. Where sound-rated drywall construction is indicated, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
- P. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.6 METHODS OF GYPSUM BOARD APPLICATION:

- A. Single-Layer Application: Install gypsum wallboard as follows:
1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
 2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.
 3. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
 4. On Z-furring or channel members apply gypsum board vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
1. Fasten with screws.

3.7 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.
1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 2. Install "L" bead where edge trim can only be installed after gypsum board is installed.
 3. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

- D. Install U-bead where indicated, and where exterior gypsum board edges are not covered by applied moldings or indicated to receive edge trim with face flanges covered with joint compound.
- E. Install control joints at locations indicated, or if not indicated, at spacings and locations required by referenced gypsum board application and finish standard and approved by the Architect for visual effect.
- F. Install resilient clips where indicated, in accordance with manufacturer's instructions.

3.8 FINISHING OF DRYWALL:

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:
 - 1. Embedding and First Coat: Setting-Type Joint Compound.
 - 2. Fill (Second) Coat: Setting-type joint compound.
 - 3. Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound.
 - 4. Level of finish to correlate with paint type. Final finish shall be as indicated and in accordance with ASTM C840
- E. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.9 PROTECTION:

- A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

END OF SECTION 092900

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings used in fire rated floor-ceiling and roof-ceiling assemblies complying with the requirements of UL systems G229 and P214 respectively.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Initial Selection: For components with factory-applied finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E1264.
 - 2. Smoke-Developed Index: 450 or less.
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Floor-ceiling assembly: UL P214
 - 2. Roof-ceiling assembly: UL G229

2.3 ACOUSTICAL PANELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong Ceiling & Wall Solutions.
 - 2. CertainTeed Corporation.
 - 3. USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

- C. Classification: Provide fire-resistance-rated panels as follows:
 - 1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with vinyl overlay on face, back, and sealed edges.
 - 2. Pattern: E (lightly textured).
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.80.
- F. Ceiling Attenuation Class (CAC): Not less than 35.
- G. Noise Reduction Coefficient (NRC): Not less than 0.80.
- H. Articulation Class (AC): Not less than 170.
- I. Edge/Joint Detail: Beveled tegular sized to fit flange of exposed suspension-system members.
- J. Thickness: 3/4 inch.
- K. Modular Size: 24 by 48 inches.
- L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Armstrong Ceiling & Wall Solutions.
 - 2. CertainTeed Corporation.
 - 3. USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
- C. Wide-Face, Capped, Double-Web, Fire-rated, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
- C. Hold-Down Clips: Manufacturer's standard hold-down clips as required to comply with UL listed assemblies.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.

2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.
 - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required and if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 4. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - 5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 - 9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
 - 1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 - 2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Install hold-down clips according to requirements indicated for fire-resistance-rated assembly.
6. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Initial Selection: For components with factory-applied finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E1264.
 - 2. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL PANELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong Ceiling & Wall Solutions.
 - 2. CertainTeed Corporation.
 - 3. USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide panels as follows:
 - 1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with vinyl overlay on face, back, and sealed edges.
 - 2. Pattern: E (lightly textured).
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.80.
- F. Ceiling Attenuation Class (CAC): Not less than 35.

- G. Noise Reduction Coefficient (NRC): Not less than 0.80.
- H. Articulation Class (AC): Not less than 170.
- I. Edge/Joint Detail: Beveled tegular sized to fit flange of exposed suspension-system members.
- J. Thickness: 3/4 inch.
- K. Modular Size: 24 by 48 inches.
- L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Armstrong Ceiling & Wall Solutions.
 - 2. CertainTeed Corporation.
 - 3. USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white.

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.

2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices

that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

4. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 6. Do not attach hangers to steel deck tabs.
 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
- 3.4 CLEANING
- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096500 - RESILIENT TILE FLOORING**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the followings:
 - 1. Vinyl composition floor tile as shown on the drawings.
- B. Resilient wall base, reducer strips, and other accessories installed with resilient floor tiles are specified in Division 9 Section "Resilient Wall Base and Accessories."

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
 - 1. Certification and/or material safety & data sheets that demonstrate that the products and adhesives supplied for tile installation comply with the requirements set forth in 1.9.A below.
- C. Samples for verification purposes in full-size tiles of each different color and pattern of resilient floor tile specified, showing full range of variations expected in these characteristics.
- D. Product certificates, in lieu of laboratory test reports when permitted by Architect, signed by manufacturer certifying that each product complies with requirements.
- E. Maintenance data for vinyl composition floor tile, to include in Operating and Maintenance Manual specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Products: Obtain each type color and pattern of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Fire Performance Characteristics: Provide resilient floor tile with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
 - 2. Smoke Density: Less than 450 per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver tile and installation accessories to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive tiles for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).
- B. Do not install tiles until they are at the same temperature as that of the space where they are to be installed.
- C. Close spaces to traffic during installation of tiles specified in this Section.

1.7 SEQUENCING AND SCHEDULING

- A. Install tiles and accessories after other finishing operations, including painting, have been completed.
- B. Do not install tiles over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture test.

1.9 INDOOR AIR QUALITY

- A. Adhesives shall meet or exceed the environmental requirements set forth in section 01506 Construction Indoor Air Quality.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION TILE (VCT)

- A. Manufacturers: Subject to compliance with requirements, provide one of the products specified in each Product Data Sheet at end of this Section.
 - 1. Armstrong World Industries, Inc
 - 2. Johnsonite, a Tarkett Company
 - 3. Mannington Mills, Inc
- B. Product Standards: ASTM F1066, class 2, through pattern
- C. Wearing surface: Smooth
- D. Thickness: 0.125 inches

- E. Size: 12 by 12 inches
- F. Colors and Patterns: As selected from manufacture's complete range

2.2 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- B. Trowelable Underlayment's and patching Compounds: Latex-modified, Portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.
- C. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated. Adhesives must comply with low VOC requirements outlined in section 1.9 above.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by tile manufacturer.
 - 2. Finishes of subfloors comply with tolerances and other requirements specified in Division 3 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated to receive tile.
- B. Use trowelable leveling and patching compounds per tile manufacturers directions to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- E. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.3 INSTALLATION

- A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths at perimeter that equal less than one-half of a tile. Install tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain running in one direction.
- D. Scribe, cut, and fit tiles to but tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, designs, thresholds, and nosing's.
- E. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating of finish flooring as marked on sub-floor. Use chalk or other nonpermanent marking device.
- G. Install tiles on covers for telephone and electrical ducts, and similar items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly adhere edges to perimeter of floor around covers and to covers.
- H. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.
- I. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.
- J. Hand roll tiles where required by tile manufacturer.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing tile installation:
 - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by tile manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by resilient floor tile manufacturer.
 - 4. Damp-mop tile to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.

1. Apply protective floor polish to tile surfaces that are free from soil, visible adhesive, and surface blemishes.
 - a. Use commercially available metal, cross-linked, acrylic product acceptable to tile manufacturer.
 - b. Coordinate selection of floor polish with Owner's maintenance service.
 2. Cover tiles with un-dyed untreated building paper until inspection for Substantial Completion.
 3. Do not move heavy and sharp objects directly over tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved. Slide or roll objects over panels with out moving panels.
- C. Clean tiles not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean tiles using method recommended by manufacturer.
1. Strip protective floor polish that was applied after completing installation, prior to cleaning.
 2. Reapply floor polish after cleaning.

END OF SECTION 096500

SECTION 096513 - RESILIENT WALL BASE AND ACCESSORIES**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section include the followings:
 - 1. Resilient wall base.
 - 2. Resilient flooring accessories.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 9 Section "Resilient Tile Flooring."

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
 - 1. Certification and/or material safety & data sheets that demonstrate that the products and adhesives supplied for the wall base installation comply with the requirements set forth in 1.9.A below.
- C. Samples for initial selection purposes of manufacturer's standard sample sets in form of piece cut from each type of product specified showing full range of colors and patterns available.
- D. Sample for verification purposes in manufacturer's standard sizes, but not less than 12 inches long, of each different color and patter of product specified.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Fire Performance Characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radian Flux: 0.45 watts per sq. cm or more per ASTM E 648.
 - 2. Smoke Density: Less than 450 per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

- B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Move products into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 85 deg F
- C. Install resilient products after other finishing operations, including painting, have been completed.
- D. Maintain the ambient relative humidity between 40% and 60% during installation.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

1.8 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage, and identified with labels clearly describing contents.
 - 1. Furnish not less than one unopened carton of each different type and color of resilient wall base installed.
 - 2. Furnish not less than 10 each of each type and color of stair tread installed.

1.9 INDOOR AIR QUALITY

- A. Adhesives shall meet or exceed the environmental requirements set forth in section 01506 – Construction Indoor Air Quality.

PART 2 - PRODUCTS

2.1 RESILIENT WALL BASE (RB1)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong Standard Excelon.
 - 2. Flexco.
 - 3. Johnsonite; A Tarkett Company.
 - 4. Roppe Corporation, USA.

- B. Product Standard: ASTM F 1861, Type TP (rubber, vulcanized thermoplastic), Group I (solid, homogeneous).
 - 1. Style and Location:
 - a) Style B, Cove: Provide in areas with resilient floor coverings
- C. Thickness: 0.125 inch.
- D. Height: 4 inches
- E. Lengths: Coils in manufacturer's standard length
- F. Outside Corners: Job formed
- G. Inside Corners: Job formed
- H. Colors: As indicated on drawings

2.2 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- B. Trowelable Underlayment's and patching Compounds: Latex-modified, Portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- C. Adhesives: Water-resistant type recommended by manufacturer to suite sheet rubber flooring products and substrate conditions indicated. Adhesives must comply with low VOC requirements outlined in section 1.9 above.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.
- B. Use trowelable leveling and patching compounds per manufacturers directions to fill cracks, holes, and depressions in substrates to produce a uniform and smooth substrate.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

- E. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
- F. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

3.3 RESILIENT BASE INSTALLATION

- A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.
- B. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required.
 - 1. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 2. Install inside and exterior corners before installing straight pieces.
 - 3. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce snug fit to substrate.
 - 4. Form outside corners on job from straight pieces of maximum lengths possible by shaving back of base at point where bending will occur. Remove a strip perpendicular to length of base and only deep enough to produce a snug fit without bends whitening or removal of more than half the thickness of wall base.
- C. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches > in length.
 - a. Miter or cope corners to minimize open joints
- D. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.
- E. Coiled wall base shall be uncoiled and laid flat for at least 24 hours at 65 deg F prior to installation.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing installation:

1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
 2. Sweep or vacuum floor thoroughly.
 3. Do not wash floor until after time period recommended by manufacturer.
 4. Damp-mop resilient accessories to remove black marks and soil.
- B. Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.

END OF SECTION 096513

SECTION 099000 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 23 for painting of HVAC equipment and supports.

