

**ADDENDUM FOUR  
AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER  
CONTRACT NO. Y-15-008-201  
CITY OF CHATTANOOGA, TENNESSEE**

The following changes shall be made to the Contract Documents, Specifications, and Drawings:

**I. Notes:**

- a. Geotechnical report as prepared by S&ME is provided for reference.

**II. Specifications:**

- a. 00-01-10 Table of Contents
- b. 01-50-00 Temporary Facilities and Controls
- c. 08-14-16 Flush Wood Doors
- d. 08-71-00 Door hardware

**III. Substitution requests:**

- a. Versa-Dek 3.5 LS is an approved substitution for the gym roof deck
  - i. This must perform as well acoustically and structurally as specified. Spans may not be reduced.
- b. Epic Metals Toris 4" A is an approved substitution for the gym roof deck
  - i. This must perform as well acoustically and structurally as specified. Spans may not be reduced.
- c. Notes on Substitution requests
  - i. Subject to conformance with all specifications, and performance requirements an above approved product may be used as a substitute for what was originally included in the drawings or specifications.
  - ii. If items are standard in the 'basis of design' product, but they are an up charge in the proposed substitution, they must be provided without increased cost to the owner.
  - iii. Approval of a substitution request shall not change the original requirements or constitute approval of an items of lesser quality. Products must be available in required colors, finishes, configurations, and warranty to be valid. If all configurations, colors, finishes, quality, configuration or warranty cannot be provided to match the original documents, the item cannot be used as a substitute.
  - iv. The GC shall still be responsible for installing items which conform to the design documents.

**IV. Drawings:**

- a. Revised Drawings:
  - i. AR-101 OVERALL FLOOR PLAN
  - ii. AR-102 ENLARGED PLAN
  - iii. AR-200 ELEVATIONS
  - iv. AR-201 ELEVATIONS
  - v. AR-400 EXTERIOR CANOPY & GUARDRAIL DETAILS
  - vi. AR-401 ENTRY VESTIBULE DETAILS

- vii. AR-800 DOOR TYPES AND SCHEDULE
- viii. C-100 SITE STAKING
- ix. C-401 SITE GRADING
- x. C-700 SITE DETAILS
- xi. E-100 SITE PLAN
- xii. E-500 ELECTRICAL DETAILS
- xiii. E-602 ELECTRICAL SCHEDULES
- xiv. S-202 FRAMING SECTIONS & DETAILS

## **BID RFIs**

1. Q: Refer to Drawing E-100, Note #6

The note referenced above requires us to coordinate the location and requirements of the electrical service with the Electric Power Board. I've started that process and received the attached information from Stacy Frizzell at EPB. He suggests that the electrical service come from a different location rather than what is indicated on the plans. Stacy can be reached at [423-648-3221](tel:423-648-3221) or [frizzellsl@epb.net](mailto:frizzellsl@epb.net). Should we proceed with our pricing based on the information shown on the electrical plans or based on the information EPB is providing?

**A: Move the service to pole N9873 next to Dodson Ave.**

2. Q: Refer to Drawing E-602 and the Lighting Fixture Schedule

The description for light fixture type "T" states that we should "provide owner's choice" for the (20) heads for this track lighting. We need to know the type heads required for this light track in order to accurately price this lighting. Will this selection be provided before the bid?

**A: Provide Lytespan, suspension beam system 6450 with Lightolier track 6001NWH and provide 25 (LT-08 RWF 830 WH VA) HEADS.**

3. Q: Wood floor specs 09 64 10 and 09 64 11 mention 3" molded vented cove base – but no other Base is mentioned. Is there a Rubber Base in the Polished Concrete areas, etc.? If so please note on finish plan and provide spec

**A: No, there is no other typical base throughout.**

4. Q: Elevation – B – Reading Lab - 2/AR-703 and Floor plan AR-102 show what appear to be open shelved cabinets on the wall – please provide details.

**A: That is furniture, and not included in this bid.**

5. Q: Spec listed on Contents is 03 41 08 Precast Concrete Bleachers but Spec included in the Project Manual is 03 41 08 Structural Precast Concrete – it is a generic spec for precast – please provide a Precast Bleacher spec.

**A: Answer The structural precast concrete specification indicates it includes precast bleacher sections. Refer to 03-41-08, 1.2,B**

6. Q: Spec section 07-41-13.6 Standing Seam Metal Panels applies to standing seam roof panels per part 1.1A of the specification. Drawings GN-003 does not list standing seam roof panels under the roof types schedule. Please clarify where standing seam roof panels are shown. Is this specification for the metal panels marked as E-2 on the exterior finish schedule shown on drawing AR-200?

**A: Yes, this spec section relates to the metal siding panels as shown on AR-200.**

7. Q: Reference Sheet L-500 Tree and Shrub Planting Plan – the designation of “Area of Contractor Responsibility” is noted but not in Bold or Large letters and Subs are missing it – also plants outside of this area are not “ghosted” as the work on other drawing is (very light) so that subs no it is not part of the contract. Can you address this – thanks

**A: Please refer to sheet L-500. There is a note on the right of the page that notes “Area of contractor responsibility. Outside of this area not in contract.”**

8. How old is storm drain?

**A: Age of the storm line is not known.**

9. Are there any existing contours labeled?

**A: We were not provided with contour labels, but they can be added to our plans.**

10. Q: Clarification of demo:

a. Dwg C-300, Note 6 – Sediment and Erosion Control Notes Due to unknown conditions. What is the allowance provided for repair of the existing sewer?

**A: The note is in reference to storm drainage structures. If needed, they should be cleaned out or repaired if there are areas of failure. The contractor should provide an allowance in the event a structure should be replaced.**

b. Do you have a survey of the conditions of the existing stormwater and sanitary systems?

**A: We do not have any survey of the conditions of the existing systems.**

11. Q: AR-302, Detail 6 – Gym Roof Edge Detail. Please provide fastening details for insulation to blocking

**A: Roofing is an adhered system, see spec section 07-54-19 PVC Roofing. Refer to manufacturer’s standard details. Decking type specified over the gym should allow the use of fasteners for the blocking which will not be visible from below.**

12. Q: Can you provide the soil boring log?

**A: Yes. See the geotechnical report issued with this addendum.**

13. Q: What type of allowance do you expect for the relocation of utilities?

**A: The main utility relocation should be the utility pole at the new driveway location. GC to include cost in their bid as required for all utility work; as indicated in the Design Documents and to appropriately service the new building.**

14. Q: Is the demo of the existing structure included

**A: No. This is additional scope in another project to be designed and bid by the city.**

15. Q: Does the bid include the outdoor basketball courts, walking trail, tennis courts, and refurbished ballfields? Or is this scope to be completed during the demo of the existing building?

**A: No, those items are not included in the scope. The above mentioned items would be additional scope in another project to be designed and bid by the city. Refer to the note on**

**AR-100 refer to plans by city of Chattanooga for full site layout, details. Concept site plan shown for reference only.**

16. Q: Section 102800 2.7 Kitchen Accessories - spec indicates same as bathroom for the soap dispenser and paper towel dispenser. Will any soap dispenser or paper towel dispenser be required in the kitchen area.

**A: Yes. Section 2.7 Kitchen Accessories describes items that will be required in the #14 Kitchen.**

17. Q: Section 102800 2.6 Custodial Accessories - Mop and broom holder - will this be required if so where. Will paper towel disp and liquid soap disp indicated in this section be required?

**A: Yes. Section 2.6 describes items that will be required in the #5 Janitors closet**

18. Q: Can we get a copy of the storefront window schedule.

**A: Please refer to the exterior elevations. The storefront should work with the CMU coursing. Refer to 3-AR-200 or 9/AR-702 more information on the design intent of the storefront.**

19. Q: The storefront openings A & B don't match the elevation views. Please advise do we use the elevation view or the door schedule for pricing?

**A: Sheet AR-800 has been re-issued. Door types A & B have been updated to clarify intent**

20. Q: It appears that there is a window between office 12 and teen 16 - if a window is required please advise on what is required

**A: Yes, there is a window. Please see drawing 5/AR-703. The window should be above the counter and backsplash on the rm #16 teen lounge side. It should align with the CMU coursing as shown. Window frame finish for this window to be white.**

21. Q: AR-501 detail 11,12, &13 indicate the stainless steel counter tops, sinks and cabinets the materials are specified but a model number or cut through these items is not provided. We need a manufacture with a model number or a cut through each stainless steel item so we know how we need to fabricate these items.

**A: Refer to spec section 11-40-00 – Foodservice equipment for more information**

22. Q: Who provides the projector screens and TV's?

**A: The City**

23. Q: Will the exterior dimensional signage above the entry to the foyer need to be included in this bid? If so provide required wording and specification for this item.

**A: Please proceed as indicated on the drawings at this time “AVONDALE YFD CENTER”**

**Revised drawings with additional information are being issued.**

24. Q: On AR-703 detail 2 what are the boxes located between door 07B & 09A? Is this something that needs to be included in our pricing?

**A: That is furniture and is not included in the bid.**



25. Q: On sheet C-100 I believe some of the site concrete work that may be needed is not shown on this drawing. Please advise if any site concrete sidewalks are required to be installed at the top of the 11 steps on the west side. If sidewalks are required advise to what extent it needs to be included in our pricing.

**A: C-100 has been re-issued.**

26. Q: On the elevation 12/AR-501 there looks to be a 2 compartment free standing sink. On the plumbing schedule this is a drop in sink listed as P8. Please clarify. Thanks.

**A: It is the intent that the kitchen counters and cabinets are fabricated from stainless steel. The counters and sinks should be one piece custom fabricated**

27. Q: Sheet G-003 shows exterior walls to be 2 hour rated. There is aluminum storefront in these exterior walls, which are not fire rated. Specifications call out for aluminum entrances & storefronts at these locations. Sheet AR-301, details 4&5 call for glass & aluminum storefront system per applicable codes. Do these not require fire-rated system & glass??

**A: No, they do not need to be fire rated storefronts. Refer to IBC table 705.8. This building is sprinklered and has a large separation distance, therefore we have large allowable openings in the exterior walls.**

28. Q: Reference Wood Door and Door Hardware Specs. Suppliers have expressed concerns that what is specified and what is desired per conversations do not match up – please review Door and Hardware Specs. From a Supplier: ‘Supplier had talked with the architect and they want Concealed Vertical Rod Devices but this is not listed in documents. Since this was not instructed prior to bid date if they bid this way they would be way more expensive.

**A: Refer to 08-70-00, 2.11, h. This states “Exposed vertical rods are not acceptable, use concealed rods.” This was in the initial bid issue of the specifications.**

29. Q: Reference floor plan sheet AR-102 at the radius wall at Storage room 13, there is a note to use radial CMU. The supplier says that they don't know anyone who makes them. On similar jobs we have often used half blocks, 8X8X8 to turn the radius – Will this be acceptable?

**A: Yes. Using 8x8x8 blocks will be acceptable for the radius. Maintain same running bond pattern.**

30. Q: The veneer on the doors should be Rotary Natural Birch but it is listed Prefinished Quarter Sliced White Oak (Very Expensive – please confirm veneer).'

**A: White Birch may be used**

31. Q: Civil Drawing C-200 and others reference City Drawings in regarding Curb and Gutter and Sidewalk Removal and Installation. Please provide a copy of the City Drawings to help with clarifying our scope.

**A: The drawings for the second phase are not ready for release. New Curb & Gutter will be required at the corner of Wilcox and Dodson in order to properly construct the ADA ramps as shown on C-100. The remainder of the existing curb and gutter will remain in place. The existing sidewalk along Wilcox and Dodson will need to be removed to allow construction of the new sidewalk as shown on C-100.**

**Sidewalk and curb and gutter are only intended to be removed where necessary to permit construction of new facilities.**

October 27, 2017

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/s/ Justin C. Holland, Administrator  
City of Chattanooga  
Department of Public Works

**Report of Geotechnical Exploration  
Avondale Youth and Family Center  
Chattanooga, Tennessee  
S&ME Project No. 4181-17-006**



Prepared for:  
City of Chattanooga – Department of Public Works  
1250 Market Street  
Chattanooga, Tennessee 37402-2713

Prepared by:  
S&ME, Inc.  
4291 Highway 58  
Chattanooga, Tennessee 37416

February 17, 2017



February 17, 2017

City of Chattanooga – Department of Public Works  
Division of Engineering Services  
1250 Market Street  
Chattanooga, Tennessee 37402-2713

Attention: Mr. Dennis Malone

Reference: Report of Geotechnical Exploration  
**Avondale Youth and Family Center**  
Chattanooga, Tennessee  
S&ME Project No. 4181-17-006

Dear Mr. Malone:

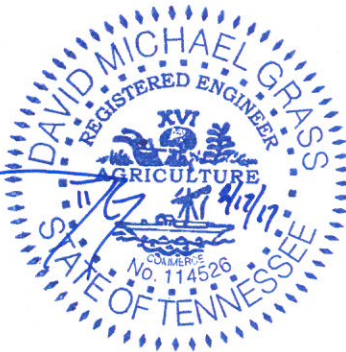
This report presents the results of the geotechnical exploration for the Avondale Youth and Family Center site in Chattanooga, Tennessee. Our work was performed in general accordance with S&ME Proposal No. 41-1600555R1 dated September 23, 2016.

This report describes our understanding of the project, presents the results of the field exploration and laboratory testing, and discusses our conclusions and recommendations. S&ME appreciates this opportunity to be of service to you. Please call if you have questions concerning this report or any of our services.

Sincerely,

S&ME, Inc.

  
David Grass, PE  
Project Engineer



  
James P. McGirl, PE  
Principal Engineer



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## **Executive Summary**

This summary is presented for the convenience of the reader. The full report text should be studied and understood before preparing an estimation of quantities or preparing designs based on this report, as it contains important information and recommendations that are not included in this brief summary.

1. The geotechnical exploration included drilling and sampling of ten soil test borings. The samples collected during our exploration were returned to our Chattanooga laboratory where they were further evaluated by a professional engineer.
2. Infiltration testing was performed at five locations on the west portion of the site.
3. Natural moisture content and Atterberg limits laboratory tests were performed on selected samples to aid our soil classification and to evaluate the on-site soil's volume change potential.
4. Subsurface conditions generally consisted of either fill or alluvial soils overlying residual soils, or residual soils from the ground surface to auger refusal. The fill soils were typically composed of very soft black and gray clay with trace amounts of foundry sand and brick fragments to depths of approximately 3 ½ to 5 ½ feet below the existing ground surface. Alluvial soils were typically composed of soft to very stiff clays to depths of about 3 to 5 ½ feet. Residual soils were typically composed of soft to hard fat clays with varying amounts of chert and limestone fragments.
5. Auger refusal was encountered in each of the test borings at depths ranging from about 3 ½ to 19 ½ feet below the existing ground surface.
6. Groundwater was not encountered in the test borings at the time of drilling. We do not expect groundwater control will be necessary during construction.
7. The site is adaptable for the proposed construction provided that necessary steps are taken during construction. This includes proper site preparation and construction testing as outlined in this report.
8. Very soft to soft residual and fill soils were encountered near the existing ground surface in several borings. These soils will require undercutting during earthwork or foundation construction. The extent of undercutting will depend on final site grades, foundation bearing elevations, and the time of year of construction. Undercutting will be less if earthwork and foundation construction is performed during the dryer months of the year.
9. The proposed structure may be supported on foundations bearing in stiff or better consistency undisturbed alluvial or residual soils or newly placed and compacted fill. The bearing conditions at each of the foundation excavations should be observed by the geotechnical engineer or his representative. The purpose of these observations is to evaluate whether the bearing conditions are suitable for the design bearing pressure or if remedial measures will be required.
10. Difficult excavation techniques may be required during foundation and utility construction.



## **1.0 Introduction**

S&ME, Inc. has completed the geotechnical exploration at the Avondale Youth and Family Center site in Chattanooga, Tennessee. Our work was performed in general accordance with S&ME Proposal Number 41-1600555R1 dated September 23, 2016. Our services were authorized by Mr. Dennis Malone, PE of the City of Chattanooga on September 27, 2016 by City of Chattanooga Contract No. Y-15-008-301.

The purpose of our work was to explore the subsurface soil conditions and groundwater level, and to provide feasible foundation and site preparation recommendations. This report describes our understanding of the project, presents the results of the field exploration and laboratory testing, and discusses our conclusions and recommendations relative to the above considerations.

The scope of our geotechnical services did not include an environmental assessment for evaluating the presence or absence of wetlands, or hazardous or toxic materials.

A Site Location Plan and Test Location Plan are included in Appendix I. A discussion of the field investigative procedures, a legend of soil classification and symbols, and the Test Boring Records are included in Appendix II. Appendix III contains a discussion of the laboratory testing procedures and the laboratory test results. Appendix IV contains a copy of the ACI 302.1R-04 Guide for Concrete Floor and Slab Construction and a document titled "Important Information About Your Geotechnical Engineering Report".

## **2.0 Site and Project Description**

Our understanding of the project is based on our discussions with Mr. Eric Booker and Mr. Andrew Hutsell of the City of Chattanooga. We were also provided schematic diagrams of building options and a site topographic survey by Mr. Chris Dufresne of H+K Architects.

### **2.1 Site Description**

The 7-acre site is located 1305 Dodson Avenue in Chattanooga, Tennessee. A Site Location Plan, Figure 1, showing the general project site location is provided in Appendix I. The site is currently occupied by a recreation center located on the east side of the site and a small concessions building located near the center of the site. The remainder of the site is occupied by two softball fields, a baseball field, two tennis courts and associated asphalt paved driveways and parking lots. The site is relatively flat. The surrounding area is predominately residential developments.

### **2.2 Project Description**

The project will include the construction of a new recreation center. We understand that the proposed building location is the northeast corner of the site. Building specifics relative to size has not been developed. However, we expect the building will be a single story structure that includes a gymnasium. The gymnasium will have a steel frame, while we expect the remainder of the building will have exterior load bearing masonry walls. Structural loading information has not been provided. Based on our experience with similar structures, we estimate maximum column and wall loads of 150 kips and 4 kips per linear foot, respectively. Once loads have been developed by the structural engineer, S&ME, Inc. should

be retained to review the design loads and our recommendations. At that time, it may be necessary to modify or amend the recommendations of this report.

Proposed grading information has not been developed. However based on existing grades, we expect minimal grade adjustments (less than 3 feet) will be required to bring the proposed building pad to final grade.

### **3.0 Regional Geology**

Chattanooga, Tennessee is located in the Valley and Ridge Physiographic Province. Elongated ridges that trend in a northeast-southwest direction characterize this province. The ridges are typically formed on highly resistant sandstones and shales, while the valleys and rolling hills are formed on less resistant limestone, dolomite, and shales.

Based on our review of the Geologic Map of Tennessee, dated 1963, bedrock of the lower member of the Chickamauga Group underlies the site. The lower member of the Chickamauga is composed of light gray to gray, fine to coarse grained limestone. An interval of bentonite clay is typically encountered at the soil/rock interface. Residual soils derived from this geology are typically composed of silts and clays with overburden thicknesses less than 15 feet.

Limestone, such as the strata underlying this site, is of great geologic age and has been subject to solution weathering over geologic time. Rainwater falling onto the surface and percolating downward through the soil and into cracks and fissures gradually dissolves the rock, producing insoluble impurities such as chert and clay. Since limestone varies greatly in its resistance to weathering, the soil/bedrock contact may be extremely irregular. More soluble bedrock develops a thicker soil cover and a more irregular bedrock surface with pinnacles and slots, and less soluble bedrock usually develops a thinner soil cover and a less irregular soil-bedrock surface.

These large variations in bedrock depth are greatly enhanced by the presence of fractures, bedding planes, and faults, which provide an increased opportunity for a greater influx of percolating water. The weaknesses may form clay-filled cavities or enlarge into caves and may be connected by a network of passageways. If a cave forms close to the bedrock surface, its roof may collapse and the overlying soils may erode into the cave. Once the weight of the overlying soil exceeds the soil's arching strength, the soil collapses and an open hole or depression may appear at the ground surface. Such a feature is termed a sinkhole.

There is always some risk associated with developing any site underlain by carbonate bedrock. However, the test borings drilled at this site did not encounter open voids or other signs of incipient sinkhole conditions. We have reviewed the USGS quadrangle map for this area. The map does not show a pattern of closed depressions that would indicate past sinkhole activity in near proximity to the site. We also observed successful development in the surrounding area. Therefore, we believe the risk of sinkhole development for this project is no greater than for surrounding successfully developed sites.



## **4.0 Subsurface Conditions**

### **4.1 Field Exploration Procedures**

The procedures used by S&ME, Inc. for field sampling and testing are in general accordance with ASTM procedures and established engineering practice in the State of Tennessee. Appendix II contains brief descriptions of the procedures used in this exploration.

S&ME, Inc. drilled ten soil test borings to obtain subsurface information at the project site. Members of our engineering staff established the actual boring locations in the field by measuring distances and estimating right angles relative to on-site landmarks. Boring elevations were obtained by superimposing boring locations onto the provided topographic site plan and interpolating between contours. Therefore, both the boring locations shown on Figure 2 – Test Location Plan in Appendix I, and the elevations shown on the Test Boring Records in Appendix II, should be considered approximate.

After each boring was completed, we observed the boreholes for the presence of groundwater. The borings were then backfilled with auger cuttings before leaving the site.

Our field representative packaged the soil samples in sealed containers, labeled them for identification, and returned them to the Chattanooga office where a geotechnical engineer further examined them. We visually classified the soils according to the Unified Soil Classification System (ASTM D 2488). The resulting soil descriptions are shown on the Test Boring Records in Appendix II. Samples were then selected for laboratory testing.

### **4.2 Soil Stratification**

The results of our field testing program are summarized in the following paragraphs, and are shown on the Test Boring Records in Appendix II. These records present our interpretation of the subsurface conditions at specific boring locations at the time of our exploration. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

## **SURFACE MATERIALS**

Surface material consisting of topsoil was encountered from the ground surface to depths ranging from about 2 to 3 inches in borings B-1, B-3, B-4, B-5, B-6, and B-7. About 2 inches of topsoil was also observed at each infiltration test location. Asphalt and crushed stone was observed to depths ranging from about 9 to 14 inches in borings B-8, B-9, and B-10. Surface material was not countered in boring B-2. This boring was performed in the infield area of a softball field.

## **FILL**

Below the ground cover or from the ground surface, fill was encountered in borings B-9 and B-10 to depths ranging from about 3 ½ to 5 ½ feet. Fill is material that has been transported to its present location by man. The fill was generally composed of gray, black, or dark brown fat clay with small amounts of foundry derived waste and brick fragments. Fill was also observed at infiltration testing locations to depths of about 12 inches. Fill at infiltration test locations consisted of red-brown clays with varying amounts of chert and brick fragments. Standard Penetration Test (SPT) N values in the fill ranged

from 1 to 2 blows per foot, indicating a very soft soil consistency. Penetration resistances indicate the fill soils were likely not compacted during placement.

The fill was not penetrated in boring B-9 above the auger refusal depth of about 3 ½ feet. This boring was offset 5 feet east and re-drilled. Auger refusal was encountered at a depth of about 3 feet in this offset boring. In our opinion, the refusal material encountered in boring B-9 and the associated offset boring does not reflect bedrock.

### ALLUVIUM

Alluvial soils were encountered in borings B-2, B-3, B-4, and B-7 below the surface materials to depths ranging from about 3 to 5 ½ feet. Alluvial soil is soil that has been transported to its present location by flowing water. The alluvial soils encountered at the site were typically composed of either brown and gray silty clay or red-brown and yellow-brown fat clay. SPT N values in the alluvium ranged from 4 to 22 blows per foot, indicating a soft to very stiff soil consistency.

### RESIDUUM

Residual soils were encountered in each of the test borings, except B-9 to auger refusal depths. Residual soil forms from the in-place weathering of the underlying bedrock. The residual soils encountered at the site were typically composed of yellow-brown and gray or red-brown and yellow-brown fat clay with varying amounts of chert and limestone fragments. SPT N values in the residuum ranged from 4 to over 50 blows per foot, indicating a soft to hard soil consistency. Residual soils typically had consistencies in the firm to very stiff range.

### AUGER REFUSAL

Auger refusal was encountered in each of the test borings at depths ranging from about 3 ½ to 19 ½ feet below the existing ground surface.

## **4.3 Water Levels**

The boreholes were observed for the presence of groundwater at the termination of boring. Groundwater was not observed in the borings. We backfilled the boreholes shortly after completion due to safety concerns, and therefore delayed groundwater level measurements were not obtained. It should be noted that groundwater levels can fluctuate with seasonal, climatic, and environmental changes. Further, groundwater may be encountered within the reach of our test borings at some future time.

## **5.0 Infiltration Testing**

### **5.1 Field Procedures**

Infiltration tests were performed at five locations as shown on Figure 2 – Test Location Plan. Infiltration tests were located in the field by measuring distances and estimating right angles relative to on-site landmarks. Infiltration testing was performed in accordance with the Chattanooga Rainwater Management Guide, Revision 1, dated November 21, 2012. A 6 to 8 inch diameter hole was excavated to a depth of about 1 to 1 ½ feet at each location using a hand auger and post hole digger. The sides and

bottoms of the excavated holes were scarified with a sharp instrument and then filled with a minimum depth of 6 inches of water. The holes were allowed to presoak for 2 hours. The infiltration testing started immediately following the 2 hour presoak period.

After the presoak period, a member of our professional staff filled each of the infiltration tests holes with water to a minimum depth of 6 inches above the bottom of each hole. A nail was placed in the side of each hole and was used as fixed reference point for the depth to water. The drop in water level below this depth was measured after 30 minutes in each hole. Water was then added to each hole to raise the water level to the starting depth. This procedure was repeated every 30 minutes for 4 hours.

## 5.2 Test Results

The infiltration test results are summarized in the below table.

Location	Infiltration Rate (inches / hour)
I-1	2
I-2	1 ½
I-3	2 ½
I-4	2
I-5	½

## 6.0 Laboratory Testing

Laboratory tests were performed on representative split-spoon samples obtained during the field exploration phase of this project. We conducted moisture content and Atterberg limits tests on selected samples to aid our soil classification and to evaluate the relative volume change potential of on-site soils. The resulting soil descriptions are shown on the Test Boring Records in Appendix II. The laboratory test results and a brief description of the laboratory test procedures are presented in Appendix III.

## 7.0 Assessment

On the basis of this geotechnical exploration, we conclude that this site is adaptable, for the proposed construction. In order to develop and adapt this site, a few items should be addressed during the planning, design, and construction phases of the project.

Prior to construction, several buildings will be demolished. Demolition should include the removal of all concrete slabs and shallow foundations. Basements or subsurface vaults should be excavated and backfilled as described in Section 9.1 of this report. Abandoned utilities should be removed from the construction area and backfilled with structural fill. Active utilities should be re-routed around proposed building pad areas.

Site preparation should include stripping the topsoil from the construction area. Topsoil should be either removed from the site or stockpiled for use in landscape areas. Asphalt and gravel should also be stripped from the construction area. However, the contractor may elect to leave the pavement in place

for use as working surface, site access roads, or lay down areas during building construction. The pavement should then be removed prior to driveway and parking lot construction.

Prior to receiving fill and once grade is achieved in cut areas, the subgrade should be thoroughly proofrolled after the completion of demolition and stripping. Proofrolling should be performed using a fully loaded tandem axle dump truck or a similar piece of equipment. Areas deflecting under the weight of the proofroll should be undercut to suitable soil as recommended by the geotechnical engineer. Areas where undercutting is performed should be backfilled as specified in Section 9.3 of this report. We expect soft residual soils encountered in the northeast corner of the site will require undercutting to a depth of about 3 feet if these soils are below final site grades. Further, we expect undercutting of fill soils will be required on the southwest portion of the site. The extent and depth of undercutting required should be determined at the time of construction. Performing earthwork activities during the dryer months of the year will reduce the amount of undercutting required during earthwork.

The proposed structure may be supported on conventional shallow foundations bearing in stiff or better consistency, undisturbed alluvial or residual soils or in newly placed and compacted structural fill. Shallow foundations may be proportioned for maximum allowable bearing pressures of 2,500 pounds per square foot (psf), or less. Depending on final bearing elevations and building locations, we expect that a limited amount of undercutting of soft residual soils will be necessary during foundation construction.

Foundation excavations should be observed by the geotechnical engineer or his representative prior to placing concrete. Floor slabs for the new structure may be supported on structural fill or residual soils.

Difficult excavation techniques may be required during foundation construction, and will likely be required during utility construction.

## **8.0 Design Recommendations**

### **8.1 Limitations of Report**

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based on applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

The analyses and recommendations submitted herein are based, in part, on the data obtained from the subsurface exploration. The nature and the extent of variations between the widely-spaced borings will not become evident until the time of construction. If variations appear evident, then we will re-evaluate the recommendations of this report. In the event any changes in the nature, overall design, or location of the building or parking areas are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions verified or modified in writing.

We recommend S&ME be provided the opportunity to review the final design plans and specifications in order that earthwork and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME, Inc.'s observation and monitoring of grading and construction activities.

## **8.2 Foundations**

The subsurface exploration revealed that the subsurface soil conditions at the probable bearing depths are suitable to support the estimated maximum loads using spread footings. Spread footings for the building will bear on either alluvial or residual soils or newly placed and compacted soil fill. Based on our analysis, spread footings bearing on compacted soil fill or residual soil may be designed using an allowable soil bearing pressure of 2,500 psf.

Near surface soft residual soils were encountered in the northeast portion of the proposed building area. Foundations should bear below this material if this material is not undercut and replaced during the earthwork portion of construction. This may require about one third of the building's foundations to be undercut 1 to 2 feet depending on design bearing elevations. The project budget should include a contingency for undercutting foundations.

Although computed footing dimensions may be less, we recommend that continuous footings be a minimum of 18 inches wide and isolated spread footings be a minimum of 36 inches wide to reduce the possibility of a localized punching shear failure. Exterior foundations should be constructed a minimum of 30 inches below subgrade, the seasonal moisture variation depth associated with soil volume change due to fat clay soils. Interior foundations can be constructed at a minimum of 18 inches below subgrade. Constructing the foundations at these depths also provides adequate confinement and protection against frost penetration.

Foundation excavations should be backfilled with concrete the same day they are opened. Footings should be poured "neat" to the excavation so that water cannot collect behind forms before backfilling. If soils exposed in the foundation excavations experience moisture variations prior to concrete placement, the affected bearing materials should be undercut as recommended by our geotechnical engineer. A 2- to 3-inch thick mud-mat of lean concrete may be used to protect the exposed support materials if the excavations cannot be backfilled with concrete the same day they are opened.

The recommendations in this report are contingent on S&ME observing and evaluating the foundation excavations prior to placing concrete. Foundation subgrade observations should be performed by the geotechnical engineer, or his qualified representative, in order to confirm the recommendations provided in this report are consistent with the site conditions encountered. A Dynamic Cone Penetrometer (DCP) should be utilized to provide information that is compared to the data obtained in the geotechnical report. If unacceptable materials are encountered, the material should be excavated to stiff or better soils or remediated as recommended by the geotechnical engineer.

Undercut foundation excavations should be backfilled using either soil fill compacted to at least 95 percent of the standard Proctor (ASTM D 698) maximum dry density or a suitable material recommended by the geotechnical engineer. The foundation subgrade should be relatively level or suitably benched and free of loose soil or rock at the time of our observations.

## **8.3 Floor Slabs**

The floor slab-on-grade should be supported on compacted select fill material. Prior to placement of the aggregate base, the exposed surface should be observed and, if necessary, proofrolled with a loaded, tandem-axle, dump truck, or rubber-tired construction equipment approved by the geotechnical

engineer. Proofrolling should be observed by the geotechnical engineer. Areas that pump, rut, or deflect excessively under the loads of the proofroll should be undercut to suitable soils and replaced with compacted structural fill or crushed stone. A stiff subgrade is essential to good floor slab performance.

A four-inch thick (minimum) granular leveling course, preferably graded aggregate base, should be placed between the floor slab and subgrade. The granular layer will promote curing and help distribute concentrated floor slab loads as well as add uniformity and serve as a capillary barrier. The use of a vapor barrier should meet ACI 302 guidelines. We have included these guidelines in Appendix IV. Expansion/contraction and construction joints should be used to isolate the floor slab from load bearing walls and/or isolated columns and should conform to ACI guidelines.

To protect the subgrade from drying or excessive wetting, we recommend protecting the subgrade before concrete is placed. Protection of the subgrade can be achieved by leaving the floor subgrade several inches above grade, and then making the final cut to subgrade shortly before floor construction.

The soil subgrade for the slabs should be crowned and sloped to drain toward the perimeter of the building. Positive site surface drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slab and pavement areas. Surface drainage should be collected and discharged such that the water is not permitted to infiltrate the backfill and floor slab.

## **8.4 Groundwater**

Groundwater was not encountered in the soil test borings during our drilling activities. Therefore, we do not anticipate that groundwater control will be necessary during construction.

## **8.5 Seismic Site Classification (IBC 2012)**

According to the 2012 International Building Code (IBC), the seismic coefficients are determined based on the site class definitions shown on Table 20.3-1 of ASCE 7-10, Minimum Design Loads for Buildings and Other Structures. The soil profile present at the site has been evaluated for a seismic design classification utilizing standard penetration resistance (N-value) information in general accordance with the IBC 2012 and Chapter 20 of ASCE 7-10. Based on the results of our exploration and the geology of the area, we recommend a Site Class of D be used for the design of the proposed buildings. The IBC contains a provision for assessing the use of site specific values, provided a site specific assessment is conducted. S&ME can provide these services, if requested.

## **8.6 Pavement Design and Construction**

When designing pavements, proposed single- and tandem-axle loads are converted to an equivalent number of 18-kip single-axle loads using published conversion factors. The converted loads are known as equivalent single axle loadings (ESAL's). We have not been provided information relative to anticipated traffic loadings. Therefore, we have estimated the following ESAL's:

Standard duty pavement: Total 18 kip ESAL = 25,000

Heavy duty pavement: Total 18 kip ESAL = 75,000

For comparison purposes, an ESAL of 25,000 is typically used to design pavements for a small office building with no truck traffic, and an ESAL of 75,000 is typically used to design pavements for a small strip

shopping center delivery lane. If these estimated loadings are not correct, we recommend S&ME be retained to re-evaluate the pavement sections once traffic loading information has been developed for this project. Variations in the traffic loading can significantly impact pavement performance as well as its service life.

Along with traffic loadings, the strength of the soil subgrade is also required when designing pavements. Soil subgrade strength is typically expressed in terms of a California Bearing Ratio (CBR) for flexible pavements. CBR testing of the subgrade soils was beyond the scope of our authorized services. Therefore, based on our experience in the area, and assuming the parking areas are prepared in accordance with our recommendations, we have estimated a CBR value of 3 for flexible pavement design. To achieve this CBR value, we recommend that the top 12 inches of the existing soils be scarified and re-compacted prior to proofrolling as described in Section 9.1 of this report.

