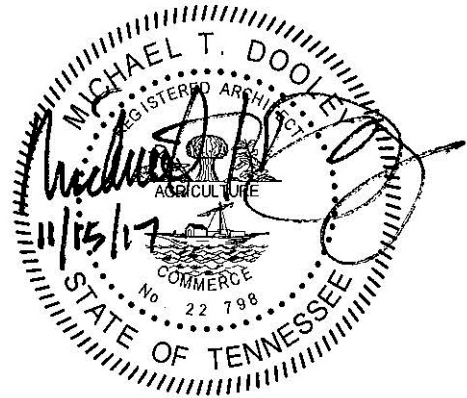


DOCUMENT 00 91 13.01 – ADDENDUM 1

1.01 PROJECT INFORMATION

- A. Project Identification: Five Point – Phase 3.
  - 1. Project Location: 304 S. Kyle Street, Knoxville, TN 37915.
- B. Owner: Knoxville Community Development Corporation, 901 Broadway, N.E., Knoxville, Tennessee 37917-6699.
- C. Architect: BarberMcMurry architects, 505 Market Street, Suite 300, Knoxville, TN 37902-2175. Phone: 865-934-1915. Fax: 865-546-0242.
- D. Architect Project Number: 166200
- E. Date of Addendum: 15 November 2017.



1.02 NOTICE TO BIDDERS

- A. This Addendum is issued to all registered plan holders pursuant to the Instructions to Bidders. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.
- B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.
- C. The date for receipt of bids is unchanged by this Addendum, at same time and location.
  - 1. Bid Date: 2:00 PM on Tuesday, 5 December 2017.

1.03 ATTACHMENTS

- A. This Addendum includes the following attached Documents and Specification Sections:
  - 1. Document: 2015 Enterprise Green Communities Criteria Checklist, new.
  - 2. Document: National Program Requirements ENERGY STAR Certified Homes, Version 3 (Rev. 08), 14 December 2015, new.
  - 3. Document: Rater Design Review Checklist ENERGY STAR Certified Homes, Version 3/3.1 (Rev. 08), revised 15 September 2015, new.
  - 4. Document: ENERGY STAR Green Criteria Air Sealing Pictures, new.
  - 5. Document: Knox Housing Partnership, Inc., HERS Verification/Rater Services Agreement, dated October 2017, new.
  - 6. Section 01 21 00 – Allowances, dated 14 November 2017, new.
  - 7. Section 01 31 00 – Project Management and Coordination, dated 14 November 2017, reissued.
  - 8. Section 03 30 00 – Cast-In-Place Concrete, dated 14 November 2017, reissued.

9. Section 06 66 30 – Exterior PVC Railings and Guards, dated 14 November 2017, new.
10. Section 07 46 00 – Siding, dated 14 November 2017, reissued.
11. Section 08 51 13 – Vinyl Windows, dated 14 November 2017, reissued.
12. Section 09 29 00 – Gypsum Board, dated 14 November 2017, reissued.

B. This Addendum includes the following attached Sheets:

1. Architectural Sheet A1-A101, revised 13 November 2017, reissued.
2. Architectural Sheet A2-A101, revised 13 November 2017, reissued.
3. Architectural Sheet B-A101, revised 13 November 2017, reissued.
4. Architectural Sheet C1-A101, revised 13 November 2017, reissued.
5. Architectural Sheet C2-A101, revised 13 November 2017, reissued.
6. Architectural Sheet D-A101, revised 13 November 2017, reissued.
7. Architectural Sheet D-A102, revised 13 November 2017, reissued.
8. Architectural Sheet E1-A101, revised 13 November 2017, reissued.
9. Architectural Sheet E2-A101, revised 13 November 2017, reissued.
10. Architectural Sheet C1-A101M, revised 13 November 2017, reissued.
11. Architectural Sheet C2-A101M, revised 13 November 2017, reissued.
12. Architectural Sheet E1-A101M, revised 13 November 2017, reissued.
13. Architectural Sheet A701, revised 13 November 2017, reissued.
14. Mechanical Sheet A1-M101, revised 13 November 2017, reissued.
15. Mechanical Sheet A2-M101, revised 13 November 2017, reissued.
16. Mechanical Sheet B-M101, revised 13 November 2017, reissued.
17. Mechanical Sheet C1-M101, revised 13 November 2017, reissued.
18. Mechanical Sheet C2-M101, revised 13 November 2017, reissued.
19. Mechanical Sheet D1-M101, revised 13 November 2017, reissued.
20. Mechanical Sheet D2-M101, revised 13 November 2017, reissued.
21. Mechanical Sheet E1-M101, revised 13 November 2017, reissued.
22. Plumbing Sheet P101, revised 13 November 2017, reissued.
23. Fire Protection Sheet A1-FP101, revised 13 November 2017, reissued.
24. Fire Protection Sheet A2-FP102, revised 13 November 2017, reissued.
25. Fire Protection Sheet B-FP101, revised 13 November 2017, reissued.