1.2 SUMMARY

- . This Section includes surface preparation, painting, and finishing of exposed interior and exterior items and surfaces.
 - 1. Surface preparation, priming, and finish coats specified in this section are in addition to shop priming and surface treatment specified under other sections.
- A. Paint exposed surfaces whether or not colors are designated in "schedule," except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color of finish is not designated, the Architect will select from standard colors or finishes available.
 - 1. Painting includes field painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- B. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels unless otherwise indicated on the drawings.
 - 1. Prefinished items not to be painted include the following factory-finished components:
 - a. Plastic toilet enclosures.
 - b. Acoustic materials.
 - c. Architectural woodwork and casework.
 - d. Elevator entrance doors and frames.
 - e. Elevator equipment.
 - f. Finished mechanical and electrical equipment.
 - g. Light fixtures.
 - h. Switchgear.
 - i. Distribution cabinets.
 - 2. Concealed surfaces not to be painted include wall or ceiling surfaces in the following generally inaccessible areas:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Utility tunnels.
 - d. Pipe spaces.
 - e. duct shafts.
 - f. Elevator shafts.
 - 3. Finished metal surfaces not to be painted include:
 - a. Pre-finished storefront work.

- b. Anodized aluminum.
 - c. Stainless steel.
 - d. Chromium plate.
 - e. Copper.
 - f. Bronze.
 - g. Brass.
4. Operating parts not to be painted include moving parts of operating equipment such as the following:
- 1. Valve and damper operators.
 - 2. Linkages.
 - 3. Sensing devices.
 - 4. Motor and fan shafts.
5. Labels: Do not paint over Underwriter's Laboratories, Factory Mutual or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- D. Related Sections: The following sections contain requirements that relate to this section:
- 1. Division 5 Section - "Structural Steel Framing" for shop priming structural steel.
 - 2. Division 5 Section - "Metal Fabrications" for shop priming ferrous metal.
 - 3. Division 6 Section - "Interior Architectural Woodwork" for shop priming architectural woodwork.
 - 4. Division 8 Section - "Hollow Metal Doors and Frames" for shop priming steel doors and frames.
 - 5. Painting mechanical and electrical work is specified in those sections.
- 1.3 DEFINITIONS
- A. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate, or finish coats.
- 1.4 SUBMITTALS
- A. Products Data: Manufacturer's technical information, label analysis, material safety & data sheets highlighting VOC limits and application instructions for each material proposed for use.
- 1. List each material and cross-reference the specific coating and finish system and application. Identify each material by the manufacturer's catalog number and general classification.
- B. Samples for initial color selection in the form of manufacturer's color charts.
- 1. After color selection, the Architect will furnish color chips for surfaces to be coated.
- C. Samples for Verification Purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate. Define each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
- 1. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.

2. Submit samples on the following substrates for the Architect's review of color and texture only:
 - a. Concrete: Provide two 4-inch-square samples for each color and finish.
 - b. Concrete Masonry: Provide two 4- by 8-inch samples of masonry, with mortar joint in the centers, for each finish and color.
 - c. Painted Wood: Provide two 12- by 12-inch samples of each color and material on hardboard.
 - d. Stained or Natural Wood: Provide two 4- by 8-inch samples of natural and stained wood finish on actual wood surfaces.
 - e. Ferrous Metal: Provide two 4-inch-square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.
 - f. Aliphatic urethane over steel: Provide two (2) 4" square samples.
- D. Certificates - Certification shall be made that the products comply with the environmental requirements set forth in Part 1.9 below.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.
- B. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 1. Notify the Architect of problems anticipated using the materials specified.
- C. Field Samples: On wall surfaces and other exterior and interior components, duplicate finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. fit. of surface until required sheen, color and texture are obtained; simulate finished lighting conditions for review of in-place work.
 1. Final acceptance of colors will be from job-applied samples.
 2. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted. Apply coatings in this room or surface in accordance with the schedule or as specified. After finishes are accepted, this room or surface will be used for evaluation of coating systems of a similar nature.
- D. Material Quality: Provide the manufacturer's best quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

1.6 PRODUCT HANDLING

- A. Deliver materials to the site in original, new and unopened packages and containers bearing manufacturer's name and label.
- B. Provide paint manufacturer's printed label on each container with the following information.
 1. Name or title of material.
 2. Manufacturer's stock number.
 3. Manufacturer's name.
 4. Analysis of major pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.

7. Color name or number.
8. Manufacturer's recommended wet and dry film thickness in mils.

1.7 COLOR SELECTION

- A. Colors shall be as shown on the finish schedule in the contract drawings.
- B. Proprietary names of a specified manufacturer used to designate colors or materials are not intended to imply that products of the specified manufacturer are required to the exclusion of equivalent approved colors or materials of other manufacturers.

1.8 PAINT COORDINATION

- A. Provide finish coats compatible with prime paints used. Review other sections of specifications in which prime coats are specified to ensure compatibility of the total coating system.

1.9 INDOOR AIR QUALITY

- A. Paints and coatings shall meet the requirements set forth in section 01 74 20 Construction Indoor Air Quality.
- B. Substitutions other than the listed manufacturer must be accompanied by a certificate from the substituted manufacturer stating that each of the paints submitted meets:
 1. The requirements in part 1.9.A and:
 2. The substituted manufacturer can provide the same range of colors as the listed manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.
- B. Painting materials scheduled are products of **The Sherwin-Williams Company**. Comparable products meeting requirements may be submitted. The burden of proof to show that the product is equal is on the proposer Other acceptable manufacturers provided they meet the specification are:
 1. Benjamin Moore
- C. Water-based latex paints shall not contain mercury preservatives. Provide manufacturer's certification attesting that paint provided under this section does not contain mercury.
- D. Oil-based paints shall not be applied on interior building surfaces, or other areas where exposure of occupants to fumes is a possibility.
- E. All paints used on the project must comply with the VOC limits set forth in section 1.9 above.

PART 3 - EXECUTION

3.1 INSPECTION PAINTING

- A. Examine areas and conditions under which painting work will be performed. Notify Architect, in writing, of conditions detrimental to proper execution of the work. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Starting of painting work will be construed as acceptance of surfaces within particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

- A. General:
 - 1. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions for each substrate condition.
 - 2. Remove hardware, hardware accessories, machine surfaces, plates, lighting fixtures and similar items in place and not to be finish painted or provide surface applied protection prior to surface preparation and painting operations. Following completion of painting of each space or area, reinstall removed items.
 - 3. Clean surface to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not settle on to wet, newly painted surfaces.
 - 4. Dislodge dirt, mortar splatters, and other dry materials from surfaces by scraping and brushing. Remove loose material by brushing, sweeping and vacuuming.

3.3 MATERIALS PREPARATION

- A. Mix and prepare paint materials in accordance with manufacturer's directions. Stir materials before application to produce a mixture of uniform density and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and if necessary, strain the material before using.

3.4 APPLICATION

- A. General:
 - 1. Apply paint by brush, roller, or spray in accordance with manufacturer's directions. Use brushes best suited for type of material being applied. Use roller of carpet, velvet back or high pile sheep's wool as recommended by paint manufacturer for material and texture required. Spray paint uniformly with suitable equipment.
 - a. Spray operations shall be confined to those times where the building is unoccupied.
 - 2. Number of coats and paint film thickness required is same regardless of application method.
 - 3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until paint film is of uniform finish, color and appearance.
 - 4. "Exposed surfaces" shall mean areas visible when permanent or built-in fixtures, convector covers, grilles, etc., are in place in areas scheduled to be painted.
 - 5. Paint interior surfaces of ducts, where visible through registers, grilles, decorative ceiling,

with flat, non-specular black paint.

- B. Minimum Coating Thickness:
 - 1. Apply each material at not less than manufacturer's recommended spreading rate, to provide a total wet and dry film thickness of not less than that indicated on manufacturer's printed label.
- C. Pigmented (Opaque) Finishes:
 - 1. Cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.
- D. Transparent (Clear) Finishes:
 - 1. On exposed portions, use multiple coats to produce glass-smooth surface film continuity of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
 - 2. Provide satin finish for final coats, unless otherwise indicated.
- E. Brush Application:
 - 1. Brush-out and work brush coats onto surface in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- F. Mechanical Applications:
 - 1. Limit roller applications to interior wall and ceiling finish coats. Apply each roller coat to provide equivalent hiding as brush-applied coats.
 - 2. Confine spray application to metal framework, siding, decking, wire mesh and similar surfaces where hand brush work would be inferior.
 - 3. Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building up film thickness of 2 coats in one pass.
 - a. Do not use spray applications at acoustical concrete block units.
- G. Complete Work:
 - 1. Match samples for color, texture and coverage. Remove finish or repaint work not in compliance with specified requirements.

3.5 PAINTING SCHEDULE, EXTERIOR

- A. Exposed Concrete Masonry Units:
 - 1. Satin Finish (10 – 20 units @ 85°):
 - a. 1st Coat: S-W PrepRite Block Filler B25W25 42 g/l VOC
 - b. 2nd Coat: S-W 100 % Acrylic B12WF Series 96 g/l VOC
 - c. 3rd Coat: S-W 100 % Acrylic B12WF Series 96 g/l VOC
- B. Gypsum Board and Cement Board - **soffits**:
 - 1. Flat Finish (0 – 5 units @ 85°):
 - a. 1st Coat: S-W Loxon Conditioner Guide Coat White A24W100 106 g/l VOC
 - b. 2nd Coat: S-W 100 % Acrylic B2WF Series 48 g/l VOC

c. 3rd Coat: S-W 100 % Acrylic B2WF Series 48 g/l VOC

H. Ferrous Metal, Primed Metal, Zinc-Coated Metal, and Aluminum:

1. Gloss Finish (≥ 70 units @ 60°):
 - a. 1st Coat: S-W Pro-Cryl Universal Metal Primer B66-310 Series 110 g/l VOC
 - b. 2nd Coat: S-W SuperPaint Exterior High Gloss A85 series 118 g/l VOC
 - c. 3rd Coat: S-W SuperPaint Exterior High Gloss A85 series 118 g/l VOC

3.6 PAINT SCHEDULE, INTERIOR

A. Gypsum Wallboard and Concrete – **walls** subject to normal exposure.

1. Semi-gloss Finish (10 – 20 units @ 85°):
 - a. 1st Coat: S-W Harmony Interior Primer B11W900 0 g/l VOC
 - b. 2nd Coat: S-W Harmony Interior Latex Eg-shel B9W900 series 0 g/l VOC
 - c. 3rd Coat: S-W Harmony Interior Latex Eg-shel B9W900 series 0 g/l VOC

B. Gypsum Wallboard and Concrete – **ceilings and soffits** subject to normal exposure.

1. Flat Finish (0 - 5 units @ 85°):
 - a. 1st Coat: S-W Harmony Interior Primer B11W900 0 g/l VOC
 - b. 2nd Coat: S-W Harmony Interior Latex Flat B5W900 series 0 g/l VOC
 - c. 3rd Coat: S-W Harmony Interior Latex Flat B5W900 series 0 g/l VOC

C. Concrete Masonry Units:

1. Semi-gloss Finish (10 – 20 units @ 85°):
 - a. 1st Coat: S-W PrepRite Block Filler B25W25 42 g/l VOC
 - b. 2nd Coat: S-W Harmony Interior Latex Eg-shel B9W900 series 0 g/l VOC
 - c. 3rd Coat: S-W Harmony Interior Latex Eg-shel B9W900 series 0 g/l VOC

G. Ferrous Metal, Primed Metal, Zinc-Coated Metal, and Aluminum:

1. Semi Gloss Finish (≥ 70 units @ 60°):
 - a. 1st Coat: S-W Pro-Cryl Universal Metal Primer B66-310 Series 110 g/l VOC
 - b. 2nd Coat: S-W Centurian Water Based 2K Urethane B65_700 66 g/l VOC
 - c. 2nd Coat: S-W Centurian Water Based 2K Urethane B65_700 66 g/l VOC

H. Exposed Overhead Work:

1. Semi-gloss Finish (10 – 20 units @ 85°):
 - a. 1st Coat (as needed): S-W Pro-Cryl Metal Primer B66-310 110 g/l VOC
 - b. 2nd Coat: S-W Waterborne Acrylic Eg-shel Dryfall B42W2 58 g/l VOC

3.7 CLEANING

- A. Touch-up and restore where finish is damaged.
- B. Remove spilled, splashed, or splattered paint from all surfaces
- C. Remove all debris, painting accessories, paint cans, and other associated equipment from the premises and legally dispose of off-site. Do not leave surplus opened painting materials on the premises as "attic stock".
- D. Attic stock – Provide 2 unopened gallons of each color and type of paint used. Top of cans shall be clearly labeled with color name and number and a color card.