### FLEXIBLE PAVEMENTS

Our thickness designs for flexible pavements were performed in general accordance with American Association of State Highway and Transportation Officials (AASHTO) procedures. Based on the previously listed CBR and ESAL values, we recommend the following flexible pavement section over a subgrade prepared in accordance with our previously described site preparation recommendations:

Flexible Pavement Type	Pavement Component		
	Asphaltic Concrete Surface (inches)	Asphaltic Concrete Base (inches)	Open-Graded Crushed Stone (inches)
Standard duty, 20 year design life	1	2	6
Heavy duty, 20 year design life	1	2	8

We recommend the asphaltic concrete conform to the current "Standard Specification for Road and Bridge Construction," published January 1, 2015 by the Tennessee Department of Transportation. The surface course mix design should comply with Section 411, Grading D or E, with aggregate gradation per Section 903.11, Grading E. The asphaltic concrete base course should conform to Section 307, Grading B, with aggregate gradation per Section 903.06, Grading B. The crushed stone gradation should comply with Section 903.05B, and should be placed and compacted in accordance with Sections 407 and 303.

Because severe flexible pavement distress is often experienced in the vicinity of trash dumpsters, turn and braking areas, or loading docks, we recommend that the owner consider the construction of concrete pads or drives at such locations to limit pavement distress. Also, using concrete in entrances and exits should be considered. We recommend that dumpster bins be placed on a concrete pad that is long enough to support both the bin and dumpster truck. Otherwise, a punching shear failure of the pavement



and subgrade will likely develop in front of the dumpster bins due to the high stresses generated by the dumpster trucks during waste transfer.

## **GENERAL PAVEMENT RECOMMENDATIONS**

Experience has shown that most asphalt pavement failures are caused by localized soft spots in the subgrade or inadequate drainage. Proofrolling, as discussed earlier, should be performed prior to asphalt placement to detect soft spots in the subgrade. The civil design must include proper drainage to reduce softening of the subgrade, frost damage, heaving, soil migration, and pumping failures. The pavement surface and subgrade should have a minimum slope of 2 percent. Water infiltrating the dense graded aggregate base should be directed to drain into catch basins (through weep holes), out-slope areas, or drainage trenches. It may also be advisable to construct a concrete pad around interior catch basins to accommodate the problems associated with the frequent saturation of the pavement system in low areas.

Poor soil subgrade preparation and inadequate or improper soil subgrade drainage can result in pavement failure. We recommend the upper 24 inches of fill beneath pavements be compacted to 100 percent of the standard Proctor maximum dry density. The fill soils should be compacted 1 to 2 percent dry of the optimum moisture content to achieve a higher CBR or subgrade modulus value. A representative of S&ME should test the moisture content and density of each lift before additional lifts are placed.

We recommend the subgrade be proofrolled just before placement of the base course to detect poorly compacted material or soft areas that may have been created during construction. Also, if the prepared base course is rained on or is left in place for an extended period of time prior to asphaltic concrete placement, we recommend additional proofrolling prior to asphaltic concrete placement.

Maintenance is essential to good long-term performance of asphalt pavements. Any distressed areas should be promptly repaired to prevent the failure from spreading due to loading and water infiltration. Cracks and joints should be sealed annually. Additionally, a seal should be applied in the second or third year of service for the asphalt pavements. The seal will retard the asphalt from becoming brittle and seal small cracks that cannot be repaired otherwise.

## **9.0 Construction Considerations**

### **9.1 Site Preparation**

#### **DEMOLITION**

We expect a number of existing structures will be demolished prior to construction. This work should include the removal of all existing grade slabs and shallow foundations. Existing basements should be excavated with 4H:1V side slopes where they occur under future building areas. Existing basements and other such areas should be backfilled with properly compacted fill. Abandoned utilities should be removed and replaced with compacted fill. Active utilities should be relocated outside of the construction area. If pipes are not removed from beneath the proposed construction, they may serve as conduits for subsurface erosion that could result in the formation of voids or depressions, with adverse effects on the foundations and floor slabs.





## STRIPPING AND UNDERCUTTING

After completion of demolition, asphalt, gravel, and topsoil should be stripped from the construction area and disposed of off-site. The depth of the topsoil encountered in the borings ranged from about 2 to 3 inches. Pavement materials were measured to be about 9 to 14 inches thick.

Based on the test boring data, we expect undercutting of very soft existing fill soils may be necessary in the southern parking lot and soft to firm residual soils in the proposed building pad area. The need for undercutting should be determined at the time of construction based on proofrolling as described below.

## GENERAL

After completion of stripping in areas to receive fill, and once grade is achieved in cut areas, we recommend proofrolling the exposed surface of the subgrade soils. The purpose of proofrolling is to locate pockets of soft or unstable soils. Proofrolling should be performed using a fully loaded dump truck or other heavy equipment approved by our geotechnical engineer. The proofrolling operation should traffic the site with parallel passes of the vehicle starting at one side of the site and continuing to the other. Each pass should overlap the preceding pass to ensure complete coverage.

An engineer from S&ME should be present to observe the proofrolling operations and to provide recommendations should unstable soils be encountered. In general, unstable materials in the building areas should be undercut until stable materials are exposed. Unstable materials in parking and drive areas should generally be undercut to stable materials or a maximum of 3 feet below planned grade, at which time our geotechnical engineer should evaluate options other than additional undercutting (e.g. bridging). Backfill should consist of compacted soil as described in Section 9.3 of this report. After proofrolling and prior to placing fill on the site, the upper surface soils should be scarified and properly compacted.

Subgrade repair can be expected to be more extensive if grading operations are performed during wet periods of the year. The onsite soils are moisture sensitive and will be softened by rubber-tired construction traffic when wet. Once areas that need remediation have been repaired, the site may be brought to grade with structural fill. Depending on climatic conditions and the speed of contractor activities during the grading phase of this project, proofrolling may be required on multiple occasions.

## **9.2 Soil Plasticity**

Soils with a plasticity index (PI) of less than 30 are generally considered slightly susceptible to volume changes while soils with PIs greater than 50 are generally considered to be highly susceptible to volume changes. Soils with PIs between 30 and 50 are generally considered to be moderately susceptible to volume changes. The soil we tested from this site falls in the moderately susceptible range, with a PI of 44.

Soil volume changes in East Tennessee are generally not as severe as in other areas because lengthy periods of continuously wet or continuously dry weather do not usually occur. However, during periods of dry weather, it is not uncommon for significant drying of soils to occur. If these soils become saturated after foundation or grade slab construction is completed, there is the possibility of structural distress associated with swelling soils. Likewise, should the foundation bearing soils dry substantially after construction, there is the possibility of structural distress associated with soil shrinkage. Therefore, the

following construction precautions are recommended for sites where moderately to highly susceptible soils are found:

- ◆ Surface water should not be allowed to pond or saturate soils during or after construction;
- ◆ High plasticity clays should not be used for backfill materials;
- ◆ Floor slab and pavement subgrades should not be allowed to become excessively wet or dry prior to floor slab or pavement construction;
- ◆ Exterior building foundations should bear 30 inches below grade, the seasonal moisture variation depth;
- ◆ Foundation concrete should be poured the same day the foundation excavation is made;
- ◆ Discharge from roof drains should be channeled well away from foundations;
- ◆ Foundation soils should be isolated from heat sources to prevent drying of the foundation soils; and,
- ◆ Plantings with high water demands should not be planted near foundations.

### **9.3 Fill Placement**

#### **MATERIALS**

Fill soils should consist of low to moderately plastic clay or silt with a plasticity index of less than thirty ( $PI < 30$ ) and a standard Proctor maximum dry density greater than 95 pounds per cubic foot. The fill should contain no rock fragments larger than 4 inches in any dimension, and no organic matter.

Soil fill operations should not begin until representative samples of proposed fill soils are collected and tested. The test results will be used to assess whether the proposed fill material meets the previously discussed plasticity and density criteria, and for quality control during grading. Please allow at least 3 to 5 days for testing before the fill operations begin.

#### **COMPACTION**

Fill should be placed in thin lifts with a maximum loose thickness of 8 inches, then compacted to 95 percent of the standard Proctor maximum dry density, with a moisture content within 3 percent of the optimum moisture content, depending on the shape of the Proctor curve. Wetting or drying of these soils may be required, depending on the time of year site grading is performed. We recommend the top one foot below grade supported slabs, and the top 2 feet beneath pavements be compacted to 100 percent standard Proctor compaction. The edge of the compacted fill should extend at least 10 feet beyond the outside building edge, and at least 5 feet beyond the outside edge of pavements before sloping. A representative of S&ME should test the density and moisture content of each lift before placing additional lifts.

In confined areas such as utility trenches, portable compaction equipment and thin lifts of 3 to 4 inches may be required to achieve specified degrees of compaction.

We recommend that fill placements be observed by one of S&ME's qualified soils technicians on a full time basis. Frequent fill density and moisture tests should be performed to evaluate that the specified degree of compaction is being achieved. However, the actual testing frequency should be determined by the geotechnical engineer based on the type of soil being placed, the equipment being used, and the

time of year the fill is being placed. More frequent testing should be performed in confined areas. Any areas that do not meet the compaction specification should be re-compacted to achieve compliance.

#### **9.4 Drainage and Runoff Concerns**

In the Tennessee Valley Region, frequent and sometimes substantial rainfalls occur from November through May. These rainy months can greatly influence the cost and schedule of construction projects, particularly earthwork and work in confined excavations. The moderate plasticity clay soils present at the site will be difficult to work in periods of wet weather. Construction traffic repeatedly crossing exposed wet soil subgrades can damage the subgrades to the point that over-excavation may be required.

The contractor should be prepared to provide adequate methods to control the infiltration of surface water into open excavations. We recommend subgrades be sufficiently sloped to provide rapid drainage. Water that collects in excavations should be removed as soon as possible to prevent softening the subgrade soils.

Maintenance of the exposed subgrade surface will be important to achieve moisture control and to prevent softening of the surface soils due to rainwater infiltration. We recommend keeping the ground surface free from depressions or ruts that would hold water, and sealing the surface using rubber tired equipment to reduce water infiltration.

#### **9.5 Difficult Excavation**

Based on the boring data obtained during the exploration, we expect material requiring difficult excavation techniques may be encountered during foundation and utility construction. In confined excavations such as foundations, utility trenches, etc., removal of weathered rock typically requires the use of large backhoes, pneumatic spades, or blasting. The difficulty of excavation will depend on the composition of the rock, the location and orientation of discontinuities and bedding, and the skill of the equipment operator.

Mass rock removal will require blasting. Since the blasting will take place close to existing buildings, the Tennessee Blasting Regulations should be consulted for guidance. A pre-blast survey of the existing structures should be conducted and the blasts monitored to determine maximum particle velocities.

### **10.0 Follow-Up Services**

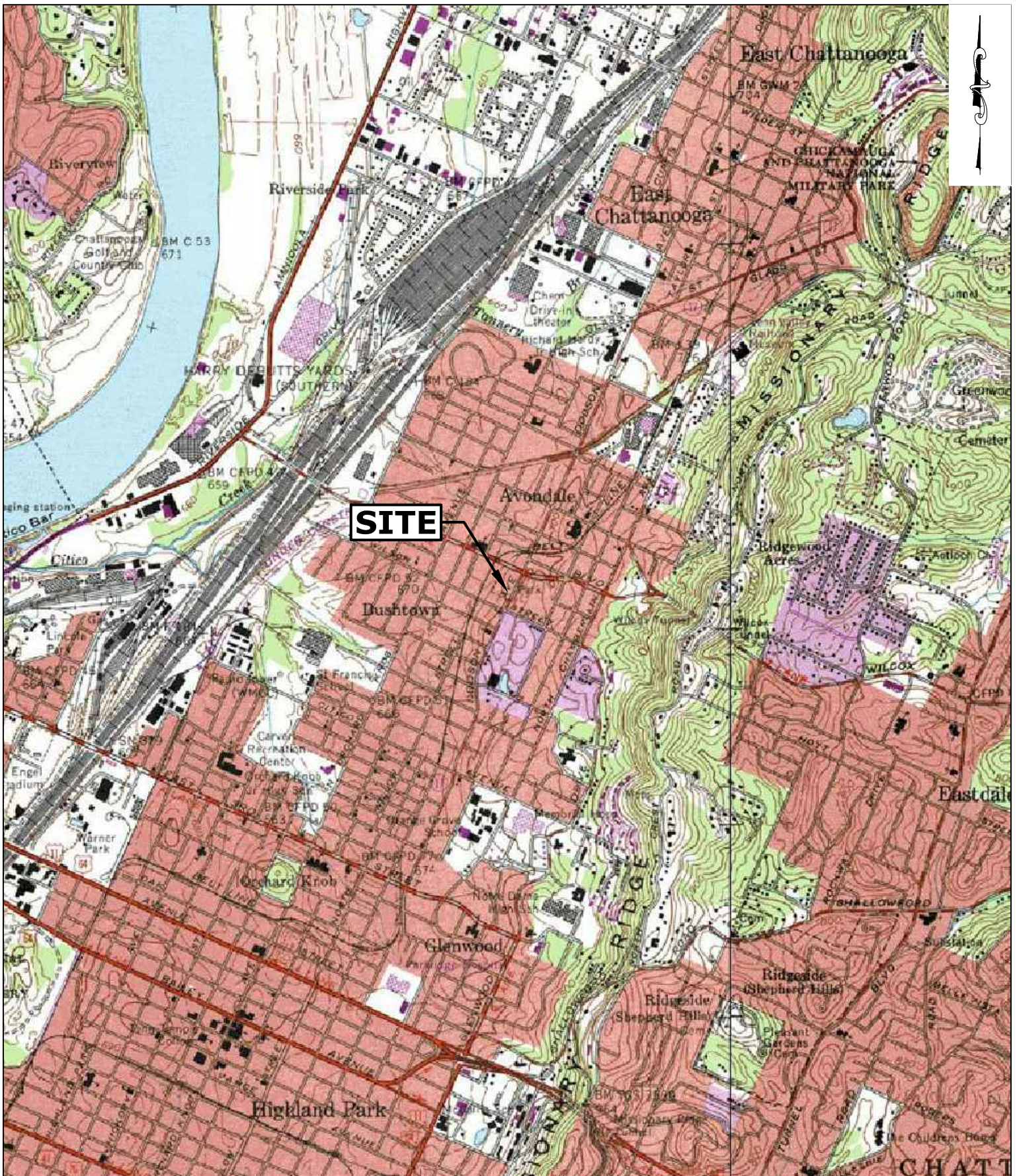
Our services should not end with the submission of this geotechnical report. S&ME should be kept involved throughout the design and construction process to maintain continuity and to determine if our recommendations are properly interpreted and implemented. To achieve this, we should review project plans and specifications with the designers to see that our recommendations are fully incorporated and have not been misinterpreted. We also should be retained by the owner to monitor and test the site preparation and foundation construction. S&ME's familiarity with the site and foundation recommendations makes us a valuable part of your construction quality assurance team. Our personnel are uniquely qualified to recognize unanticipated ground conditions and can offer responsive remedial recommendations should these unanticipated conditions occur.

## **Appendix I -**

Figure 1 - Site Location Plan

Figure 2 - Test Location Plan





SOURCE: USGS 7.5 Minute Topographic Map -- CHATTANOOGA, TENNESSEE (1976)  
DRAWING FOR ILLUSTRATION PURPOSES ONLY



**SITE LOCATION PLAN**  
**AVONDALE YOUTH AND FAMILY CENTER**  
**CHATTANOOGA, TENNESSEE**



<b>JOB NUMBER:</b>	4181-17-006	<b>APPROXIMATE SCALE:</b>	1"=2000'
<b>DRAWN BY:</b>	JLN	<b>CHECKED BY:</b>	DMG
<b>DATE:</b>	2/16/2017	<b>FIGURE:</b>	1

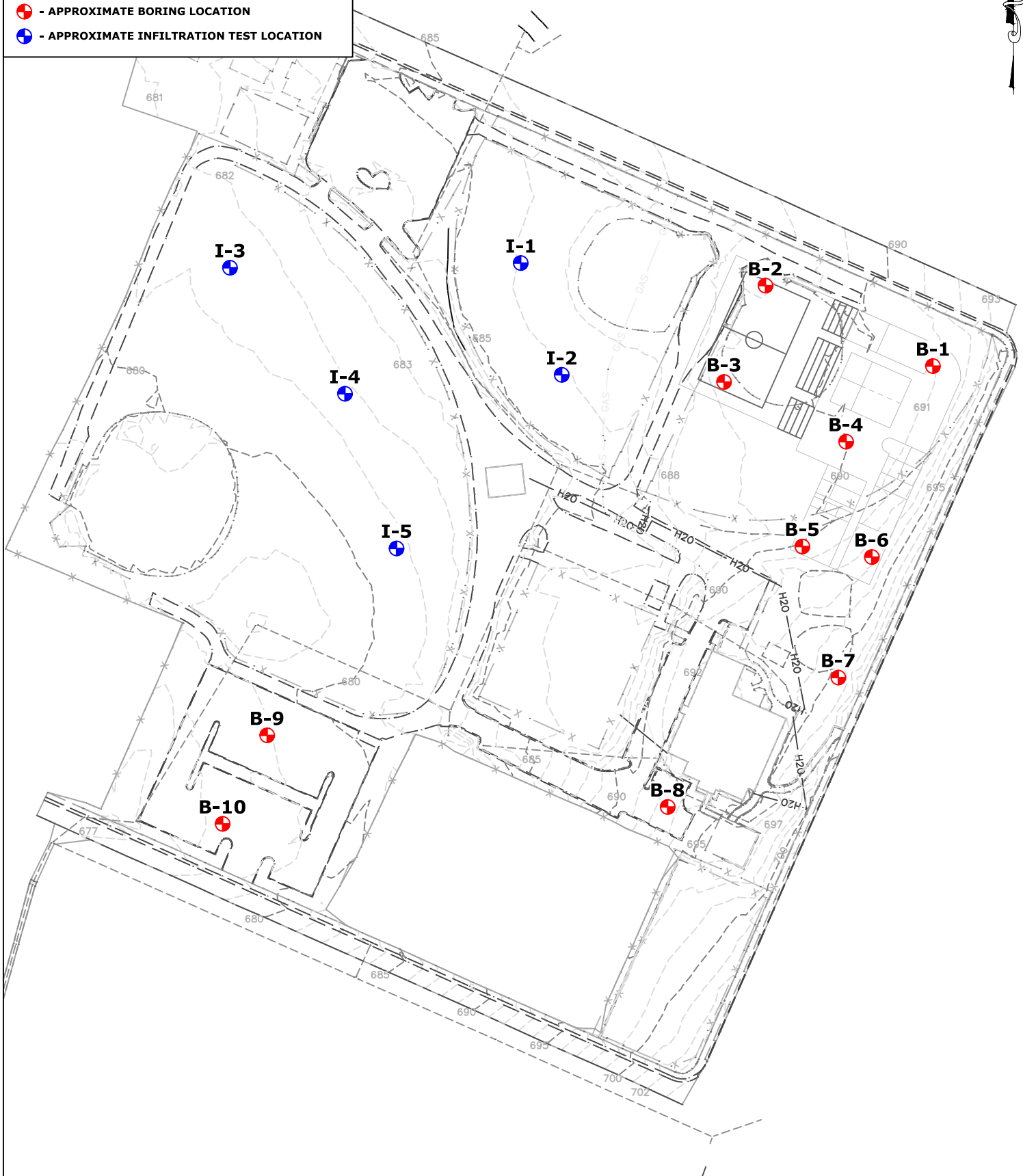


**NOTES:**

- DRAWING FOR ILLUSTRATIVE PURPOSES ONLY
- BASE IMAGE PROVIDED BY H+K ARCHITECTS

**LEGEND:**

-  - APPROXIMATE BORING LOCATION
-  - APPROXIMATE INFILTRATION TEST LOCATION



**TESTING LOCATION PLAN**  
AVONDALE YOUTH AND FAMILY CENTER  
CHATTANOOGA, TENNESSEE

JOB NUMBER:	4181-17-006	APPROXIMATE SCALE:	1"=100'
DRAWN BY:	JLN	CHECKED BY:	DMG
DATE:	2/16/2017	FIGURE:	2

## **Appendix II**

Field Exploration Procedures

Test Boring Record Legend

Test Boring Records

## **HOLLOW STEM AUGERING PROCEDURES WITH STANDARD PENETRATION RESISTANCE TESTING ASTM D 1586**

The borings were advanced using auger drilling techniques. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-tube sampler. The sampler was initially seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is the standard penetration resistance. Standard penetration resistance, when properly evaluated, is an index to the soil's strength and density. The criteria used during this exploration are presented on the Test Boring Record Legend.

Representative portions of the soil samples, thus obtained, were placed in sealed containers and transported to the laboratory. The engineer selected samples for laboratory testing. The Test Boring Records in this Appendix provide the soil descriptions and penetration resistances.

Soil drilling and sampling equipment may not be capable of penetrating hard cemented soils, thin rock seams, large boulders, waste materials, weathered rock, or sound continuous rock. Refusal is the term applied to materials that cannot be penetrated with soil drilling equipment or where the standard penetration resistance exceeds 100 blows per foot. Core drilling is needed to determine the character and continuity of the refusal materials.



# TEST BORING/PIT RECORD LEGEND

## FINE AND COARSE GRAINED SOIL INFORMATION










































COARSE GRAINED SOILS (SANDS & GRAVELS)		FINE GRAINED SOILS (SILTS & CLAYS)			PARTICLE SIZE	
N	Relative Density	N	Consistency	Qu, KSF Estimated		
0-4	Very Loose	0-1	Very Soft	0-0.5	Boulders	Greater than 300 mm (12 in)
5-10	Loose	2-4	Soft	0.5-1	Cobbles	75 mm to 300 mm (3 to 12 in)
11-20	Firm	5-8	Firm	1-2	Gravel	4.74 mm to 75 mm (3/16 to 3 in)
21-30	Very Firm	9-15	Stiff	2-4	Coarse Sand	2 mm to 4.75 mm
31-50	Dense	16-30	Very Stiff	4-8	Medium Sand	0.425 mm to 2 mm
Over 50	Very Dense	Over 31	Hard	8+	Fine Sand	0.075 mm to 0.425 mm
					Silts & Clays	Less than 0.075 mm

The **STANDARD PENETRATION TEST** as defined by ASTM D 1586 is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./2-inch O.D. split-barrel sampler is driven three 6-inch increments with a 140 lb. hammer falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The blow counts required to drive the sampler the final two increments are added together and designate the N-value defined in the above tables.

## ROCK PROPERTIES

ROCK QUALITY DESIGNATION (RQD)		ROCK HARDNESS			
Percent RQD	Quality	Very Hard:	Rock can be broken by heavy hammer blows		
0-25	Very Poor	Hard:	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows.		
25-50	Poor	Moderately Hard:	Small pieces can be broken off along sharp edges by considerable hard thumb pressure; can be broken with light hammer blows.		
50-75	Fair	Soft:	Rock is coherent but breaks very easily with thumb pressure at sharp edges and crumbles with firm hand pressure.		
75-90	Good	Very Soft:	Rock disintegrates or easily compresses when touched; can be hard to very hard soil.		
90-100	Excellent				
RQD = $\frac{\text{Sum of 4 in. and longer Rock Pieces Recovered}}{\text{Length of Core Run}}$		X100	43 RQD	Core Diameter	Inches
Recovery = $\frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}}$		X100	NQ	BQ	1-7/16
			63 REC	NQ	1-7/8
				HQ	2-1/2

## SYMBOLS

KEY TO MATERIAL TYPES				SOIL PROPERTY SYMBOLS	
	Topsoil		High Plasticity Inorganic Silt or Clay	N:	Standard Penetration, BPF
	Asphalt		Organic Silts/Clays	M:	Moisture Content, %
	Crushed Limestone		Well-Graded Gravel	LL:	Liquid Limit, %
	Fill Material		Poorly-Graded Gravel	PI:	Plasticity Index, %
	Shot-rock Fill		Silty Gravel	Qp:	Pocket Penetrometer Value, TSF
	Low Plasticity Inorganic Silt		Clayey Gravel	Qu:	Unconfined Compressive Strength Estimated Qu, TSF
	High Plasticity Inorganic Silt		Well-Graded Sand	$\gamma_d$ :	Dry Unit Weight, PCF
	Low Plasticity Inorganic Clay		Poorly-Graded Sand	F:	Fines Content
	High Plasticity Inorganic Clay		Silty Sand	<b>SAMPLING SYMBOLS</b>	
	Low Plasticity Inorganic Silt or Clay		Clayey Sand		Undisturbed Sample
					Split-Spoon Sample
					Rock Core Sample
					Auger or Bag Sample
					No Sample Recovery
					Water Level After Drilling
					Extended Time Reading
					Peat
					Limestone
					Sandstone
					Siltstone
					Shale
					Claystone
					Weathered Rock
					Dolomite
					Granite
					Gneiss
					Schist
					Amphibolite
					Metagraywacke
					Phyllite



# TEST BORING RECORD

**BORING NO.: B-1**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1	
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262633		EAST: 2189660	
ELEVATION: 691 feet ±		BORING STARTED: 2/2/2017		RIG TYPE:Geoprobe		BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic		

GROUNDWATER: Dry ATD			Remarks:			
-------------------------	--	--	----------	--	--	--

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	691.0 690.8	0	0.17' TOPSOIL - 2 inches CLAY (CH) with chert fragments, yellow-brown, moist, soft																	
	688.0	3'	CLAY (CH) with limestone fragments, yellow-brown, hard																	1 - 2 - 2 (4)
	685.1	5	Auger refusal at 5.9 feet, boring terminated																	21 - 20 - 25 (45)
		10																		
		15																		
		20																		
		25																		

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 1

Project Manager: D. Grass, PE

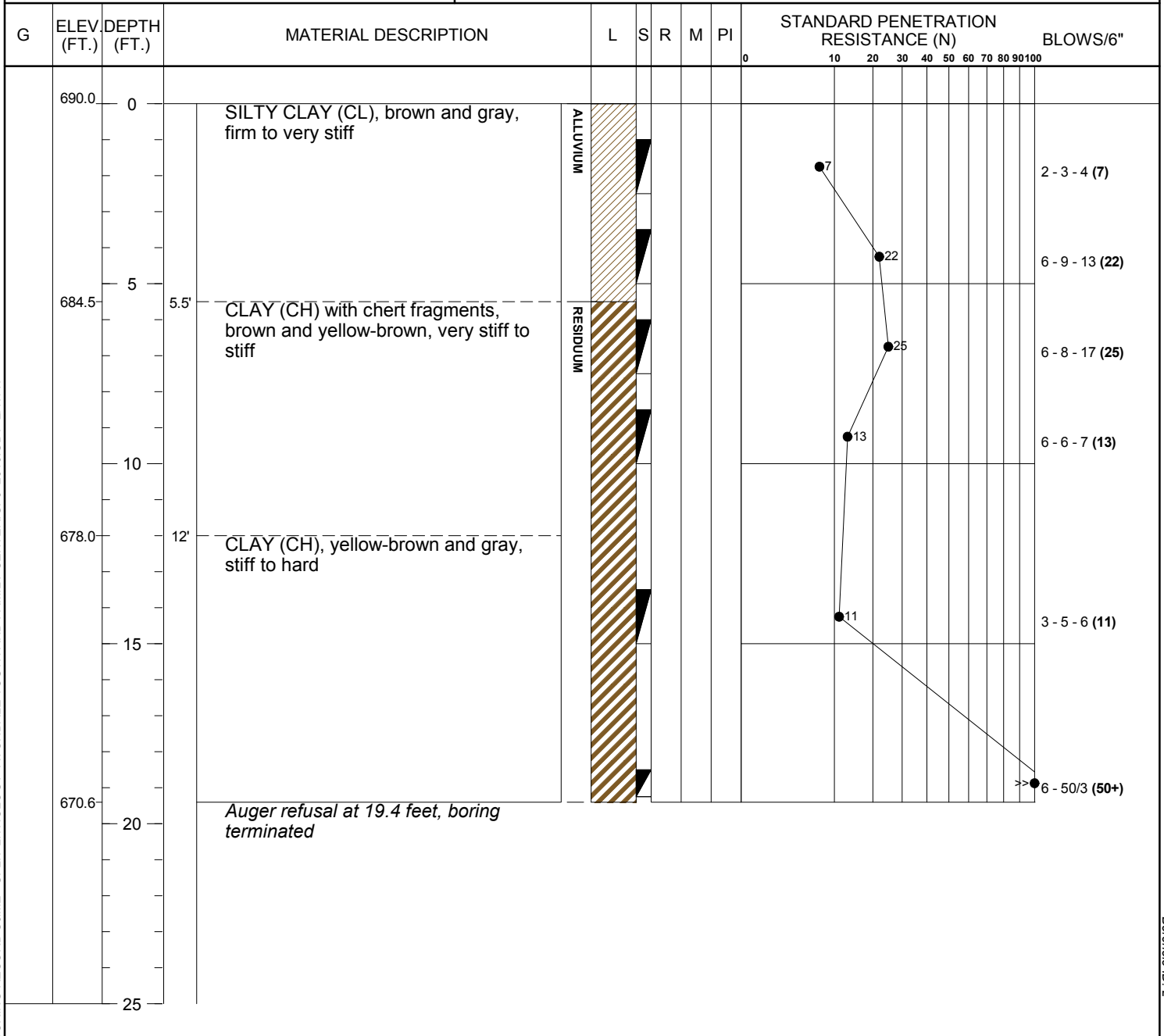


# TEST BORING RECORD

**BORING NO.: B-2**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1	
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262694		EAST: 2189532	
ELEVATION: 690 feet ±		BORING STARTED: 2/2/2017		RIG TYPE:Geoprobe		BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic		

GROUNDWATER: Dry ATD			Remarks:			
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BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 2



# TEST BORING RECORD

**BORING NO.: B-3**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1	
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262621		EAST: 2189501	
ELEVATION: 690 feet ±		BORING STARTED: 2/2/2017		RIG TYPE:Geoprobe		BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic		

GROUNDWATER: Dry ATD			Remarks:			
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G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	690.0 689.8	0	0.17' TOPSOIL - 2 inches SILTY CLAY (CL), gray and brown, stiff	ALLUVIUM																2 - 4 - 5 (9)
	687.0	3'	CLAY (CH) with chert fragments, yellow-brown and gray, stiff and firm	RESIDUUM																4 - 4 - 5 (9)
		5																		2 - 2 - 4 (6)
		10																		4 - 5 - 7 (12)
	677.9		Auger refusal at 12.1 feet, boring terminated																	
		15																		
		20																		
		25																		

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 3

Project Manager: D. Grass, PE



# TEST BORING RECORD

**BORING NO.: B-4**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262575		EAST: 2189594
ELEVATION: 690 feet ±		BORING STARTED: 2/2/2017		RIG TYPE: Geoprobe	BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic	

GROUNDWATER: Dry ATD			Remarks:		
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G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	690.0 689.8	0	0.17' TOPSOIL - 2 inches CLAY (CH), red-brown and yellow-brown, firm	ALLUVIUM																1 - 2 - 3 (5)
	687.0	3'	CLAY (CH) with chert fragments, yellow-brown and gray, firm to very stiff																	1 - 2 - 5 (7)
		5		RESIDUUM																5 - 9 - 6 (15)
																				5 - 9 - 7 (16)
	677.4		Auger refusal at 12.6 feet, boring terminated																	
		15																		
		20																		
		25																		

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Project Manager: D. Grass, PE

Borehole ID: 4



# TEST BORING RECORD

**BORING NO.: B-5**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262495		EAST: 2189561
ELEVATION: 690 feet ±		BORING STARTED: 2/2/2017		RIG TYPE: Geoprobe	BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic	

GROUNDWATER: Dry ATD			Remarks:		
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G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	690.0 689.8	0	0.17' TOPSOIL - 2 inches CLAY (CH) with trace organics, yellow-brown, firm	RESIDUUM																1 - 2 - 3 (5)
																				2 - 2 - 3 (5)
	684.5	5	5.5' CLAY (CH) with trace chert fragments, yellow-brown and gray, stiff																	5 - 5 - 7 (12)
																				4 - 5 - 7 (12)
	676.7	13.3	Auger refusal at 13.3 feet, boring terminated																	

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 5

Project Manager: D. Grass, PE



# TEST BORING RECORD

**BORING NO.: B-6**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1	
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262487		EAST: 2189613	
ELEVATION: 692 feet ±		BORING STARTED: 2/2/2017		RIG TYPE:Geoprobe		BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic		

GROUNDWATER: Dry ATD			Remarks:			
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G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	692.0 691.8	0	0.25' TOPSOIL - 3 inches CLAY (CH) with trace chert, yellow-brown, firm																	1 - 2 - 3 (5)
	689.0	3'	CLAY (CH) with chert fragments, yellow-brown, red-brown, and gray, very stiff to stiff																	6 - 10 - 12 (22)
		5																		4 - 4 - 6 (10)
		10																		3 - 4 - 6 (10)
	679.2		Auger refusal at 12.8 feet, boring terminated																	
		15																		
		20																		
		25																		

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 6

Project Manager: D. Grass, PE



# TEST BORING RECORD

**BORING NO.: B-7**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1	
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262396		EAST: 2189588	
ELEVATION: 695 feet ±		BORING STARTED: 2/2/2017		RIG TYPE:Geoprobe		BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic		

GROUNDWATER: Dry ATD			Remarks:			
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G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	695.0 694.8	0	0.25' TOPSOIL - 3 inches CLAY (CH) with trace chert, red-brown and yellow-brown, soft	ALLUVIUM																
	692.0	3'	CLAY (CH) with trace chert, yellow-brown and gray, firm	RESIDUUM																2 - 2 - 2 (4)
	689.3	5																		2 - 3 - 5 (8)
			Auger refusal at 5.7 feet, boring terminated																	
		10																		
		15																		
		20																		
		25																		

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 7

Project Manager: D. Grass, PE



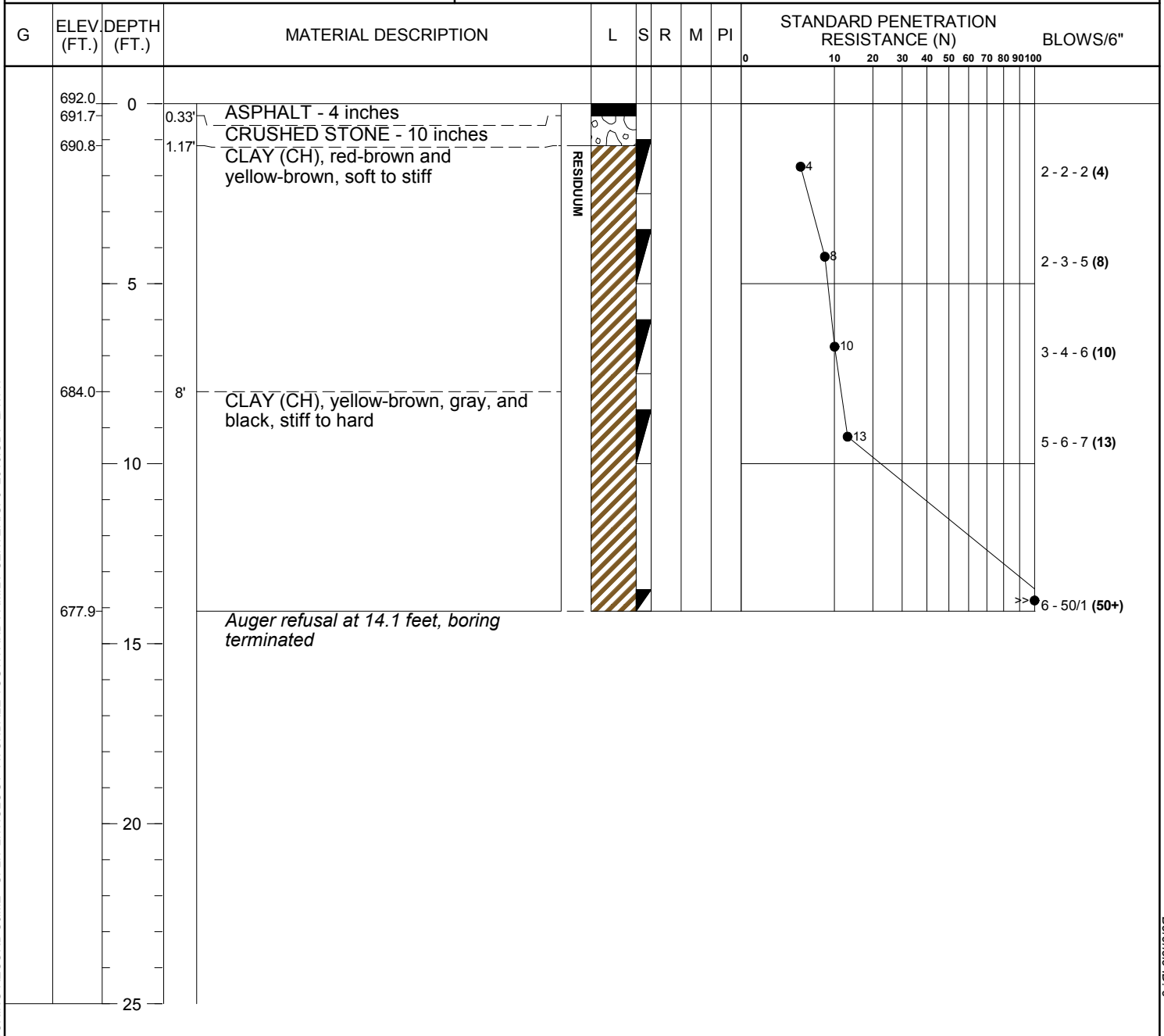


# TEST BORING RECORD

**BORING NO.: B-8**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262297		EAST: 2189458
ELEVATION: 692 feet ±		BORING STARTED: 2/2/2017		RIG TYPE: Geoprobe	BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic	

GROUNDWATER: Dry ATD			Remarks:		
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BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Boring ID: 8

Project Manager: D. Grass, PE



# TEST BORING RECORD

**BORING NO.: B-9**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1	
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262352		EAST: 2189153	
ELEVATION: 679 feet ±		BORING STARTED: 2/2/2017		RIG TYPE:Geoprobe		BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic		

GROUNDWATER:  
Dry ATD

Remarks:  
Boring offset 5 feet east and re-drilled to auger refusal at 3.1 feet.