END OF DOCUMENT 00 91 13.01

ELD's

BMA/GC/consultant  
civil/site  
FSC/H<sub>2</sub>O/Energy  
FSC/Electrical



M = MANDATORY  
# = OPTIONAL POINTS

## 2015 Enterprise Green Communities Criteria Checklist

This checklist provides an overview of the technical requirements within the Enterprise Green Communities Criteria. **To achieve Enterprise Green Communities Certification, all projects must achieve compliance with the Criteria mandatory measures applicable to that construction type. Additionally, New Construction projects must achieve 35 optional points, Substantial Rehab projects must achieve 30 optional points, and Moderate Rehab projects must also achieve 30 optional points.**

### 1. INTEGRATIVE DESIGN

YES  NO  MAYBE

M

#### 1.1a Goal Setting

Develop an integrative design process that works best for your project team and intentions. At minimum, document:

1. A statement of the overall green development goals of the project and the expected intended outcomes from addressing those goals.
2. A summary of the integrative process that was used to select the green building strategies, systems and materials that will be incorporated into the project.
3. A description of how progress and success against these goals will be measured throughout the completion of design, construction and operation to ensure that the green features are included and correctly installed.

YES  NO  MAYBE

M

#### 1.1b Criteria Documentation

Create design and construction documentation to include information on implementation of appropriate Enterprise Green Communities Criteria.

YES  NO  MAYBE

9

#### 1.1c Designing for Project Performance

Identify how the expected performance of your project compares to the actual performance of other projects in your portfolio and/or community.

YES  NO  MAYBE

M

#### 1.2a Resident Health and Well-Being: Design for Health

Identify potential resident health factors and design your project to address resident health and well-being by using the matrix provided on pages 22 and 23.

YES  NO  MAYBE

12

#### 1.2b Resident Health and Well-Being: Health Action Plan

At pre-design and continuing throughout the project life cycle, collaborate with public health professionals and community stakeholders to assess, identify, implement and monitor achievable actions to enhance health-promoting features of the project and minimize features that could present health risks. Specifically, create a Health Action Plan and integrate the selected interventions and a plan for monitoring and evaluating progress per the full criterion.

YES  NO  MAYBE

M

#### 1.3a Resilient Communities: Design for Resilience *(New Construction and Substantial Rehab only)*

Given your project building type, location and expected resident population, identify a project characteristic that would most likely impact your project's ability to withstand an unexpected weather event or loss of power. Select at least one criterion from the given list that would help mitigate that impact, and incorporate this within your project plans and design. Include a short narrative providing your rationale for selecting this criterion above the others.



M = MANDATORY  
# = OPTIONAL POINTS

YES  NO  MAYBE **15** **INTEGRATIVE DESIGN** *(continued)*

**1.3b Resilient Communities: Multi-Hazard Risk/Vulnerability Assessment**  
Carry out a Vulnerabilities Assessment and implement building elements designed to enable the project to adapt to, and mitigate, climate impacts given the project location, building/construction type and resident population.

SUBTOTAL OPTIONAL POINTS

**2. LOCATION + NEIGHBORHOOD FABRIC**

*New Construction:* All new construction projects must earn optional points under Criterion 2.8 Access to Public Transportation, **OR** earn 8 optional points through selecting one or more of the following:

- 2.7 Preservation of and Access to Open Space
- 2.9 Improving Connectivity to the Community
- 2.12 Access to Fresh, Local Foods
- 2.13 LEED for Neighborhood Development Certification
- 2.14 Local Economic Development and Community Wealth Creation

YES  NO  MAYBE **M** **2.1 Sensitive Site Protection**

Do not locate new projects, including buildings, built structures, roads or parking areas, on portions of sites that meet any of the following provisions:

1. Land within 100 feet of wetlands, including isolated wetlands or streams. Maintain or establish riparian buffer using native vegetation where possible. Bike and foot paths are allowed if at least 25 feet from the wetlands boundary.
2. Land on slope greater than 15%.
3. Land with prime soils, unique soils or soils of state significance per USDA designations.
4. Public parkland.
5. Land that is specifically identified as an existing habitat for any species on federal or state threatened or endangered lists.
6. Land that is within the Special Flood Hazard Areas (SFHA) as identified by FEMA on the Flood Insurance Rate Map.