3.9 WASTE MANAGEMENT

- A. Separate waste in accordance with the approved waste management plan. Set aside extra

paint for future color matches, or reuse by owner, school theatre sets, Habitat for Humanity, etc. Where local options exist for left over paint recycling, collect all waste paint by type and provide for delivery to recycling or collection facility.

- B. Close and seal tightly all partly used paint and finish containers and store protected in well ventilated, fire safe area at moderate temperature.
- C. Place empty containers of solvent based paints in areas designated for hazardous materials.
- D. Do not dispose of paints or solvents by pouring on the ground. Place in designated containers for proper disposal.

PART 4 – MEASUREMENT AND PAYMENT

- A. Payment will be made on the basis of the lump sum bid prices and shall constitute full compensation for all materials, equipment, labor and incidentals necessary to complete the work of this Section as drawn and specified.

END OF SECTION 099000

SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on alternating-current power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet (1000 m) above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Premium efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.

- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
 - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- I. Insulation: Class F.
- J. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 ADDITIONAL REQUIREMENTS FOR POLYPHASE MOTORS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width-modulated inverters.
 - 2. Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split phase.
 - 3. Capacitor start, inductor run.
 - 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.

- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230513

SECTION 23 0529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Hanger shield inserts.
 - 5. Fastener systems.
 - 6. Equipment supports.
- B. Related Sections:
 - 1. Division 23 Section "Vibration Controls for HVAC Piping and Equipment" for vibration isolation devices.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of the Valve and Fittings Industry Inc.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.
 - c. Flex-Strut Inc.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut Corporation; Tyco International, Ltd.
2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
3. Standard: MFMA-4.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Metallic Coating: Hot-dipped galvanized mechanically-deposited zinc.

2.4 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. PHS Industries, Inc.
6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

- B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength and vapor barrier.

- C. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) minimum compressive strength.
- D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- F. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened Portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 - 2. Base: Plastic.
 - 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 - 4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

2.6 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.7 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Non-staining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

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

- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Pipe Stand Installation:
1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Division 07 Section "Roof Accessories" for curbs.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:

1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
 - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
 - c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.

4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.
- C. All exposed-to-view hangers and supports in public areas shall be painted. Color to be as selected by the Architect.

3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and metal framing systems and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
 2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
 3. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 (DN 15 to DN 600) if little or no insulation is required.
 4. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
 5. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of non-insulated, stationary pipes NPS 3/4 to NPS 8 (DN 20 to DN 200).
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

- a. Light (MSS Type 31): 750 lb (340 kg).
 - b. Medium (MSS Type 32): 1500 lb (680 kg).
 - c. Heavy (MSS Type 33): 3000 lb (1360 kg).
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
 3. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
- O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- Q. Use powder-actuated fasteners instead of building attachments where required in concrete construction.

END OF SECTION 23 05 29

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Constant-volume air systems.
 - 2. Balancing Hydronic Piping Systems:
 - a. Constant-flow hydronic systems.
 - 3. Testing, Adjusting, and Balancing Equipment:
 - a. Motors.
 - b. Heat-transfer coils.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- F. TDH: Total dynamic head.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

- B. Contract Documents Examination Report: Within 45 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. Certified TAB reports.
- E. Sample report forms.
- F. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

1.5 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC or NEBB.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC or NEBB.
 - 2. TAB Technician: Employee of the TAB specialist and certified by AABC or NEBB as a TAB technician.
- B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- C. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

1.6 FIELD CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens have been replaced by permanent screens with indicated perforations.
- L. Examine control valves for proper installation for their intended function of throttling, diverting, or mixing fluid flows.
- M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- N. Examine system pumps to ensure absence of entrained air in the suction piping.
- O. Examine operating safety interlocks and controls on HVAC equipment.
- P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
1. Equipment and systems to be tested.
 2. Strategies and step-by-step procedures for balancing the systems.
 3. Instrumentation to be used.
 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
1. Airside:
 - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - b. Duct systems are complete with terminals installed.
 - c. Volume, smoke, and fire dampers are open and functional.
 - d. Clean filters are installed.
 - e. Fans are operating, free of vibration, and rotating in correct direction.
 - f. Variable-frequency controllers' startup is complete and safeties are verified.
 - g. Automatic temperature-control systems are operational.
 - h. Ceilings are installed.
 - i. Windows and doors are installed.
 - j. Suitable access to balancing devices and equipment is provided.
 2. Hydronics:
 - a. Verify leakage and pressure tests on water distribution systems have been satisfactorily completed.
 - b. Piping is complete with terminals installed.
 - c. Water treatment is complete.
 - d. Systems are flushed, filled, and air purged.
 - e. Strainers are pulled and cleaned.
 - f. Control valves are functioning per the sequence of operation.
 - g. Shutoff and balance valves have been verified to be 100 percent open.
 - h. Pumps are started and proper rotation is verified.
 - i. Pump gage connections are installed directly at pump inlet and outlet flanges or in discharge and suction pipe prior to valves or strainers.
 - j. Variable-frequency controllers' startup is complete and safeties are verified.
 - k. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.
- 3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS
- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
 - B. Prepare schematic diagrams of systems' "as-built" duct layouts.
 - C. For variable-air-volume systems, develop a plan to simulate diversity.
 - D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
 - E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
 - F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
 - G. Verify that motor starters are equipped with properly sized thermal protection.
 - H. Check dampers for proper position to achieve desired airflow path.
 - I. Check for airflow blockages.
 - J. Check condensate drains for proper connections and functioning.
 - K. Check for proper sealing of air-handling-unit components.
 - L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."
- 3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS
- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 1. Measure total airflow.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.

- b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses, close to the fan and prior to any outlets, to obtain total airflow.
 - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report artificial loading of filters at the time static pressures are measured.
 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 4. Obtain approval from Construction Manager or commissioning authority for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
 1. Measure airflow of submain and branch ducts.
 2. Adjust submain and branch duct volume dampers for specified airflow.
 3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
 1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
 2. Measure inlets and outlets airflow.
 3. Adjust each inlet and outlet for specified airflow.
 4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
 1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
 2. Re-measure and confirm that total airflow is within design.
 3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
 4. Mark all final settings.
 5. Test system in economizer mode. Verify proper operation and adjust if necessary.
 6. Measure and record all operating data.
 7. Record final fan-performance data.

3.6 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports for pumps, coils, and heat exchangers. Obtain approved submittals and manufacturer-recommended testing procedures. Crosscheck the summation of required coil and heat exchanger flow rates with pump design flow rate.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. In addition to requirements in "Preparation" Article, prepare hydronic systems for testing and balancing as follows:
 - 1. Check liquid level in expansion tank.
 - 2. Check highest vent for adequate pressure.
 - 3. Check flow-control valves for proper position.
 - 4. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
 - 5. Verify that motor starters are equipped with properly sized thermal protection.
 - 6. Check that air has been purged from the system.

3.7 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

- A. Adjust flow-measuring devices installed at terminals for each space to design water flows.
 - 1. Measure flow at terminals.
 - 2. Adjust each terminal to design flow.
 - 3. Re-measure each terminal after it is adjusted.
 - 4. Position control valves to bypass the coil, and adjust the bypass valve to maintain design flow.
 - 5. Perform temperature tests after flows have been balanced.
- B. For systems with pressure-independent valves at terminals:
 - 1. Measure differential pressure and verify that it is within manufacturer's specified range.
 - 2. Perform temperature tests after flows have been verified.
- C. For systems without pressure-independent valves or flow-measuring devices at terminals:
 - 1. Measure and balance coils by either coil pressure drop or temperature method.
 - 2. If balanced by coil pressure drop, perform temperature tests after flows have been verified.
- D. Verify final system conditions as follows:
 - 1. Re-measure and confirm that total water flow is within design.
 - 2. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
 - 3. Mark final settings.
- E. Verify that memory stops have been set.

3.8 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 - 1. Manufacturer's name, model number, and serial number.

2. Motor horsepower rating.
3. Motor rpm.
4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

- B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.9 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.

- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.10 PROGRESS REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

3.11 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

- B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

- C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
 2. Name and address of the TAB specialist.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.
- E. Apparatus-Coil Test Reports:
1. Coil Data:
 - a. System identification.
 - b. Location.
 - c. Coil type.
 - d. Number of rows.
 - e. Fin spacing in fins per inch (mm) o.c.
 - f. Make and model number.
 - g. Face area in sq. ft. (sq. m).

- h. Tube size in NPS (DN).
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm (L/s).
 - b. Average face velocity in fpm (m/s).
 - c. Air pressure drop in inches wg (Pa).
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F (deg C).
 - e. Return-air, wet- and dry-bulb temperatures in deg F (deg C).
 - f. Entering-air, wet- and dry-bulb temperatures in deg F (deg C).
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F (deg C).
 - h. Water flow rate in gpm (L/s).
 - i. Water pressure differential in feet of head or psig (kPa).
 - j. Entering-water temperature in deg F (deg C).
 - k. Leaving-water temperature in deg F (deg C).
 - l. Refrigerant expansion valve and refrigerant types.
 - m. Refrigerant suction pressure in psig (kPa).
 - n. Refrigerant suction temperature in deg F (deg C).
 - o. Inlet steam pressure in psig (kPa).
- F. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data:
- a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches (mm), and bore.
 - h. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).
2. Motor Data:
- a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches (mm), and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
 - g. Number, make, and size of belts.
3. Test Data (Indicated and Actual Values):
- a. Total airflow rate in cfm (L/s).
 - b. Total system static pressure in inches wg (Pa).
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg (Pa).
 - e. Suction static pressure in inches wg (Pa).