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	679.0	0	ASPHALT - 3 inches																	
	678.8	0.25	CRUSHED STONE - 6 inches																	
	678.3	0.75	CLAY (CH) with trace FOUNDRY DERIVED WASTE and brick fragments, green, gray, and dark brown, wet, very soft																	
	675.5		Auger refusal at 3.5 feet, boring terminated																	1 - 0 - 1 (1)
		5																		
		10																		
		15																		
		20																		
		25																		

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 9

Project Manager: D. Grass, PE



# TEST BORING RECORD

**BORING NO.: B-10**

PROJECT: Avondale Youth and Family Center			JOB NO: 4181-17-006		SHEET 1 OF 1
PROJECT LOCATION: Chattanooga, Tennessee			NORTH: 262284		EAST: 2189119
ELEVATION: 679 feet ±		BORING STARTED: 2/2/2017		RIG TYPE: Geoprobe	BORING DIA. (IN): 3.25
DRILLING METHOD: Hollow-Stem Augers		BORING COMPLETED: 2/2/2017		HAMMER: Automatic	

GROUNDWATER: Dry ATD			Remarks:		
-------------------------	--	--	----------	--	--

G	ELEV. (FT.)	DEPTH (FT.)	MATERIAL DESCRIPTION	L	S	R	M	PI	STANDARD PENETRATION RESISTANCE (N)											BLOWS/6"
									0	10	20	30	40	50	60	70	80	90	100	
	679.0	0	ASPHALT - 4 inches																	
	678.7	0.33'	CRUSHED STONE - 6 inches																	
	678.2	0.82'	SILTY CLAY (CH) with trace FOUNDRY DERIVED WASTE, gray and black, wet, very soft																	2 - 1 - 1 (2)
	676.0	3'	SILTY CLAY (CH), gray and yellow-brown, wet, very soft																	2 - 1 - 1 (2)
	673.5	5.5'	SILTY CLAY (CH) with trace rock fragments, yellow-brown and gray, stiff																	3 - 5 - 7 (12)
	671.3		Auger refusal at 7.7 feet, boring terminated																	
		10																		
		15																		
		20																		
		25																		

BORING RECORD S&ME - SPLIT LITHOLOGY AVONDALE YOUTH AND FAMILY CENTER.GPJ 2/17/17

Borehole ID: 10

Project Manager: D. Grass, PE

## **Appendix III**

Laboratory Test Procedures

Laboratory Test Results

## **NATURAL MOISTURE**

### **ASTM D 2216, EM 1110-2-1906**

The moisture content of soils is an indicator of various physical properties, including strength and compressibility. Selected samples obtained during exploratory drilling were taken from their sealed containers. Each sample was weighed and then placed in an oven heated to  $110^{\circ}\text{C} + 5^{\circ}$ . The sample remained in the oven until the free moisture had evaporated. The dried sample was removed from the oven, allowed to cool, and re-weighed. The moisture content was computed by dividing the weight of evaporated water by the weight of the dry sample. The results, expressed as a percent, are shown on the attached Laboratory Test Results Summary.

## **ATTERBERG LIMITS DETERMINATION**

### **ASTM D 4318/AASHTO T89/T90**

Representative samples were subjected to Atterberg limits testing to determine the soil's plasticity characteristics. The plasticity index (PI) is the range of moisture content over which the soil deforms as a plastic material. The liquid limit (LL) marks the transition from the plastic state to the liquid state. The plastic limit (PL) marks the transition from the plastic state to the solid state.

To determine the liquid limit, a soil specimen is wetted until it is in a viscous fluid state. A portion of this soil is then placed in a brass cup of standardized dimensions, and a groove made through the middle of the soil specimen with a grooving tool of standardized dimensions. The cup is attached to a cam that lifts the cup 10 mm, and then allows the cup to fall and strike a rubber base of standardized hardness. The cam is rotated at about 2 drops per second until the two halves of the soil specimen come in contact at the bottom of the groove along a distance of 13 mm. The number of blows required to make this degree of contact is recorded, and a portion of the specimen is subjected to a moisture content determination. Additional water is added to the remainder of the specimen, and the grooving process and cam action process repeated. This testing sequence is repeated until the soil flows as a heavy viscous fluid. The number of blows vs. moisture content is then plotted on semi-logarithmic graph paper, and the moisture content corresponding to 25 blows is designated the liquid limit.

The plastic limit is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into threads 3 mm in diameter. It is determined by taking a pat of soil remaining from the liquid limit test, and repeatedly rolling, kneading, and air drying the specimen until the soil breaks into threads about 3 mm in diameter and 3 to 10 mm long. The moisture content of these soil threads is then determined, and is designated the plastic limit. The results of these tests are presented on the Laboratory Test Results Summary.

Avondale Youth and Family Center  
Chattanooga, Tennessee  
S&ME Project No. 4181-17-006

Laboratory Test Results Summary

Boring Number	Sample Type	Sample Depth (ft)	Moisture Content (%)	ATTERBERG LIMITS		
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
B-3	SPT	1 – 2.5	18.1			
		3.5 – 5	29.9	69	25	44 (CH)
		6 – 7.5	33.5			
		8.5 - 10	32.8			
B-4	SPT	1 – 2.5	30.2			
		3.5 – 5	30.3			
		6 – 7.5	26.1			
		8.5 - 10	35.1			
B-5	SPT	1 – 2.5	27.4			
		3.5 – 5	33.2			
		6 – 7.5	26.8			
		8.5 - 10	30.4			

SPT – Standard Penetration Test Sample

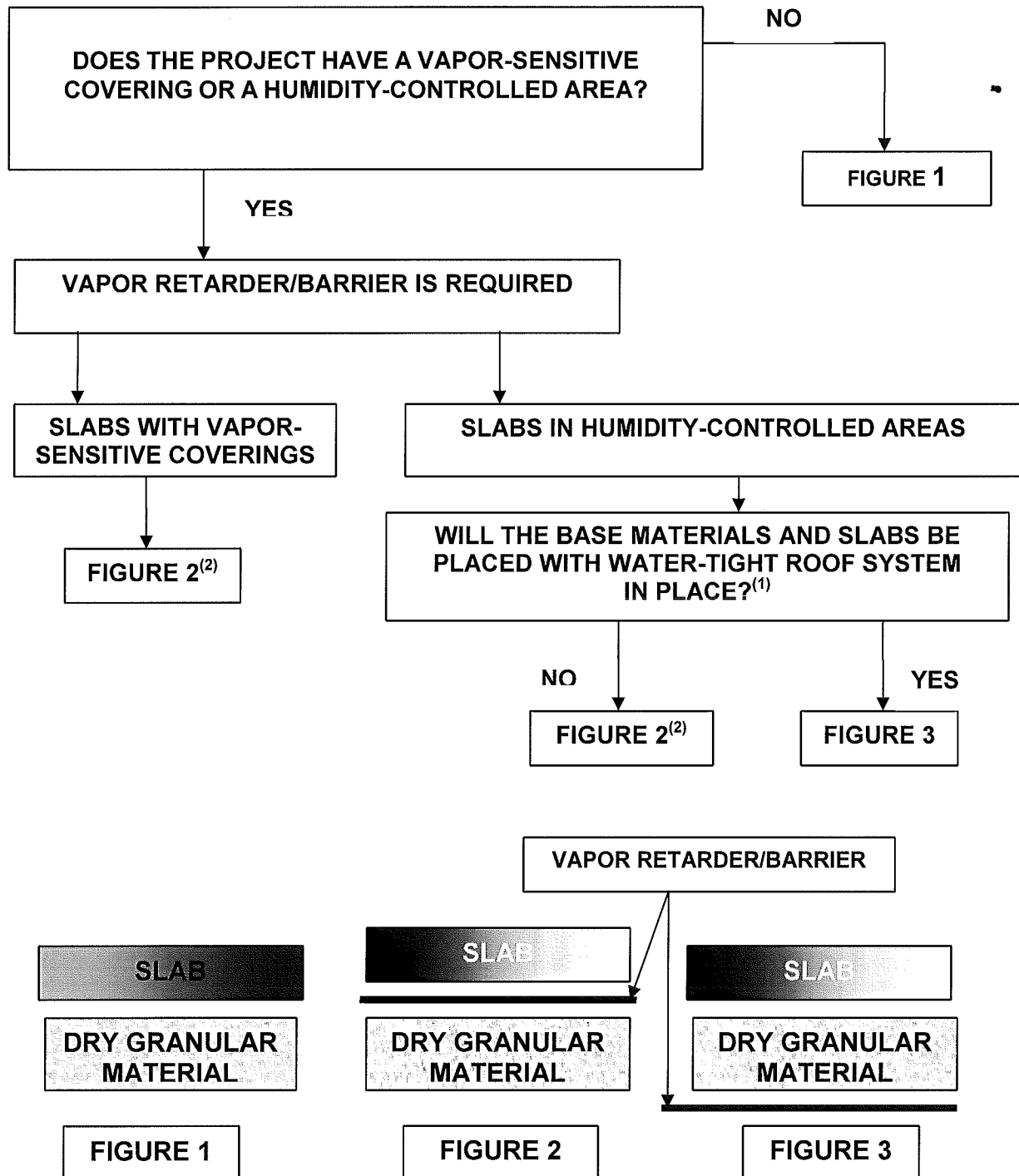
## **Appendix IV**

ACI 302.1R-04 Guide For Concrete Floor and Slab Construction

Important Information About Your Geotechnical Engineering Report

# ACI 302.1R-04

## DECISION FLOW CHART FOR LOCATION OF VAPOR RETARDER/BARRIER



### NOTES:

- (1) IF GRANULAR MATERIAL IS SUBJECT TO FUTURE MOISTURE INFILTRATION, USE FIGURE 2.
- (2) IF FIGURE 2 IS USED, A REDUCED JOINT SPACING, A LOW SHRINKAGE MIX DESIGN, OR OTHER MEASURES TO MINIMIZE SLAB CURL WILL LIKELY BE REQUIRED.





# Important Information About Your Geotechnical Engineering Report

*Variations in subsurface conditions can be a principal cause of construction delays, cost overruns and claims. The following information is provided to assist you in understanding and managing the risk of these variations.*

## **Geotechnical Findings Are Professional Opinions**

Geotechnical engineers cannot specify material properties as other design engineers do. Geotechnical material properties have a far broader range on a given site than any manufactured construction material, and some geotechnical material properties may change over time because of exposure to air and water, or human activity.

Site exploration identifies subsurface conditions at the time of exploration and only at the points where subsurface tests are performed or samples obtained. Geotechnical engineers review field and laboratory data and then apply their judgment to render professional opinions about site subsurface conditions. Their recommendations rely upon these professional opinions. Variations in the vertical and lateral extent of subsurface materials may be encountered during construction that significantly impact construction schedules, methods and material volumes. While higher levels of subsurface exploration can mitigate the risk of encountering unanticipated subsurface conditions, no level of subsurface exploration can eliminate this risk.

## **Scope of Geotechnical Services**

Professional geotechnical engineering judgment is required to develop a geotechnical exploration scope to obtain information necessary to support design and construction. A number of unique project factors are considered in developing the scope of geotechnical services, such as the exploration objective; the location, type, size and weight of the proposed structure; proposed site grades and improvements; the construction schedule and sequence; and the site geology.

Geotechnical engineers apply their experience with construction methods, subsurface conditions and exploration methods to develop the exploration scope. The scope of each exploration is unique based on available project and site information. Incomplete project information or constraints on the scope of exploration increases the risk of variations in subsurface conditions not being identified and addressed in the geotechnical report.

## **Services Are Performed for Specific Projects**

Because the scope of each geotechnical exploration is unique, each geotechnical report is unique. Subsurface conditions are explored and recommendations are made for a specific project. Subsurface information and recommendations may not be adequate for other uses. Changes in a proposed structure location, foundation loads, grades, schedule, etc. may require additional geotechnical exploration, analyses, and consultation. The geotechnical engineer should be consulted to determine if additional services are required in response to changes in proposed construction, location, loads, grades, schedule, etc.

## **Geo-Environmental Issues**

The equipment, techniques, and personnel used to perform a geo-environmental study differ significantly from those used for a geotechnical exploration. Indications of environmental contamination may be encountered incidental to performance of a geotechnical exploration but go unrecognized. Determination of the presence, type or extent of environmental contamination is beyond the scope of a geotechnical exploration.

## **Geotechnical Recommendations Are Not Final**

Recommendations are developed based on the geotechnical engineer's understanding of the proposed construction and professional opinion of site subsurface conditions. Observations and tests must be performed during construction to confirm subsurface conditions exposed by construction excavations are consistent with those assumed in development of recommendations. It is advisable to retain the geotechnical engineer that performed the exploration and developed the geotechnical recommendations to conduct tests and observations during construction. This may reduce the risk that variations in subsurface conditions will not be addressed as recommended in the geotechnical report.

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## SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

#### 1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use. Provide connections and extensions of services as required for construction operations.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
1. Locations of dust-control partitions at each phase of work.
  2. HVAC system isolation schematic drawing.
  3. Location of proposed air-filtration system discharge.
  4. Waste-handling procedures.
  5. Other dust-control measures.

#### 1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in **[the United States Access Board's ADA-ABA Accessibility Guidelines]** **[and]** **[ICC/ANSI A117.1]**.

#### 1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

### PART 2 - PRODUCTS

#### 2.1 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases. Lockable storage for RPR records.
  2. Drinking water and private toilet.
  3. Lighting fixtures capable of maintaining average illumination of **20 fc (215 lx)** at desk height.
  4. Adequate heating, air-conditioning, and ventilation

5. Outside doors with lock. Two (2) keys to be provided to the Owner. Additional keys to be provided to project team as required.
6. Surge protection for electronic devices in use. (Provide at all outlets)
7. Chairs for meetings
8. Four (4) extra: hard hats, pairs of safety glasses and hi-visibility PPE vest for visitors

C. Sheds

1. Storage platforms and sheds shall be provided for materials that require protection from the weather and or need to be raised above the ground or require a level storage surface
2. Sheds and platforms shall be substantially constructed
3. Material storage shall comply with manufacturers written instructions

## 2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

## PART 3 - EXECUTION

### 3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

### 3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### 3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
- F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service [**overhead**] unless otherwise indicated.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install [**WiFi cell phone access equipment**] [**and**] [**one**] land-based telephone line(s) for each field office.
- I. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect, Owner and RPR to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:

1. Processor: Intel Core i5 or i7.
2. Memory: [4] gigabyte.
3. Disk Storage: [500] gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
4. Display: 24-inch (610-mm) LCD monitor with 256-Mb dedicated video RAM.
5. Full-size keyboard and mouse.
6. Network Connectivity: [10/100BaseT Ethernet]
7. Operating System: Microsoft Windows 7 Professional.
8. Productivity Software:
  - a. Microsoft Office Professional, 2010 or higher, including Word, Excel, and Outlook.
  - b. Adobe Reader 11.0 or higher.
  - c. WinZip 7.0 or higher.
9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum [1.0] Mbps upload and [15] Mbps download speeds at each computer.
11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
12. Machine to be able to manipulate project revit file and meet system operation requirements

### 3.4 SUPPORT FACILITIES INSTALLATION

#### A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

#### B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas [within construction limits indicated] on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

#### C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.



- D. Parking: [**Provide temporary**] or [**Use designated areas of Owner's existing**] parking areas for construction personnel.
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
  - 2. Remove snow and ice as required to minimize accumulations.
- F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Provide at least four (4) (addenda) large, min 4'x8' (addenda), durable, weather resistant, legible full-color signs or artistic rendering(s) of the site, as approved by the Architect and Owner. Artistic rendering signs shall be large enough and placed such that they are clearly visible to traffic on Wilcox Blvd and Dodson Ave.
  - 4. Maintain and touch up signs so they are legible at all times.
- G. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
  - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Comply with **authorities having jurisdiction**,
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to [**erosion- and sedimentation-control Drawings**] and as required by local authorities having jurisdiction
  - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
  - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
  - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
  - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- H. Site Enclosure Fence: [**Before construction operations begin**] [**Prior to commencing earthwork**], furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
  - 1. Extent of Fence: [**As required to enclose entire Project site or portion determined sufficient to accommodate construction operations**] or [**As indicated on Drawings**].
  - 2. Site enclosure fence shall include full-height screening as directed by the Architect, Owner, or RPR. (addenda)
- I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

- J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- K. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- L. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- M. Construction Site Video Monitoring and Documentation:
  - 1. The Contractor shall provide one or more high definition multi-megapixel camera(s) for authorized users to remotely view the project on a secure connection via a standard network connection. The camera(s) shall be provided in sufficient number and placed such to provide a full view of the Work areas on the construction site, including the common-use office trailer entrances, and access to any on-site material storage.
  - 2. The camera(s) may be fixed or pan-tilt-zoom type, shall provide a resolution of 720P (1080x720) for video and stills. The supplied camera systems shall include sufficient external lighting or low-light capability to provide adequate nighttime surveillance of the Work, the common-use office trailer, stored materials, and other critical areas as directed by the Architect or RPR.
  - 3. Camera(s) shall have battery back-up to provide a minimum of 2 hours operation should primary power be interrupted.
  - 4. The camera(s) shall be accessible via an internet-based software solution, which is an online interface that will be supported by the camera system supplier. The online access service will be available for the term of the Project and allow the viewing of live video and capturing still images, and storing video and stills on both mobile and desktop platforms.
  - 5. The online interface shall include a project dashboard for viewing and accessing multiple cameras, permit real-time video viewing, allow for pan-tilt-zoom (if camera(s) so supplied), permit real-time snapshot capture, permit for scheduled and timed video and still capture, and time-lapse capture. The interface shall allow for social media integration for sharing project images and notes on Facebook and Twitter, automatic generation and delivery of daily/weekly project progress update emails with camera image.
  - 6. The online interface shall have account security to permit access control, password protection, IP blocking, and SSL protection of user login.
  - 7. The system shall capture and upload images every 5 minutes, 24 hours a day.
  - 8. The camera system provider shall provide technical support as needed to ensure the online interface remains functional for the duration of the project.
  - 9. The Contractor shall be responsible for keeping the camera(s) clean, secure, and in operation up to and through final project closeout.
  - 10. The camera system shall capture and store all images and/or video from camera feed(s) for the duration of the project and be available for a minimum of 90 days following project closeout.

11. The camera system provider shall provide, if directed by the Owner, development of a public-access website, separate from the above-described online interface, that will permit display of one or more live feed(s), live image(s), pre-programmed cycling through multiple camera feed(s), and other customization to provide an attractive and simple viewing experience for the public. The configuration of the website shall meet the approval of the Owner before "going live."

### 3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
  1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
  3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  1. Protect porous materials from water damage.
  2. Protect stored and installed material from flowing or standing water.
  3. Keep porous and organic materials from coming into prolonged contact with concrete.
  4. Remove standing water from decks.
  5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  2. Keep interior spaces reasonably clean and protected from water damage.
  3. Periodically collect and remove waste containing cellulose or other organic matter.
  4. Discard or replace water-damaged material.
  5. Do not install material that is wet.
  6. Discard and replace stored or installed material that begins to grow mold.
  7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

### 3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

## SECTION 081416 - FLUSH WOOD DOORS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with [**wood-veneer**] faces.
2. [**Factory finishing**] flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of door.[ **Include factory-finishing specifications.**]

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

C. Samples: For [**factory-finished doors**].

#### 1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Comply with the latest addition of Architectural Woodwork Standards

C. Fire-Rated Wood Doors: Positive Pressure – Category A Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UBC Standard 7-2.

1. Test Pressure: After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.

- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

#### 1.4 DELIVERY STORAGE AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Mark each door with opening number used on Shop Drawings.

#### 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 43 and 70 percent during the remainder of the construction period.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 36-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors
  - 2. Revise subparagraph below to suit Project. Standard manufacturer's warranty generally goes into effect on date of shipment, not Project acceptance.
  - 3. Warranty shall be in effect during the following period of time from date of Substantial Completion:
    - a. Solid-Core Exterior Doors: None
    - b. Solid-Core Interior Doors: Life of installation.
    - c. Hollow-Core Interior Doors: Two years.



## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated into the Work include:
1. Graham Wood Doors
  2. Mohawk
  3. VT Industries

### 2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with [AWI's, AWMAC's, and WI's "Architectural Woodwork Standards"]
- B. WDMA I.S.1-A Performance Grade:
1. Extra Heavy Duty: At all locations, UNO
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to [NFPA 252] [or] [UL 10C].
1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
  2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
  3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- E. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
    - a. Screw Withdrawal, Face: 700 lbf (3100 N).
    - b. Screw Withdrawal, Edge: 400 lbf (1780 N).
- F. Mineral-Core Doors:
1. Where required for fire rating
  2. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.

3. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
4. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

## 2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

### A. Interior Solid-Core Doors

1. Grade: **[Premium, with Grade A faces]**
2. Species: White Birch (addenda)
3. Cut: **[Quarter sliced]**
4. Match between Veneer Leaves: **[Book]** match.
5. Assembly of Veneer Leaves on Door Faces: **[Balance]** match.
6. Pair and Set Match: Provide for doors hung in same opening **[ or separated only by mullions]**.
7. Core: **[Structural composite lumber]**
8. Construction: **[Five]** [plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. **[ Faces are bonded to core using a hot press.]**

## 2.4 LIGHT FRAMES AND LOUVERS

- A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of **0.048-inch- (1.2-mm-)** thick, cold-rolled steel sheet; **[factory primed for paint] [Contractor to finish, paint to match door finish ]**finish; and approved for use in doors of fire-protection rating indicated.
- C. Metal Louvers:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work
    - a. Air Louvers Inc
    - b. Louvers & dampers Inc
    - c. McGill Architectural Products
  2. Metal and Finish: Hot-dip galvanized steel, **0.040 inch (1.0 mm)** thick, **[factory primed for paint, GC to finish, to match door finish] [with baked-enamel- or powder-coated, if available in matching finish]** finish.

## 2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  - 1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
- C. Openings: Factory cut and trim openings through doors.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
  - 3. Louvers: Factory install louvers in prepared openings.

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:
  - 1. Grade: **[Premium]**
  - 2. Staining: Manufacturer's standard **[As selected by Architect from manufacturer's full range]**
  - 3. Effect: **[Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores].**
  - 4. Sheen: **[Satin]**

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Hardware: For installation, see **[Section 087100 "Door Hardware."] [Section 087111 "Door Hardware (Descriptive Specification)."]**
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.
  2. Install smoke- and draft-control doors according to NFPA 105.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
1. Clearances: Provide **1/8 inch (3.2 mm)** at heads, jambs, and between pairs of doors. Provide **1/8 inch (3.2 mm)** from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide **1/4 inch (6.4 mm)** from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

### 3.2 ADJUSTING

1. Operation: Rehang or replace doors that do not swing or operate freely
2. Finished doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence for repair or refinishing.

END OF SECTION 081416

## SECTION 087100 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Mechanical door hardware for the following:
  - a. Swinging doors.
  - b. Sliding doors.
  - c. Folding doors.
2. Cylinders for door hardware
3. Electrified door hardware.

B. Related sections.

1. 08-33-23 Coiling counter doors
2. 10-40-00 Key control cabinets

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **[Project site]**
- B. Keying Conference: Conduct conference at **[Project site]**
1. Coordinate keying with owners rep

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For electrified door hardware.
1. Include diagrams for power, signal, and control wiring.
  2. Include details of interface of electrified door hardware and building safety and security systems.
- C. Samples: For each exposed product in each finish specified.
1. Must include finishes for all doors to ensure proper match
- D. Door hardware schedule.
- E. Door hardware cut sheets

1. Must be labeled to indicate which doors and hardware set each component is associated with. Must use same nomenclature and numbering system as in place on the drawings and this spec section
2. Cut sheets must have all items, components and selections fully indicated on them prior to submittal.
3. Items without cut sheets will not be reviewed. A hardware submittal which is only a list of part numbers, will not be reviewed.

F. Keying schedule.

G. 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. Scheduling Responsibility: Preparation of door hardware and keying schedule.
2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an **[Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC)] [Architectural Openings Consultant (AOC)]**.

#### 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. **[Electromagnetic] [and] [Delayed-Egress]** Locks: **[Five]** years from date of Substantial Completion.
  - b. Exit Devices: **[Two]** years from date of Substantial Completion.
  - c. Manual Closers: **[10]** years from date of Substantial Completion.

- d. Concealed Floor Closers: **[Five]** **[10]** years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. The door and all hardware and components must match the fire rating of the wall in which it is located.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
1. Air Leakage Rate: Maximum air leakage of **[0.3 cfm/sq. ft. (3 cu. m per minute/sq. m)]** at the tested pressure differential of **[0.3-inch wg (75 Pa)]** of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
1. Provide all required connections for electrified door hardware.
  2. All components must be compatible with the devices offered by the City's vendor, with whom they already have a contract.
  3. Fully coordinate the installation of all components.
- D. Means of Egress Doors: Latches do not require more than **15 lbf (67 N)** to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with **[the DOJ's "2010 ADA Standards for Accessible Design"]** [current version of ANSI ICC A117.1"]

### 2.2 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.
1. Door hardware is scheduled **[in Part 3]**

### 2.3 HINGES

- A. Hinges: BHMA A156.1. **[Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.]**

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. Baldwin Hardware
  - c. Hanger
  - d. Lawrence Hardware
  - e. McKinny Products
  - f. Stanley Commercial Hardware
2. Description:
  - a. Heavy duty, five knuckle, ball bearing type, full mortise

## 2.4 CONTINUOUS HINGES

- A. Continuous Hinges: BHMA A156.26; minimum **0.120-inch- (3.0-mm-)** thick, hinge leaves with minimum overall width of **4 inches (102 mm)**; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
- B. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
  1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
    - a. Allegion
    - b. Hanger
    - c. McKinny Products
    - d. Stanley Commercial Hardware
    - e. Zero International
    - f. Storefront door manufacturer's standard

## 2.5 MECHANICAL LOCKS AND LATCHES

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. ASSA Abloy
  - c. Stanley Commercial Hardware
- B. Grade 1, heavy duty
- C. Lock Functions: As indicated in door hardware schedule.
- D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
  1. Bored Locks: Minimum **1/2-inch (13-mm)** latchbolt throw.
  2. Mortise Locks: Minimum **3/4-inch (19-mm)** latchbolt throw.
  3. Deadbolts: Minimum [**1-inch (25-mm)**] bolt throw.



- E. Lock Backset: **2-3/4 inches (70 mm)** unless otherwise indicated.
- F. Lock Trim:
  - 1. Description: **[As selected by Architect from manufacturers full line, or as indicated in the hardware schedule or by the basis of design]**
  - 2. Levers: **[Cast]**.
    - a. ADA compliant
    - b. Typically a flat or square bar which is bent or angled at the end
    - c. Basis of design: Allegion, Falcon, K series, Dane lever
  - 3. Escutcheons (Roses): **[wrought]**.
  - 4. Dummy Trim: Match lever lock trim and escutcheons.
  - 5. Pulls for storefront
    - a. ~~"L" shaped. Horizontal the width of the door, then turning upward for a height equal to the width. Made of flat bar stock, 2 1/2" x 1/4". Both ends shall return to the door face.~~ 1 1/2" square section with rounded edges. 5'-0" vertical pull. 2 1/2" clearance behind the pull. Color to match the storefront. (addenda)
    - b. ADA compliant
- G. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
  - 1. Provide electric strikes where required.
- H. Bored Locks: BHMA A156.2; **[Grade 1]** Series 4000.
  - 1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
    - a. Allegion
    - b. ASSA Abloy
    - c. Dorma
    - d. Hanger
    - e. Stanley Commercial Hardware
  - 2. Basis of design:
    - a. Subject to compliance: Allegion – Schalge ND series. Rhodes (RHO) levers
  - 3. Locks should not include push button locking

## 2.6 AUXILIARY LOCKS

- A. Bored Auxiliary Locks: BHMA A156.36: **[Grade 1]** with strike that suits frame.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. ASSA Abloy
  - c. Hanger
  - d. Lawrence Hardware
  - e. Medeco
  - f. Stanley Commercial Hardware

## 2.7 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; [**Grade 1**] with faceplate to suit lock and frame.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Adams Rite
  - b. Allegion
  - c. ASSA Abloy
  - d. Dormatronics Systems
  - e. Hanger
  - f. Rutherford
  - g. Stanley Commercial Hardware
  - h. Trine
  - i. Must be compatible with owners door access controls.

## 2.8 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; [**Grade 1**] solenoid driven; with strike that suits frame.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. ASSA Abloy
  - c. DynaLock
  - d. Lawrence hardware
  - e. Rutherford
  - f. Sargent
  - g. Confirm the required function of all door levers and panic hardware for compatibility
  - h. Must be compatible with owners door access controls.

2. Type: [**Mortise deadbolt**]
3. Magnetic locks are not acceptable, provide vertical locking rods typ
4. Provide power connection as required
5. All exit devices must still allow for free egress, even if electromechanical locks are installed and there is a power failure.
6. All locks to fail secure, and remain locked in the case of a power failure. This shall not prohibit free egress from the building.

## 2.9 EXIT LOCKS AND EXIT ALARMS

### A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

1. Provide alarms at all emergency egress doors
2. Exit alarms should be hardwired, not battery powered
3. Alarm box to be recessed and mounted in adjacent wall
4. Alarms shall be disabled via key if door needs to be opened
5. Paddle type, alarmed panic bars, not accepted
6. Provide all power, contacts or wiring
7. Provide sign on door. White letters. "EMERGENCY EXIT ONLY, ALARM WILL SOUND"
8. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Arrow
  - b. ASSA Abloy
  - c. Detex
  - d. Precision Hardware
  - e. Sargent
  - f. Must be compatible with owners door access controls and monitoring system.
9. Basis of Design: Detex EAX-4200

## 2.10 MANUAL FLUSH BOLTS

- ### A. Manual Flush Bolts: BHMA A156.16; minimum **3/4-inch (19-mm)** throw; designed for mortising into door edge.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Adams Rite
  - b. Allegion
  - c. Door Controls International
  - d. Trimco
2. Provide metal sleeve where bottom flush bolt enters the concrete floor.
  - a. A raw drilled hole in the concrete shall not be acceptable.
  - b. Sleeve shall not protrude above the floor.
  - c. Grout or infill concrete must match the color of rest of the concrete floor
3. Flush bolts mounted at edge of door. In the 1 3/4" door thickness. Should not be visible when both doors in the pair are closed.

## 2.11 EXIT DEVICES AND AUXILIARY ITEMS

### A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. ASSA Abloy
  - c. Dorma
  - d. Lawrence Hardware
  - e. Sargent
  - f. Von Duprin
  - g. Must be compatible with Owners door access controls and monitoring system.
    - 1) Coordinate with electric locks for dogging requirements
  - h. Exposed vertical rods are not acceptable, use concealed rods.
  - i. All exit devices must still allow for free egress, even if electromechanical locks are installed and there is a power failure.
2. Basis of design: Allegion AX 98/99 series with smooth housing. Finish to match door. Bronze on a bronze door. Brushed stainless on a wood door.
3. For panic hardware on storefront or glass doors, use appropriate devices for such installation. Back of panic hardware must be finished when viewed through glass door.  
(addenda)

## 2.12 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. [ **Provide cylinder from same manufacturer of locking devices, UNO. Coordinate with Ownership for locking requirements** ]
  1. Coordinate with Ownership for City or facility standards on locking
- B. Standard Lock Cylinders: BHMA A156.5; [ **Grade 1** ] permanent cores; face finished to match lockset.
  1. Core Type: [ **Interchangeable** ]

- C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

## 2.13 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. [**Incorporate decisions made in keying conference.**]
  - 1. Master Key System: Change keys and a master key operate cylinders.
    - a. Provide five cylinder change keys and eight master keys.
  - 2. Keyed Alike: Key all cylinders to same change key.
- B. Keys: [**Brass**].
  - 1. Stamping: Permanently inscribe each key with a visual key control number

## 2.14 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. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
    - a. Allegion
    - b. Corbin Russwin
    - c. Dorma
    - d. Rixson
    - e. Sargent

## 2.15 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16.
  - 1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
    - a. Allegion
    - b. ASSA Abloy
    - c. Door Controls International

- d. Hanger Companies
- e. Rockwood Manuf
- f. Trimco
2. Basis of Design wall mounted stop: Rockwood Manuf, #403. Stainless steel base, concave rubber bumper

## 2.16 OVERHEAD STOPS AND HOLDERS

### A. Overhead Stops and Holders: BHMA A156.8.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. Dorma
  - c. Hanger
  - d. Rixson
  - e. Sargent

## 2.17 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. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Hanger
  - b. National Guard Products
  - c. Pemko Manuf.
  - d. Zero International

### B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg (75 Pa), as follows:

1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
3. Gasketing on Double Doors: 0.50 cfm per foot (0.000774 cu. m/s per m) of door opening.