YES  NO  MAYBE **M** **2.2 Connections to Existing Development and Infrastructure** *(Except for projects located on rural tribal lands, in colonias communities, or in communities with populations of less than 10,000)*

Locate the project on a site with access to existing roads, water, sewers and other infrastructure within or contiguous to (having at least 25% of the perimeter bordering) existing development. Connect the project to the pedestrian grid.

YES  NO  MAYBE **M** **2.3 Compact Development**

At a minimum, build to the residential density (dwelling units/acre) of the census block group in which your project is located.

YES  NO  MAYBE **5 or 7** **2.4 Compact Development**

Exceed the residential density (dwelling units/acre) of the census block group in which your project is located. Exceed by 2x for [5 points]; exceed by 3x for [7 points].



M = MANDATORY  
# = OPTIONAL POINTS

**LOCATION + NEIGHBORHOOD FABRIC** *(continued)*

YES  NO  MAYBE

**M 2.5 Proximity to Services**

Locate the project within a 0.5-mile walk distance of at least four, or a 1-mile walk distance of at least seven, of the listed services. For projects that qualify as Rural/Tribal/Small Town, locate the project within 5 miles of at least four of the listed services.

YES  NO  MAYBE

**M 2.6 Preservation of and Access to Open Space for Rural / Tribal / Small Towns**

Set aside a minimum of 10% (minimum of 0.25 acre) of the total project acreage as non-paved open space for use by all residents **OR** locate the project within a 0.25-mile walk distance of dedicated public non-paved open space that is a minimum of 0.75 acres.

YES  NO  MAYBE **6 max**

**2.7 Preservation of and Access to Open Space**

Set aside a percentage of non-paved open space for use by all residents. 20% [2 points]; 30% [4 points]; 40% + written statement of preservation/conservation policy for set-aside land [6 points].

YES  NO  MAYBE **8 or 10**

**2.8 Access to Public Transportation**

Locate projects within a 0.5-mile walk distance of transit services combined (bus, rail and/or ferry), constituting at least 60 or more transit rides per weekday, with some type of weekend ride option. [8 points]

For projects that qualify as Rural/Tribal/Small Town, locate the project within a 5-mile distance of at least one of the following transit options: 1) vehicle share program; 2) dial-a-ride program; 3) employer vanpool; 4) park-and-ride; or 5) public-private regional transportation. [8 points]

For an additional 2 points: Locate the project along dedicated bike trails or lanes that lead to transit services or stations (bus, rail and ferry) within 3 miles.

YES  NO  MAYBE **2 to 8**

**2.9 Improving Connectivity to the Community**

Improve access to community amenities through at least one of the transit, auto or biking mobility measures listed.

YES  NO  MAYBE **5 max**

**2.10 Passive Solar Heating /Cooling**

Design and build with passive solar design, orientation and shading that meet specified guidelines.

YES  NO  MAYBE **4**

**2.11 Brownfield Site or Adaptive Reuse Building**

Rehabilitate an existing structure that was not previously used as housing or locate the project on a brownfield site.

YES  NO  MAYBE **6**

**2.12 Access to Fresh, Local Foods**

Pursue one of three options to provide residents and staff with access to fresh, local foods, including neighborhood farms and gardens, community-supported agriculture, or proximity to farmers markets.

YES  NO  MAYBE **4**

**2.13 LEED for Neighborhood Development Certification**

Locate building(s) in a Stage 2 Pre-Certified or Stage 3 Certified Neighborhood Development.

YES  NO  MAYBE **6 max**

**2.14 Local Economic Development and Community Wealth Creation**

Demonstrate that local preference for construction employment and subcontractor hiring was part of your bidding process [2 points] **OR** demonstrate that you achieved at least 20% local employment [3 points] **OR** provide physical space for small business, nonprofits, and/or skills and workforce education [3 points].

SUBTOTAL OPTIONAL POINTS



M = MANDATORY  
# = OPTIONAL POINTS

**3. SITE IMPROVEMENTS**

YES  NO  MAYBE      M      **3.1 Environmental Remediation**  
Conduct an environmental site assessment to determine whether any hazardous materials are present on-site; mitigate any found.