G. Air-Terminal-Device Reports:

1. Unit Data:
 - a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Apparatus used for test.
 - d. Area served.
 - e. Make.
 - f. Number from system diagram.
 - g. Type and model number.
 - h. Size.
 - i. Effective area in sq. ft. (sq. m).
2. Test Data (Indicated and Actual Values):
 - a. Airflow rate in cfm (L/s).
 - b. Air velocity in fpm (m/s).
 - c. Preliminary airflow rate as needed in cfm (L/s).
 - d. Preliminary velocity as needed in fpm (m/s).
 - e. Final airflow rate in cfm (L/s).
 - f. Final velocity in fpm (m/s).
 - g. Space temperature in deg F (deg C).

H. Instrument Calibration Reports:

1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

3.12 VERIFICATION OF TAB REPORT

- A. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Construction Manager and commissioning authority.
- B. Construction Manager and commissioning authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- E. If TAB work fails, proceed as follows:

1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
 3. If the second verification also fails, Owner may contact AABC Headquarters regarding the AABC National Performance Guaranty.
- F. Prepare test and inspection reports.

3.13 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

BLANK PAGE

SECTION 232113 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes pipe and fitting materials and joining methods for the following:
 - 1. Copper tube and fittings.
 - 2. Steel pipe and fittings.
 - 3. Joining materials.
 - 4. Transition fittings.
 - 5. Dielectric fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Pipe.
 - 2. Fittings.
 - 3. Joining materials.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Welding certificates.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installers of Pressure-Sealed Joints: Installers shall be certified by pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.
- B. Steel Support Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

- C. Pipe Welding: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
1. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.
- B. DWV Copper Tubing: ASTM B 306, Type DWV.

2.2 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; welded and seamless, Grade B, and wall thickness as indicated in "Piping Applications" Article.
- B. Cast-Iron Threaded Fittings: ASME B16.4; Classes 125 and 250 as indicated in "Piping Applications" Article.
- C. Malleable-Iron Threaded Fittings: ASME B16.3, Classes 150 and 300 as indicated in "Piping Applications" Article.
- D. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300 as indicated in "Piping Applications" Article.
- E. Cast-Iron Pipe Flanges and Flanged Fittings: ASME B16.1, Classes 25, 125, and 250; raised ground face, and bolt holes spot faced as indicated in "Piping Applications" Article.
- F. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.
- G. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
1. Material Group: 1.1.
 2. End Connections: Butt welding.
 3. Facings: Raised face.

2.3 PLASTIC PIPE AND FITTINGS

- A. PVC Plastic Pipe: ASTM D1785, with wall thickness as indicated in "Piping Applications" Article.
1. PVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM D2466 for Schedule 40 pipe; ASTM D2467 for Schedule 80 pipe.

2.4 JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness unless otherwise indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.
- E. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- F. Solvent Cements for PVC Piping: ASTM D2564. Include primer according to ASTM F656.

2.5 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
 - 1. Description:
 - a. Standard: ASSE 1079.
 - b. Pressure Rating: 125 psig minimum at 180 deg F.
 - c. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
 - 1. Description:
 - a. Standard: ASSE 1079.
 - b. Factory-fabricated, bolted, companion-flange assembly.
 - c. Pressure Rating: 125 psig minimum at 180 deg F.
 - d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Insulating Kits:
 - 1. Description:
 - a. Nonconducting materials for field assembly of companion flanges.
 - b. Pressure Rating: 150 psig.
 - c. Gasket: Neoprene or phenolic.
 - d. Bolt Sleeves: Phenolic or polyethylene.
 - e. Washers: Phenolic with steel backing washers.

- E. Dielectric Nipples:
 - 1. Description:
 - a. Standard: IAPMO PS 66.
 - b. Electroplated steel nipple, complying with ASTM F 1545.
 - c. Pressure Rating: 300 psig at 225 deg F.
 - d. End Connections: Male threaded or grooved.
 - e. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Hot-water heating piping, aboveground, NPS 2 (DN 50) and smaller, shall be the following:
 - 1. Schedule 40, Grade B steel pipe; Class 125, cast-iron fittings; cast-iron flanges and flange fittings; and threaded joints.
- B. Condensate-Drain Piping: Schedule 40 PVC plastic pipe and fittings and solvent-welded joints.
- C. Air-Vent Piping:
 - 1. Inlet: Same materials and joining methods as for piping specified for the service.
 - 2. Outlet: Type K (Type A), annealed-temper copper tubing with soldered or flared joints.
- D. Safety-Valve-Inlet and -Outlet Piping for Hot-Water Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.

- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- L. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the top of the main pipe.
- P. Install shutoff ball valves to isolate each unit.
- Q. Install unions in piping, NPS 2 (DN 50) and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- R. Install flanges in piping, NPS 2-1/2 (DN 65) and larger, at final connections of equipment and elsewhere as indicated.
- S. Install shutoff valve immediately upstream of each dielectric fitting.
- T. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- U. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- V. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.3 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric nipples or unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flanges, flange kits, or nipples.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.
- C. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.
 2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet (6 m) or longer.
 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
 4. Spring hangers to support vertical runs.
 5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- D. Install hangers for copper tubing and steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Support horizontal piping within 12 inches (300 mm) of each fitting and coupling.
- F. Support vertical runs of copper tubing and steel piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- G. Support vertical runs of fiberglass piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- 3.5 PIPE JOINT CONSTRUCTION
- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- E. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- G. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. PVC Nonpressure Piping: Join according to ASTM D2855.

3.6 TERMINAL EQUIPMENT CONNECTIONS

- A. Sizes for supply and return piping connections shall be the same as or larger than equipment connections.
- B. Install control valves in accessible locations close to connected equipment.
- C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.
- D. Install ports for pressure gages and thermometers at coil inlet and outlet connections. Comply with requirements in Section 230519 "Meters and Gages for HVAC Piping."

3.7 FIELD QUALITY CONTROL

- A. Prepare hydronic piping according to ASME B31.9 and as follows:
 - 1. Leave joints, including welds, uninsulated and exposed for examination during test.
 - 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
 - 3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
 - 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
 - 5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.
- B. Perform the following tests on hydronic piping:
 - 1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
 - 2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
 - 3. Isolate expansion tanks and determine that hydronic system is full of water.
 - 4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
 - 5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
 - 6. Prepare written report of testing.
- C. Perform the following before operating the system:
 - 1. Open manual valves fully.
 - 2. Inspect pumps for proper rotation.
 - 3. Set makeup pressure-reducing valves for required system pressure.
 - 4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).

5. Set temperature controls so all coils are calling for full flow.
6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
7. Verify lubrication of motors and bearings.

END OF SECTION 232113

SECTION 238146.13 - WATER-TO-AIR HEAT PUMPS

PART 1 - GENERAL

1.1

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Exposed, floor-mounted console units.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, furnished specialties, and accessories for each model.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Include diagrams for power, signal, and control wiring.
- C. Samples: For each exposed product and for each color and texture specified.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For water-to-air heat pumps to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. ASHRAE Compliance:
 - 1. ASHRAE 15.
 - 2. Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- B. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- C. Comply with NFPA 70.
- D. Comply with safety requirements in UL 484 for assembly of free-delivery, water-source heat pumps.

- E. Comply with safety requirements in UL 1995 for duct-system connections.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of water-source heat pumps that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, refrigeration components.
 - 2. Warranty Period: One (1) year from date of Substantial Completion except four (4) additional years for compressor materials.

PART 2 - PRODUCTS

2.1 EXPOSED, CONSOLE WATER-SOURCE HEAT PUMPS

- A. Trane, McQuay, or approved equal.
- B. Description: Packaged water-source heat pump with temperature controls; factory assembled, tested, and rated according to ASHRAE/ARI/ISO-13256-1.
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- C. Cabinet and Chassis: Manufacturer's standard height, flat-top,galvanized-steel casing with the following features:
 - 1. Access panel for access and maintenance of internal components.
 - 2. Knockouts for electrical and piping connections.
 - 3. Cabinet Insulation: Glass-fiber liner, minimum **1/2 inch (13 mm)** thick, complying with UL 181, ASTM C1071, and ASTM G21.
 - 4. Cabinet Insulation: Glass-fiber liner, minimum **1/2 inch (13 mm)** thick, complying with ASTM C1071 and NAIMA AH124, "Fibrous Glass Duct Liner Standard."
 - 5. Sound Attenuation Package: Provide one or more of the following:
 - a. Minimum **0.598-inch- (1.5-mm-)** thick compressor enclosure and front panel. Minimum **0.0937-inch (2.38-mm)** thick foam gasket around the compressor and perimeter of end panel.
 - 6. Condensate Drainage: High-density polyethylene plastic or stainless-steel drain pan with condensate drain piping projecting to unit exterior and complying with ASHRAE 62.1.
 - a. Condensate Overflow Protection: Solid state electronic; mechanical float switch not permitted.
 - 7. Discharge Grille: Steel, aluminum, or plastic grille for adjustable discharge air pattern.
 - 8. Color: Selected by Architect from manufacturer's standard color selection.
 - 9. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

- D. Fan: Direct driven, centrifugal, with multispeed motor mounted on a removable fan-motor board.
1. General requirements for motors are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
 2. Motor: Multispeed, permanently lubricated, permanent split capacitor.
- E. Water Circuit:
1. Refrigerant-to-Water Heat Exchanger: Coaxial heat exchanger with copper water tube with enhanced heat-transfer surfaces inside a steel shell; both shell and tube are leak tested to **450 psig (3102 kPa)** for refrigerant side and **400 psig (2758 kPa)** for water side. Factory mount heat exchanger in unit on resilient rubber vibration isolators.
 2. Water-Regulating Valves: Limit water flow through refrigerant-to-water heat exchanger and control head pressure on compressor during cooling and heating. Valves shall close when heat-pump compressor is not running.
- F. Refrigerant-to-Air Coils: Copper tubes with aluminum fins, leak tested to **450 psig (3102 kPa)**.
- G. Refrigerant Circuit Components:
1. Sealed Refrigerant Circuit: Charge with R-410A refrigerant.
 2. Filter-Dryer: Factory installed to clean and dehydrate the refrigerant circuit.
 3. Charging Connections: Service fittings on suction and liquid for charging and testing.
 4. Reversing Valve: Four-way, solenoid-activated valve designed to be fail-safe in heating position with replaceable magnetic coil.
 5. Compressor: Hermetic rotary compressor installed on vibration isolators housed in an acoustically treated enclosure with factory-installed safeties as follows:
 - a. Antirecycle timer.
 - b. High-pressure cutout.
 - c. Low-pressure cutout or loss of charge switch.
 - d. Internal thermal-overload protection.
 - e. Freezestat to stop compressor if water-loop temperature in refrigerant-to-water heat exchanger falls below **35 deg F (2 deg C)**.
 - f. Condensate overflow switch to stop compressor with high condensate level in condensate drain pan.
 - g. Water-coil, low-temperature switch.
 - h. Air-coil, low-temperature switch.
 6. Refrigerant Piping Materials: ASTM B743 copper tube with wrought-copper fittings and brazed joints.
 7. Pipe Insulation: Refrigerant minimum **3/8-inch- (10-mm-)** thick, flexible elastomeric insulation on piping exposed to airflow through the unit. Maximum 25/50 flame-spread/smoke-developed indexes per ASTM E84.
 8. Refrigerant Metering Device: Dual-port, thermal-expansion valve to allow specified operation with entering-water temperatures from **25 to 125 deg F (minus 4 to 52 deg C)**.
 9. Hot-Gas Reheat Valve: Pilot-operated, sliding-type valve with replaceable magnetic coil.
- H. Hot-Gas Reheat: Reheat valve diverts refrigerant hot gas to reheat coil when unit-mounted humidistat calls for dehumidification.
- I. Filters: Disposable, pleated type, **1 inch (25 mm)** thick and with a minimum efficiency reporting value of 7 according to ASHRAE 52.2.