## 2.18 THRESHOLDS

### A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Hanger
  - b. National Guard Products
  - c. Pemko Manuf.

- d. Rixson
- e. Zero International

## 2.19 AUXILIARY DOOR HARDWARE

### A. Auxiliary Hardware: BHMA A156.16.

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. Bladwin
  - c. Hanger
  - d. Rockwood
  - e. Trimco
2. Silencers: rubber, shall mount into holes drilled in frame (on hollow metal doors). Adhesive type is not acceptable.

## 2.20 AUXILIARY ELECTRIFIED DOOR HARDWARE

### A. Auxiliary Electrified Door Hardware:

1. Manufactures. Subject to compliance manufacturers who produce product that may be incorporated into the work include:
  - a. Allegion
  - b. Dorma
  - c. Dynalock
  - d. Hanger
  - e. Sargent
2. Door contacts
  - a. Ensure compatibility with Owners monitoring system

## 2.21 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 **[indicated on Drawings]** **[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.

2. Custom Steel Doors and Frames: HMMA 831.
  3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. For all doors and or frames: For applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6 and manufacturer's written instructions
- C. 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.
- D. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every **30 inches (750 mm)** of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- E. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every **30 inches (750 mm)** of door height greater than **90 inches (2286 mm)**.
- F. Lock Cylinders: Install construction cores to secure building and areas during construction period.
1. Replace construction cores with permanent cores as **[indicated in keying schedule]** **[directed by Owner]**.
- G. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- H. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, **[in equipment room]**. Verify location with Architect.
1. Configuration: Provide **[least number of power supplies required to adequately serve doors]** with electrified door hardware.
- I. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- J. Stops: Provide wall mounted stops typical, to prevent doors from contacting adjacent walls. Do not use floor stops as they will impede traffic, use overhead holders instead.
- K. 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.
- L. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.



- M. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- N. Electric door controls and monitoring.
  - 1. Coordinate with Owners vendor for purchase and installation of card readers. All other items to be provided by GC. GC to provide any and all components to allow for install. (Power, data, conduit, recessed boxes, etc...)
  - 2. All electronic hardware connection points should be accessed via conduit from the point of connection and extending to a turnout above the wall in areas with suspended ceiling grids and into the nearest cable tray in open ceiling areas.
  - 3. Coordinate with Owners for door contacts and any other item monitored by their systems, to ensure compatibility prior to purchase.
  - 4. Provide all power and connections
  - 5. Coordinate with Ownership to verify successful installation and monitoring
  - 6. All exterior mounted electric door controls to be properly rated for weather exposure

### 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.
- B. Coordinate with Owner to ensure that all electric controls and monitoring are working properly.
- C. Clean doors and hardware at substantial completion and time of final building turn over.

### 3.3 DOOR HARDWARE SCHEDULE

#### A. Door hardware notes

1. All sets indicated are to be considered an indication of design intent, not a complete set. It is the GCs responsibility to provide complete and fully functional door hardware sets, using the items indicated as a guideline. Items not specifically listed shall be of the same quality and type as the parts indicated
2. Provide all parts, materials and labor to furnish and install complete and fully functional doors and hardware sets
3. All door and hardware must match the fire rating of the walls they are within
4. All exterior doors to be insulated, thermally broken and have weather stripping.
5. All doors in HM frames to receive silencers, unless it is not allowed to correspond to the required fire rating
6. All hardware to be Domestic (addenda) Grade 1
7. Provide all required power, communications connections for electric door components; both GC and Owner supplied. Coordinate installation with Owner's vendor. Ensure all components installed at this facility are compatible with Owners existing monitoring systems.
8. No wiring shall be in the removable center mullion.
9. GC to confirm all hardware is appropriate for the weight or size of the door
10. GC to confirm compatibility of hardware with door type any stile size prior to ordering
11. GC is responsible for field measuring openings prior to ordering
12. All exterior doors and all interior doors with card readers to have door contacts
13. All exterior doors to have door contacts. All exterior doors to have closers
14. All hardware to be ADA and ANSI 117.1 compliant
15. All thresholds to be ADA compliant
16. All hardware on exterior storefront doors to match the color of the storefront, UNO
17. All hardware on typical interior doors to be brushed stainless steel finish UNO

B. Set 01A

1. Location: Storefront double doors, vestibule or exterior
  - a. Doors: 01A, 16A, 16C
2. Function: Entry / Egress
3. Continuous geared hinges
4. Pulls, 'L' shaped. ADA compliant
5. Closers, surface mounted
6. Panic hardware, touch bar type
7. Thresholds
8. Weather stripping
9. Door contacts
10. Electromechanical lock, solenoid type, one per leaf
11. Coordinate with card reader by owner, supply power and required connections
12. Keyed removable center mullion

C. Set 01B

1. Location Storefront double doors vestibule interior
  - a. Doors: 01B, 16B
2. Function Entry / Egress
3. Continuous geared hinges
4. Pulls, 'L' shaped. ADA compliant
5. Closers, surface mounted
6. Lockset
7. Panic hardware, touch bar type, key doggable
8. Thresholds
9. Weather stripping
10. Door contacts
11. Keyed removable center mullion

D. Set 02

1. Location: Bathroom / locker room doors
2. Function: passage
3. Doors: 02, 03, 18, 19
4. Hinges, full mortise, 5 knuckle, 3 per door
5. Kick plates, 8" min height, to fit width of door, both sides
6. Push plate on push side
7. 12" vertical pull with back plate on pull side
8. Deadlock, key operated both sides
9. Closer, surface mounted
10. Silencers
11. Door stop, wall mount, if door in open position will strike wall
12. Saddle, marble, grey. Match width of door frame. ADA complaint. Color to coordinate with concrete flooring, submit samples to Architect.

E. Set 03

1. Not used

F. Set 04

1. Location: Utility
2. Function: Storage
3. Doors: 04, 11, 12, 22
4. Hinges, full mortise, 5 knuckle, 3 per door
5. Lockset
6. Electric strike
7. Door contacts
8. Door stop, wall mount, typ. Floor mount if in front of windows.
9. Silencers
10. Coordinate with card reader by owner, supply power and required connections

G. Set 05

1. Location: Janitors Closet
2. Function: Storage
3. Doors: 05
4. Hinges, full mortise, 5 knuckle, 3 per door
5. Lockset
6. Card reader
7. Electric Strike
8. Door contacts
9. Silencers
10. Door stop, wall mount
11. Kick plates, 8" min height, to fit width of door, both sides
12. Coordinate with card reader by owner, supply power and required connections

H. Set 06

1. Location: Storage library, utility
2. Function: Storage
3. Door: 06, 20
4. Hinges, full mortise, 5 knuckle, 3 per door
5. Levers
6. Electromechanical lock, solenoid type. One per leaf
7. Silencers
8. Door contacts
9. Kick plates, 8" min height, to fit width of door, push side only
10. Coordinate with card reader by owner, supply power and required connections

I. Set 07A

1. Location: Library Entry
2. Function: Classroom / egress
3. Door: 07A
4. Hinges, full mortise, 5 knuckle, 3 per door
5. Recessed overhead hold opens
6. Lever lockset
7. Panic hardware, touch bar type
8. Silencers

J. Set 07B

1. Location: Library and Classroom entry
2. Function: Classroom
3. Doors: 07B, 08A, 09A
4. Hinges, full mortise, 5 knuckle, 3 per door
5. Silencers
6. Lever lockset
7. Door stop, if door will contact wall or windows. Wall mounted typ. Floor mounted if door opens in front of windows

K. Set 07C

1. Location: Library side exit
2. Function: Egress
3. Door: 07C, 10A
4. Hinges: Continuous geared hinges
5. Pull, 'L' shaped. ADA compliant
6. Closer: surface mounted
7. Lockset
8. Panic hardware, touch bar type
9. Threshold
10. Weather stripping
11. Door contacts
12. Door alarm

- L. Set 08A
  - 1. Not used
- M. Set 08B
  - 1. Location: Door joining multiple classrooms
  - 2. Door: 08B
  - 3. Function: utility, institutional. Lockset is operated by key on either side. Door is always locked
  - 4. Hinges, full mortise, 5 knuckle, 3 per door
  - 5. Silencers
  - 6. Lever lockset
  - 7. Door stop: floor mounted
- N. Set 08C
  - 1. Location: Classroom exterior doors
  - 2. Function:
  - 3. Doors: 08C, 09B
  - 4. Hinges: Continuous geared hinges
  - 5. Pulls, 'L' shaped. ADA compliant
  - 6. Closer: surface mounted
  - 7. Lever
  - 8. Threshold
  - 9. Weather stripping
  - 10. Door contacts
  - 11. Electric strike
  - 12. Coordinate with card reader by owner, supply power and required connections
- O. Set 09
  - 1. Not used
- P. Set 10A
  - 1. Not used
- Q. Set 10B
  - 1. Location: Dance
  - 2. Function: Classroom
  - 3. Doors: 10B
  - 4. Hinges, full mortise, 5 knuckle, 3 per door
  - 5. Silencers
  - 6. Lever lockset
  - 7. Acoustic door seals all around door
  - 8. Self closing, heavy duty, surface mounted, automatic door bottom seal

- R. Set 11
  - 1. Not used
- S. Set 12
  - 1. Not used
- T. Set 13
  - 1. Location: Storage
  - 2. Function: Storage
  - 3. Doors: 13, 17
  - 4. Hinges, full mortise, 5 knuckle, 3 per door
  - 5. Silencers
  - 6. Lever lockset
  - 7. Flush bolts, top and bottom of inactive leaf
- U. Set 14A
  - 1. Location: Kitchen
  - 2. Function: Classroom
  - 3. Doors: 14A
  - 4. Hinges, full mortise, 5 knuckle, 3 per door
  - 5. Silencers
  - 6. Lever lockset
  - 7. Kick plate, 8" min, both sides
  - 8. Concealed overhead stop
- V. Set 14B
  - 1. Refer to coiling counter door spec

- W. Set 14C
1. Location: Kitchen
  2. Function: Classroom
  3. Doors: 14A
  4. Hinges, full mortise, 5 knuckle, 3 per door
  5. Silencers
  6. Lever lockset
  7. Kick plate, 8" min, kitchen side
  8. Wall stop
- X. Set 15A
1. Location: Multipurpose room, Gym
  2. Function: Classroom / egress. Both leaves active for egress
  3. Doors: 15A, 15B
  4. Hinges, full mortise, 5 knuckle, 3 per door
  5. Silencers
  6. Lever lockset
  7. Panic hardware, touch bar type
  8. Stops: Wall stop if door will contact wall
- Y. Set 15B
1. Not used
- Z. Set 15C
1. Location: Multipurpose room, Gym
  2. Function: Classroom / egress. Both leaves active for egress
  3. Doors: 15C, 21A, 21B
  4. Hinges, full mortise, 5 knuckle, 3 per door
  5. Silencers
  6. Lever lockset
  7. Panic hardware, touch bar type
  8. Door hold open, overhead
  9. Stops: Wall stop if door will contact wall



AA. Set 15D

1. Location: Multipurpose room
2. Function: Storage
  - a. Refer to drawings for door type. Oversized dutch style doors. It is assumed that the top panels will be usually locked in place and the bottom panels will provide the normal door function. Top panels to be opened to allow oversized equipment into the space from the gym.
  - b. Not, gym padding also needs to be affixed to the back of these doors
3. Doors: 15D, 15G
4. Hinges, full mortise, 5 knuckle, 3 per bottom leaf. 2 per top leaf
5. Silencers
6. Lever lockset. Levers only on multipurpose side. Flush plate on gym side.
7. Flush bolts.
  - a. Active leaf: 2 per leaf. At upper panel
  - b. Inactive leaf: 3 per leaf.
    - 1) Note: Two flush bolts should be installed in the bottom leaf, and be reachable standing on the ground. The upper flush bolt secures the top panel to the top of the frame when engaged.

BB. Set 16 -20

1. Not used

CC. Set 21A

1. Not used

DD. Set 21B

1. Not used

EE. Set 21C

1. Location Storefront double doors gym
  - a. Doors: 21C, 21E
2. Function Egress
3. Continuous geared hinges
4. Pulls, none
5. Closers, surface mounted
6. Panic hardware, touch bar type, key doggable
7. Thresholds
8. Weather stripping
9. Door contacts
10. Door alarm
11. Keyed removable center mullion

FF. Set 21D

1. Refer to overhead door specification

END OF SECTION 087100

## AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER

1305 DODSON AVE, CHATTANOOGA TN 37406

No.	Desc.	Date
1	BID RFI	11.01.2017

### CONSTRUCTION DOCUMENTS

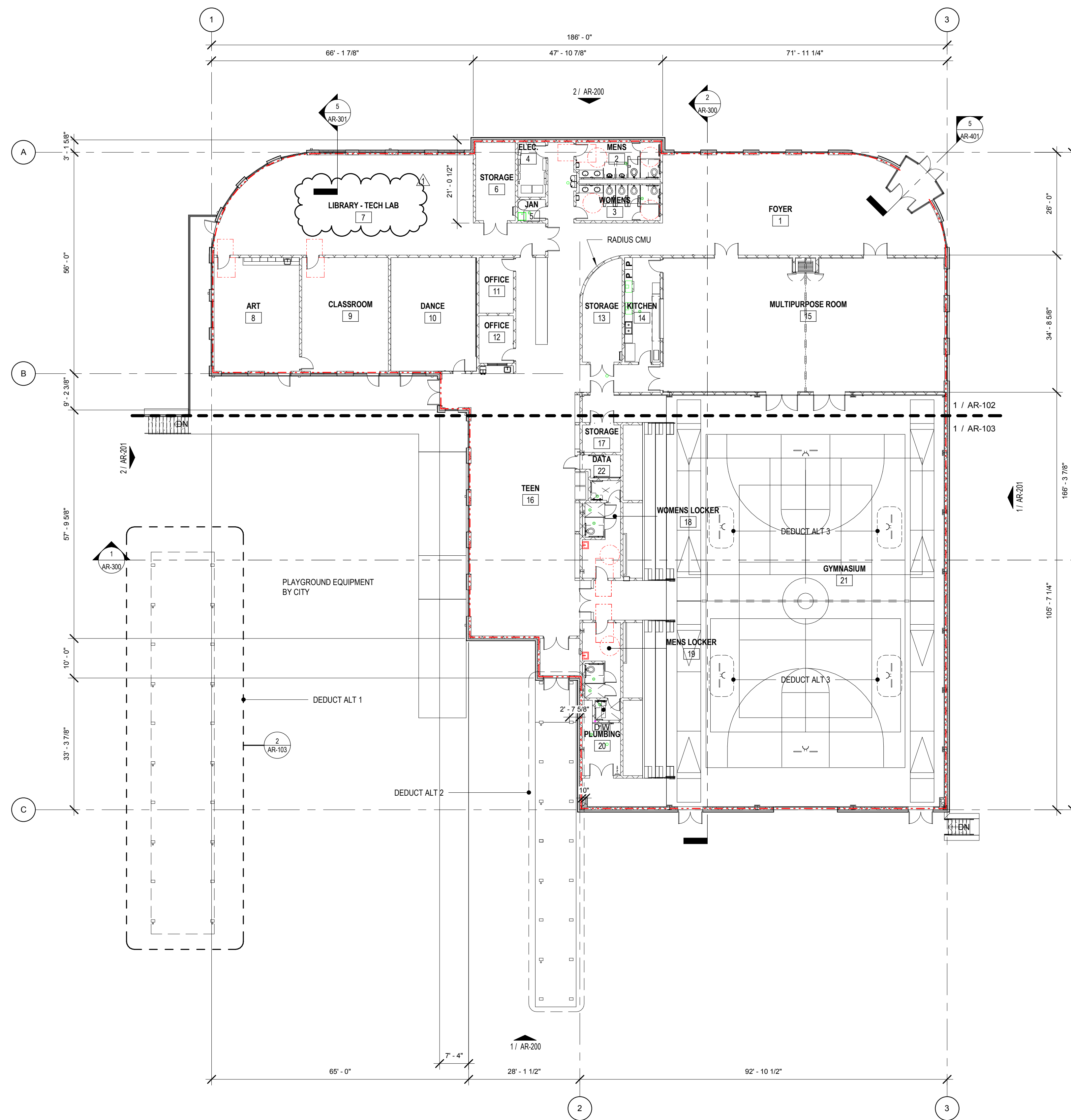


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JOB#: 16-057  
SCALE: AS INDICATED  
DRAWN: AREY

### OVERALL FLOOR PLAN

# AR-101



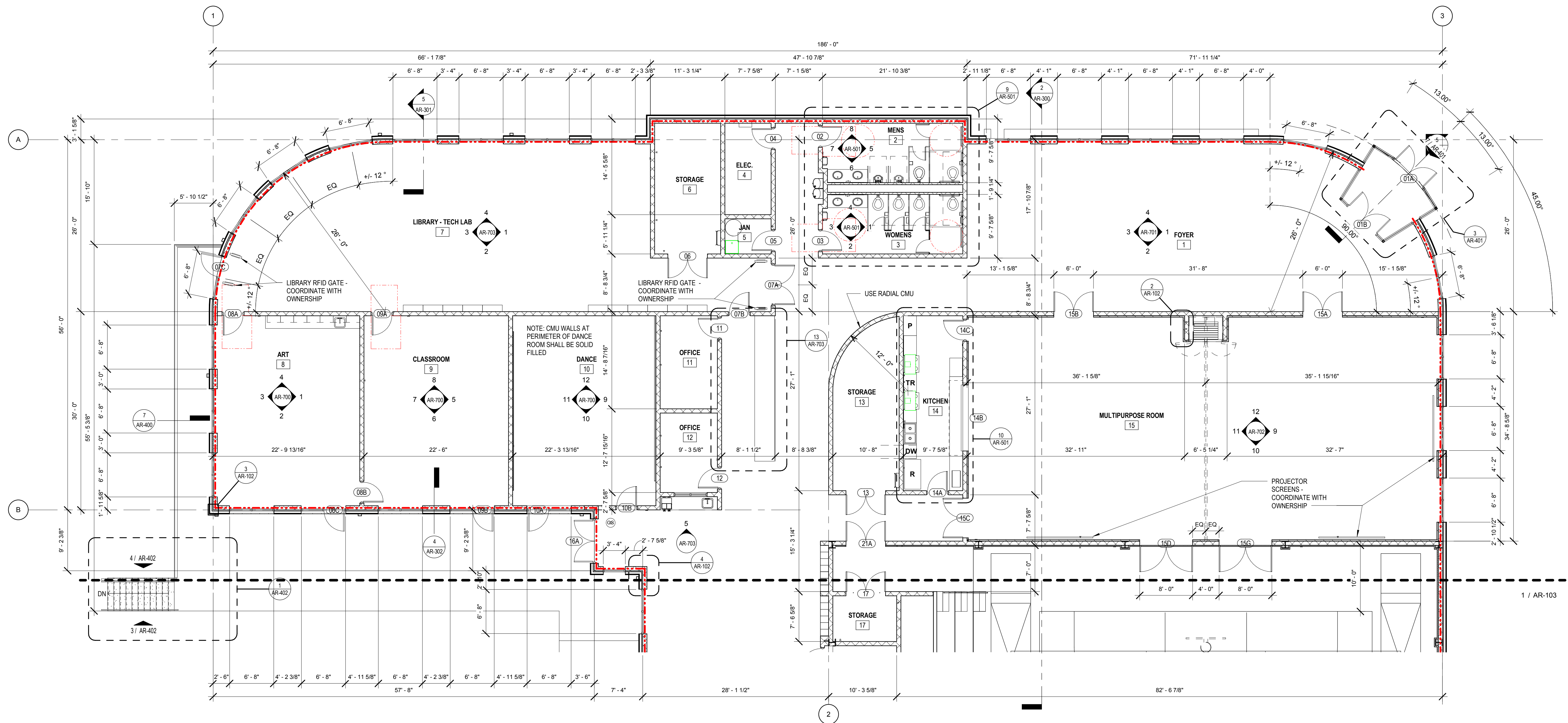
① Level 1  
1/16" = 1'-0"



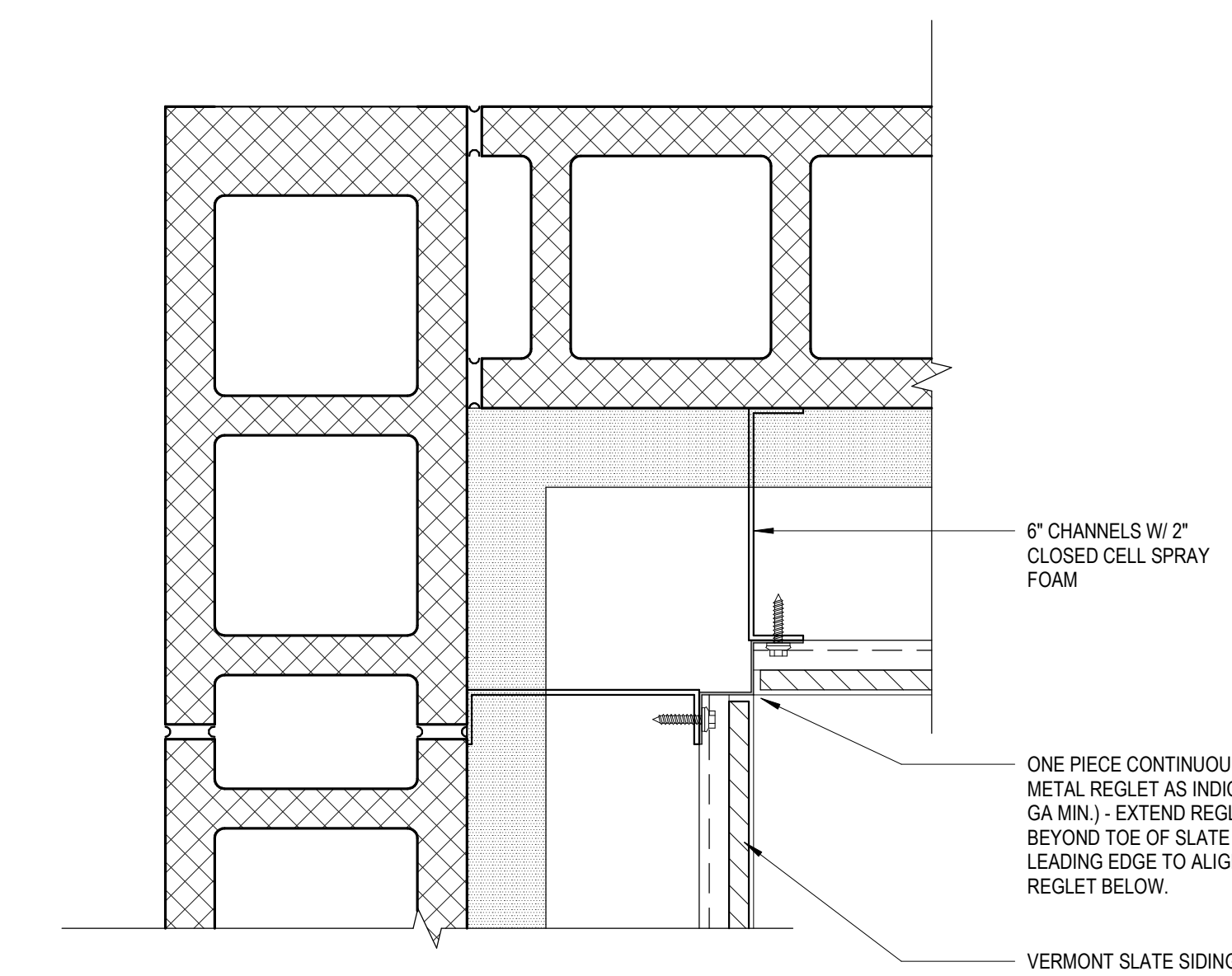
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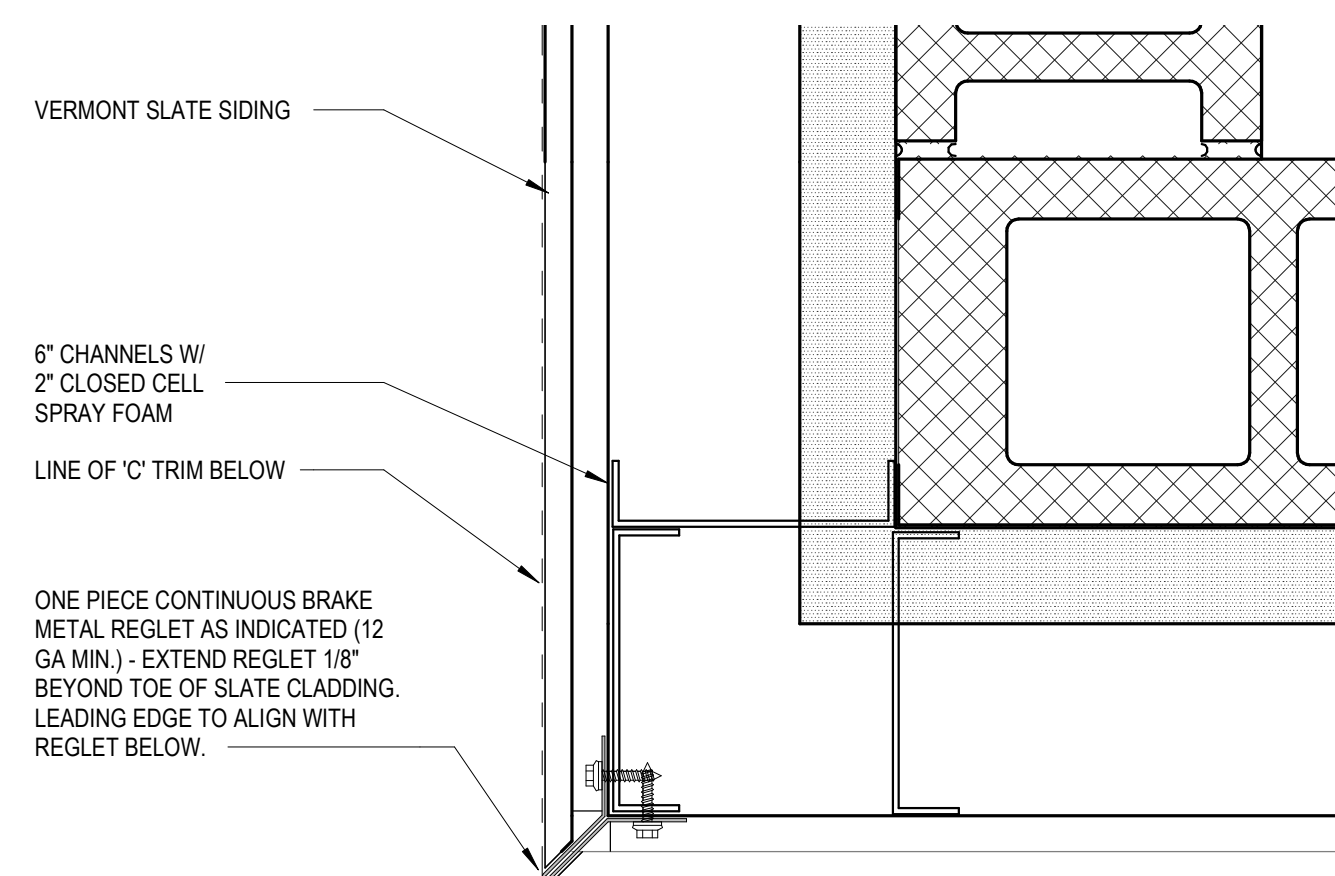
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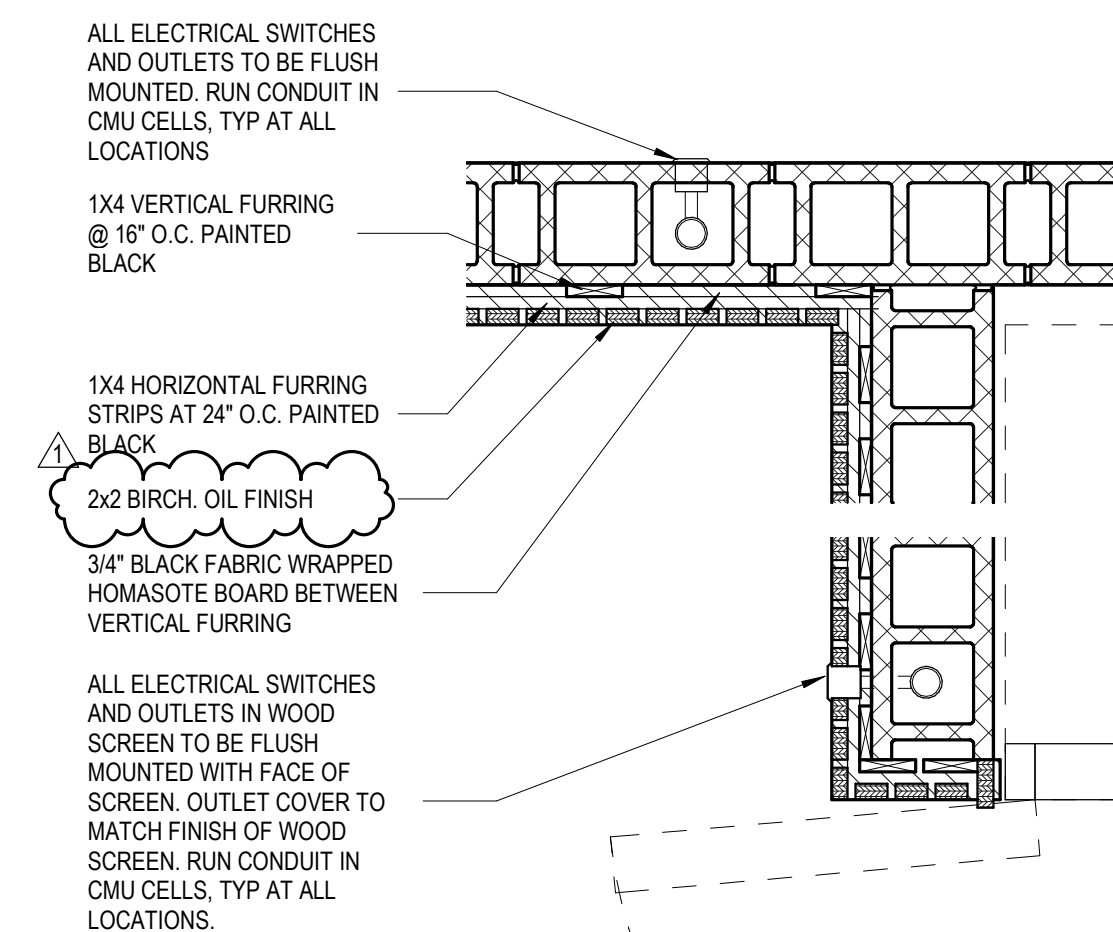
① ENLARGED FLOOR PLAN - FOYER/READING/MULTIPURPOSE  
1/8" = 1'-0"



④ TYPICAL SLATE INSIDE CORNER  
3" = 1'-0"



③ EXTERIOR CORNER AT SLATE  
3" = 1'-0"



② WOOD SLAT WALL  
1" = 1'-0"

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SCALE: AS INDICATED  
DRAWN: AREY

## ENLARGED PLAN

# AR-102



105 DODSON AVE, CHATTANOOGA TN 37406

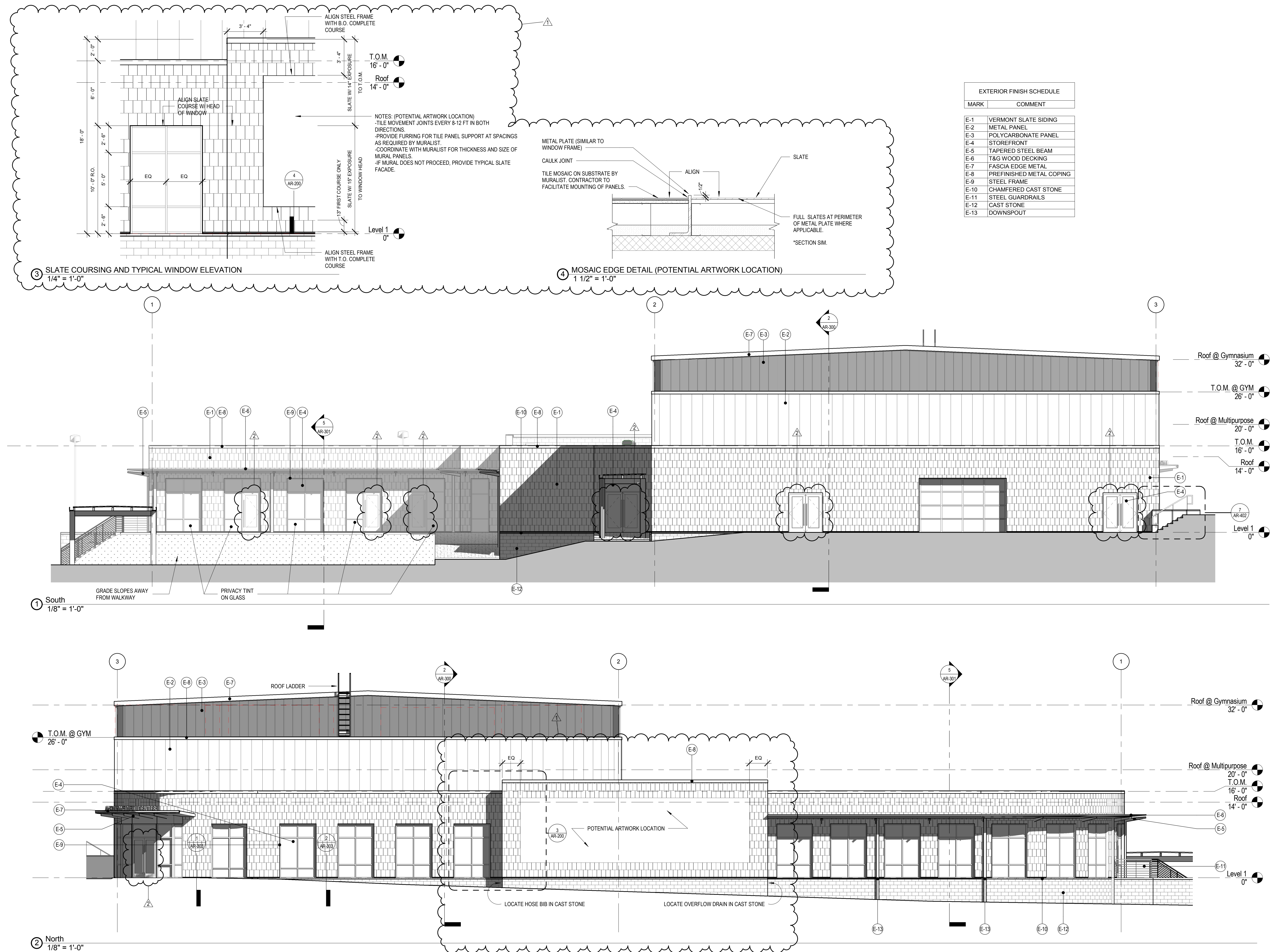
No.	Desc.	Date
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2	BID RFI	11.01.2017