YES  NO  MAYBE      M      **3.2 Erosion and Sedimentation Control** *(Except for infill sites with buildable area smaller than one acre)*  
Implement EPA's Best Management Practices for Construction Site Stormwater Runoff Control, or local requirements, whichever is more stringent.

YES  NO  MAYBE      M      **3.3 Low-Impact Development**  
Projects located on greenfields must meet the list of low-impact development criteria.

YES  NO  MAYBE      M      **3.4 Landscaping**  
If providing plantings, all should be native or adapted to the region, appropriate to the site's soil and microclimate, and none of the new plants is an invasive species. Reseed or xeriscape all disturbed areas.

YES  NO  MAYBE      M      **3.5a Efficient Irrigation and Water Reuse**  
If irrigation is used, install an efficient irrigation or water reuse system per the guidelines.

YES  NO  MAYBE      4 or 8      **3.5b Efficient Irrigation and Water Reuse**  
Install an efficient irrigation system equipped with a WaterSense-labeled weather-based irrigation controller (WBIC) **OR** at least 50% of the site's irrigation should be satisfied by reusing water.

YES  NO  MAYBE      4 or 8      **3.6 Surface Stormwater Management**  
Retain, infiltrate and/or harvest the first 1.0 inch of rain that falls [4 points] **OR** as calculated for a 24-hour period of a one-year (1) storm event, so that no stormwater is discharged to drains/inlets. [8 points] For both options, permanently label all storm drains and inlets.

YES  NO  MAYBE      1      **3.7 Reducing Heat-Island Effect: Paving**  
Use light-colored, high-albedo materials and/or an open-grid pavement, with a minimum solar reflectance of 0.3, over at least 50% of the site's hardscaped area.

SUBTOTAL OPTIONAL POINTS

**4. WATER CONSERVATION**

YES  NO  MAYBE      M      **4.1 Water-Conserving Fixtures**  
Install water-conserving fixtures in all units and any common facilities with the following specifications. *Toilets:* WaterSense-labeled and 1.28 gpf; *Urinals:* WaterSense-labeled and 0.5 gpf; *Showerheads:* WaterSense-labeled and 2.0 gpm; *Kitchen faucets:* 2.0 gpm; *Lav faucets:* WaterSense-labeled and 1.5 gpm

**AND** for all single-family homes and all dwelling units in buildings three stories or fewer, the static service pressure must not exceed 60 psi.



M = MANDATORY  
# = OPTIONAL POINTS

**WATER CONSERVATION** (continued)

YES  NO  MAYBE **6 max**

**4.2 Advanced Water Conservation**

Reduce water consumption either by installing water-conserving fixtures in all units and all common space bathrooms with the following specifications: ~~Toilets: WaterSense-labeled and 1.1 gpf [1 point]; Showerheads: WaterSense-labeled and 1.5 gpm [1 point]; Kitchen faucets: 1.5 gpm and lav faucets: WaterSense-labeled and 1.0 gpm [1 point]~~

OR

~~Reduce total indoor water consumption by at least 30% compared to the baseline indoor water consumption chart, through a combination of your choosing. [6 points maximum]~~

YES  NO  MAYBE **4**

**4.3 Leaks and Water Metering**

Conduct pressure-loss tests and visual inspections to determine if there are any leaks; fix any leaks found; and meter or submeter each dwelling unit with a technology capable of tracking water use. Separately meter outdoor water consumption.

YES  NO  MAYBE **4**

**4.4 Efficient Plumbing Layout and Design**

To minimize water loss from delivering hot water, the hot water delivery system shall store no more than 0.5 gallons of water in any piping/manifold between the hot water source and any hot water fixture.

YES  NO  MAYBE **6 max**

**4.5 Water Reuse**

Harvest, treat, and reuse rainwater and/or greywater to meet a portion of the project's total water needs: 10% reuse [3 points]; 20% reuse [4 points]; 30% reuse [5 points]; 40% reuse [6 points]

YES  NO  MAYBE **8**

**4.6 Access to Potable Water During Emergencies**

Provide residents with access to potable water in the event of an emergency that disrupts normal access to potable water, including disruptions related to power outages that prevent pumping water to upper floors of multifamily buildings or pumping of water from on-site wells, per one of the three options.