- J. Controls: as indicated on construction drawings.
- K. Electrical Connection: Single electrical connection. See equipment schedule on drawings.

2.2 HOSE KITS

- A. General: Hose kits shall be designed for minimum 400-psig (2758-kPa) working pressure and operating temperatures from 33 to 211 deg F (0.5 to 99 deg C). Tag hose kits to equipment designations.
- B. Hose: Length 24 inches (600 mm) braided stainless steel, complete with adapters. Minimum diameter, equal to water-source, heat-pump connection size.
- C. Isolation Valves: Two-piece, bronze-body ball valves with stainless-steel, standard-port ball and stem with normal pipe thread (NPT) connections, and galvanized-steel lever handle. Provide valve for supply and return. If balancing device is combination shutoff type with memory stop, the isolation valve may be omitted on the return.
- D. Strainer: Y-type with blowdown valve in supply connection.
- E. Balancing Device: Mount in return connection. Include meter ports to allow flow measurement with differential pressure gage.
 - 1. Automatic balancing valve, factory set to operate within 10 percent of design flow rate over a 40:1 differential pressure range of 2 to 80 psig (13.8 to 552 kPa).
 - 2. Manual, calibrated-orifice balancing valve.
 - 3. Manual, venturi-type balancing valve.
- F. Motorized Water Valve: Slow-acting, 24-V dc, with NPT connections.

2.3 HOSE KIT ASSEMBLIES

- A. Supply and return hoses having ball valve with pressure temperature port.
- B. Supply hose having ball valve with pressure temperature port; return hose having automatic flow regulator valve with pressure temperature ports, and ball valve.
- C. Supply hose having "Y" strainer with blowdown valve, and ball valve with pressure temperature port; return hose having automatic flow regulator with PT ports, and ball valve.
- D. Supply hose having "Y" strainer with blowdown valve, and ball valve with pressure temperature port.
- E. Return hose having ball valve with pressure temperature port.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine roughing-in for piping and electric installations for water-source heat pumps to verify actual locations of piping connections and electrical conduits before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Equipment Mounting:
 - 1. Install water-source heat pumps on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
 - 2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
 - 3. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."
- B. Install wall-mounting thermostats, humidistats, and switch controls in electrical outlet boxes at heights to match lighting controls or as required in Section 230923.27 "Temperature Instruments," Section 230923.19 "Moisture Instruments," and Section 230923 "Direct Digital Control (DDC) System for HVAC."

3.3 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties. Specific connection requirements are as follows:
 - 1. Connect supply and return hydronic piping to heat pump with unions, shutoff valves and hose kits.
 - 2. Connect heat-pump condensate drain pan to indirect waste connection with condensate trap of adequate depth to seal against fan pressure. Install cleanouts in piping at changes of direction.
- B. Install electrical devices furnished by manufacturer but not specified to be factory mounted.
- C. Install piping adjacent to machine to allow service and maintenance.
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections:
 - 1. After installing water-source heat pumps and after electrical circuitry has been energized, test units for compliance with requirements.
 - 2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- B. Heat pumps will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.5 STARTUP SERVICE

- A. Complete installation and startup checks according to manufacturer's written instructions and do the following:
 - 1. Inspect for visible damage to unit casing.
 - 2. Inspect for visible damage to compressor, coils, and fans.
 - 3. Inspect internal insulation.
 - 4. Verify that labels are clearly visible.
 - 5. Verify that clearances have been provided for servicing.
 - 6. Verify that controls are connected and operable.
 - 7. Verify that filters are installed.
 - 8. Adjust vibration isolators.
 - 9. Inspect operation of barometric dampers.
 - 10. Verify bearing lubrication on fan.
 - 11. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
 - 12. Adjust fan belts to proper alignment and tension.
 - 13. Start unit according to manufacturer's written instructions.
 - 14. Complete startup sheets and attach copy with Contractor's startup report.
 - 15. Inspect and record performance of interlocks and protective devices; verify sequences.
 - 16. Operate unit for an initial period as recommended or required by manufacturer.
 - 17. Verify thermostat and humidistat calibration.
 - 18. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
 - 19. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
 - 20. Start refrigeration system, and measure and record the following:
 - a. Coil leaving-air, dry- and wet-bulb temperatures.
 - b. Coil entering-air, dry- and wet-bulb temperatures.
 - c. Outdoor-air, dry-bulb temperature.
 - d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
 - 21. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.
 - a. Supply-air volume.
 - b. Return-air volume.
 - c. Relief-air volume.
 - d. Outdoor-air intake volume.

3.6 ADJUSTING

- A. Adjust initial temperature and humidity set points.
- B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

- C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.7 CLEANING

- A. Replace filters used during construction prior to air balance or Substantial Completion.
- B. After completing installation of exposed, factory-finished, water-source heat pumps, inspect exposed finishes and repair damaged finishes.

3.8 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain water-source heat pumps.

END OF SECTION 238146.13

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Copper building wire rated 600 V or less.
 2. Aluminum building wire rated 600 V or less.
 3. Metal-clad cable, Type MC, rated 600 V or less.
 4. Fire-alarm wire and cable.
 5. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Southwire Company.
 2. WESCO.
- C. Standards:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 2. RoHS compliant.
 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

- E. Conductor Insulation:
 - 1. Type THHN and Type THWN-2: Comply with UL 83.
 - 2. Type XHHW-2: Comply with UL 44.

2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Southwire Company](#).
 - 2. [WESCO](#).
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. Comply with UL 1569.
 - 3. RoHS compliant.
 - 4. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Circuits:
 - 1. Single circuit.
 - 2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.
- E. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- F. Ground Conductor: Insulated.
- G. Conductor Insulation:
 - 1. Type TFN/THHN/THWN-2: Comply with UL 83.
 - 2. Type XHHW-2: Comply with UL 44.
 - 3. .
- H. Armor: Steel, interlocked.

2.3 FIRE-ALARM WIRE AND CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Allied Wire & Cable Inc.](#)
 - 2. [Genesis Cable Products; Honeywell International, Inc.](#)
- B. Signaling Line Circuits: Twisted, shielded pair, not less than No. 16 AWG.

1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire-alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.
 3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NRTL listed for fire-alarm and cable tray installation, plenum rated.

2.4 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. 3M Electrical Products.
 2. ABB (Electrification Products Division).
 3. Hubbell Incorporated, Power Systems.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
 2. Type: Two hole with long barrels.
 3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway

- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- D. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway or Metal-clad cable, Type MC as permitted by the NEC.
- F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 INSTALLATION OF FIRE-ALARM WIRING

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method:
 - 1. Cables and pathways used for fire-alarm circuits, and equipment control wiring associated with fire-alarm system, may not contain any other wire or cable.
 - 2. Signaling Line Circuits: Power-limited fire-alarm cables shall not be installed in the same cable or pathway as signaling line circuits.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- E. Color-Coding: Color-code fire-alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.

3.5 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.6 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.7 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.8 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB (Electrification Products Division).
 - 2. ILSCO.
 - 3. Siemens Industry, Inc., Energy Management Division.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B3.

2. Stranded Conductors: ASTM B8.
3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- D. Conduit Hubs: Mechanical type, terminal with threaded hub.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 1. Feeders and branch circuits.
 2. Lighting circuits.
 3. Receptacle circuits.
 4. Single-phase motor and appliance branch circuits.
 5. Three-phase motor and appliance branch circuits.
 6. Flexible raceway runs.
 7. Armored and metal-clad cable runs.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.3 FIELD QUALITY CONTROL

- A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- B. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
6. Fabricated metal equipment support assemblies.

B. Related Requirements:

1. Section 260548.16 "Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.
3. Equipment supports.
4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

C. Delegated-Design Submittal: For hangers and supports for electrical systems.

1. Include design calculations and details of hangers.
2. Include design calculations for seismic restraints.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved.

B. Seismic Qualification Data: Certificates, for hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.

- C. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame Rating: Class 1.
 - 2. Self-extinguishing according to ASTM D635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB (Electrification Products Division).
 - b. Eaton (B-line).
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 - 4. Channel Width: 1-5/8 inches.
 - 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 7. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 8. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

- D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
 - 5. Toggle Bolts: All-steel springhead type.
 - 6. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMC and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 260529

SECTION 26 0533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Metal wireways and auxiliary gutters.
4. Nonmetal wireways and auxiliary gutters.
5. Surface raceways.
6. Boxes, enclosures, and cabinets.
7. Handholes and boxes for exterior underground cabling.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.
2. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.
3. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. LEED Submittals: Comply with Section 018113

1. Product Data for Credit IEQ 4.1: For solvent cements and adhesive primers, documentation including printed statement of VOC content.
 2. Laboratory Test Reports for Credit IEQ 4: For solvent cements and adhesive primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 3. MR Credit 3: BDPO – Sourcing of Raw Materials
 - a. For recycled content conduit: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.
- C. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
1. Structural members in paths of conduit groups with common supports.
 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Allied Tub & Conduit; a part of Atkore International
 - b. Southwire Company,
 - c. Thomas & Betts Corporation; A Member of the ABB Group
 - d. Republic Conduit
 - e. Wheatland Tube Company
 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 3. GRC: Comply with ANSI C80.1 and UL 6.
 4. ARC: Comply with ANSI C80.5 and UL 6A.
 5. IMC: Comply with ANSI C80.6 and UL 1242.
 6. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - a. Comply with NEMA RN 1.
 - b. Coating Thickness: 0.040 inch, minimum.
 7. EMT: Comply with ANSI C80.3 and UL 797.

8. FMC: Comply with UL 1; zinc-coated steel.
9. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Allied Tub & Conduit; a part of Atkore International
 - b. Southwire Company,
 - c. Thomas & Betts Corporation; A Member of the ABB Group
 - d. Republic Conduit
 - e. Wheatland Tube Company
2. Comply with NEMA FB 1 and UL 514B.
3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Fittings, General: Listed and labeled for type of conduit, location, and use.
5. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
6. Fittings for EMT:
 - a. Material: Steel
 - b. Type: Setscrew or compression.
7. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
8. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

- C. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. AFC Cable Systems; a part of Atkore International
 - b. RACO; Hubbell
 - c. Thomas & Betts Corporation; A Member of the ABB Group
 - d. Kraloy
 - e. CANTEX, Inc.
 - f. Champion Fiberglass, Inc.
2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fiberglass:

- a. Comply with NEMA TC 14.
 - b. Comply with UL 2515 for aboveground raceways.
 - c. Comply with UL 2420 for belowground raceways.
4. ENT: Comply with NEMA TC 13 and UL 1653.
 5. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
 6. LFNC: Comply with UL 1660.
 7. RTRC: Comply with UL 2515A and NEMA TC 14.
- B. Nonmetallic Fittings:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AFC Cable Systems; a partk of Atkore International
 - b. RACO; Hubbell
 - c. Thomas & Betts Corporation; A Member of the ABB Group
 - d. Kraloy
 - e. CANTEX, Inc.
 - f. Champion Fiberglass, Inc.
 2. Fittings, General: Listed and labeled for type of conduit, location, and use.
 3. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
 4. Solvents and Adhesives: As recommended by conduit manufacturer.
 5. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 6. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
1. B-line, an Eaton Business
 2. Hoffman; a brand of nVent
 3. MonoSystems, Inc
 4. Square D
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Finish: Manufacturer's standard enamel finish.