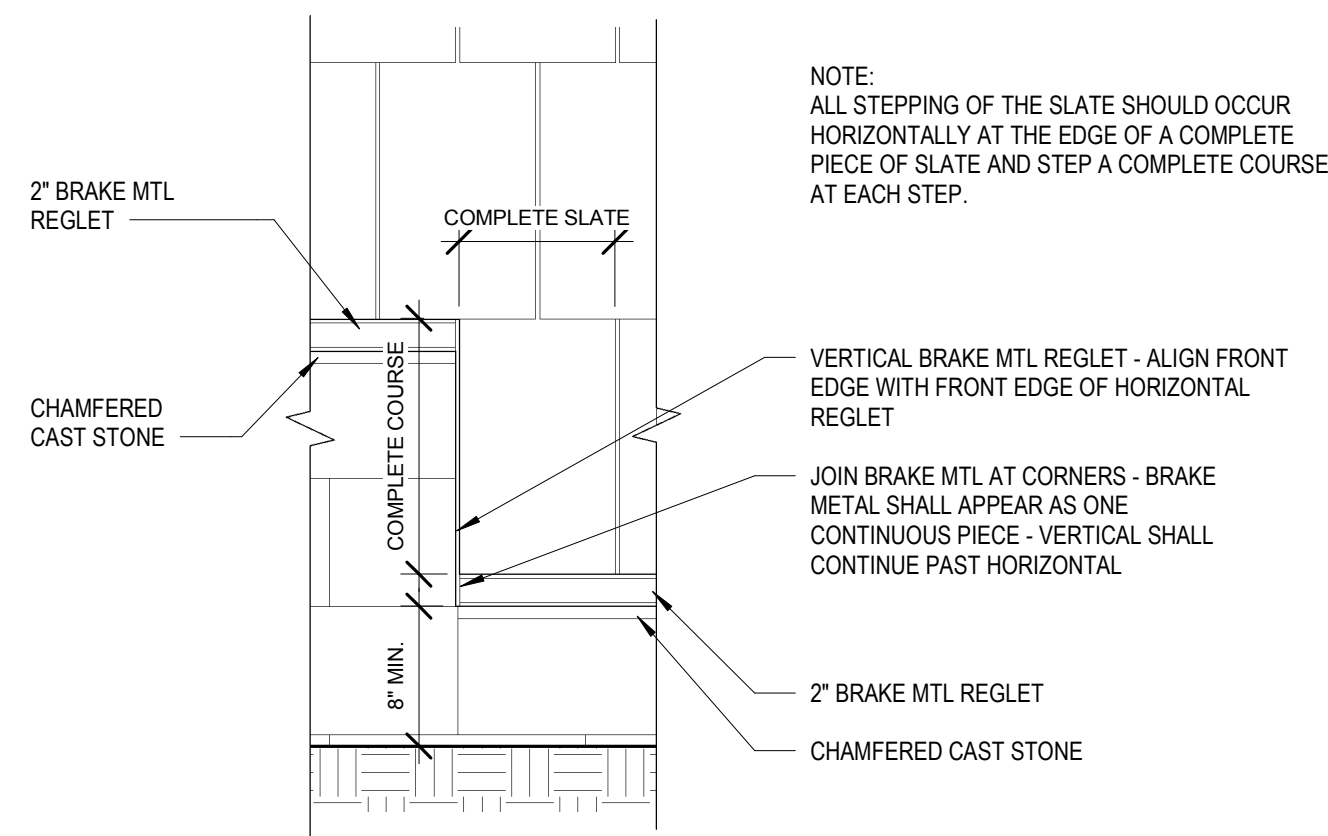
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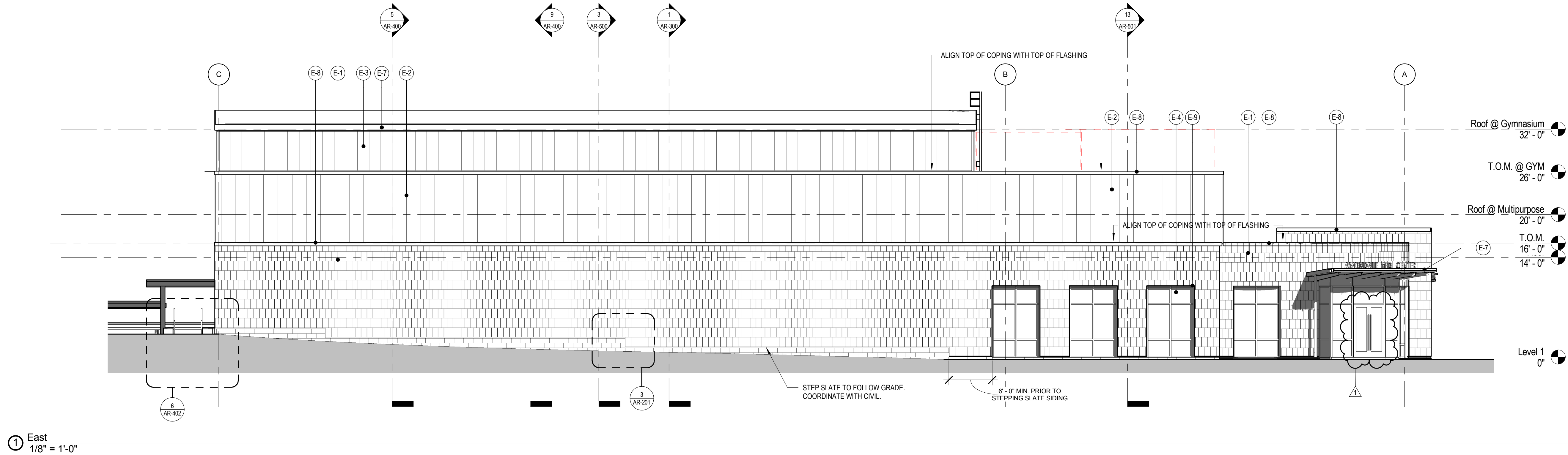
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SCALE: AS INDICATED  
DRAWN: AREY

AR-200

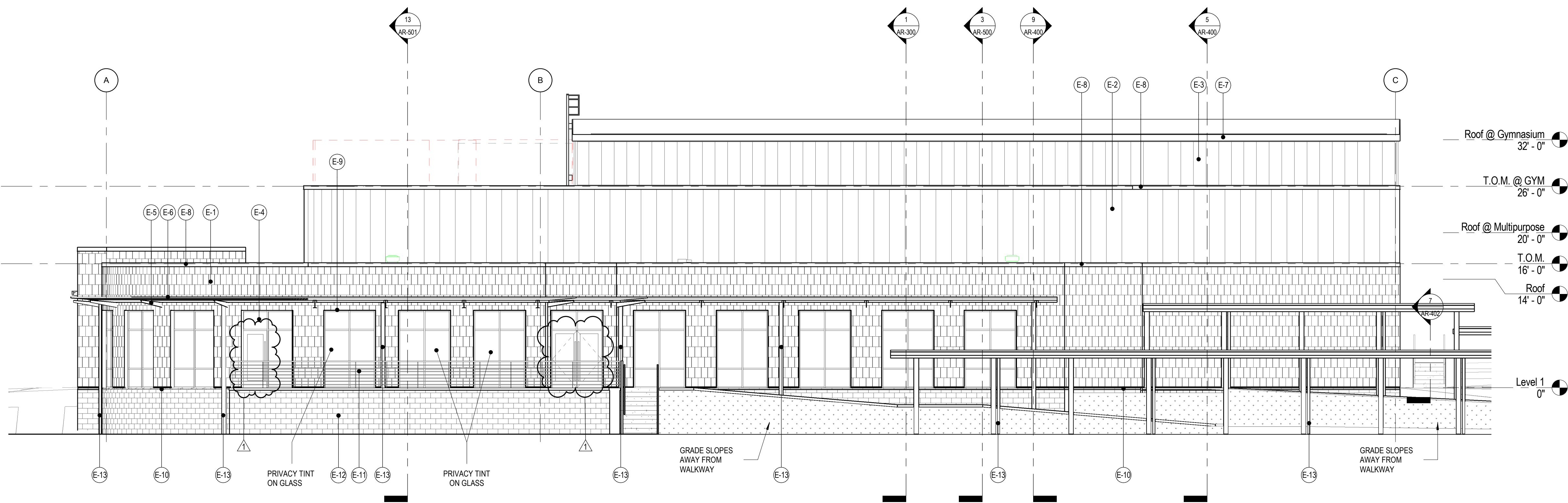




③ SLATE STEP DETAIL  
1" = 1'-0"



① East  
1/8" = 1'-0"



② West  
1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE	
MARK	COMMENT
E-1	VERMONT SLATE SIDING
E-2	METAL PANEL
E-3	POLYCARBONATE PANEL
E-4	STOREFRONT
E-5	TAPERED STEEL BEAM
E-6	T&G WOOD DECKING
E-7	FASCIA EDGE METAL
E-8	PREFINISHED METAL COPING
E-9	STEEL FRAME
E-10	CHAMFERED CAST STONE
E-11	STEEL GUARDRAILS
E-12	CAST STONE
E-13	DOWNSPOUT

## AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER

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### ELEVATIONS

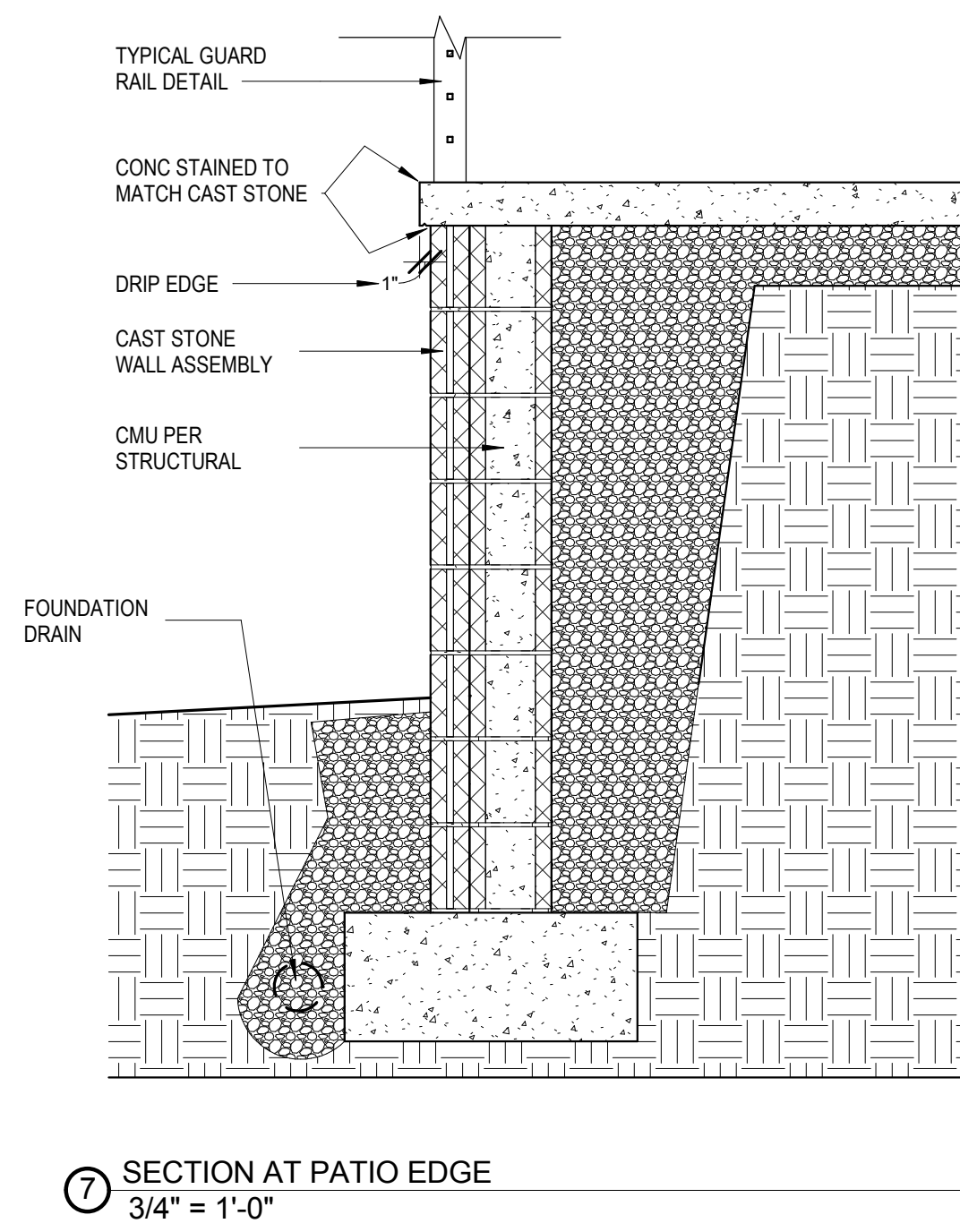
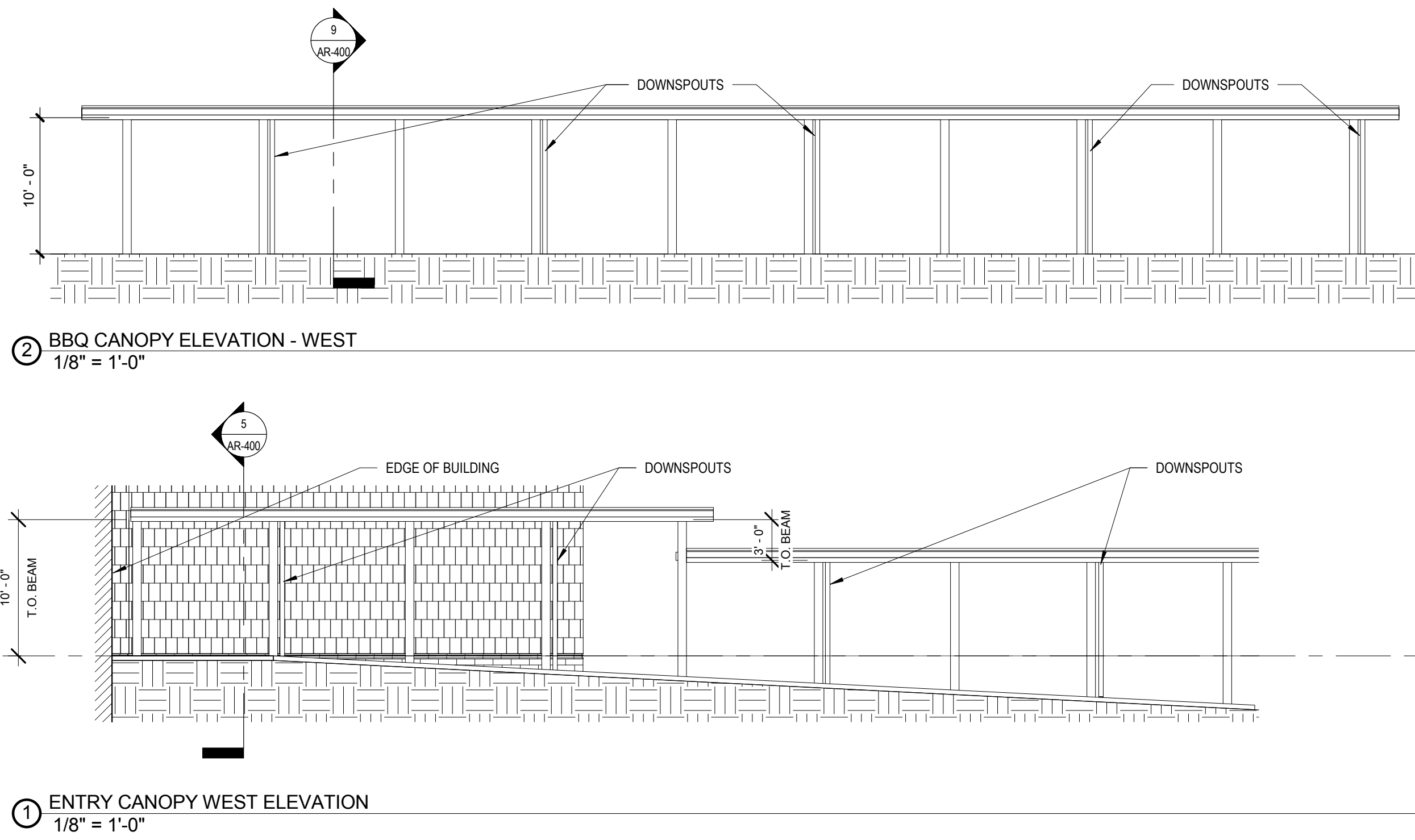
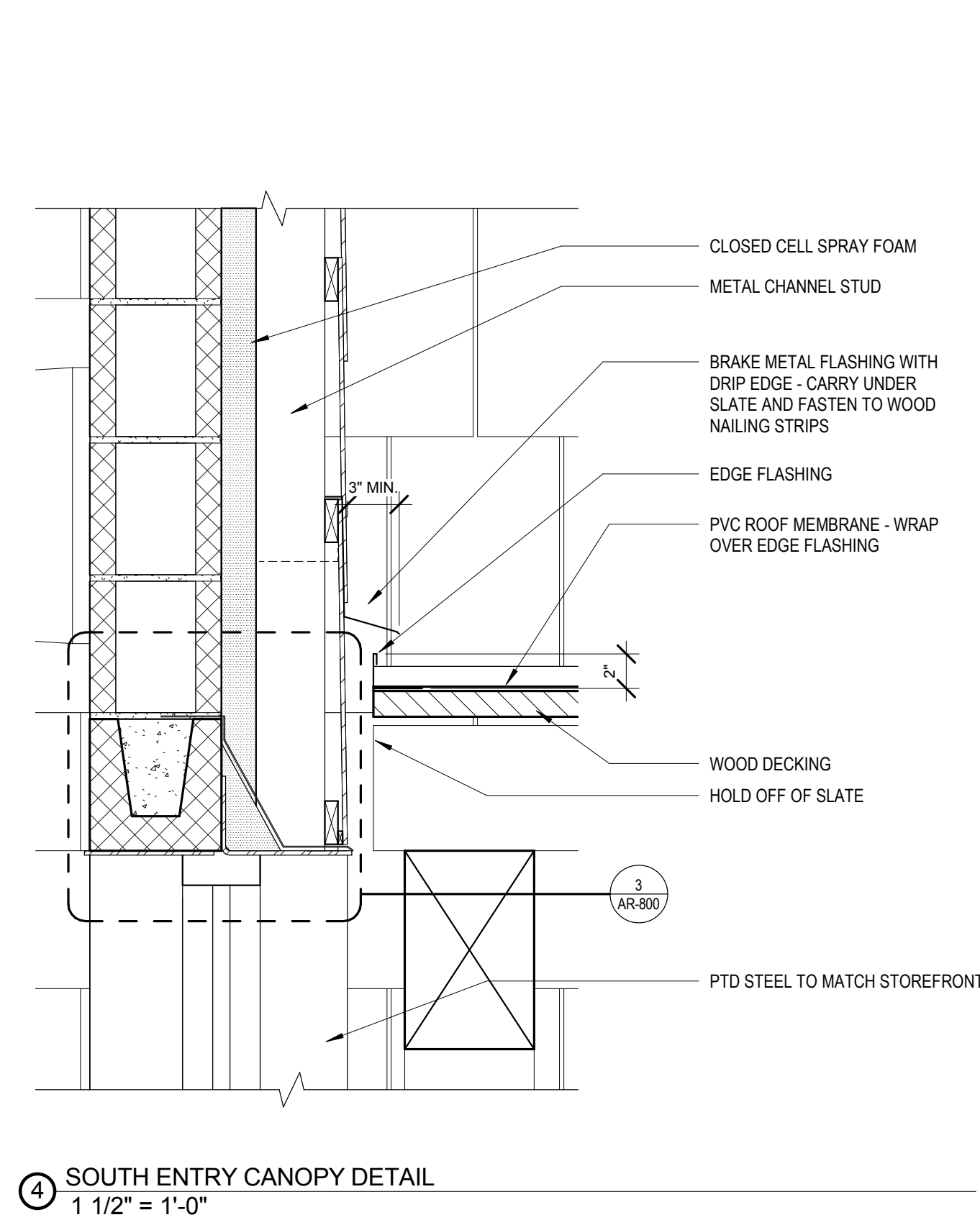
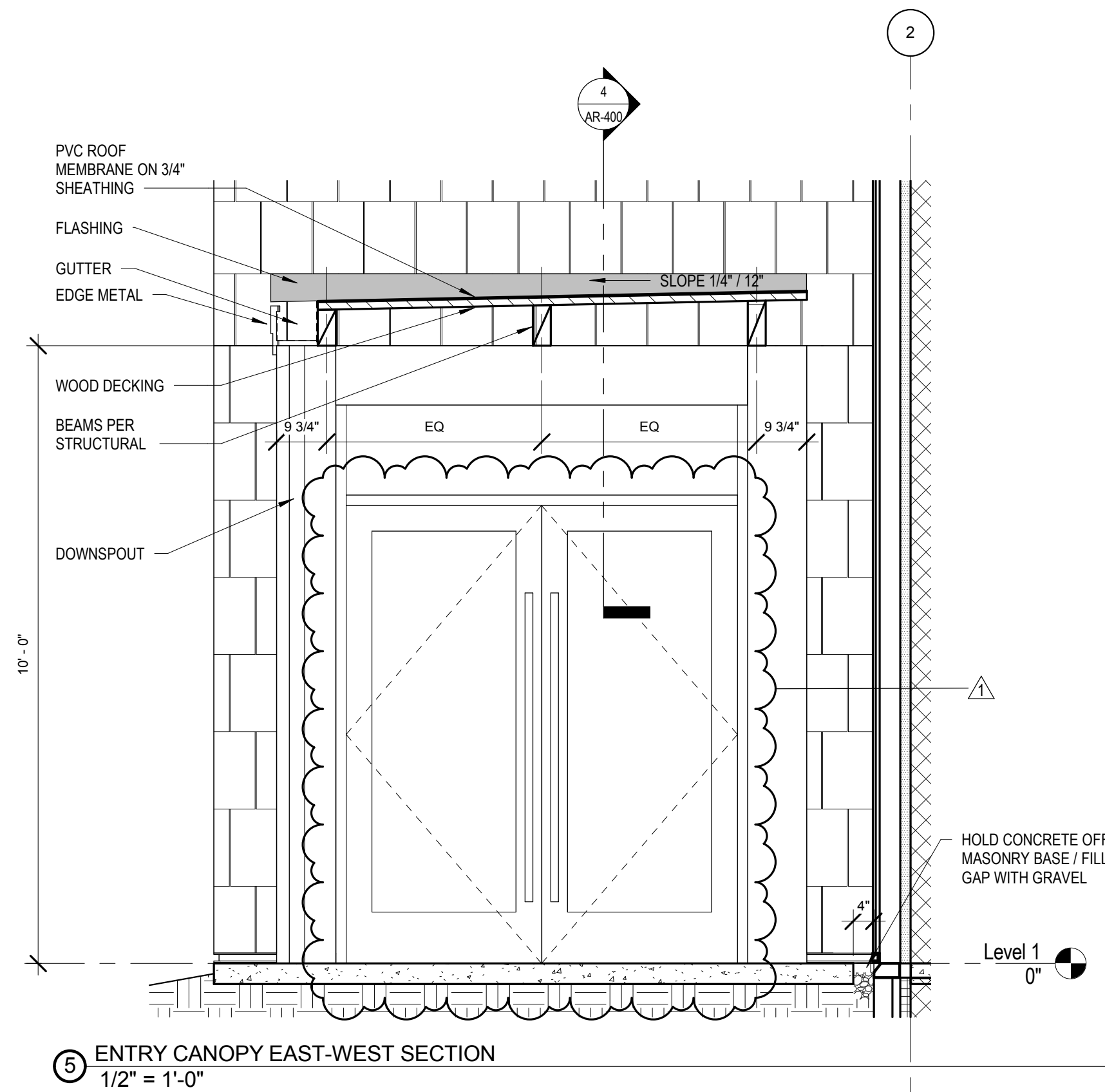
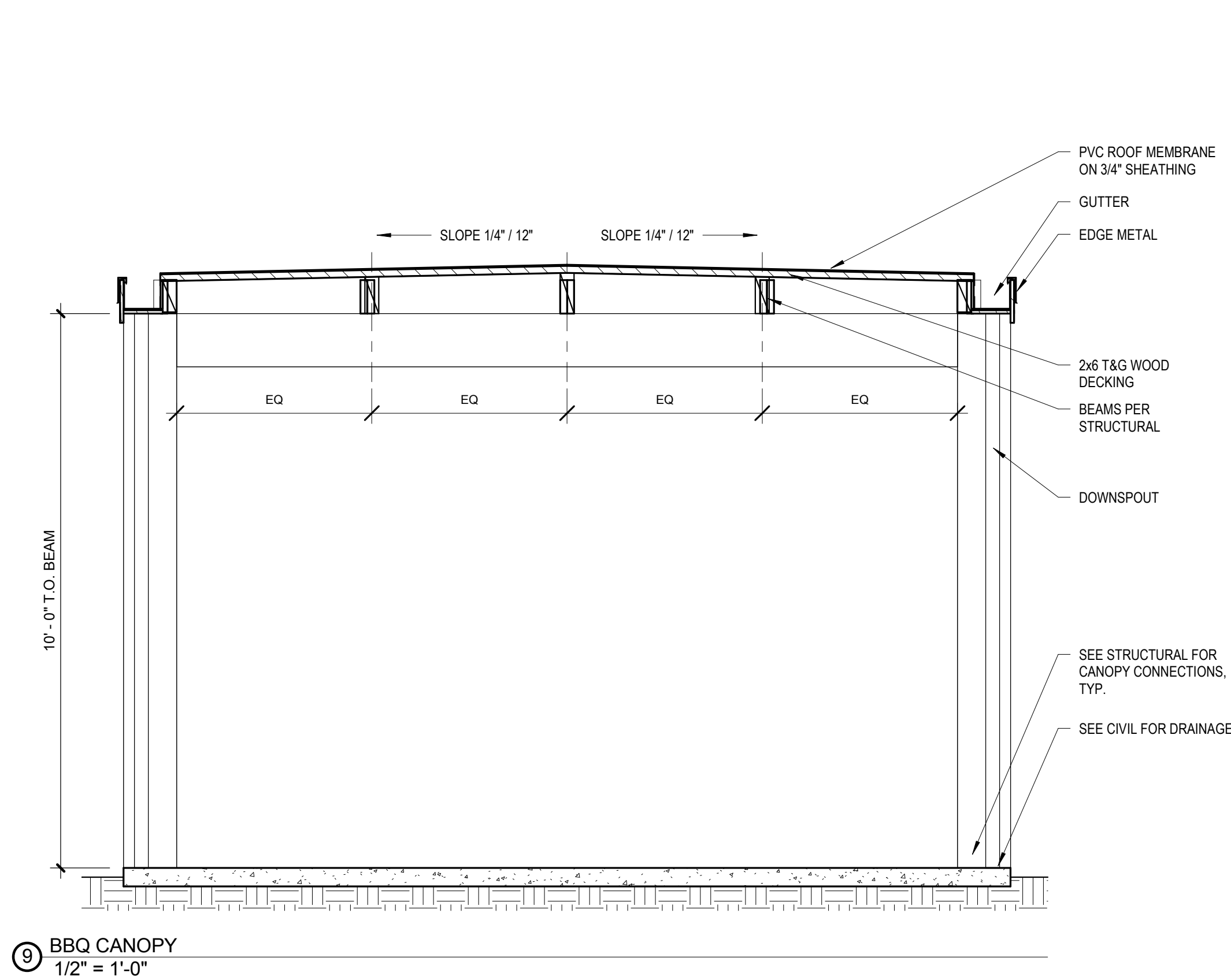
# AR-201



## AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER

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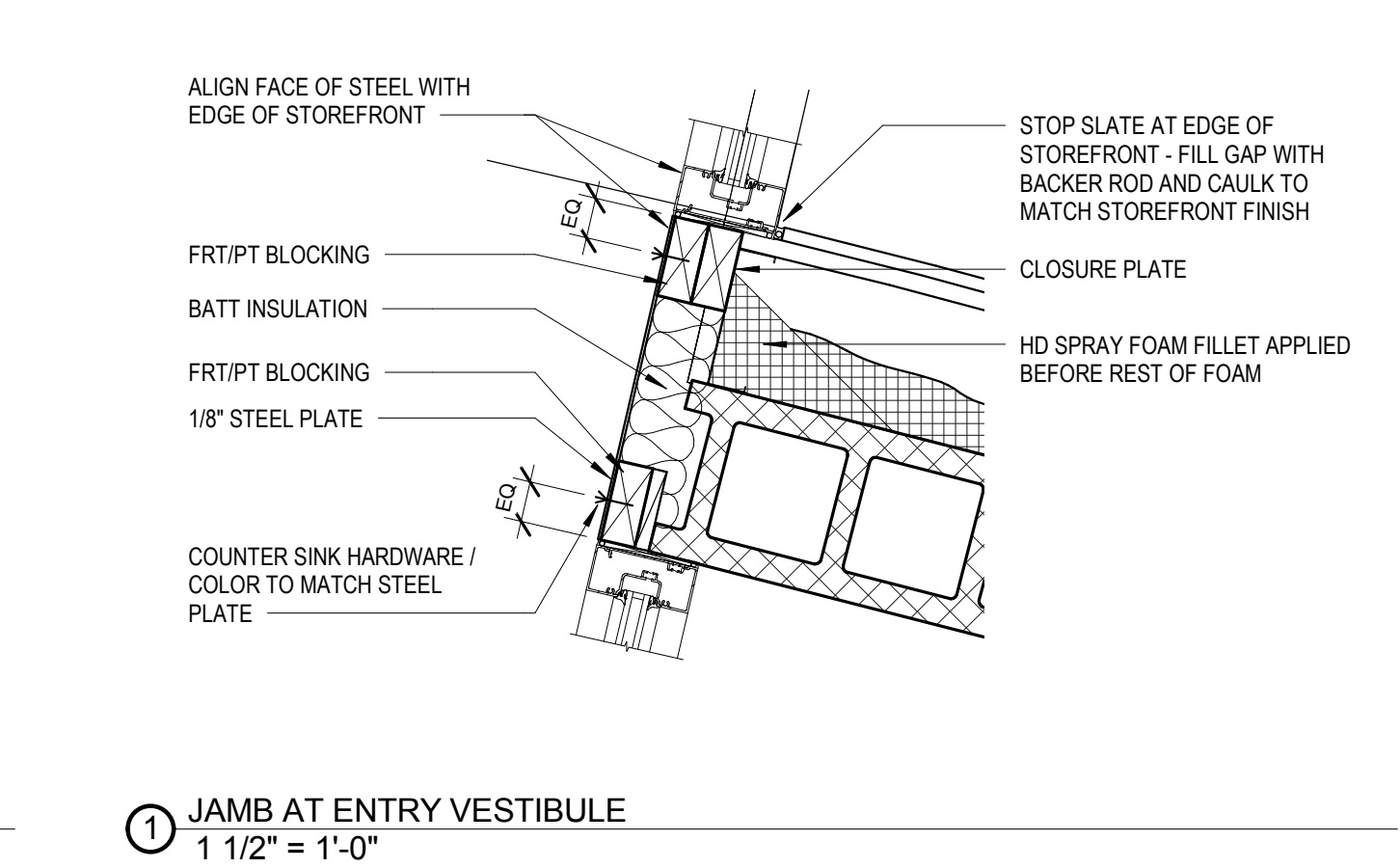
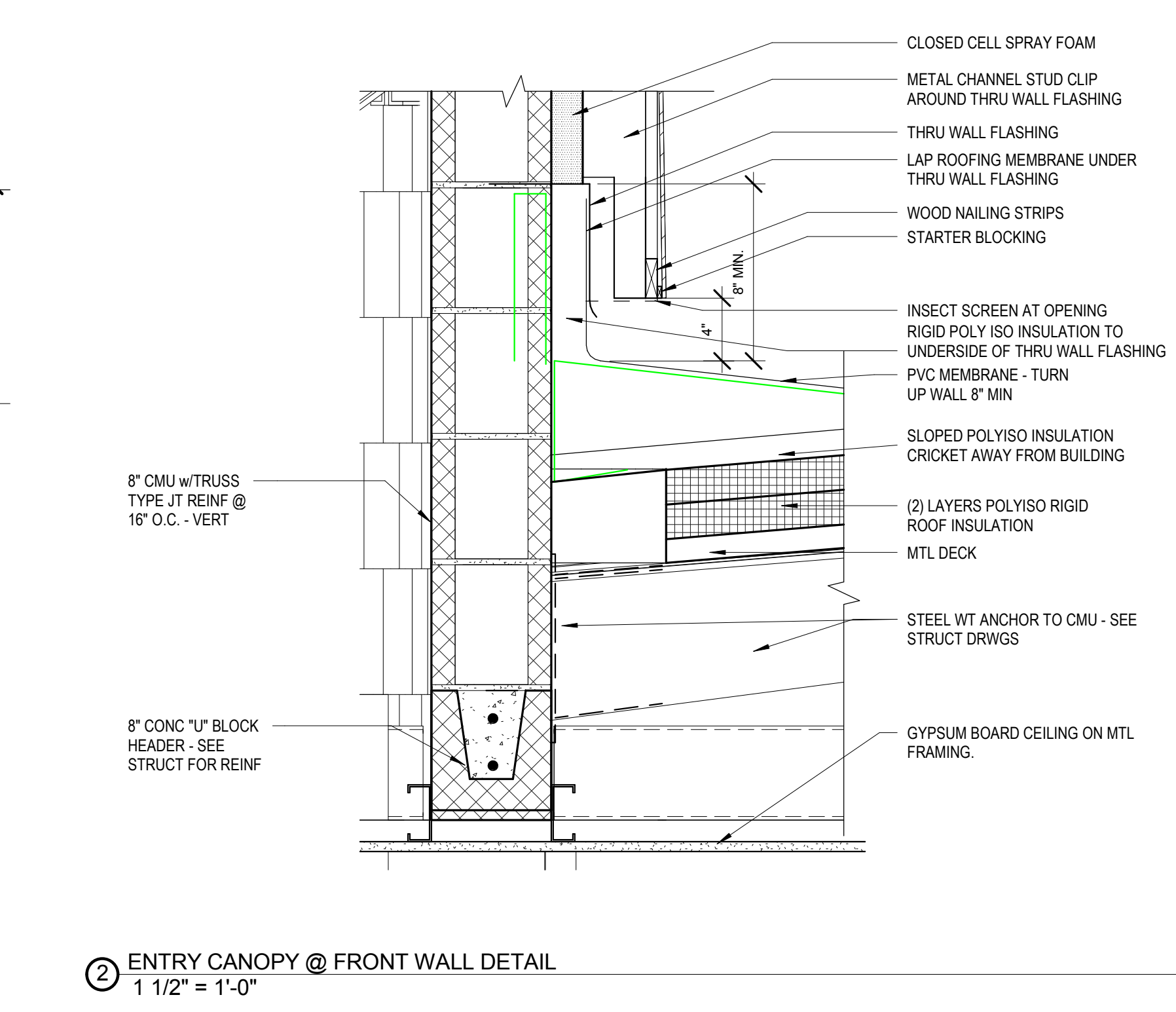
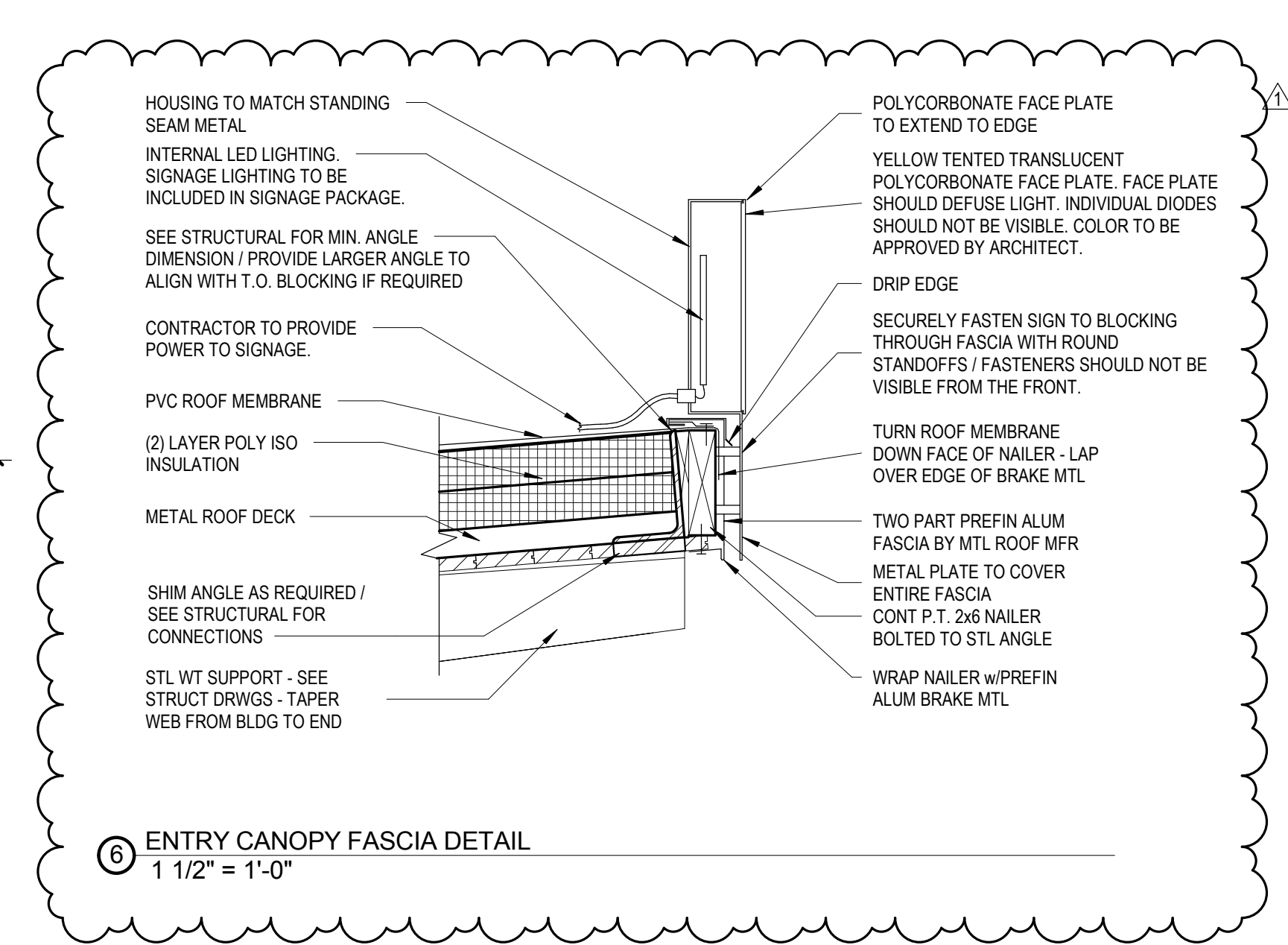
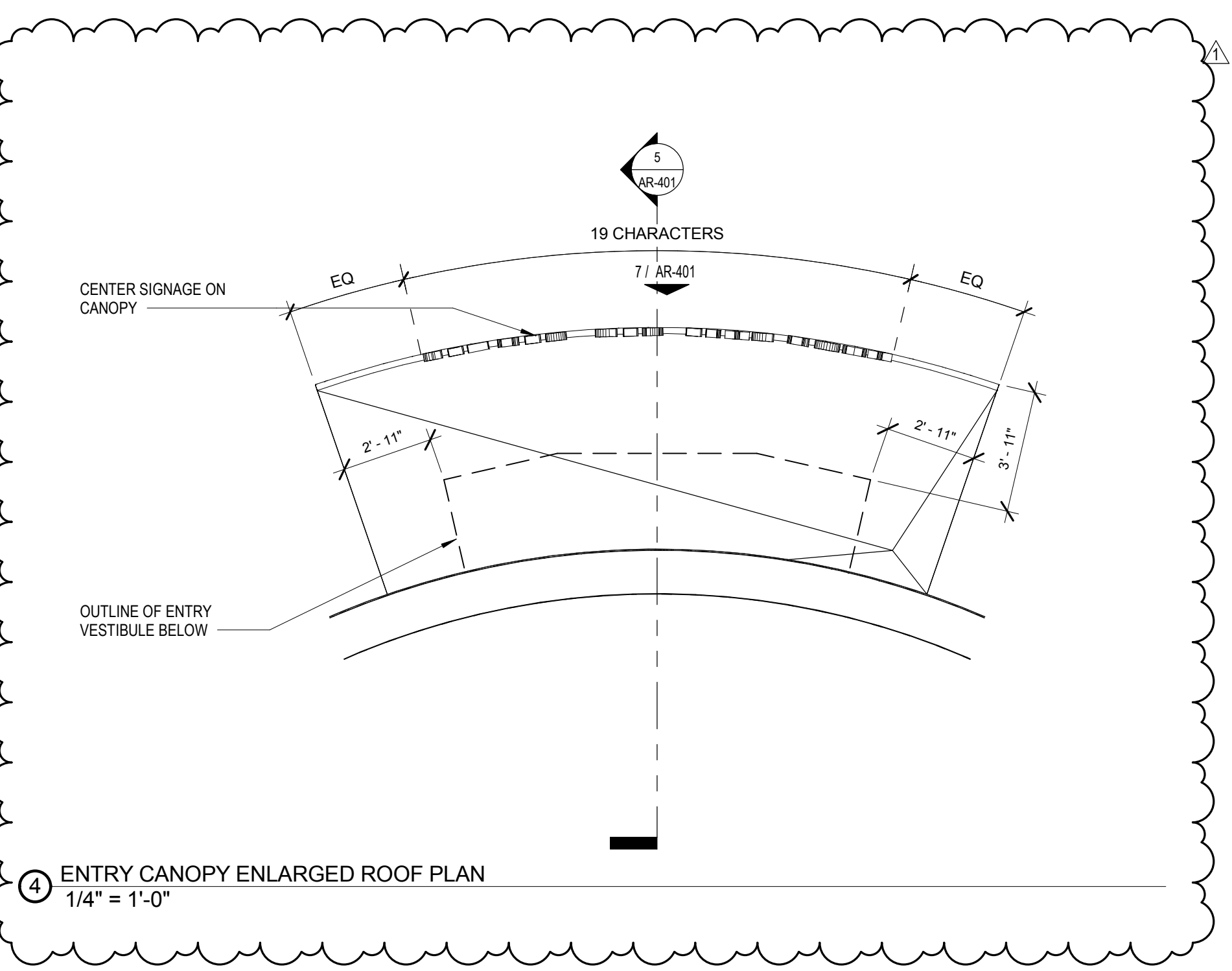
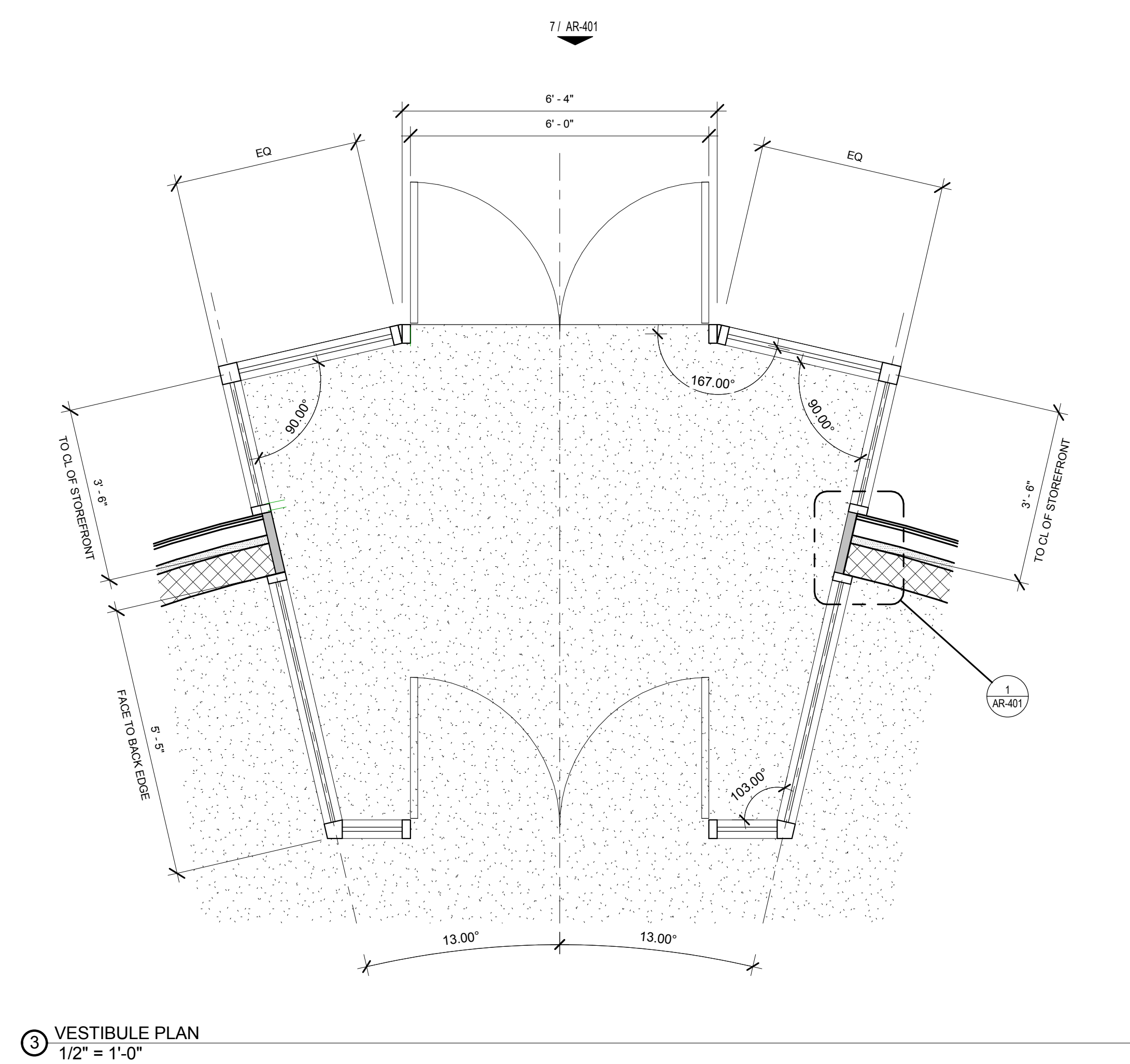
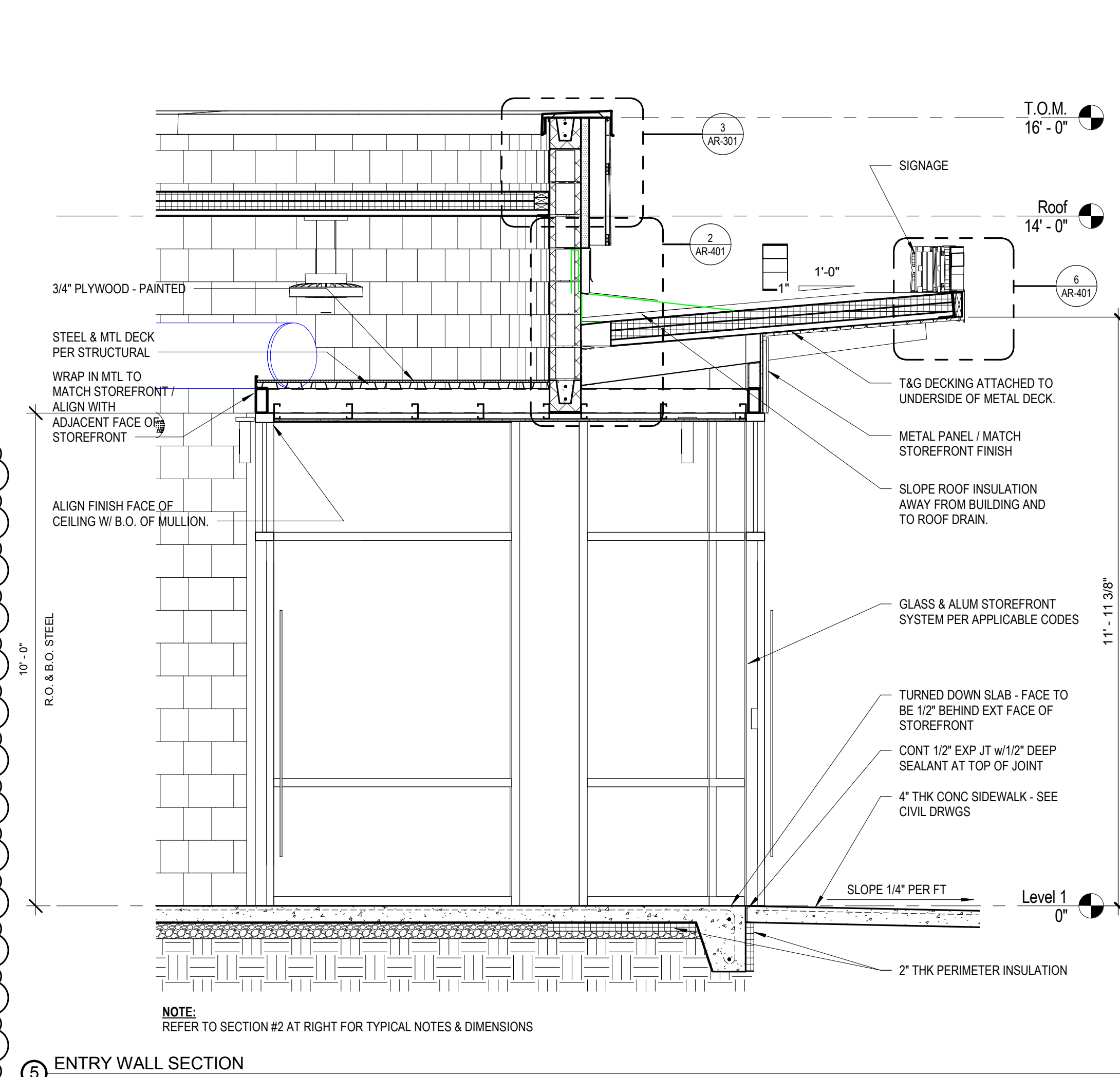
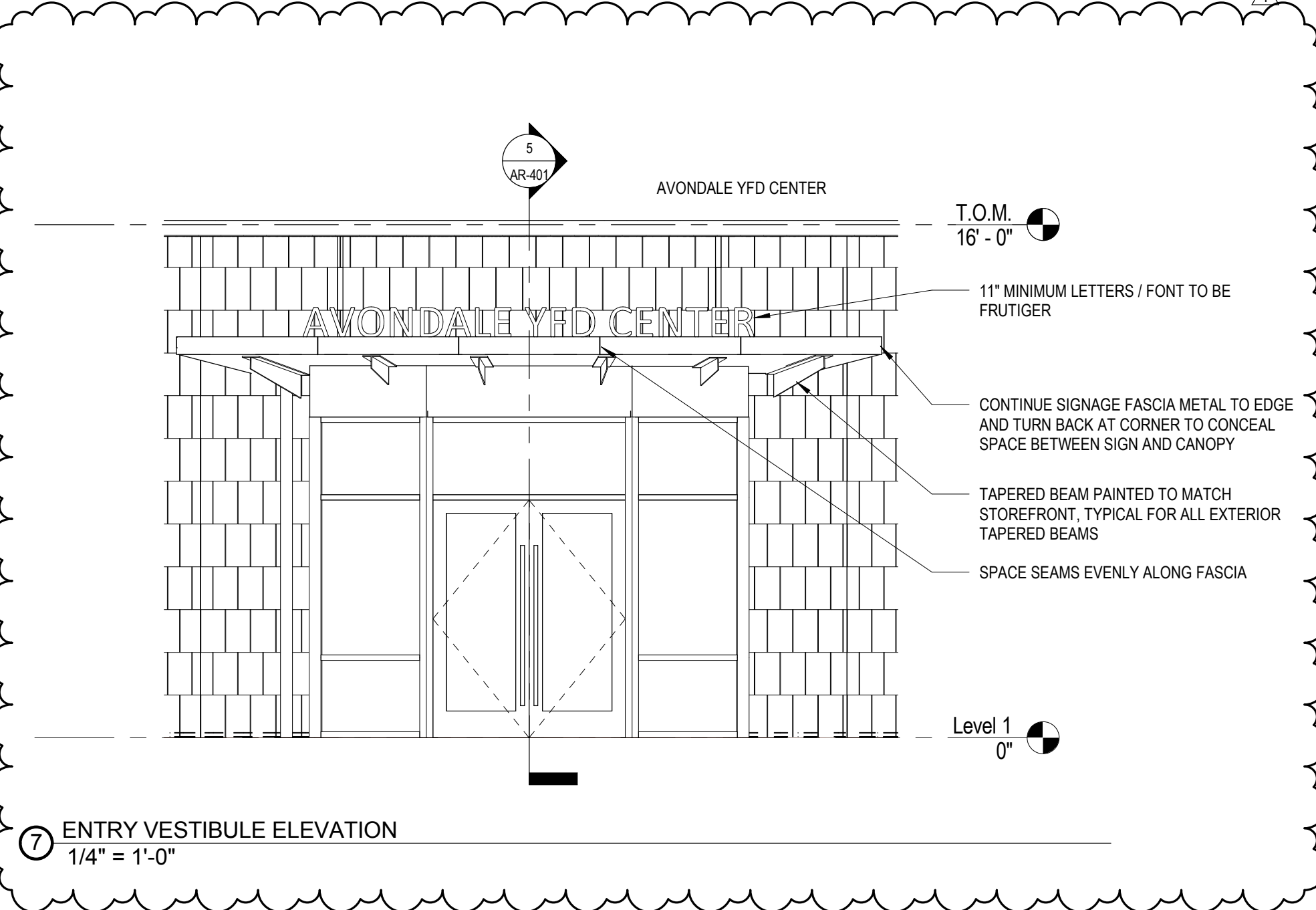


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DRAWN: JMB

## EXTERIOR CANOPY & GUARDRAIL DETAILS AR-400





# HK

HEFFERLIN + KRONENBERG ARCHITECTS  
1216 E Main Street, Suite 120  
Chattanooga, TN 37402  
Tel 423 266 3656 Fax 423 266 3357

## AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER

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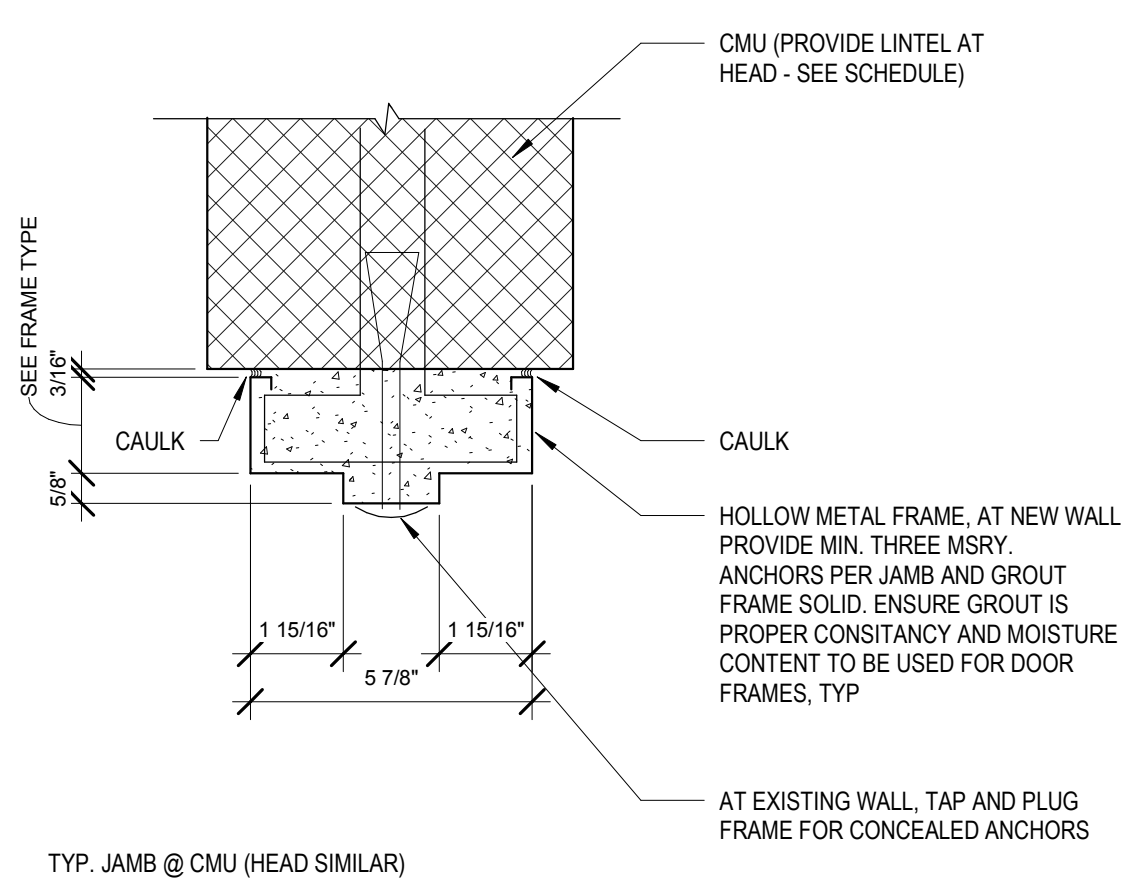
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SCALE: AS INDICATED  
DRAWN: JMB

## ENTRY VESTIBULE DETAILS

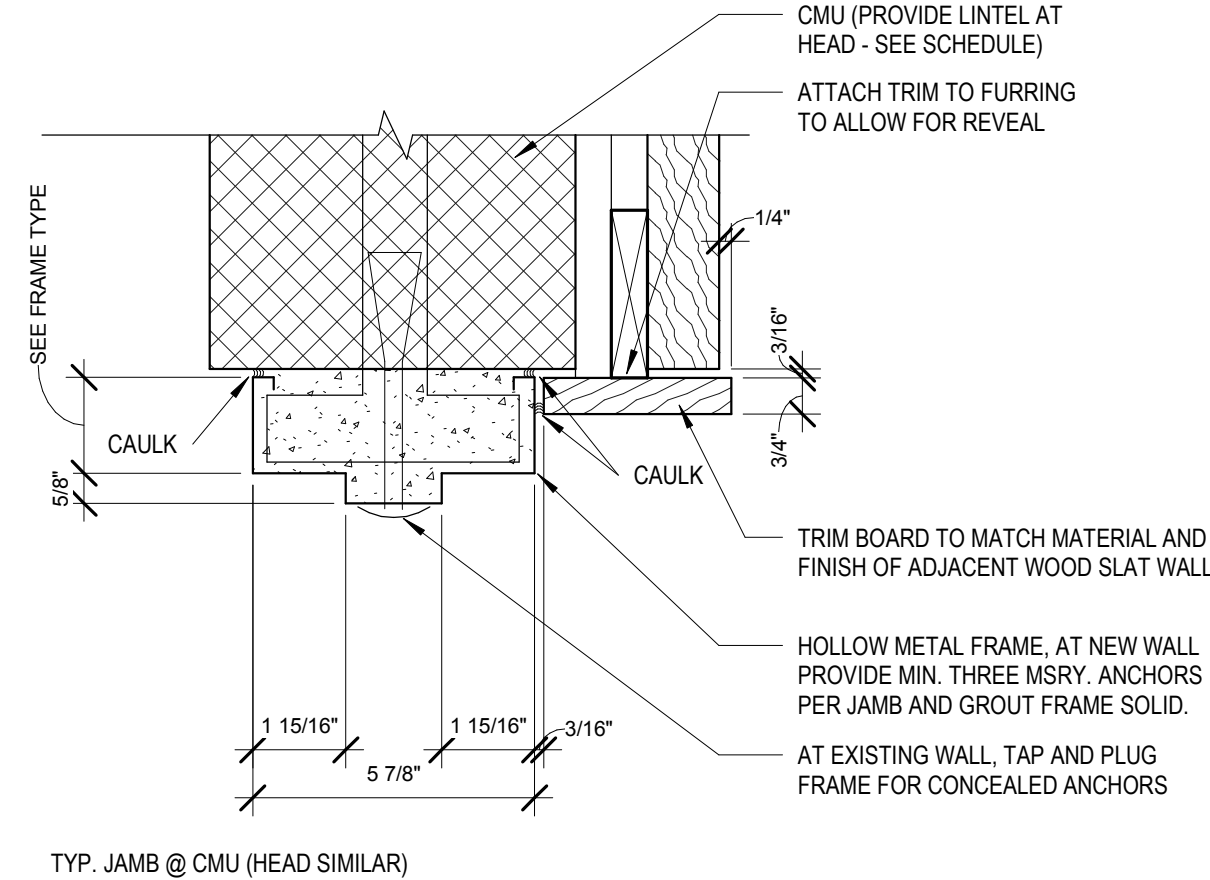
# AR-401





TYP. JAMB @ CMU (HEAD SIMILAR)

2 INTERIOR JAMB/HEAD DETAIL @ CMU  
3" = 1'-0"

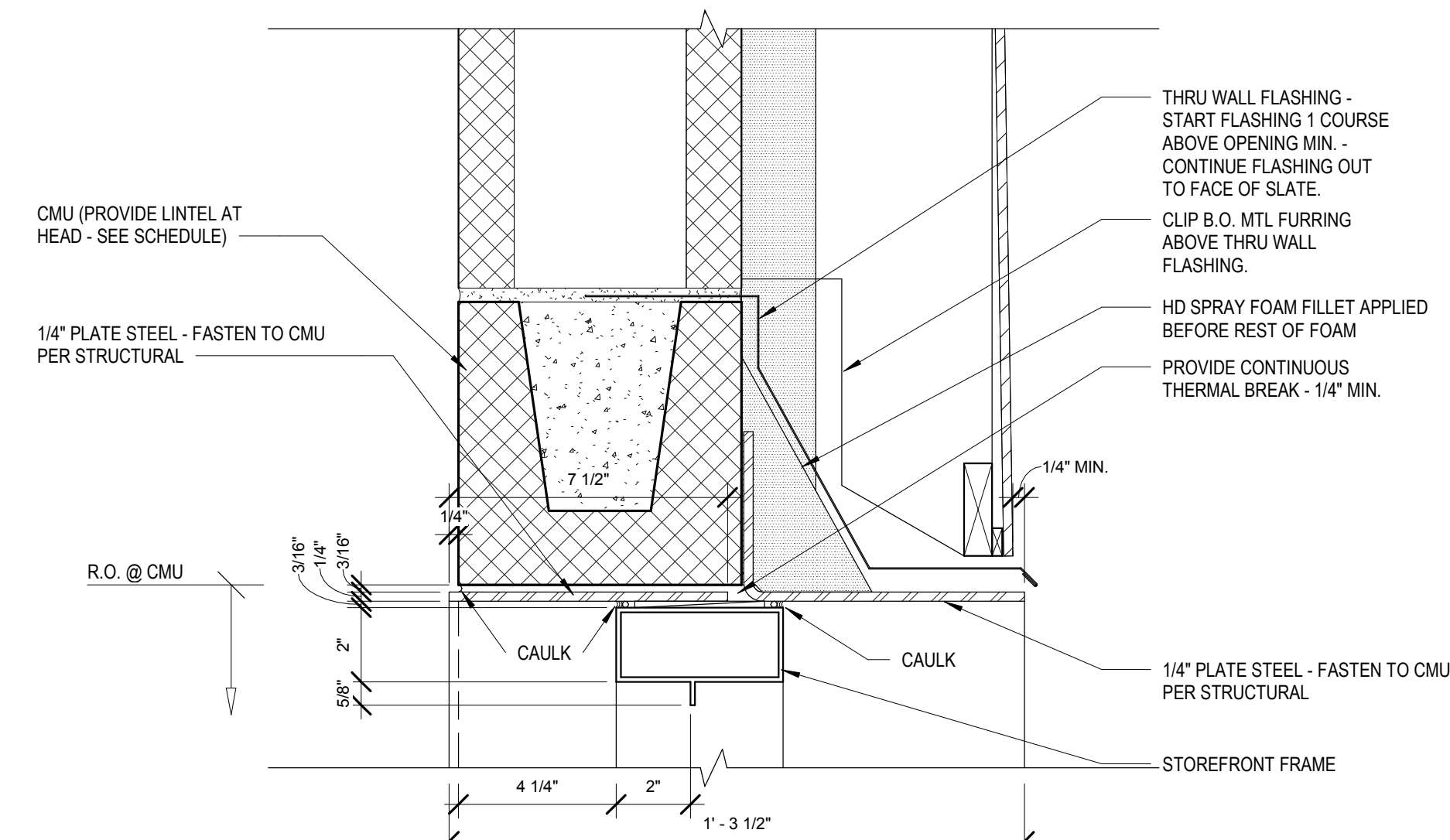


TYP. JAMB @ CMU (HEAD SIMILAR)

5 INTERIOR JAMB/HEAD DETAIL @ MULTIPURPOSE ROOM  
3" = 1'-0"

## INTERIOR

## EXTERIOR

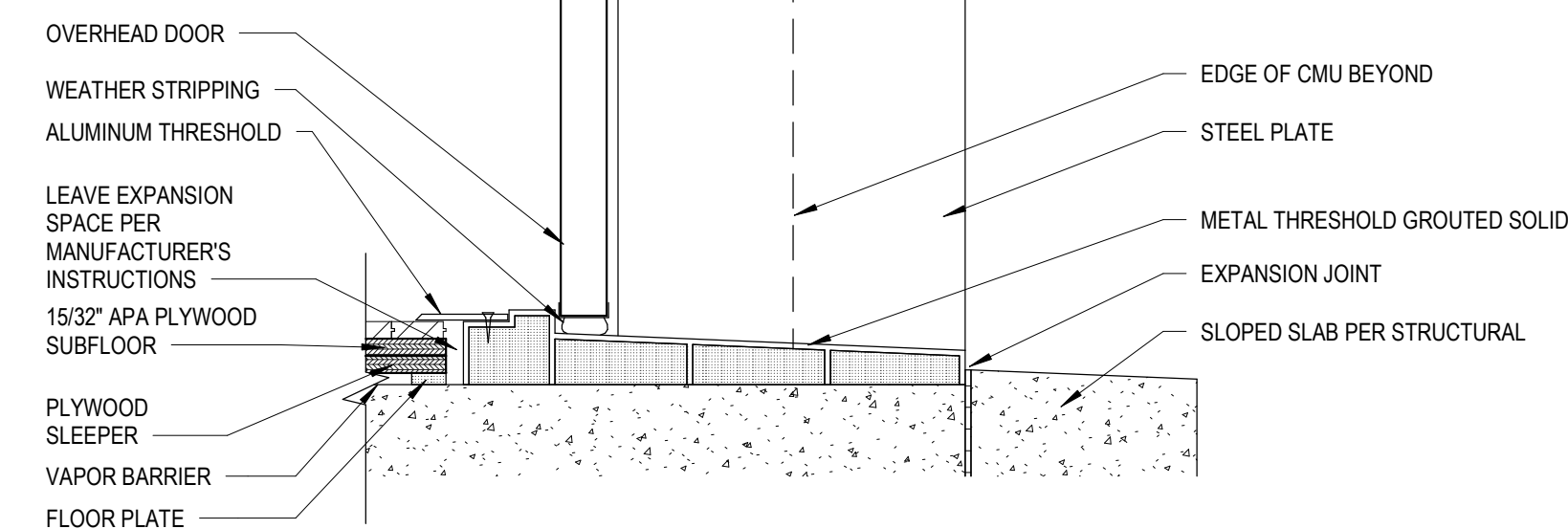


TYP. EXTERIOR HEAD @ CMU (JAMB SIMILAR)

3 EXTERIOR JAMB/HEAD DETAIL  
3" = 1'-0"

## INTERIOR

## EXTERIOR

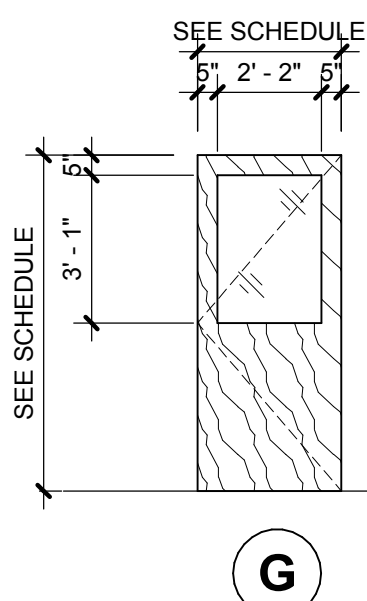
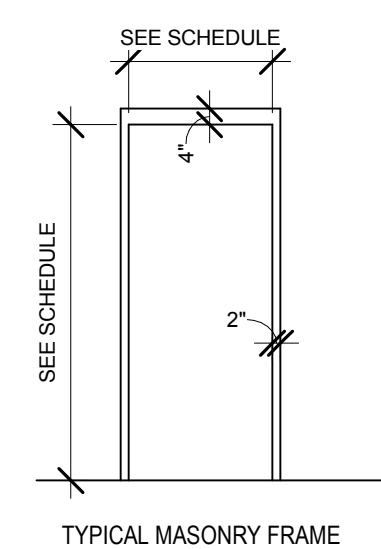