SUBTOTAL OPTIONAL POINTS

**5. ENERGY EFFICIENCY**

YES  NO  MAYBE **M**

**5.1a Building Performance Standard** (New Construction: single-family and low-rise multifamily)

Certify each dwelling unit in the project through the ENERGY STAR New Homes program.

YES  NO  MAYBE **M**

N/A

**5.1b Building Performance Standard** (New Construction: mid-rise and high-rise multifamily, with some exceptions)

Certify the project through the ENERGY STAR Multifamily High-Rise program (MFHR) OR follow the combined MFHR and LEED Commissioning Path outlined in the criterion.

*Exception:* Multifamily buildings that are four or five stories, in which all dwelling units have their own heating, cooling and hot water systems, should comply with Criterion 5.1a and certify each dwelling unit per ENERGY STAR Certified New Homes.



M = MANDATORY  
# = OPTIONAL POINTS

ENERGY EFFICIENCY (continued)	
<input type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE  <span style="color: red; font-size: 2em;">N/A</span>	<p><b>M 5.1c Building Performance Standard</b> (<i>Substantial and Moderate Rehab: single-family and low-rise multifamily</i>) For each dwelling unit, achieve a HERS Index score of 85 or less.  <i>Exception:</i> Substantial rehabs of buildings with walls made only of brick/masonry that are three stories or fewer and built before 1980, as well as moderate rehabs of buildings that are three stories or fewer and built before 1980, are permitted to instead achieve a HERS Index score of 100 or less for each dwelling unit.</p>
<input type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE  <span style="color: red; font-size: 2em;">N/A</span>	<p><b>M 5.1d Building Performance Standard</b> (<i>Substantial and Moderate Rehab: mid-rise and high-rise</i>) Demonstrate that the energy performance of the completed building will be equivalent to ASHRAE 90.1-2010 using an energy model created by a qualified energy services provider per Appendix G.</p>
<input type="radio"/> YES <input checked="" type="radio"/> NO <input type="radio"/> MAYBE	<p><b>5 to 12 5.2a Additional Reductions in Energy Use</b> Design and construct a building that is projected to be at least 5% more efficient than what is required of the project by Criteria 5.1a–d. (Projects receiving points in Criterion 5.2a may not receive points per Criterion 5.2b)</p>
<input type="radio"/> YES <input checked="" type="radio"/> NO <input type="radio"/> MAYBE	<p><b>12 5.2b Advanced Certification: Nearing Net Zero</b> Certify the project in a program that requires advanced levels of building envelope performance such as PHIUS, Living Building Challenge and/or DOE Zero Energy Ready Home. (Projects receiving points in Criterion 5.2b may not receive points per Criterion 5.2a)</p>
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE	<p><b>M 5.3 Sizing of Heating and Cooling Equipment</b> Size and select heating and cooling equipment in accordance with the Air Conditioning Contractors of America (ACCA) Manuals J and S or ASHRAE handbooks.</p>
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE	<p><b>M 5.4 ENERGY STAR Appliances</b> <span style="color: blue;">- KDC</span> If providing appliances, install ENERGY STAR clothes washers, dishwashers and refrigerators. If appliances will not be installed or replaced at this time, specify that, at the time of installation or replacement, ENERGY STAR models must be used.</p>
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE	<p><b>M 5.5 Lighting</b> <span style="color: blue;">Will put 1/2 m sensor to meet requirements</span> Follow the guidance for high-efficacy lighting controls and other characteristics for all permanently installed lighting fixtures in project dwelling units, common spaces and exterior</p>
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE <input type="radio"/> YES <input checked="" type="radio"/> NO <input type="radio"/> MAYBE	<p><b>M 5.6 Electricity Meter</b> <i>New Construction and Substantial Rehab</i> <b>6</b> <i>Moderate Rehab (Except for single-room occupancy and designated supportive housing dwelling units)</i> Install individual or submetered electric meters for all dwelling units.</p>
<input type="radio"/> YES <input checked="" type="radio"/> NO <input type="radio"/> MAYBE	<p><b>4 5.7a Photovoltaic/Solar Hot Water Ready</b> Orient, design, engineer, wire and/or plumb the development to accommodate installation of photovoltaic (PV) or solar hot water system in the future.</p>





M = MANDATORY  
# = OPTIONAL POINTS

**ENERGY EFFICIENCY** *(continued)*

YES  NO  MAYBE **10 max**

**5.7b Renewable Energy**

Install photovoltaic (PV) panels or other electric-generating renewable energy source to provide a specified percentage of the project's estimated total energy demand or water heating energy demand. *(Projects may earn points through Criterion 5.7b or 5.8b, but not both.)*