2.4 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1. Allied Moulded Products, Inc.
 - 2. Hoffman; a brand of nVent
 - 3. Lamson & Sessions
 - 4. Niedax inc.
- B. Listing and Labeling: Nonmetallic wireways and auxiliary gutters shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Description: Fiberglass polyester, extruded and fabricated to required size and shape, without holes or knockouts. Cover shall be gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections shall be flanged and have stainless-steel screws and oil-resistant gaskets.
- D. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
- E. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.
- F. Solvents and Adhesives: As recommended by conduit manufacturer.
- G. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- H. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.

2.5 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.

- C. Surface Nonmetallic Raceways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC. Product shall comply with UL 94 V-0 requirements for self-extinguishing characteristics.

2.6 BOXES, ENCLOSURES, AND CABINETS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1. RACO; Hubbell
 - 2. Wiremold / Legrand
 - 3. Thomas & Betts Corporation; A Member of the ABB Group
 - 4. Hubbell Incorporated
 - 5. Appleton Electric
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Metal Floor Boxes:
 - 1. Material: Cast metal.
 - 2. Type: Fully Adjustable
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- I. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- J. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- K. Device Box Dimensions: 4 inches square by 2-1/8 inches deep
- L. Gangable boxes are allowed.

- M. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 2. Nonmetallic Enclosures: Plastic
 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- N. Cabinets:
1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.
 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.7 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Standard: Comply with SCTE 77.
2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC."
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
7. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC
 2. Concealed Conduit, Aboveground: EMT.
 3. Underground Conduit: RNC, Type EPC-40-PVC, concrete encased.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: **3/4-inch** trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- G. Install surface raceways only where indicated on Drawings.
- H. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Complete raceway installation before starting conductor installation.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- I. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- J. Support conduit within 12 inches of enclosures to which attached.
- K. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of **2 inches** of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from ENT to GRC before rising above floor.
- L. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

- M. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- N. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- O. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- P. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- Q. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- R. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- S. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- T. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- U. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- V. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- W. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Conduit extending from interior to exterior of building.
 - 4. Where otherwise required by NFPA 70.

- X. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- Y. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- Z. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of **72 inches** of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- AA. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- BB. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- CC. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- DD. Locate boxes so that cover or plate will not span different building finishes.
- EE. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

- FF. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- GG. Set metal floor boxes level and flush with finished floor surface.
- HH. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits but a minimum of 6 inches below grade. Align planks along centerline of conduit.
7. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Bands and tubes.
4. Tapes and stencils.
5. Tags.
6. Signs.
7. Cable ties.
8. Paint for identification.
9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with NFPA 70.
- C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 1. Black letters on an orange field.
 2. Legend: Indicate voltage.

- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
1. Color shall be factory applied.
 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 4. Color for Neutral: White or gray.
 5. Color for Equipment Grounds: Green.
- C. Equipment Identification Labels:
1. Black letters on a white field.

2.3 SIGNS

- A. Baked-Enamel Signs:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlton Industries, LP.
 - b. Champion America.
 - c. Marking Services, Inc.
 2. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
 3. 1/4-inch (6.4-mm) grommets in corners for mounting.
 4. Nominal Size: 7 by 10 inches (180 by 250 mm).

2.4 CABLE TIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. HellermannTyton.
 2. Marking Services, Inc.
 3. Panduit Corp.
- B. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 Deg F (23 Deg C) according to ASTM D638: 7000 psi (48.2 MPa).
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 1. Secure tight to surface of conductor, cable, or raceway.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- I. Baked-Enamel Signs:
 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

2. Unless otherwise indicated, provide a single line of text with **1/2-inch- (13-mm-)** high letters on minimum **1-1/2-inch- (38-mm-)** high sign; where two lines of text are required, use signs minimum **2 inches (50 mm)** high.

J. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.2 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at **50-foot (15-m)** maximum intervals in straight runs, and at **25-foot (7.6-m)** maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
 1. "EMERGENCY POWER."
 2. "POWER."
 3. "UPS."
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels self-adhesive wraparound labels to identify the phase.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at **50-foot (15-m)** maximum intervals in straight runs, and at **25-foot (7.6-m)** maximum intervals in congested areas.
- F. Equipment Identification Labels:
 1. Indoor Equipment: Baked-enamel signs.
 2. Outdoor Equipment: Stenciled legend **4 inches (100 mm)** high.

END OF SECTION 260553

SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following types of LED luminaires:
1. Recessed, linear.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 2. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
- B. Shop Drawings: For nonstandard or custom luminaires.
1. Include plans, elevations, sections, and mounting and attachment details.
 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.4 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Ambient Temperature: 41 to 104 deg F (5 to 40 deg C).

1. Relative Humidity: Zero to 95 percent.

B. Altitude: Sea level to 1000 feet (300 m).

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:

- a. "USE ONLY" and include specific lamp type.
- b. Lamp diameter, shape, size, wattage, and coating.
- c. CCT and CRI.

C. Recessed luminaires shall comply with NEMA LE 4.

2.3 RECESSED, LINEAR (Type A).

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Elite Lighting Corporation.

B. Nominal Operating Voltage: Universal - 120/277 V ac.

C. Lamp:

1. Minimum 4000 lm.
2. Minimum allowable efficacy of 85 lm/W.
3. CRI of minimum 80. CCT of 3500K.
4. Rated lamp life of 50,000 hours to L70.
5. Dimmable from 100 percent to zero percent of maximum light output.
6. Internal driver.

D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

E. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.
4. NEMA LE 4.

2.4 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Steel:

1. ASTM A36/A36M for carbon structural steel.
2. ASTM A568/A568M for sheet steel.

C. Stainless Steel:

1. 1. Manufacturer's standard grade.
2. 2. Manufacturer's standard type, ASTM A240/240M.

D. Galvanized Steel: ASTM A653/A653M.

E. Aluminum: ASTM B209.

2.5 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.6 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: **1/2-inch (13-mm)** steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, **12 gage (2.68 mm)**.
- D. Rod Hangers: **3/16-inch (5-mm)** minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.

- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 265119

SECTION 284621.11 - ADDRESSABLE FIRE-ALARM SYSTEMS

1.1 SUMMARY

- A. Section Includes:
1. Manual fire-alarm boxes.
 2. Notification appliances.

1.2 ACTION SUBMITTALS

- A. General Submittal Requirements:
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
 2. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified, fire-alarm technician; Level III minimum.
 - c. Licensed or certified by authorities having jurisdiction.
- B. Product Data: For each type of product, including furnished options and accessories.
- C. Shop Drawings: For fire-alarm system.
1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 2. Include plans, elevations, sections, details, and attachments to other work.
 3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
 4. Detail assembly and support requirements.
 5. Include voltage drop calculations for notification-appliance circuits.
 6. Include input/output matrix.
 7. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
 8. Include performance parameters and installation details for each detector.
 9. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.
- D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Data: Certificates, for fire-alarm control unit, accessories, and components, from manufacturer.
- C. Field quality-control reports.
- D. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
 - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - c. Complete wiring diagrams showing connections between all devices and equipment.
 - d. Riser diagram.
 - e. Record copy of site-specific software.
 - f. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
 - 1) Equipment tested.
 - 2) Frequency of testing of installed components.
 - 3) Frequency of inspection of installed components.
 - 4) Requirements and recommendations related to results of maintenance.
 - 5) Manufacturer's user training manuals.
 - g. Manufacturer's required maintenance related to system warranty requirements.
 - h. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
 1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.
- B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation.
- C. Automatic sensitivity control of certain smoke detectors.
- D. All components provided shall be listed for use with the selected system.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
 1. Manual stations.

2. Automatic sprinkler system water flow.
3. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
2. Identify alarm and specific initiating device at fire-alarm control unit.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Record events in the system memory.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of communication with any addressable sensor, input module, relay, control module, or remote annunciator.
4. Loss of primary power at fire-alarm control unit.
5. Ground or a single break in internal circuits of fire-alarm control unit.
6. Abnormal ac voltage at fire-alarm control unit.
7. Break in standby battery circuitry.
8. Failure of battery charging.
9. Abnormal position of any switch at fire-alarm control unit or annunciator.

E. System Supervisory Signal Actions:

1. Initiate notification appliances.
2. Identify specific device initiating the event at fire-alarm control unit.
3. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.

2.3 MANUAL FIRE-ALARM BOXES

A. **Manufacturers:** Use base building fire alarm system manufacturer. Contractor to field verify.

B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38.

1. Single-action mechanism, [**breaking-glass or plastic-rod**] [**pull-lever**] type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key- or wrench-operated switch.

2.4 NOTIFICATION APPLIANCES

- A. Manufacturers: Use base building fire alarm system manufacturer. Contractor to field verify.
- B. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
- C. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum **1-inch- (25-mm-)** high letters on the lens.
 - 1. Mounting: Wall mounted unless otherwise indicated.
 - 2. Flashing shall be in a temporal pattern, synchronized with other units.
 - 3. Strobe Leads: Factory connected to screw terminals.
 - 4. Mounting Faceplate: Factory finished, red.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
- C. Manual Fire-Alarm Boxes:
 - 1. Install manual fire-alarm box in the normal path of egress within **60 inches (1520 mm)** of the exit doorway.
 - 2. Mount manual fire-alarm box on a background of a contrasting color.
 - 3. The operable part of manual fire-alarm box shall be between **42 inches (1060 mm)** and **48 inches (1220 mm)** above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- D. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least **6 inches (150 mm)** below the ceiling. Install all devices at the same height unless otherwise indicated.
- E. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.2 PATHWAYS

- A. Pathways shall be installed in EMT.
- B. Exposed EMT shall be painted red enamel.

3.3 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than **36 inches (910 mm)** from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.5 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.6 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter.
 - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 3. Test visible appliances for the public operating mode according to manufacturer's written instructions.

4. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
 - D. Fire-alarm system will be considered defective if it does not pass tests and inspections.
 - E. Prepare test and inspection reports.
 - F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
 - G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 284621.11

SECTION 311000 - SITE CLEARING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Protecting existing vegetation to remain.
 2. Removing existing vegetation.
 3. Clearing and grubbing.
 4. Stripping and stockpiling topsoil.
 5. Stripping and stockpiling rock.
 6. Removing above- and below-grade site improvements.
 7. Disconnecting, capping or sealing, removing site utilities and abandoning site utilities in place.
 8. Temporary erosion and sedimentation control.
- B. Related Sections:
1. Section 015000 - Temporary Construction Facilities, Utilities and Controls.
 2. Division 26 – Electrical
 3. Section 015635 – Temporary Tree and Plant Protection

1.3 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction as indicated on Drawings.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or video recordings.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.
- C. Utility Locator Service: Engage private utility locating service before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- E. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015635 - Temporary Tree and Plant Protection.

- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. Protect trees and plants remaining on-site according to requirements in Section 015635 - Temporary Tree and Plant Protection.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015635 - Temporary Tree and Plant Protection.

3.4 EXISTING UTILITIES

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
 - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
 - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- C. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- E. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 3. Use only hand methods or air spade for grubbing within protection zones.
 - 4. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 72 inches.
 - 2. Do not stockpile topsoil within protection zones.
 - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
 - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for walks, pavements, turf and grasses and plants.
3. Excavating and backfilling for buildings and structures.
4. Subbase course for concrete walks and pavements.
5. Subbase course and base course for asphalt paving.
6. Subsurface drainage backfill for walls.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

1. Section 013233 – Project Reporting and Photographs.
2. Section 033000 - Cast-in-Place Concrete.
3. Section 311000 - Site Clearing and Demolition.
4. Section 312000 – Excavation, Filling and Grading.
5. Section 329200 – Turf and Grasses.
6. Section 329300 – Plants.
7. Section 329113 – Soil Preparation.

1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices for earth moving specified in Section 012900 – Applications for Payment.

1.4 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct preexcavation conference at Project site.
 - 1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
 - a. Personnel and equipment needed to make progress and avoid delays.
 - b. Coordination of Work with utility locator service.
 - c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
 - d. Extent of trenching by hand or with air spade.
 - e. Field quality control.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Controlled low-strength material, including design mixture.

1.7 INFORMATIONAL SUBMITTALS

- A. Retain "Material Test Reports" Paragraph below for material test reports that are Contractor's responsibility.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.

2. Laboratory compaction curve according to ASTM D 698.
- C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.8 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.9 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locating service before beginning earth-moving operations.
- C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 311000 - Site Clearing are in place.
- D. Do not commence earth-moving operations until plant-protection measures specified in Section 015635 - Temporary Tree and Plant Protection are in place.
- E. The following practices are prohibited within protection zones:
 1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of washed, crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33/C 33M; fine aggregate.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Self-compacting, low-density, flowable concrete material produced from the following:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I Type II or Type III.
 - 2. Fly Ash: ASTM C 618, Class C or F.
 - 3. Normal-Weight Aggregate: ASTM C 33/C 33M, 3/4-inch (19-mm) nominal maximum aggregate size.
 - 4. Foaming Agent: ASTM C 869.
 - 5. Water: ASTM C 94/C 94M.
 - 6. Air-Entraining Admixture: ASTM C 260.
- B. Produce low-density, controlled low-strength material with the following physical properties:
 - 1. As-Cast Unit Weight: 36 to 42 lb/cu. ft. at point of placement, when tested according to ASTM C 138/C 138M.
 - 2. Compressive Strength: 140 psi (965 kPa), when tested according to ASTM C 495.

2.3 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.

- b. 12 inches outside of concrete forms at footings.
- c. 6 inches outside of minimum required dimensions of concrete cast against grade.
- d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
- e. 6 inches beneath bottom of concrete slabs-on-grade.
- f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
 1. Clearance: 12 inches on each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
 3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
 4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- E. Trenches in Tree- and Plant-Protection Zones:
1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.8 SUBGRADE INSPECTION

- A. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- B. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring, bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in [Section 033000 "Cast-in-Place Concrete."]
- D. Backfill voids with satisfactory soil while removing shoring and bracing.
- E. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Place and compact final backfill with satisfactory soil to final subgrade elevation.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
 2. Under walks and pavements, use satisfactory soil material.
 3. Under steps and ramps, use engineered fill.
 4. Under building slabs, use engineered fill.
 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 ASTM D 1557:
1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
1. Turf or Unpaved Areas: Plus or minus 1 inch.
 2. Walks: Plus or minus 1 inch.

3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBSURFACE DRAINAGE

- A. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.
 2. Place and compact impervious fill over drainage backfill in 6-inch thick compacted layers to final subgrade.

3.18 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS.

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Place base course material over subbase course under hot-mix asphalt pavement.
 3. Shape subbase course and base course to required crown elevations and cross-slope grades.
 4. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
 5. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.19 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 2. Determine that fill material classification and maximum lift thickness comply with requirements.
 3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
 - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
 - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 321313 - CONCRETE PAVING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Walks.
- B. Related Requirements:
 - 1. Section 033000 - Cast-in-Place Concrete.
 - 2. Section 321373 - Concrete Paving Joint Sealants.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.
- B. Material Test Reports: For each of the following:
 - 1. Aggregates.
- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

- C. Concrete Testing Service: Contractor to engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 CONCRETE MATERIALS

- A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150/C 150M, gray portland cement Type I.
 - 2. Fly Ash: ASTM C 618, Class C or Class F].
 - 3. Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag Type IP, portland-pozzolan cement.
- B. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 4M, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C 260/C 260M.
- D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: Potable and complying with ASTM C 94/C 94M.

2.3 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry or cotton mats.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

2.4 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy-Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
 - 1. Types I and II, nonload bearing, Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.
- F. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

2.5 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.
- B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Pozzolan: 25 percent.
 - 2. Slag Cement: 50 percent.

3. Combined Fly Ash or Pozzolan, and Slag Cement: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 to 0.30 percent by weight of cement.
- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use high-range, water-reducing and retarding admixture in concrete as required for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- E. Concrete Mixtures: Normal-weight concrete.
 1. Compressive Strength (28 Days): 4500 psi.
 2. Slump Limit: 4 inches plus or minus 1 inch.

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.
- F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
- G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 - 2. Provide tie bars at sides of paving strips where indicated.
 - 3. Butt Joints: Use bonding agent or epoxy-bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
 - a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut **1/8-inch** wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 - a. Tolerance: Ensure that sawed joints are within **3 inches either** way from centers of dowels.
 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture-retaining-cover curing or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 - 1. Elevation: 3/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot- long; unleveled straightedge not to exceed 1/2 inch.
 - 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
 - 5. Lateral Alignment and Spacing of Dowels: 1 inch.
 - 6. Vertical Alignment of Dowels: 1/4 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
 - 8. Joint Spacing: 3 inches.
 - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

3.11 REPAIR AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 321373 - CONCRETE PAVING JOINT SEALANTS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cold-applied joint sealants.
 - 2. Hot-applied joint sealants.
- B. Related Requirements:
 - 1. Section 321216 - Asphalt Paving.
 - 2. Section 321313 - Concrete Paving.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Paving-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer or testing agency.
- B. Product Certificates: For each type of joint sealant and accessory.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS**2.1 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

- A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type NS.
- B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.
- C. Multicomponent, Nonsag, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.
- D. Single Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.
- E. Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.

2.3 HOT-APPLIED JOINT SEALANTS

- A. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I, II, and III.

2.4 JOINT-SEALANT BACKER MATERIALS

- A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

- C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.
- D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.5 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.
- C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint-sealant backings.
 - 2. Do not stretch, twist, puncture, or tear joint-sealant backings.

3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:
1. Place joint sealants so they fully contact joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
1. Remove excess joint sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.
- B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Joints within concrete paving.
1. Joint Location:
 - a. Expansion and isolation joints in concrete paving.
 - b. Contraction joints in concrete paving.
 - c. Other joints as indicated.
 2. Joint Sealant: Single-component, nonsag, silicone joint sealant.
 3. Joint-Sealant Color: Manufacturer's standard.

END OF SECTION 321373

SECTION 329113 - SOIL PREPARATION**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes planting soils specified by composition of the mixes.
- B. Related Requirements:
 - 1. Section 129300 "Site Furnishings" for placing planting soil in exterior unit planters.
 - 2. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
 - 3. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
 - 4. Section 329300 "Plants" for placing planting soil for plantings.

1.3 DEFINITIONS

- A. AAPFCO: Association of American Plant Food Control Officials.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
- C. CEC: Cation exchange capacity.
- D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- F. Imported Soil: Soil that is transported to Project site for use.
- G. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.
- H. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- I. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

- J. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- L. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- M. SSSA: Soil Science Society of America.
- N. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- O. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- P. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- Q. USCC: U.S. Composting Council.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. Material Certificates: For each type of imported soil, soil amendment, and fertilizer before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
 - c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.
- B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For each testing agency.

- B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.
- C. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil and imported soil.
- B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.
 - 1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.9 SOIL-SAMPLING REQUIREMENTS

- A. General: Extract soil samples according to requirements in this article.
- B. Sample Collection and Labeling: Have samples taken and labeled by Contractor under the direction of the testing agency.
 - 1. Number and Location of Samples: Minimum of three representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
 - 2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
 - 3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
 - 4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.10 TESTING REQUIREMENTS

- A. General: Perform tests on soil samples according to requirements in this article.
- B. Physical Testing:
 - 1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":

- a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
 - b. Hydrometer Method: Report percentages of sand, silt, and clay.
2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).
- C. Chemical Testing:
1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3-Chemical Methods."
 2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
 3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
 4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
- D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NEC-67, including the following:
1. Percentage of organic matter.
 2. CEC, calcium percent of CEC, and magnesium percent of CEC.
 3. Soil reaction (acidity/alkalinity pH value).
 4. Buffered acidity or alkalinity.
 5. Nitrogen ppm.
 6. Phosphorous ppm.
 7. Potassium ppm.
 8. Manganese ppm.
 9. Manganese-availability ppm.
 10. Zinc ppm.
 11. Zinc availability ppm.
 12. Copper ppm.
 13. Sodium ppm and sodium absorption ratio.
 14. Soluble-salts ppm.
 15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
 16. Other deleterious materials, including their characteristics and content of each.
- E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
- F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants

indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- B. Bulk Materials:
 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Do not move or handle materials when they are wet or frozen.
 4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Planting-Soil Type: Existing, on-site surface soil, with the duff layer, if any, retained and stockpiled on-site; modified to produce viable planting soil. Blend existing, on-site surface soil with the following soil amendments and fertilizers as noted in soil test results.
- C. Planting-Soil Type: Imported, naturally formed soil from off-site sources and consisting of sandy loam, loam, or loamy sand soil according to USDA textures; and modified to produce viable planting soil.
 1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass.
 2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 4 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
 3. Unacceptable Properties: Clean soil of the following:

- a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches in any dimension.
4. Amended Soil Composition: Blend imported, unamended soil with the soil amendments and fertilizers as noted in soil test results.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
 2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
 3. Form: Provide lime in form of ground dolomitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M

2.3 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
1. Feedstock: Limited to leaves
 2. Reaction: pH of 5.5 to 8
 3. Soluble-Salt Concentration: Less than 4dS/m.
 4. Moisture Content: 35 to 55percent by weight.
 5. Organic-Matter Content: minimum 30 percent of dry weight.
 6. Particle Size: Minimum of 98 percent passing through a 1-inch sieve.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 6 to 7.5, a soluble-salt content measured by electrical conductivity of maximum 5dS/m, having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
- D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.
- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches and stockpile until amended.