4 GYM OVERHEAD DOOR SILL  
1 1/2" = 1'-0"

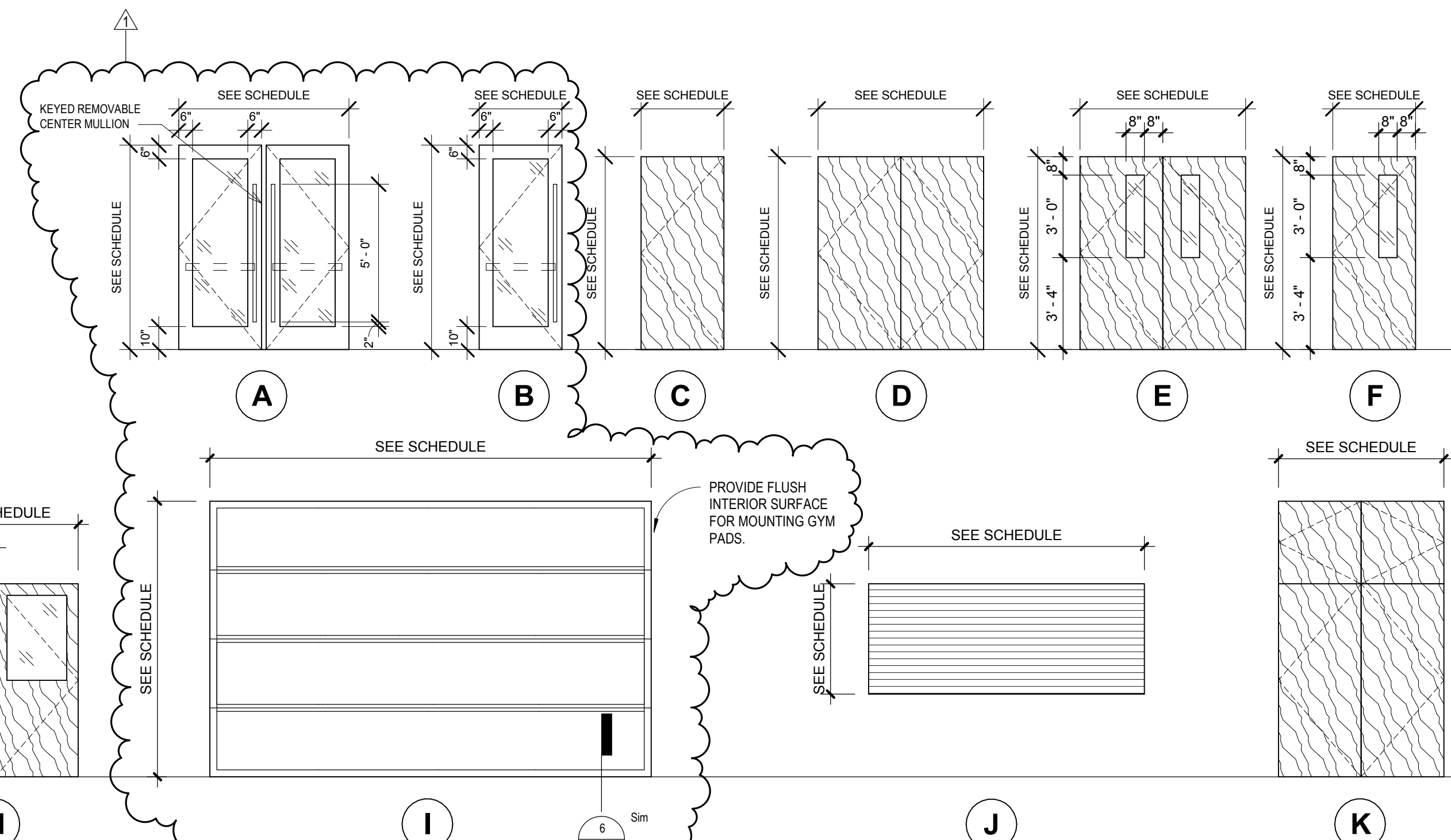
Door Schedule											
WT	Type	Door					Frame		Fire Rating	Hardware	Comments
		Width	Height	Thickness	Material	Finish	Material	Finish			
01A	A	6' - 0"	7' - 5"	2"	ALUM		ALUM			01A	KEYED REMOVABLE MULLION W/ KEY CARD READER
01B	A	6' - 0"	7' - 5"	2"	ALUM		ALUM			01B	KEYED REMOVABLE MULLION
02	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		02	
03	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		02	
04	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		04	KEY CARD READER
05	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		05	KEY CARD READER
06	D	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		06	KEY CARD READER
07A	E	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD	45-MIN	07A	NARROW LITE
07B	F	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD	45-MIN	07B	NARROW LITE
07C	B	3' - 1"	7' - 5"	2"	ALUM		ALUM			07C	
08A	F	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		07B	NARROW LITE
08B	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		08B	
08C	B	3' - 1"	7' - 5"	2"	ALUM		ALUM			08C	KEY CARD READER
09A	F	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		07B	NARROW LITE
09B	B	3' - 1"	7' - 5"	2"	ALUM		ALUM			08C	KEY CARD READER
10A	B	3' - 1"	7' - 5"	2"	ALUM		ALUM			08C	
10B	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD	45-MIN	10B	
11	G	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		04	HALF GLASS W/ KEY CARD READER
12	G	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		04	HALF GLASS W/ KEY CARD READER
13	D	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		13	
14A	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		14A	
14B	J	10' - 0"	4' - 0"	3"	STEEL		-			14B	COUNTER DOOR - PAINT SW 7069 IRON ORE
14C	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		14C	
15A	D	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		15A	
15B	D	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		15A	
15C	D	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		15A	
15D	K	8' - 0"	10' - 0"	1 3/4"	SC-WD	STN	HM	PTD		15D	
15G	K	8' - 0"	10' - 0"	1 3/4"	SC-WD	STN	HM	PTD		15D	
16A	A	6' - 4"	7' - 5"	2"	ALUM		ALUM			01A	KEYED REMOVABLE MULLION
16B	A	6' - 4"	7' - 5"	2"	ALUM		ALUM			01B	KEYED REMOVABLE MULLION
16C	A	6' - 4"	7' - 5"	2"	ALUM		ALUM			01A	KEYED REMOVABLE MULLION
17	D	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		13	
18	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		02	
19	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		02	
20	D	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		06	KEY CARD READER
21A	H	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		15A	HALF GLASS
21B	H	6' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		15A	HALF GLASS
21C	A	6' - 0"	7' - 0"	2"	ALUM		ALUM			21C	FULL GLASS
21D	I	16' - 0"	10' - 0"	1 1/2"	STEEL		-			21D	SECTION DOOR
21E	A	6' - 0"	7' - 0"	2"	ALUM		ALUM			21C	FULL GLASS
22	C	3' - 0"	7' - 0"	1 3/4"	SC-WD	STN	HM	PTD		04	KEY CARD READER

### NOTES:

1. ALARM ALL EXIT ONLY DOORS.
2. BRUSHED STAINLESS STEEL FINISH, TYP.
3. ALL DOORS, FRAMES, AND HARDWARE TO MATCH FIRE RATINGS OF THE WALLS THEY ARE IN.
4. ALL HOLLOW METAL FRAMES TO BE FULLY WELDED. KNOCK DOWN FRAMES ARE NOT ACCEPTABLE.
5. SAFETY GLASS IN ALL DOORS.
6. PROVIDE SAFETY GLASS ADJACENT TO ALL DOORS AND WALK WAYS AS REQUIRED.



1 Door Type Legend  
1/4" = 1'-0"



# HK

HEFFERLIN + KRONENBERG ARCHITECTS  
1216 E Main Street, Suite 120  
Chattanooga, TN 37402  
Tel 423 266 3656 Fax 423 266 3357

## AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER

1305 DODSON AVE, CHATTANOOGA TN 37406

No.	Desc.	Date
1	BID RFI	11.01.2017

## CONSTRUCTION DOCUMENTS



9-6-17  
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DATE: 9/6/17  
JOB#: 16-057  
SCALE: AS INDICATED  
DRAWN: AREY

## DOOR TYPES AND SCHEDULE

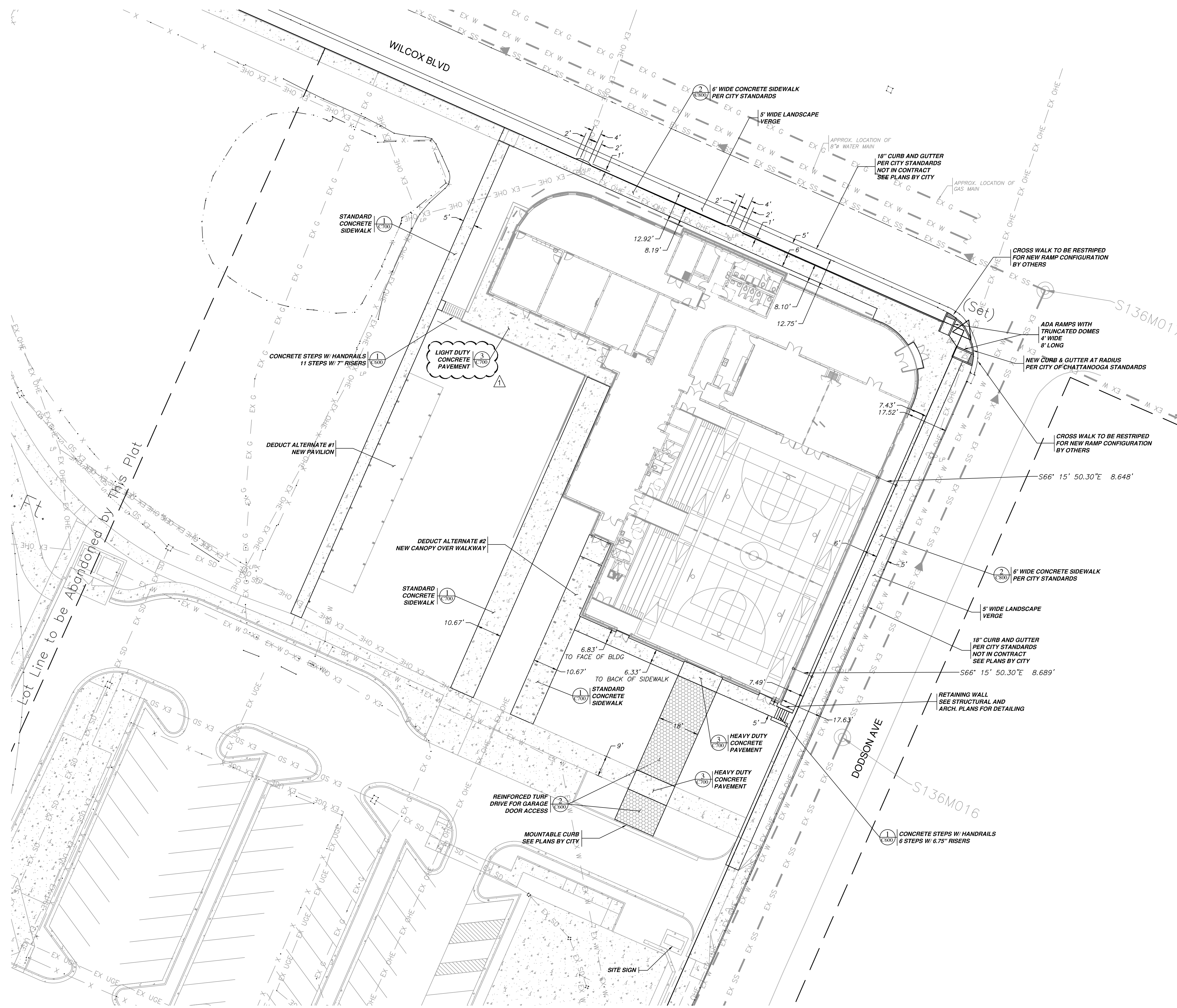
# AR-800



## AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER

1305 DODSON AVE. CHATTANOOGA TN 37408

No. Desc. Date  
1. SITE REVISIONS 11/02/17



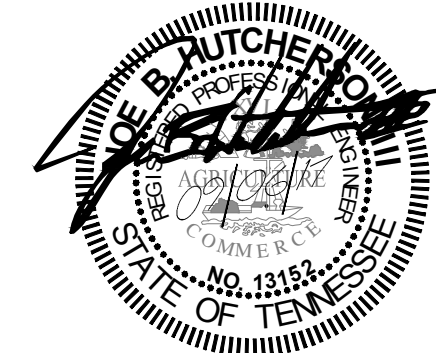
### LEGEND

EX C	Ex. Curb
EX CL	Ex. Centerline
EX F	Ex. Fence
EX W	Ex. Water Line
EX FL	Ex. Fire Line
EX IRR	Ex. Irrigation Line
EX SD	Ex. Storm Drainage Line
EX SS	Ex. Sanitary Sewer Line
EX FM	Ex. Sanitary Sewer Force Main
EX SC	Ex. Swale Centerline
EX D	Ex. Ditch Centerline
EX G	Ex. Gas Line
EX OHE	Ex. Overhead Elect. or Utility Line
EX UGE	Ex. Underground Electrical
EX UGTV	Ex. Underground Cable TV
EX UGFO	Ex. Underground Fiber Optics
EX UGT	Ex. Underground Telephone
---	PROPERTY LINE
---	EASEMENT LINE
---	BUILDING SETBACK LINE
---	LANDSCAPE BUFFER LINE
---	LOT LINE
---	ROW LINE
---	CURB
---	CENTERLINE
---	SPLIT ZONING LINE (w/in PROPERTY)
---	PROP. FENCE LINE
---	PROP. SILT FENCE
---	PROP. LIMITS OF CONSTRUCTION
---	PROPOSED TREE PROTECTION
---	PROPOSED SWALE CENTERLINE
---	PROPOSED DITCH CENTERLINE
---	PROP. WATER LINE
---	PROP. DRY FIRE LINE
---	PROP. FIRE LINE
---	PROP. IRRIGATION LINE
---	PROP. GAS LINE
---	PROP. STORM DRAINAGE LINE
---	PROP. SANITARY SEWER LINE
---	PROP. SANITARY SEWER FORCE MAIN
---	PROP. OVERHEAD ELECT. OR UTILITY LINE
---	PROP. UNDERGROUND ELECTRICAL
---	PROP. UNDERGROUND CABLE TV
---	PROP. UNDERGROUND FIBER OPTICS
---	PROP. UNDERGROUND TELEPHONE

### SITE INFORMATION

PROJECT AREA: 1.30 ACRES  
SITE IS ZONED: UOC  
LAND DISTURBANCE AREA: 1.30+ ACRES  
TAX MAP PARCEL #: 136M C 002  
BUILDING HEIGHT: ONE STORY BLDG.  
BUILDING TYPE: YOUTH CENTER  
STREET ADDRESS: 1305 DODSON AVENUE  
SANITARY SEWER AVAILABILITY: EX. PUBLIC SEWER MAIN LOCATED IN WILCOX BLVD  
POTABLE WATER EX. PUBLIC WATER MAIN LOCATED IN SUPPLY AVAILABILITY: DODSON AVENUE  
STORM DRAINAGE: STORM DRAINAGE WILL DISCHARGE INTO AN EXISTING STORM SYSTEM WITHIN THE PROPERTY  
FLOODZONE: PORTIONS OF THE PROPERTY ARE LOCATED IN FLOOD ZONE "X" AS SCALED FROM THE FIRM MAP COMMUNITY-PANEL NUMBER #10002420, MAP REVISED 02/03/16.  
PROPERTY OWNER: CITY OF CHATTANOOGA

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DATE: 09/06/17  
JOB#: 16-057  
SCALE: AS INDICATED  
DRAWN: MBH

Site Staking

C-100

20' 0 20' 40'

Scale 1" = 20'

MAA CIVIL CONTACT: MICHAEL B. HUTCHERSON, PE  
DIRECT LINE: 423-664-1484



310 Dodds Ave.  
P.O. Box 3689  
Chattanooga, Tennessee 37404  
PH: (423)698-6675  
MAA #: 17041





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Chattanooga TN 37402  
Tel 423 266 3656 Fax 423 266 3357

## AVONDALE YOUTH AND FAMILY DEVELOPMENT CENTER

1305 DODSON AVE. CHATTANOOGA TN 37406

No. Desc. Date  
1. SITE REVISIONS 11/02/17

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DATE: 09/06/17  
JOB#: 16-057  
SCALE: AS INDICATED  
DRAWN: MBH

### Site Grading

# C-401

REVISION #1 NOTE: ELEVATION LABELS WERE ADDED TO THE EXISTING CONTOURS.

### LEGEND

EX C	Ex. Curb
EX CL	Ex. Centerline
EX F	Ex. Fence
EX W	Ex. Water Line
EX FL	Ex. Fire Line
EX IRR	Ex. Irrigation Line
EX SD	Ex. Storm Drainage Line
EX SS	Ex. Sanitary Sewer Line
EX FM	Ex. Sanitary Sewer Force Main
EX SC	Ex. Swale Centerline
EX D	Ex. Ditch Centerline
EX G	Ex. Gas Line
EX OHE	Ex. Overhead Elect. or Utility Line
EX UGE	Ex. Underground Electrical
EX UGTV	Ex. Underground Cable TV
EX UGFO	Ex. Underground Fiber Optics
EX UGT	Ex. Underground Telephone
---	PROPERTY LINE
---	EASEMENT LINE
---	BUILDING SETBACK LINE
---	LANDSCAPE BUFFER LINE
---	LOT LINE
---	ROW LINE
---	CURB
---	CENTERLINE
---	SPLIT ZONING LINE (w/in PROPERTY)
---	PROP. FENCE LINE
SF	PROP. SILT FENCE
LOC	PROP. LIMITS OF CONSTRUCTION
TF	PROPOSED TREE PROTECTION
---	PROPOSED SWALE CENTERLINE
---	PROPOSED DITCH CENTERLINE
---	PROP. WATER LINE
DFL	PROP. DRY FIRE LINE
FL	PROP. FIRE LINE
IRR	PROP. IRRIGATION LINE
G	PROP. GAS LINE
SD	PROP. STORM DRAINAGE LINE
SS	PROP. SANITARY SEWER LINE
FM	PROP. SANITARY SEWER FORCE MAIN
OHE	PROP. OVERHEAD ELECT. OR UTILITY LINE
UGE	PROP. UNDERGROUND ELECTRICAL
UGTV	PROP. UNDERGROUND CABLE TV
UGFO	PROP. UNDERGROUND FIBER OPTICS
UGT	PROP. UNDERGROUND TELEPHONE

ABBREVIATIONS  
SSE - NEW PUBLIC SANITARY SEWER EASEMENT (SEE PLAN FOR WIDTH).  
DE - NEW DRAINAGE EASEMENT (SEE PLAN FOR WIDTH).  
WE - NEW PUBLIC WATER EASEMENT (SEE PLAN FOR WIDTH).  
L/A BUTTER - NEW LANDSCAPE BUTTER (SEE PLAN FOR WIDTH AND TYPE).  
FYSB - FRONT YARD SETBACK  
SYSB - SIDE YARD SETBACK  
RYSB - REAR YARD SETBACK  
FFE - FINISHED FLOOR ELEVATION  
TWE - FINISH GRADE AT TOP OF RETAINING WALL  
BWE - FINISHED GROUND GRADE AT BOTTOM OF RETAINING WALL (GRASS GRADE)  
SDCO / SSICO - STORM DRAINAGE / SANITARY SEWER CLEAN-OUT  
DS - ROOF DOWNSPOUT CONNECTION

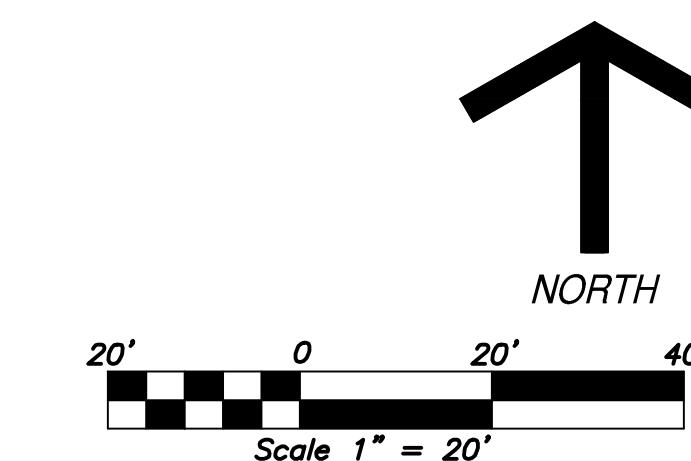
SITE INFORMATION:  
PROJECT AREA: 1.30 ACRES  
SITE IS ZONED: UOC  
LAND DISTURBANCE AREA: 1.30+ ACRES  
TAX MAP PARCEL #: 136M C 002  
  
BUILDING HEIGHT: ONE STORY BLDG.  
BUILDING TYPE: YOUTH CENTER  
  
STREET ADDRESS: 1305 DODSON AVENUE  
  
SANITARY SEWER AVAILABILITY: EX. PUBLIC SEWER MAIN LOCATED IN WILCOX BLVD.  
  
POTABLE WATER EX. PUBLIC WATER MAIN LOCATED IN SUPPLY AVAILABILITY: DODSON AVENUE  
  
STORM DRAINAGE: STORM DRAINAGE WILL DISCHARGE INTO AN EXISTING STORM SYSTEM WITHIN THE PROPERTY  
  
FLOODZONE: PORTIONS OF THE PROPERTY ARE LOCATED IN FLOOD ZONE "X" AS SCALED FROM THE FIRM MAP COMMUNITY-PANEL NUMBER #100024420, MAP REVISED 02/15/16.  
  
PROPERTY OWNER: CITY OF CHATTANOOGA

PRIOR TO FINAL ACCEPTANCE BY THE CITY ENGINEER AND/OR ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY, THE OWNER OR OWNER'S AGENT SHALL:

- SUBMIT AN INVENTORY OF THE CONSTRUCTED STORMWATER DRAINAGE SYSTEM, WHETHER PUBLIC OR PRIVATE, TO THE CITY OF CHATTANOOGA IN ELECTRONIC FORMAT. ELECTRONIC AS-BUILT DRAWINGS SHALL BE SUBMITTED IN AUTOCAD AND PDF FORMAT AND SHALL SHOW PLAINLY THE APPROVED AND CONSTRUCTED LAYOUT OF THE STORMWATER SYSTEMS. THE AS-BUILT DRAWING SHALL INCLUDE ALL STORMWATER FEATURES, WHETHER NEW OR EXISTING, INCLUDING THE OUTFALL TO THE CITY DRAINAGE SYSTEM (EX. CATCH BASINS, CONDUITS, HYDROLOGIC FEATURES INCLUDING PONDS, STREAMS, CULVERT INLETS AND OUTFALLS, AND ALL PERVIOUS SURFACES, ETC.).
- COMPLY WITH ALL PERMANENT LANDSCAPING REQUIREMENTS AND SCHEDULE A LANDSCAPE INSPECTION WITH KARNA LEVITT, THE CITY'S LANDSCAPE ARCHITECT. MS. LEVITT CAN BE REACHED AT 423.643.5885.
- ALL EROSION AND SEDIMENT CONTROL PRACTICES MUST COMPLY WITH THE CURRENT EDITION OF THE TN EROSION & SEDIMENT CONTROL MANUAL, THE CITY OF CHATTANOOGA BMP MANUAL, AND THE TDEC CONSTRUCTION GENERAL PERMIT (IF APPLICABLE).

### NOTES

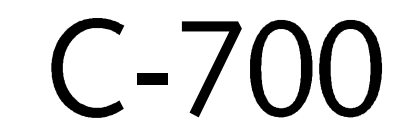
- SEE SHEET C0.1 FOR GENERAL AND GRADING AND DRAINAGE NOTES.
- CROSS SLOPES OF SIDEWALKS NOT TO EXCEED 2.00% SLOPE.
- ANY EXCAVATED SLOPE 3:1 OR STEEPER IS TO BE STABILIZED WITHIN 7 DAYS.
- CONTRACTOR SHALL NOTIFY SURVEYOR AND CITY STORM WATER INSPECTOR AT LEAST 48 HOURS PRIOR TO ANY COVER PLACED ON UNDERGROUND SYSTEMS.
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING A STORM WATER AS-BUILT AT THE CLOSE OUT OF PROJECT. AS-BUILT DRAWINGS SHALL BE ACCOMPANIED BY AS-BUILT PHOTOGRAPHS MADE DURING THE SURVEY/INSPECTION. MARCH ADAMS & ASSOCIATES CAN HELP PROVIDE THESE PHOTOGRAPHS, PROVIDED THAT 72 HOUR NOTICE IS PROVIDED BY THE CONTRACTOR.



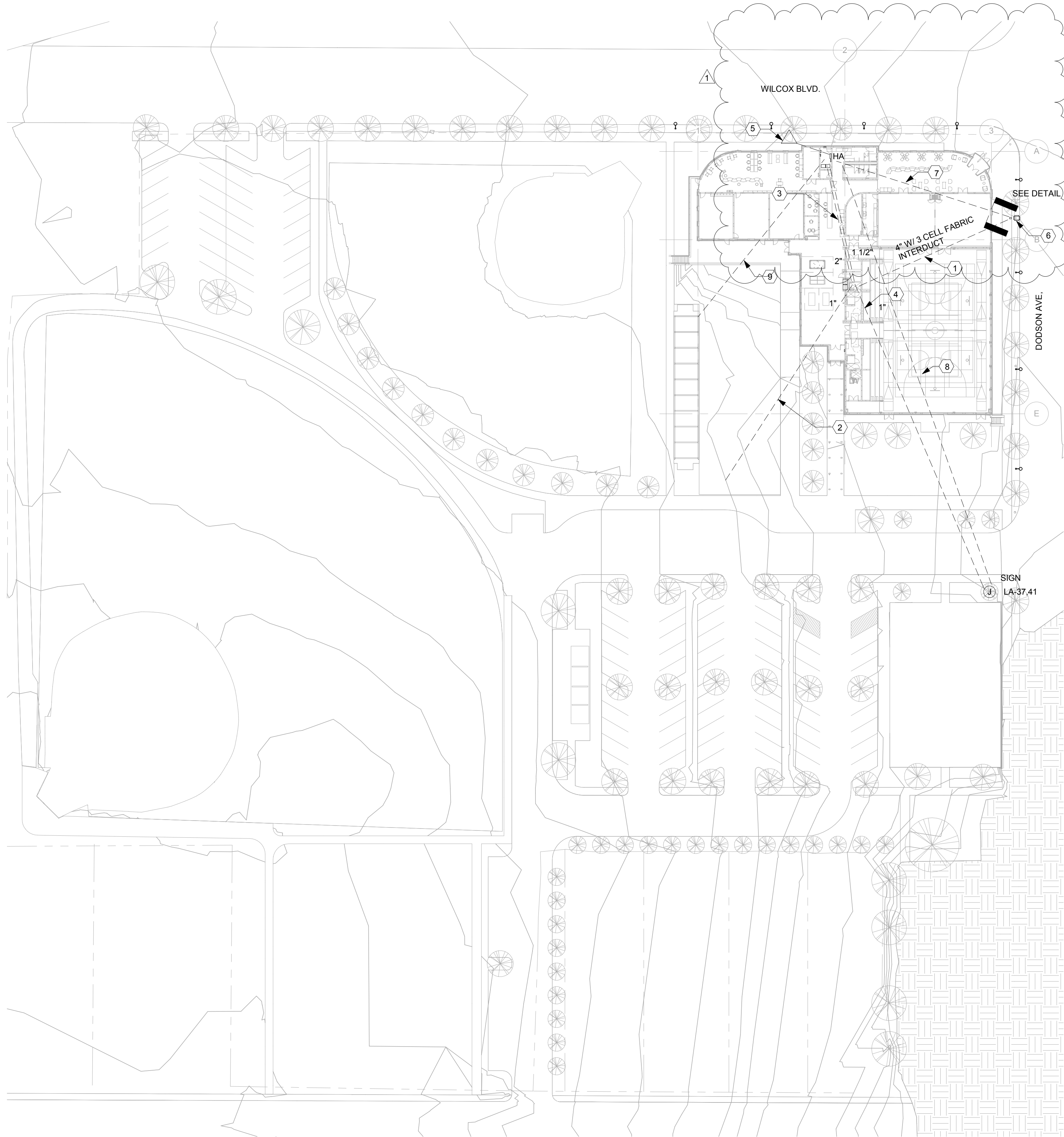
MAA CIVIL CONTACT: MICHAEL B. HUTCHERSON, PE  
DIRECT LINE: 423-664-1484

**MAA** March Adams & Associates  
Consulting Engineers  
310 Dodds Ave.  
P.O. Box 3689  
Chattanooga, Tennessee 37404  
PH: (423)698-6675  
MAA #: 17041









# ELECTRICAL KEY NOTES:

1. COORDINATE EXACT EXTERIOR LOCATION WITH DATA/COMMUNICATIONS UTILITY LV CONTRACTOR.
2. PROVIDE 1" EMPTY CONDUIT W/ PULLSTRING/STUB FROM DATA ROOM TO EDGE OF PROJECT FOR FUTURE EXTENSION BY CONCESSION STAND PROJECT.
3. PROVIDE 2" EMPTY CONDUIT W/PULLSTRING TO ELECTRICAL ROOM FROM DATA ROOM AND 1 1/2" EMPTY CONDUIT W/ PULLSTRING TO LIGHTING CONTROL PANEL..
4. PROVIDE 1" EMPTY CONDUIT W/ PULLSTRING FROM DATA ROOM TO SIGN FOR LV CABLE. COORDINATE EXACT LOCATION WITH SIGN CONTRACTOR.
5. PROVIDE GROUND TRIAD NEAR ELECTRICAL ROOM. ANY OR ALL PORTIONS OF TRIAD CAN EXTEND UNDER CONCRETE AS LONG AS, CONCRETE IS NOT SEALED TO PREVENT WATER PENETRATION AND VAPOR BARRIER IS NOT USED.
6. POLE MOUNTED TRANSFORMER PROVIDED BY UTILITY. COORDINATE EXACT LOCATION AND RACEWAY REQUIREMENTS FROM HAND HOLE TO TRANSFORMER WITH POWER UTILITY.
7. SEE SINGLE LINE DIAGRAM FOR UNDERGROUND DUCT BANK REQUIREMENTS.
8. PROVIDE 3/4" CONDUIT UNDERGROUND WITH 2) 120V ELECTRICAL CIRCUITS AS SHOWN ON THIS DRAWING FROM PANELBOARD TO SIGN.
9. PROVIDE 4#10, 1#10G-3/4"C (SWITCH LEG FROM LCP W/ NEUTRAL, AND SWITCH LEG FROM INVERTOR W/NEUTRAL).