	5%	10%	20%	30%	40%
Single-story/Single-family	—	—	6	8	10
2 to 3 stories	—	6	8	10	—
4 stories or more	6	8	10	—	—

YES  NO  MAYBE **8**

**5.8a Resilient Energy Systems: Floodproofing**

Conduct floodproofing, including perimeter floodproofing (barriers/shields), of lower floors. Design and install building systems as specified by the full criterion so that the operation of those systems will not be grossly affected in case of a flood.

YES  NO  MAYBE **4 to 8**

**5.8b Resilient Energy Systems: Islandable Power**

Provide emergency power through an islandable photovoltaic (PV) system or an efficient and portable generator that will offer at least limited electricity for critical circuits during power outages per one of the three options listed. *(Projects may earn points through Criterion 5.7b or 5.8b, but not both.)*

SUBTOTAL OPTIONAL POINTS

**6. MATERIALS**

YES  NO  MAYBE **M**

**6.1 Low/No VOC Paints, Coatings and Primers**

All interior paints and primers must have VOC levels, in grams per liter, less than or equal to the thresholds established by South Coast Air Quality Management District (SCAQMD) Rule 1113.

YES  NO  MAYBE **M**

**6.2 Low/No VOC Adhesives and Sealants**

All adhesives and sealants (including caulks) must have VOC levels, in grams per liter, less than or equal to the thresholds established by the South Coast Air Quality Management District Rule 1168.

YES  NO  MAYBE **3 max**

**6.3 Recycled Content Material**

Incorporate building materials that are composed of at least 25% post-consumer recycled content or at least 50% post-industrial recycled content. *[1 point]*

Building materials that make up at least 75% of their project component each receive *1 point*.

YES  NO  MAYBE **4 max**

**6.4 Regional Materials**

Use products that were extracted, processed and manufactured within 500 miles of the project for a minimum of 50%, based on cost, of the building materials' value.

Select any or all of these options (each material can qualify for *1 point*):

- Framing materials
- Exterior materials (e.g., siding, masonry, roofing)
- Flooring materials
- Concrete/cement and aggregate material
- Drywall/interior sheathing materials



M = MANDATORY  
# = OPTIONAL POINTS

MATERIALS (continued)	
<input type="radio"/> YES <input checked="" type="radio"/> NO <input type="radio"/> MAYBE	<b>1</b> <b>6.5 Certified, Salvaged and Engineered Wood Products</b> For at least 25% of all structural wood products, by cost or value, commit to using either FSC-certified, salvaged products or engineered framing materials without urea formaldehyde.
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE	<b>M</b> <b>6.6 Composite Wood Products that Emit Low/No Formaldehyde</b> All composite wood products must be certified as compliant with California 93120 Phase 2 <b>OR</b> , if using a composite wood product that does not comply with California 93120 Phase 2, all exposed edges and sides must be sealed with low-VOC sealants, per Criterion 6.2.
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE	<b>M</b> <b>6.7a Environmentally Preferable Flooring</b> Do not install carpets in building entryways, laundry rooms, bathrooms, kitchens/kitchenettes, utility rooms or any rooms built on foundation slabs. Where installed, all carpet products must meet the Carpet and Rug Institute's Green Label or Green Label Plus certification for carpet, pad and carpet adhesives. Any hard surface flooring products must be either ceramic tile or solid unfinished hardwood floors, or meet the Scientific Certification System's FloorScore program criteria (including pre-finished hardwood flooring).
<input type="radio"/> YES <input checked="" type="radio"/> NO <input type="radio"/> MAYBE	<b>6</b> <b>6.7b Environmentally Preferable Flooring: Throughout Building</b> Use non-vinyl, non-carpet floor coverings throughout each building in the project.
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE	<b>M</b> <b>6.8 Mold Prevention: Surfaces</b> Use materials that have durable, cleanable surfaces throughout bathrooms, kitchens and laundry rooms. Materials installed in these rooms should not be prone to deterioration due to moisture intrusion or encourage the growth of mold.
<input checked="" type="radio"/> YES <input type="radio"/> NO <input type="radio"/> MAYBE	<b>M</b> <b>6.9 Mold Prevention: Tub and Shower Enclosures</b> Use moisture-resistant backing materials such as cement board, fiber cement board or equivalent per ASTM #D3273 behind tub/shower enclosures. Projects using a one-piece fiberglass tub/shower enclosure are exempt from this requirement.
<input type="radio"/> YES <input type="radio"/> NO <input checked="" type="radio"/> MAYBE	<b>12 max</b> <b>6.10 Asthmagin-Free materials</b> Do not install products that contain ingredients that are known to cause or trigger asthma. Key products to avoid are: <ul style="list-style-type: none"> <li>• <i>Insulation:</i> Do not use spray polyurethane foam (SPF) or formaldehyde-containing fiberglass batts. [4 points]</li> <li>• <i>Flooring:</i> Do not use flexible vinyl (PVC) roll or sheet flooring or carpet-backed with vinyl with phthalates. Do not use fluid applied finish floors. [4 points]</li> <li>• <i>Wall coverings:</i> Do not use wallpaper made from vinyl (PVC) with phthalates or site-applied high-performance coatings that are epoxy or polyurethane based. [4 points]</li> <li>• <i>Composite wood:</i> Use only ULEF products for cabinetry, subflooring and other interior composite wood uses. [4 points]</li> </ul>
<input type="radio"/> YES <input type="radio"/> NO <input checked="" type="radio"/> MAYBE	<b>5</b> <b>6.11 Reduced Heat-Island Effect: Roofing</b> Use an ENERGY STAR-certified roofing product for 100% of the roof area <b>OR</b> install a "green" (vegetated) roof for at least 50% of the roof area and ENERGY STAR-certified roofing product for the remainder of the roof area.