- B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
- D. Screening: Pass unamended soil through a 2-inch sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 12 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
- C. Mixing: Spread unamended soil to total depth of 6 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix lime and sulfur with dry soil before mixing fertilizer.
 - b. Mix fertilizer with planting soil no more than seven days before planting.
 - 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

- A. Application: Apply 4 inches of compost to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.
- C. Soil will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.6 PROTECTION

- A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
- C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.7 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.
 - 1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

SECTION 329200 - TURF AND GRASSES**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Seeding.
 - 2. Hydroseeding.
 - 3. Sodding.
 - 4. Meadow grasses and wildflowers.
 - 5. Turf renovation.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" and drawing designations for planting soils.
- E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer.

- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
 - 1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.
- C. Product Certificates: For fertilizers, from manufacturer.
- D. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf and meadow establishment.
 - 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 2. Experience: Five years' experience in turf installation in addition to requirements in Section 014000 "Quality Requirements."
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Lawncare Manager.
 - c. Landscape Industry Certified Lawncare Technician.
 - 5. Pesticide Applicator: State licensed, commercial.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.
- C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.9 FIELD CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
 1. Seed
 - a. Spring: March 01 to May 15
 - b. Fall: August 15 to October 15
 2. Sod
 - a. Spring: March 01 to June 15
 - b. Fall: August 15 to October 15
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances. It shall be mixed in the proportion shown and test results certifying 98% minimum purity, with no more than .01% weed seed (must be free of ryegrass, timothy, orchardgrass, bentgrass, Canada bluegrass, clover, or any other contaminant which will be unsightly or hard to control), no more than .01% other crops (must be free of dock, chess, chickweed, crabgrass, plantain, and black medic), free of noxious weed seed, and 85% minimum germination. Approved varieties shall be selected from "Recommended Turfgrass cultivars for Professional Seed Mixtures," University of Maryland Turfgrass Technical Update TT-77, most recent edition. A copy of this publication can be obtained by visiting the Maryland Turfgrass Council website <http://www.md turf council.org> or by calling them at 410-836-2876.
- B. Seed Species:
 1. Quality: State-certified seed of grass species as listed below for solar exposure.
 2. Quality: Seed of grass species as listed below for solar exposure, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:
 3. Sun and Partial Shade: Proportioned by weight as follows:
 - a. 80-95% Certified Tall Fescue
 - b. 5-10% Certified Kentucky Bluegrass
 - c. 0-10% Certified Perennial Ryegrass*
- C. All seed and labeling must fully comply with the Maryland Seed Law and these specifications.

- D. All seed must be state certified and blended under the supervision of the Maryland Department of Agriculture (MDA), Turf and Seed Section.
- E. All seed and labeling must fully comply with the Maryland State Department of Agriculture (MDA) Turf & Seed Section.
- F. Each bag shall contain proper label and certification tag.

2.2 TURFGRASS SOD

- A. Turfgrass Sod: Maryland Certified (labeled), inspected and approved by the Maryland Department of Agriculture, complying with Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.
- B. Turfgrass Species:
 - 1. Sod shall be a 90/10 mix with 90% of the mix consisting of a blend of at least three turf type tall fescues, and at least 10% Bluegrass. Approved varieties shall be selected "Recommended Turfgrass cultivars for Professional Seed Mixtures," University of Maryland Turfgrass Technical Update TT-77 most recent edition. A copy of this publication can be obtained by visiting the Maryland Turfgrass Council website <http://www.md turf council.org> or by calling them at 410-836-2876.
 - a. Thickness of Cut: The thickness of the roots and soil should be ½" to ¾".
 - b. Pad Size: Individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be 5%. Broken pads and torn or uneven ends will not be acceptable.
 - c. Strength of Sod Sections: Under ideal conditions, standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10% of the section without the use of netting. NOTE: Younger tall fescue will not be strong enough to pass this test but is still okay to use.
 - d. Sod Viability: Sod shall not be harvested or transplanted under drought conditions.

2.3 MEADOW GRASSES AND WILDFLOWERS

- A. Wildflower and Native-Grass Seed: Fresh, clean, and dry new seed, of mixed species as noted in drawings.
- B. Seed Carrier: Inert material, sharp clean sand or perlite.

2.4 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.5 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.
- C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
- D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of less than 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 to 60 percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
- G. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.6 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 3. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation." Coordinate "Placing Planting Soil" Paragraph below with Section 329113 "Soil Preparation" or Section 329115 "Soil Preparation (Performance Specification)."
- B. Placing Planting Soil: Place and mix planting soil in place over exposed subgrade.
 - 1. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- D. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

- A. Prepare area as specified in "Turf Area Preparation" Article.

- B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.
- C. Fill cells of erosion-control mat with planting soil and compact before planting.
- D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
- E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.
 - 1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 2. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate of [7 to 8 lb/1000 sq. ft.
- C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with erosion-control mats where indicated on Drawings; install and anchor according to manufacturer's written instructions.
- F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
 - 2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.
- G. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.6 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, commercial fertilizer and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 - 1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.

2. Spray-apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Spray-apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre.

3.7 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 1. Lay sod across slopes exceeding 1:3.
 2. Anchor sod on slopes exceeding 1:6 with biodegradable staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.8 TURF MAINTENANCE

- A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches
 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth

in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow Fescue/Kentucky Bluegrass to a height of 2 to 3 inches.
- D. Turf Postfertilization: Apply slow-release fertilizer after initial mowing and when grass is dry.
1. Use fertilizer that provides actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.9 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches
 2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
 3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.
 4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.10 MEADOW

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.
1. Before sowing, mix seed with seed carrier at a ratio of not less than **three** parts seed carrier to one-part seed.
 2. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 3. Do not use wet seed or seed that is moldy or otherwise damaged.
- B. Sow seed at a total rate as indicated by manufacturer.
- C. Brush seed into top 1/16 inch of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.
- E. Water newly planted areas and keep moist until meadow is established.

3.11 MEADOW MAINTENANCE

- A. Maintain and establish meadow by watering, weeding, mowing, trimming, replanting, and performing other operations as required to establish a healthy, viable meadow. Roll, regrade, and replant bare or eroded areas and mulch. Provide materials and installation the same as those used in the original installation.
 - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and meadow damaged or lost in areas of subsidence.
 - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 - 3. Apply treatments as required to keep meadow and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and meadow-watering equipment to convey water from sources and to keep meadow uniformly moist.
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water meadow with fine spray at a minimum rate of 1/2 inch per week for eight weeks after planting unless rainfall precipitation is adequate.

3.12 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.13 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.
- C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- D. Remove nondegradable erosion-control measures after grass establishment period.

3.14 MAINTENANCE SERVICE

- A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:
1. Seeded Turf: From date of installation to end of warranty period.
 - a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
 2. Sodded Turf: From date of installation period to end of warranty period.
- B. Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Meadow Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than maintenance period below.
1. Maintenance Period: 40 days from date of Substantial Completion.

END OF SECTION 329200

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Plants.
 - 2. Tree stabilization.
 - 3. Tree-watering devices.
- B. Related Requirements:
 - 1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
 - 2. Section 329200 "Turf and Grasses" for turf (lawn) and meadow planting, and hydroseeding.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

- F. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- G. Finish Grade: Elevation of finished surface of planting soil.
- H. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- I. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- J. Planting Area: Areas to be planted.
- K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.
- L. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- M. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- N. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- O. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 COORDINATION

- A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.

2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.
- B. Samples for Verification: For each of the following:
1. Trees and Shrubs: Three > Samples of each variety and size delivered to site for review. Maintain approved Samples on-site as a standard for comparison.
 2. Organic Mulch: 1-pint > volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
 3. Slow-Release, Tree-Watering Device: One unit of each size required.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
1. Manufacturer's certified analysis of standard products.
 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 2. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."

3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Interior.
 - c. Landscape Industry Certified Horticultural Technician.
 5. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
1. Selection of plants purchased under allowances is made by Architect, who tags plants at their place of growth before they are prepared for transplanting.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.
- B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk materials with appropriate certificates.
- C. Deliver bare-root stock plants within 24 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.

- D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- E. Handle planting stock by root ball.
- F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.
- G. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- H. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
 - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3. Do not remove container-grown stock from containers before time of planting.
 - 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.11 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. September 1 to June 15, whenever soil is not frozen or excessively wet.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Periods: From date of planting completion.
- a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months or completion of a single complete growing season, whichever is greater.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months or completion of a single complete growing season, whichever is greater.
 - c.
3. Include the following remedial actions as a minimum:
- a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

- E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 FERTILIZERS

- A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
 - 1.
 - 2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 - 1. Type: Shredded hardwood.
 - 2. Size Range: 3 inches maximum, 1/2 inch minimum
 - 3. Color: Natural.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through a 1-inch sieve; soluble-salt content of 2 to 5dS/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 to 60percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.4 PESTICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.5 TREE-STABILIZATION MATERIALS

- A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
3. Guy Cables: Five-strand, 3/16-inch-diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
4. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

2.6 TREE-WATERING DEVICES

- A. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.

2.7 MISCELLANEOUS PRODUCTS

- A. Burlap: Non-synthetic, biodegradable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
 3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."
- B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
 - 1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 2. Excavate approximately three times as wide as ball diameter.
 - 3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 - 4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 7. Maintain supervision of excavations during working hours.
 - 8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
 - 9. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Backfill Soil: Subsoil and topsoil removed from excavations maybe used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch > adjacent finish grades.
 - 1. Backfill: Planting soil For trees, use excavated soil for backfill.
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1-inch adjacent finish grades.
 - 1. Backfill: Planting soil For trees, use excavated soil for backfill.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE-SPADE PLANTING

- A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
- B. Use the same tree spade to excavate the planting hole as will be used to extract and transport the tree.
- C. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
- D. Cut exposed roots cleanly during transplanting operations.

- E. Plant trees following procedures in "Tree, Shrub, and Vine Planting" Article.
- F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

- A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:
 - 1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend one-third of trunk height above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 - 2. Upright Staking and Tying: Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet (4.2 m) high and up to 4 inches in caliper. Space stakes equally around trees.
 - 3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
 - 4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
- B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.
 - 1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.
 - a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle for each guy wire and tighten securely.
 - b. For trees more than 6 inches, anchor guys to deadmen buried at least 36 inches below grade. Provide turnbuckle for each guy wire and tighten securely.
 - c. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
 - d. Support trees with guy cable, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.

- e. Attach flags to each guy wire, 30 inches above finish grade.
 - f. Paint turnbuckles] with luminescent white paint.
2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.9 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 36-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
 2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.11 INSTALLING SLOW-RELEASE WATERING DEVICE

- A. Provide one device for each tree.
- B. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.12 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.13 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.14 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees that are more than 25percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

3.15 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

- E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.16 MAINTENANCE SERVICE

- A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: From date of installation to end of warranty period
- B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: From date of installation to end of warranty period.

END OF SECTION 329300