1  
E-100  
ELECTRICAL - SITE PLAN  
1" = 40'-0"



20' 40' 80'

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Tel 423 266 3656 Fax 423 266 3357

AVONDALE  
YOUTH AND  
FAMILY  
DEVELOPMENT  
CENTER

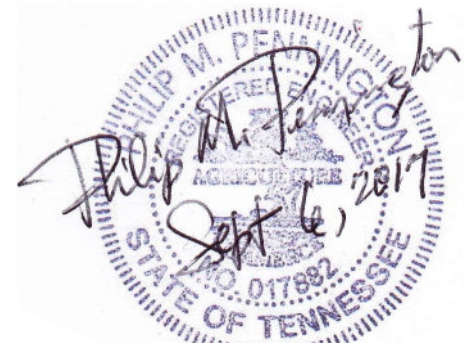
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CHATTANOOGA, TN 37406

**SKING**  
Associates, Inc.  
ENGINEERS • PLANNERS • MANAGERS

270 Peachtree Street, N.W.  
Suite 1600  
Atlanta, GA 30303  
(M) 404.524.5800  
(F) 404.584.1799  
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No.	Desc.	Date
1	Revision 1	10/31/2017

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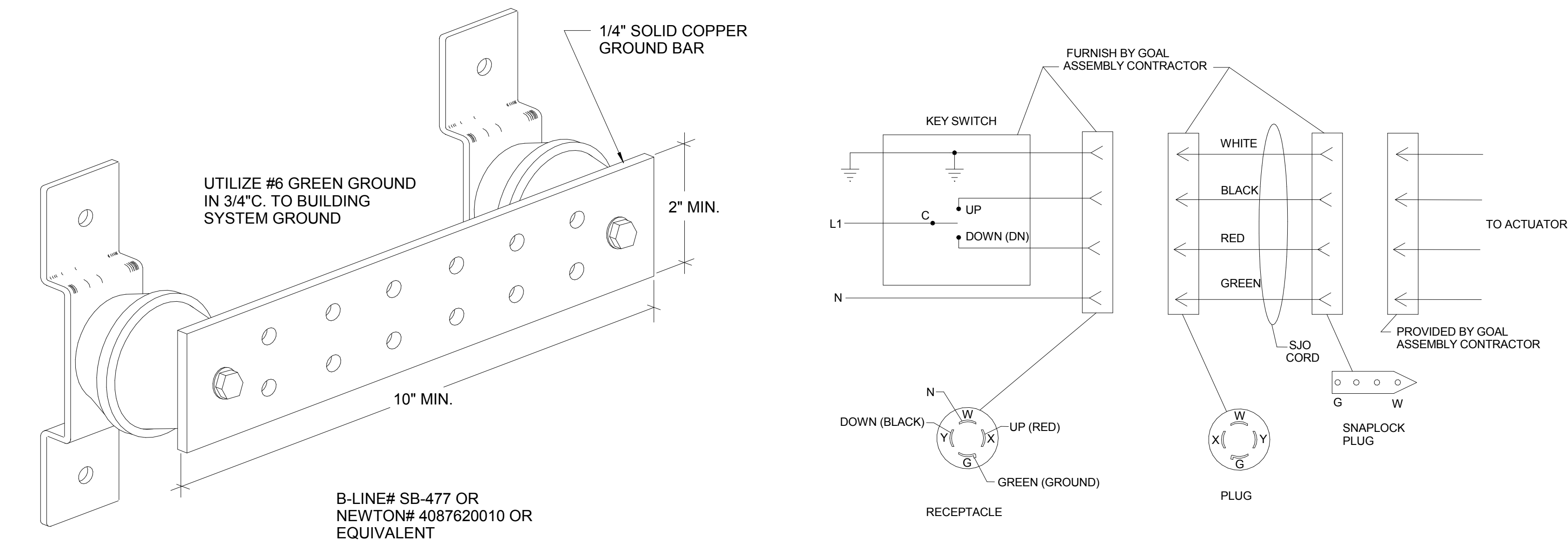
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JOB#: 2017008  
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DRAWN: WBE

SITE PLAN

E-100

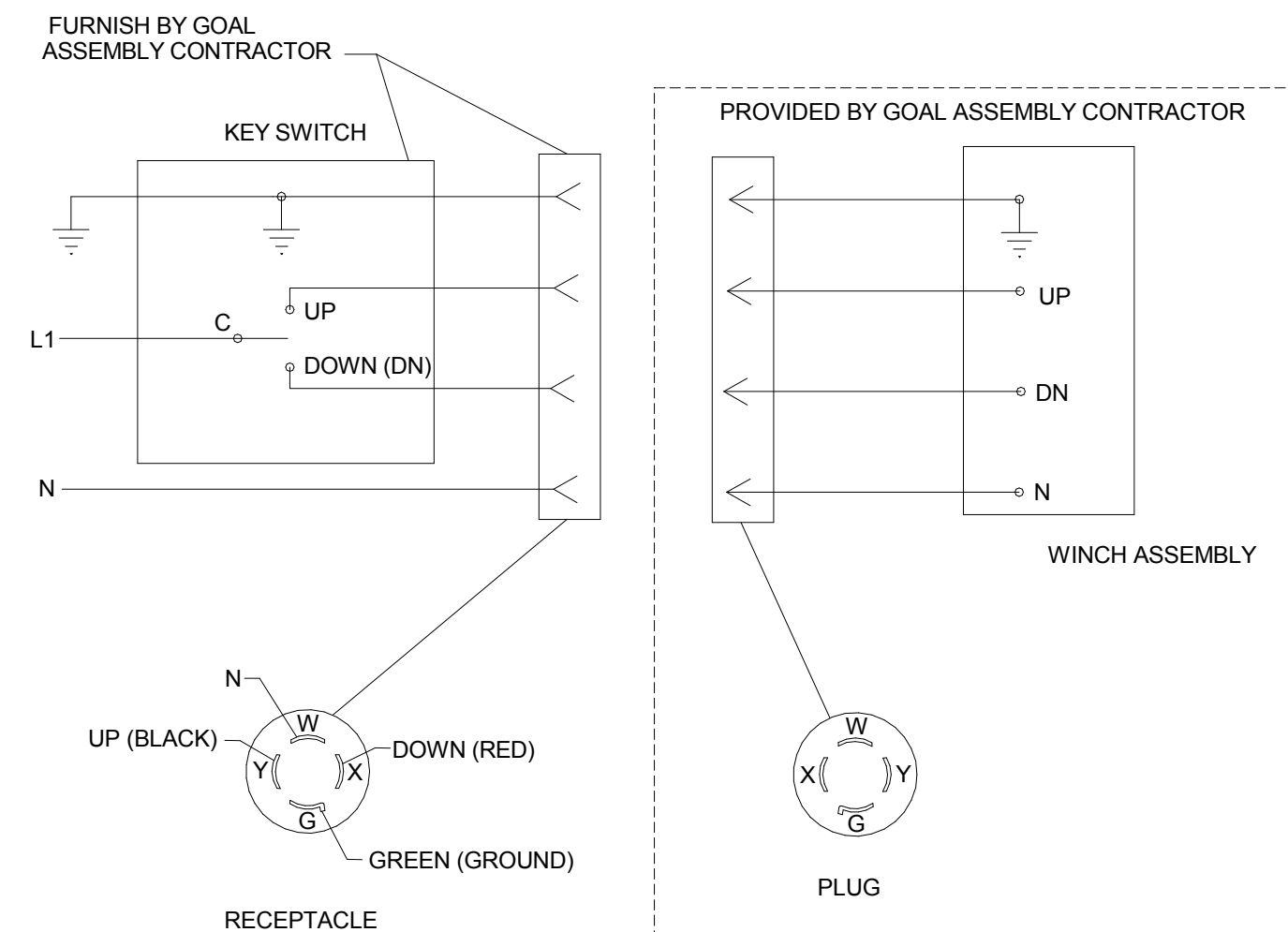


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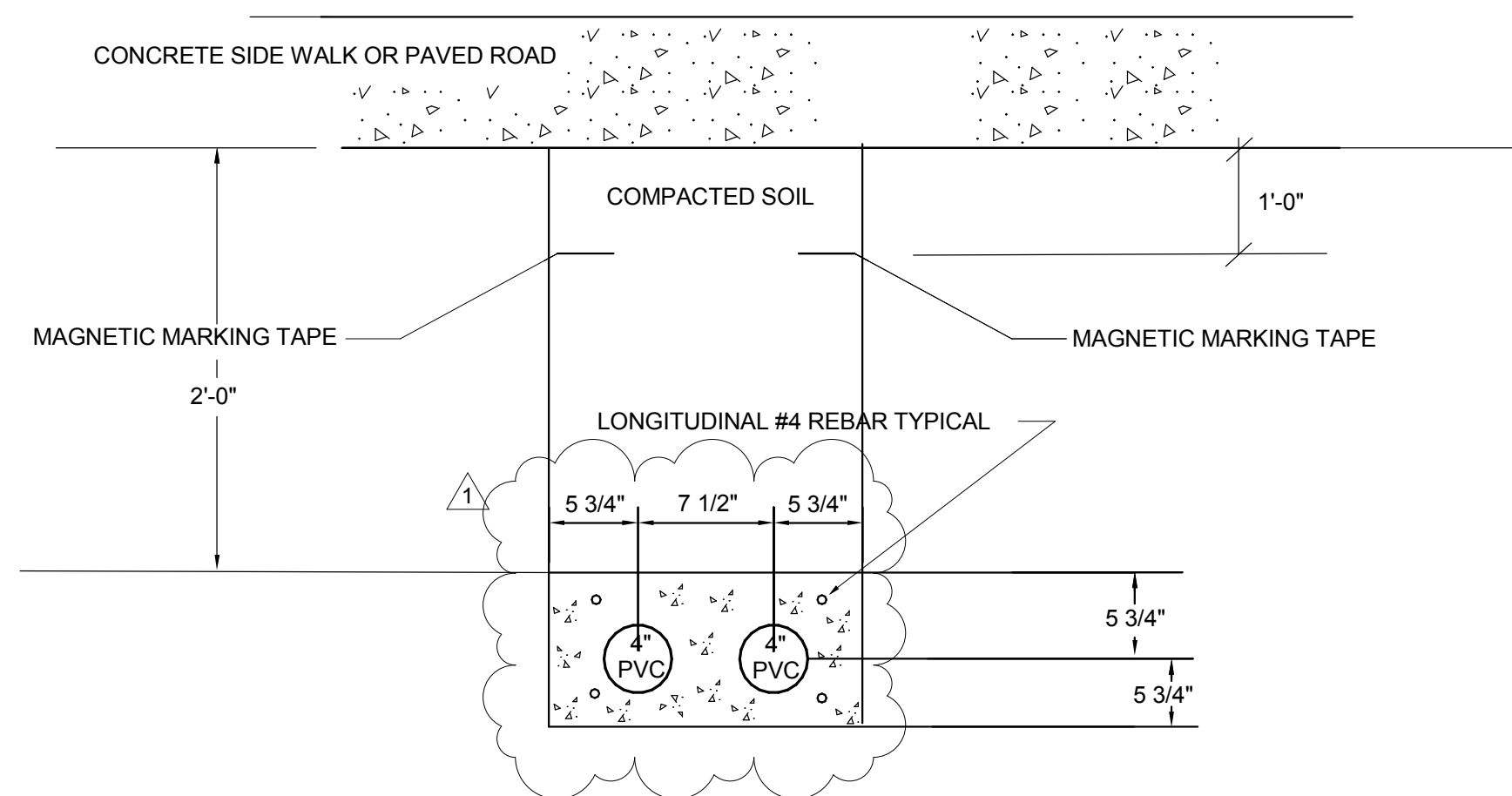


5 GROUND BUSBAR DETAIL  
E-500 NOT TO SCALE

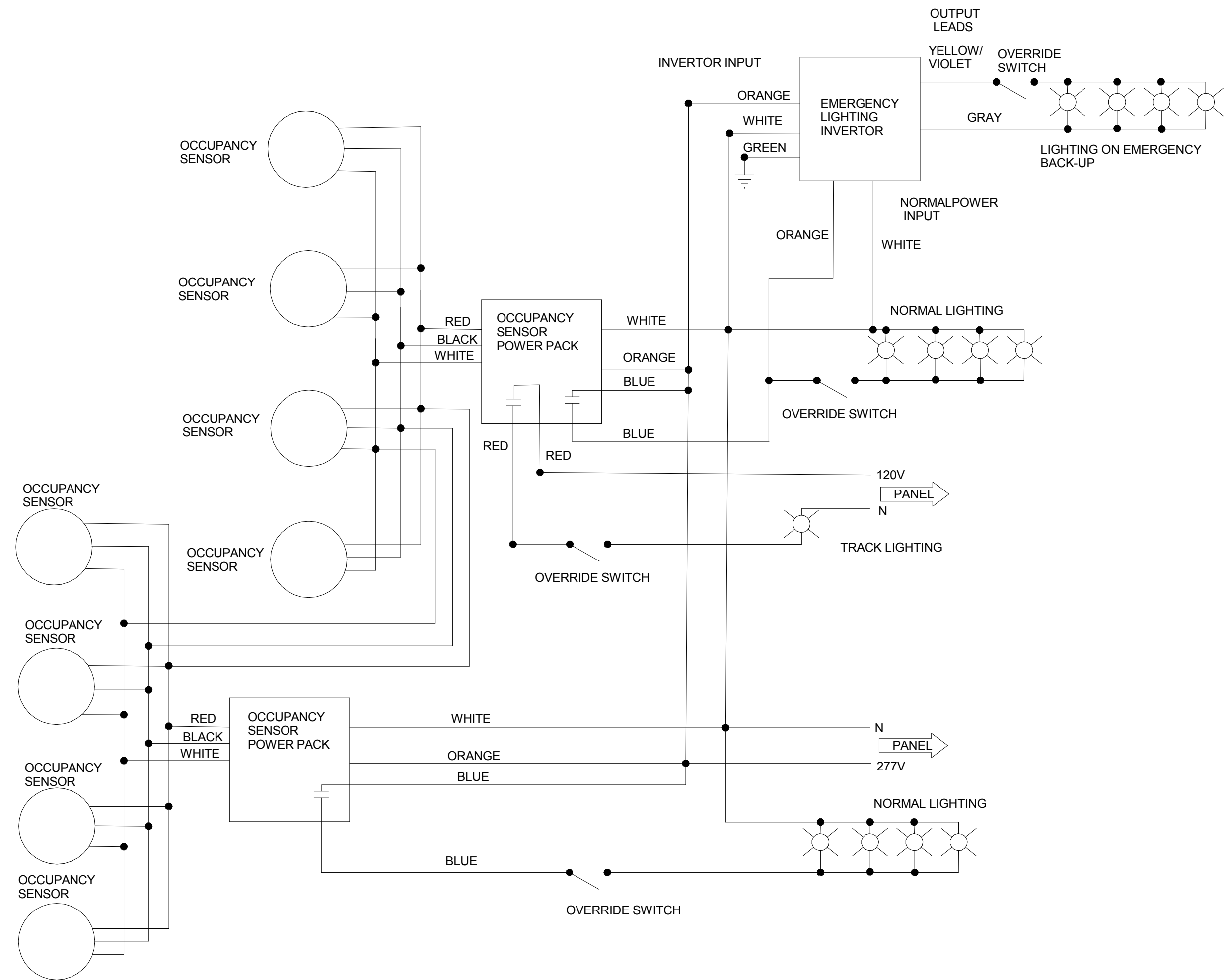
3 ADJUST A GOAL DETAIL  
E-500 NOT TO SCALE



4 WINCH DETAIL  
E-500 NOT TO SCALE

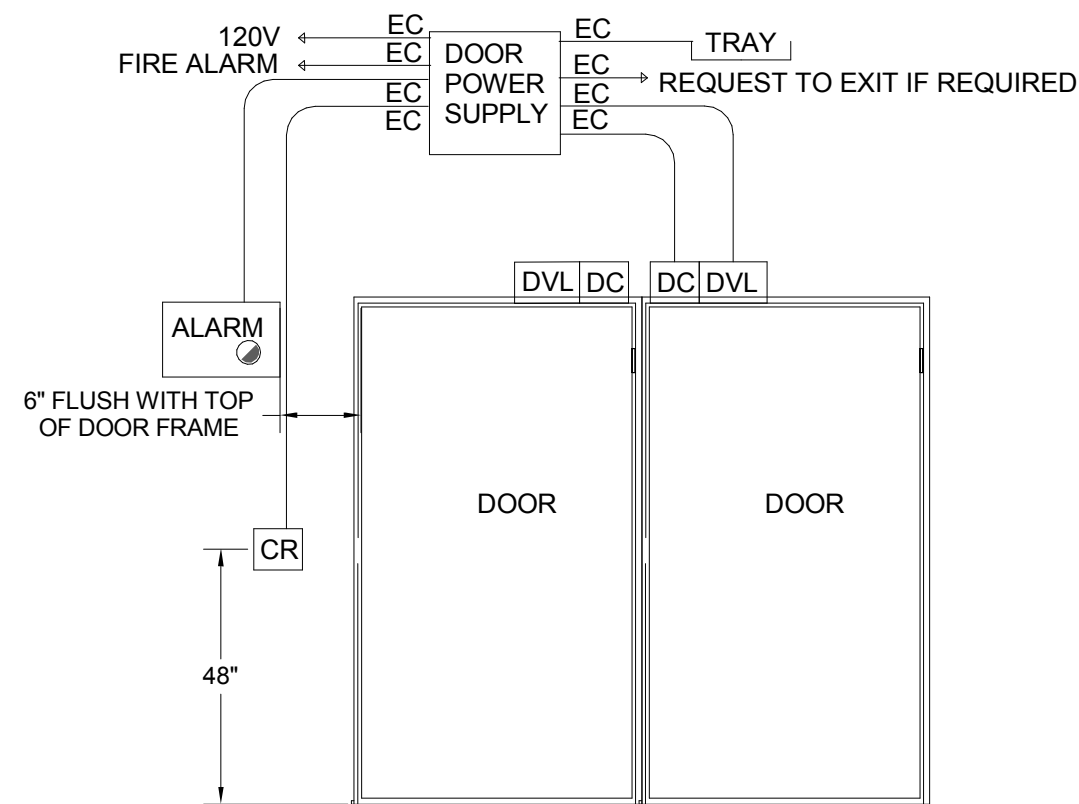


7 DUCTBANK DETAIL  
E-500 NOT TO SCALE



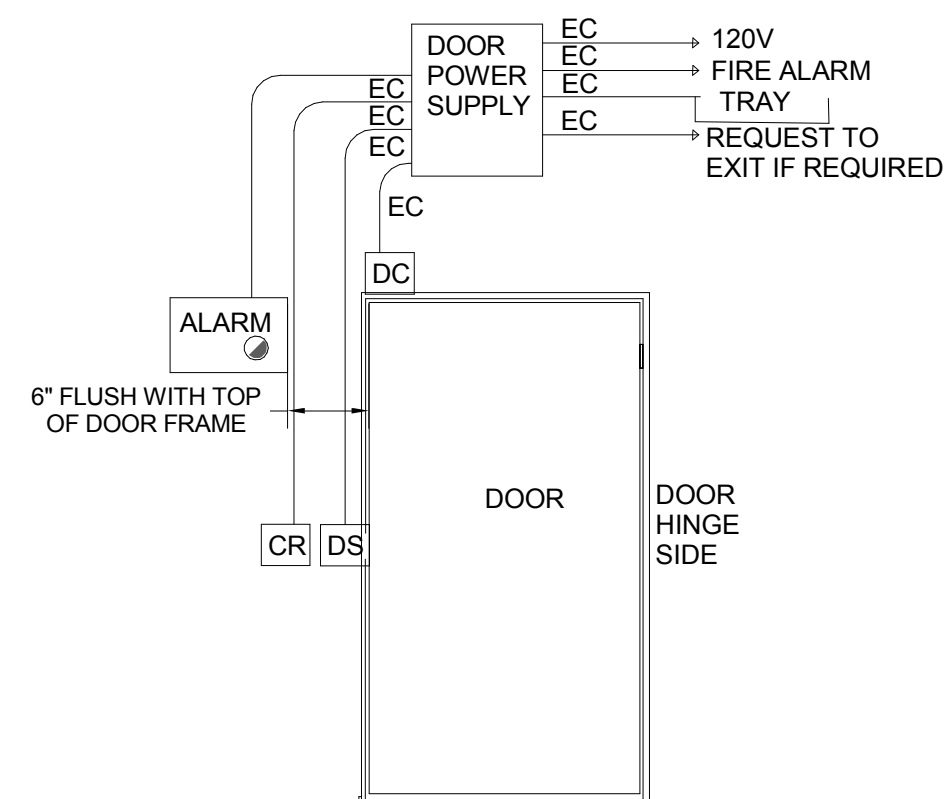
1 HALL AND LOBBY LIGHTING DETAIL  
E-500 NOT TO SCALE

- NOTES:
- COORDINATE LOCATION AND REQUIREMENTS OF EQUIPMENT AND CONDUIT WITH SECURITY CONTRACTOR.
  - EC = 3/4" CONDUIT WITH PULLSTRING.



6 DOUBLE DOOR ACCESS CONTROL  
E-500 NOT TO SCALE

- NOTES:
- COORDINATE LOCATION AND REQUIREMENTS OF EQUIPMENT AND CONDUIT WITH SECURITY CONTRACTOR.
  - EC = 3/4" CONDUIT WITH PULLSTRING.



2 SINGLE DOOR ACCESS CONTROL  
E-500 NOT TO SCALE

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Tel 423 266 3656 Fax 423 266 3357

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DEVELOPMENT  
CENTER

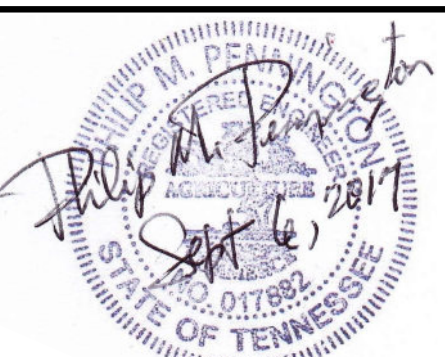
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1	Revision 1	10.31.2017

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DATE: 09/06/17  
JOB#: 2017008  
SCALE: AS INDICATED  
DRAWN: WBE

ELECTRICAL -  
DETAILS

E-500



LIGHTING FIXTURE SCHEDULE							
4	DESCRIPTION	BASIS OF DESIGN	VOLTAGE (V)	LAMPS	MOUNTING HEIGHT	Wattag e Comn ents	MOUNTING
				TYPE			
A	4' LINEAR LED PENDANT FIXTURE SUPPORTED BY AIRCRAFT CABLE.	ALERA LP7-0A-X-35LW-80-CM-X-E-U-MW	277V	LED FURNISHED W/ FIXTURE	10'AFF	37W	PENDANT
A1	4' LINEAR LED PENDANT FIXTURE SUPPORTED BY AIRCRAFT CABLE.	ALERA LP7-0A-X-35LW-20-CM-X-E-U-MW	277V	LED FURNISHED W/ FIXTURE	11' AFF	37W	PENDANT
A1E	4' LINEAR LED PENDANT FIXTURE SUPPORTED BY AIRCRAFT CABLE.	ALERA LP7-0A-X-35LW-20-CM-X-E-U-MW-ELL10	277V	LED FURNISHED W/ FIXTURE	11' AFF	37W	PENDANT
AE	4' LINEAR LED PENDANT FIXTURE SUPPORTED BY AIRCRAFT CABLE.	ALERA LP7-0A-X-35LW-40-CM-X-E-U-MW-ELL10	277V	LED FURNISHED W/ FIXTURE	10'AFF	37W	PENDANT
AK	2'X4' 2-LAMP, VOLUMETRIC LINEAR FLUORESCENT TROFFER, CEILING MOUNTED FIXTURE, WHITE OPAL ACRYLIC DIFFUSER, UNIVERSAL ELECTRONIC BALLAST	LITHONIA 2VTL 60L ADPT MVOLT EZ1 LP835	277V	LED FURNISHED WITH FIXTURE		52W	RECESSED
AKE	2'X4' 2-LAMP, VOLUMETRIC LINEAR FLUORESCENT TROFFER, CEILING MOUNTED FIXTURE, WHITE OPAL ACRYLIC DIFFUSER, UNIVERSAL ELECTRONIC BALLAST	LITHONIA 2VTL 60L ADPT MVOLT EZ1 LP835	277V	LED FURNISHED WITH FIXTURE		52W	RECESSED
B	4" SQUARE APERTURE LED DOWNLIGHT CYLINDER PENDANT MOUNTED WITH BLACK AIRCRAFT CABLE	PORTFOLIO LSSQS4B15D010MB EC4B10208035 4LBSQSQ3LI AC448MB	277V	LED FURNISHED W/ FIXTURE	14' AFF	15.5W	PENDANT
C	4" APERTURE RECESSED LED DOWNLIGHT	LITHONIA LDN4 35/15 L04WR 277 EZ10	277V	LED FURNISHED W/ FIXTURE		20.4W	RECESSED
CE	4" APERTURE RECESSED LED DOWNLIGHT	LITHONIA LDN4 35/15 L04WR 277 EZ10-EL	277V	LED FURNISHED W/ FIXTURE		20.4W	RECESSED
D	4' LINEAR SURFACE LED VOLUMETRIC FIXTURE	LITHONIA STL4 20L EZ1 LP835	277V	LED FURNISHED W/ FIXTURE	SURFACE OR 10'AFF	20W	SURFACE/PEND ANT
DE	4' LINEAR SURFACE LED VOLUMETRIC FIXTURE	LITHONIA STL4 20L EZ1 LP835-EL14L	277V	LED FURNISHED W/ FIXTURE	SURFACE OR 10'AFF	20W	SURFACE/PEND ANT
F	4' LINEAR WET LOCATION SURFACE LED FIXTURE	LITHONIA LPL-R-4L53-35K-UNV-F1	277V	LED FURNISHED W/ FIXTURE	SURFACE	53W	SURFACE
G	LED HIGH BAY WITH WIRE GUARD	LITHONIA IBL 30L WD LP835 WGX	277V	LED FURNISHED W/ FIXTURE	26' AFF	241W	PENDANT
H	SURFACE LED CANOPY LIGHT	GARDCO SFC 5W 48 700 NW-G2 277	277V	LED FURNISHED W/ FIXTURE		104W	SURFACE CEILING
H2	SURFACE LED CANOPY LIGHT	GARDCO SFC 5W 48 400 NW-G2 277	277V	LED FURNISHED W/ FIXTURE	AS INDICATED ON DRAWINGS	60W	SURFACE CEILING
N	SURFACE MOUNTED LED WITH FROSTED GLASS 33W	LUMINIS KR1550-L1W30R1-277V-WHT-K35-CK	277V	LED FURNISHED W/ FIXTURE		33W	SURFACE CEILING
NL	SURFACE MOUNTED LED WITH FROSTED GLASS 46W	LUMINIS KR1550-L1W48R0-277V-WHT-K35-CK	277V	LED FURNISHED W/ FIXTURE		46W	SURFACE CEILING
P	LED PENDANT WITH NARROW ACRYLIC DIFFUSER	CAMMAN LIGHTING P8800-24-LN-35K-2-VIM-FMMW	277V	LED FURNISHED W/ FIXTURE	AS INDICATED ON DRAWINGS	20W	PENDANT
SP	LED PENDANT MOUNTED SPOT LIGHT	SOLAIS XD24Z5C/35M/1600BK/CM2	277V	LED FURNISHED W/ FIXTURE	14' AFF	20W	PENDANT
T	TRACK LIGHTING (PROVIDE 25) LT - 08 RWF 830 WH VA HEADS)	PHILLIPS LIGHTOLIER 6450 and 6001NWH	120V	LED FURNISHED W/ FIXTURE	11' AFF	NEC	SUSPENSION
V	LINEAR WALL MOUNTED LED VANITY LIGHT	PHILLIPS DAY-BRITE TAB4L-ASY 277 BA	277V	LED FURNISHED W/ FIXTURE	WALL MOUNTED 6" ABOVE MIRROR	14.9W	SURFACE WALL
W	EXTERIOR LED WALLPACK WITH INTERGAL BATTERY PACK	LUMARK XTOR8B-W-BK-CBP-PC2	277V	LED FURNISHED W/ FIXTURE	10'AFF	81W	SURFACE WALL
WG	LED WALL GRAZING FIXTURE	PHILLIPS COLOR KINETIC 523-000099-02	277V	LED FURNISHED W/ FIXTURE		12.5W	SURFACE
X	LED PENDANT OR WALL MOUNTED EXIT LIGHT WITH RED LETTERING AND EMERGENCY BATTERY.	CHLORIDE VERVEM	277V	LED FURNISHED W/ FIXTURE	10'AFF	4.7W	PENDANT/WALL
X2	LED PENDANT OR WALL MOUNTED EXIT LIGHT WITH RED LETTERING AND EMERGENCY BATTERY.	CHLORIDE VLCCR2R	277V	LED FURNISHED W/ FIXTURE	10'AFF	3W	PENDANT/WALL

LOCATION: ELECTRICAL ROOM MOUNTING: SURFACE ENCLOSURE: NEMA 1 PANELBOARD FEEDER: SEE SINGLE LINE DIAGRAM FEED FROM: HA					PANEL LC					SERVICE: 208/120V, 3ø, 4WIRE, 60HZ AIC (MIN.): 42KAIC MAINS: 250A MLO NEUTRAL: YES																						
WIRE / CABLE DESCRIPTION		CKT NO.	BKR SIZE	POLES	KVA	LOAD DESCRIPTION			KVA			LOAD DESCRIPTION			KVA	POLES	BKR SIZE	CKT NO.	WIRE / CABLE DESCRIPTION													
3#10 & 1#10GND IN 3/4"		1			2.92	VAV-2-1			5.00			VAV-3-2			2.08			2	3#12 & 1#12GND IN 3/4"													
		3	25	3	2.92				5.00						2.08			4														
		5			2.92				5.00						2.08			6														
		7			1.25										0.83			8														
3#12 & 1#12GND IN 3/4"		9	15	3	1.25	VAV-2-2			2.08			VAV-3-3			0.83			3	15	10	3#12 & 1#12GND IN 3/4"											
		11			1.25				2.08						0.83			12														
		13			0.62				1.45						0.83			14														
		15	15	3	0.62				1.45						0.83			3	15	16			3#12 & 1#12GND IN 3/4"									
17			0.62	1.45			0.83			18																						
19			4.17	7.51			3.34			20																						
3#6 & 1#10GND IN 3/4"		21	35	3	4.17	VAV-2-4			7.51			VAV-3-5			3.34			3	30	22	3#10 & 1#10GND IN 3/4"											
		23			4.17				7.51						3.34			24														
		25			2.29				3.71						1.42			26														
		2#12 & 1#12GND IN 3/4"		27	20				3	2.29	VAV-3-1				3.71			ECH-2					1.42			3	15	28	3#12 & 1#12GND IN 3/4"			
29					2.29	3.71			1.42					30																		
31					1.42	2.92			1.50					1	20	32	2#12 & 1#12GND IN 3/4"															
3#12 & 1#12GND IN 3/4"				33	15	3	1.42	5.67						4.25							2	50	34	3#6 & 1# 10GND IN 3/4"								
		35			1.42	5.67			4.25			36																				
		2#12 & 1#12 GND IN 3/4"		37	20	2	1.80	CU-2/AC-2			3.49			REFRIGERATOR					1.69			2	20			38	3#12 & 1#12GND IN 3/4"					
				39			1.80				3.49						1.69			40												
2#12 & 1#12 GND IN 3/4"				41	20	1	0.10				IRRIGATION PANEL						0.40			SECURITY CONTROL PANEL			0.30			1			20	42	2#12 & 1#12GND IN 3/4"	
				43	20	1											0.10						0.10			1			20	44		
		45	20	1		0.10			0.10					1	20	46	2#12 & 1#12GND IN 3/4"															
		47	20	1		0.10			0.10					1	20	48			2#12 & 1#12GND IN 3/4"													
49	20	1		0.10			0.10			1	20	50	2#12 & 1#12GND IN 3/4"																			
51	20	1		0.10			0.10			1	20	52			2#12 & 1#12GND IN 3/4"																	
53	20	1		0.10			0.10			1	20	54					2#12 & 1#12GND IN 3/4"															
LOAD TYPES:																																
LIGHTING:		0			0	Total (KVA): 81																										
LARGEST MOTOR:		0	1.25		0	=																										
ADDITIONAL MOTORS:		0	1		0																											
RECEPTACLES:		0	0.5		0																											
HVAC:		54.99	1		54.99																											
ELECTRIC SPACE HEATING:		8.508	1		8.508																											
KITCHEN:		11.884	1		11.884																											
MISCELLANEOUS:		6	1		6																											
NOTES: * INDICATES CLASS A, 5ma GFCI BREAKER (PERSONNEL PROTECTION). ** INDICATES 30ma GFCI BREAKER (GFPE, EQUIPMENT PROTECTION). ALL CIRCUIT BREAKERS FOR HVAC EQUIPMENT SHALL BE RATED HID. ALL CIRCUIT BREAKERS FOR LIGHTING SHALL BE RATED SWD. 1. E.C. SHALL PROVIDE AN UPDATED PANEL SCHEDULE.																																
SECTIONS 1 & 2																																
KVA																																
AMPS																																
TOTAL CONNECTED LOAD: 81.4 225.9																																
TOTAL DEMAND LOAD: 81.4 225.9																																

MECHANICAL EQUIPMENT - ELECTRICAL CONNECTION SCHEDULE																	
TAG	EQUIPMENT DESCRIPTION	LOCATION	V / Ø	HP	KW	MOTOR		BY	FROM PANEL	DISCONNECT SWITCH		BREAKER		STARTER		COMMENTS	
						FLA	MCA			A/POLES/FUSE/ENCL.	BY	AMPS/POLES	BY	TYPE-SIZE	BY		
RTU-1	ROOF TOP UNIT	ROOF	480 / 3	7.5	4.03		42.4	FWE	HA	CMPT	FWE	50/3	E.C.	CMPT	FWE		
RTU-2	ROOF TOP UNIT	ROOF	480 / 3	5	12.94		37.6	FWE	HA	CMPT	FWE	40/3	E.C.	CMPT	FWE		
RTU-3	ROOF TOP UNIT	ROOF	480 / 3	5	12.95		37.6	FWE	HA	CMPT	FWE	40/3	E.C.	CMPT	FWE		
RTU-4	ROOF TOP UNIT	ROOF	480 / 3	5	12.96		37.6	FWE	HA	CMPT	FWE	40/3	E.C.	CMPT	FWE		
RTU-5	ROOF TOP UNIT	ROOF	480 / 3	5	12.97		37.6	FWE	HA	CMPT	FWE	40/3	E.C.	CMPT	FWE		
EF-1	EXHAUST FAN	ROOF	120 / 1	.25		5.8		FWE	LB	CMPT	FWE	20/1	E.C.	CMPT	FWE		
EF-2	EXHAUST FAN	ROOF	120 / 1	.25		5.8		FWE	LB	CMPT	FWE	20/1	E.C.	CMPT	FWE		
EF-3	EXHAUST FAN	ROOF	120 / 1	.25		5.8		FWE	LB	CMPT	FWE	20/1	E.C.	CMPT	FWE		
CU-1	SPLIT SYSTEM COMPRESSOR	ROOF	208 / 1			1.68	18.1	FWE	LB	30/2/NF/3R	E.C.	20/2	E.C.	CMPT	FWE	NOTE 1	
CU-2	SPLIT SYSTEM COMPRESSOR	ROOF	208 / 1			1.60	15	FWE	LC	30/2/NF/3R	E.C.	20/2	E.C.	CMPT	FWE	NOTE 1	
VAV-1-1	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				24.3	FWE	LB	CMPT	FWE	25/3	E.C.	CMPT	FWE		
VAV-1-2	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				19.1	FWE	LB	CMPT	FWE	20/3	E.C.	CMPT	FWE		
VAV-1-3	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				17.3	FWE	LB	CMPT	FWE	20/3	E.C.	CMPT	FWE		
VAV-1-4	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				12.1	FWE	LB	CMPT	FWE	15/3	E.C.	CMPT	FWE		
VAV-1-5	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				8.7	FWE	LB	CMPT	FWE	15/3	E.C.	CMPT	FWE		
VAV-1-6	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				6.9	FWE	LB	CMPT	FWE	15/3	E.C.	CMPT	FWE		
VAV-2-1	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				24.3	FWE	LC	CMPT	FWE	25/3	E.C.	CMPT	FWE		
VAV-2-2	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				10.4	FWE	LC	CMPT	FWE	15/3	E.C.	CMPT	FWE		
VAV-2-3	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				5.2	FWE	LC	CMPT	FWE	15/3	E.C.	CMPT	FWE		
VAV-2-4	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				34.7	FWE	LC	CMPT	FWE	35/3	E.C.	CMPT	FWE		
VAV-3-1	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				19.1	FWE	LC	CMPT	FWE	20/3	E.C.	CMPT	FWE		
VAV-3-2	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				17.3	FWE	LC	CMPT	FWE	20/3	E.C.	CMPT	FWE		
VAV-3-3	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				6.9	FWE	LC	CMPT	FWE	15/3	E.C.	CMPT	FWE		
VAV-3-4	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				6.9	FWE	LC	CMPT	FWE	15/3	E.C.	CMPT	FWE		
VAV-3-5	DUCT TERMINAL UNIT	SEE PLANS	208 / 3				27.9	FWE	LC	CMPT	FWE	30/3	E.C.	CMPT	FWE		
EUH-1	UNIT HEATER	SEE PLANS	277 / 1		14.8			FWE	HB	CMPT	FWE	20/1	E.C.	CMPT	FWE	TOTAL AMPS	
ECH-1	CEILING HEATER	SEE PLANS	208 / 3		11.8			FWE	LC	CMPT	FWE	20/3	E.C.	CMPT	FWE	TOTAL AMPS	
ECH-2	CEILING HEATER	SEE PLANS	208 / 3		11.8			FWE	LC	CMPT	FWE	20/3	E.C.	CMPT	FWE	TOTAL AMPS	
HWCP-1	HOT WATER CIRC. PUMP	SEE PLANS	120 / 1		3.8			FWE	LB	MRS	E.C.	20/1	E.C.	CMPT	FWE	NOTE 2	
HWCP-2	HOT WATER CIRC. PUMP	SEE PLANS	120 / 1		3.8			FWE	LB	MRS	E.C.	20/1	E.C.	CMPT	FWE	NOTE 2	
<div>ABBREVIATIONS.</div> <div><div>BY - PROVIDED BY</div><div>CMPT - COMPARTMENT</div><div>E.C. - ELECTRICAL CONTRACTOR</div></div> <div><div>EXIST. - EXISTING</div><div>FVNR - FULL VOLTAGE NON-REVERSING COMBINATION STARTER</div><div>FVR - FULL VOLTAGE REVERSING COMBINATION STARTER</div><div>FWE - FURNISHED WITH EQUIPMENT</div><div>MULTI- MULTI MOTOR ARIU</div></div> <div><div>SSMC - SOFT START MOTOR CONTROLLER</div><div>VFD - VARIABLE FREQUENCY DRIVE</div><div>Y-D - WYE DELTA STARTER</div><div>2SW2 - 2 SPEED 2 WINDING COMBINATION STARTER</div><div>MRS- MOTOR RATED SWITCH</div></div> <div><div>NOTES: 1. PROVIDE 3/12 &amp; 1/12 GND IN 1/2"Z BETWEEN INDOOR UNIT AND OUTDOOR UNIT.</div><div>2. HWCP-1 AND HWCP-2 ARE ON THE SAME BREAKER.</div></div>																	