M = MANDATORY  
# = OPTIONAL POINTS

**MATERIALS** (continued)

YES  NO  MAYBE

**M or**  
**6 max**

**6.12 Construction Waste Management**

Commit to following a waste management plan that reduces non-hazardous construction and demolition waste through recycling, salvaging or diversion strategies through one of the three options. Achieve optional points by going above and beyond the requirement.

YES  NO  MAYBE

**3**

**6.13 Recycling Storage**

Provide separate bins for the collection of trash and recycling for each dwelling unit and all shared community rooms (if applicable).

Additionally, in multifamily buildings, provide at least one easily accessible, permanent and dedicated indoor area for the collection and storage of materials for recycling. In single-family homes, points will be accrued only if curb-side recycling pickup is available.

Collected materials should include, at a minimum, paper, cardboard, glass, metals and plastics.

SUBTOTAL OPTIONAL POINTS

**7. HEALTHY LIVING ENVIRONMENT**

YES  NO  MAYBE

**M**

**7.1 Ventilation**

*New Construction and Substantial Rehab*

YES  NO  MAYBE

**12 max**

*Moderate Rehab*

For each dwelling unit, in full accordance with ASHRAE 62.2-2010, install a local mechanical exhaust system in each bathroom [4 points], a local mechanical exhaust system in each kitchen [4 points], and a whole-house mechanical ventilation system [4 points].

For each multifamily building of four stories and more, in full accordance with ASHRAE 62.1-2010, install a mechanical ventilation system for all hallways and common spaces [3 points].

For all project types, in addition to the above requirements:

- All systems and associated ductwork must be installed per manufacturer’s recommendations.
- All individual bathroom fans must be ENERGY STAR labeled, wired to turn on with the light switch, and equipped with a humidistat sensor, timer or other control (e.g., occupancy sensor, delay off switch, ventilation controller).
- If using central ventilation systems with rooftop fans, each rooftop fan must be direct-drive and variable-speed with speed controller mounted near the fan. Fans with design CFM 300-2000 must also have an ECM motor.

YES  NO  MAYBE

**M**

**7.2 Clothes Dryer Exhaust**

Clothes dryers must be exhausted directly to the outdoors using rigid-type ductwork (except for condensing dryers, which must be plumbed to a drain).



M = MANDATORY  
# = OPTIONAL POINTS

**HEALTHY LIVING ENVIRONMENT** *(continued)*

YES  NO  MAYBE

**M 7.3 Combustion Equipment**

For new construction and rehab projects, specify power-vented or direct vent equipment when installing any new combustion appliance for space or water heating that will be located within the conditioned space.

In Substantial and Moderate Rehabs, if there is any combustion equipment located within the conditioned space for space or water heating that is not power-vented or direct vent and that is not scheduled for replacement, conduct initial combustion safety testing per the given guidelines.

Install one hard-wired carbon monoxide (CO) alarm with battery backup function for each sleeping zone, placed per National Fire Protection Association (NFPA) 720.

YES  NO  MAYBE

**9 or 11 7.4 Elimination of Combustion Within the Conditioned Space**

No combustion equipment may be used for cooking (to include, but not limited to ranges, cooktops, stoves, ovens) as part of the building project [9 points] **OR** no combustion equipment may be used as part of the building project [11 points].

YES  NO  MAYBE

**M 7.5 Vapor Retarder Strategies**

Install vapor barriers that meet specified criteria appropriate for the foundation type.

YES  NO  MAYBE

**M 7.6 Water Drainage** *(For all New Construction projects and those Rehab projects that include replacing particular assemblies called out below)*

Provide drainage of water away from walls, windows and roofs by implementing the list of techniques.

YES  NO  MAYBE

**M 7.7 Mold Prevention: Water Heaters**

Provide adequate drainage for water heaters that includes drains or catch pans with drains piped to the exterior of the dwelling.

YES  NO  MAYBE

**M 7.8 Radon Mitigation**

For New Construction in EPA Zone 1 areas, install passive radon-resistant features below the slab and a vertical vent pipe with junction box within 10 feet of an electrical outlet in case an active system should prove necessary in the future. For Substantial Rehab projects in EPA Zone 1, test and mitigate per the specified protocols. *Add to dwgs*

YES  NO  MAYBE

*N/A*

**M 7.9 Garage Isolation**

- Provide a continuous air barrier between the conditioned space and any garage space to prevent the migration of any contaminants into the living space. Visually inspect common walls and ceilings between attached garages and living spaces to ensure that they are air-sealed before insulation is installed.
- Do not install ductwork or air handling equipment in a garage.
- Fix all connecting doors between conditioned space and garage with gaskets or otherwise make substantially airtight with weather stripping.
- Install one hard-wired carbon monoxide (CO) alarm with battery backup function for each sleeping zone of the project, placed per National Fire Protection Association (NFPA) 720.

YES  NO  MAYBE

**M 7.10 Integrated Pest Management**

Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate nontoxic sealing methods to prevent pest entry.



M = MANDATORY  
# = OPTIONAL POINTS

**HEALTHY LIVING ENVIRONMENT** *(continued)*

YES  NO  MAYBE

9

**7.11a Beyond ADA: Universal Design** *(New Construction)*

Design a minimum of 15% of the dwelling units (no fewer than one) in accordance with ICC/ANSI A117.1, Type A, Fully Accessible guidelines. Design the remainder of the ground-floor units and elevator-reachable units in accordance with ICC/ANSI A117.1, Type B.

YES  NO  MAYBE

7 or 9

**7.11b Beyond ADA: Universal Design** *(Substantial and Moderate Rehab)*

Design a minimum of 10% of the dwelling units (one, at minimum) in accordance with ICC/ANSI A117.1, Type A, Fully Accessible guidelines. [7 points]

N/A

*For an additional 2 points:* Design the remainder of the ground-floor units and elevator-reachable units with accessible unit entrances designed to accommodate people who use a wheelchair.

YES  NO  MAYBE

M

**7.12 Active Design: Promoting Physical Activity Within the Building**

Situate at least one building stairway per the criterion to encourage use **OR** emphasize at least one strategy inside the building designed to increase frequency and duration of physical activity per the criterion.

YES  NO  MAYBE

10

**7.13 Active Design: Staircases and Building Circulation**

A staircase must be accessible and visible from the main lobby as well as visible within a 25-foot walking distance from any edge of lobby. Ensure that no turns or obstacles prevent visibility of or accessibility to the qualifying staircase from the lobby, and that the staircase is encountered before or at the same time as the elevators.

From the corridor, accessible staircases should be made visible by: Providing transparent glazing of at least 10 square feet (1 square meter) at all stair doors or at a side light **OR** providing magnetic door holds on all doors leading to the stairs **OR** removing door enclosures/ vestibules.

YES  NO  MAYBE

9

**7.14 Interior and Outdoor Activity Spaces for Children and Adults**

Provide an on-site dedicated recreation space with exercise or play opportunities for adults and/or children that is open and accessible to all residents; see criterion for specifics.

YES  NO  MAYBE

M

**7.15 Reduce Lead Hazards in Pre-1978 Buildings** *(Substantial Rehab)*

Conduct lead risk assessment or inspection to identify lead hazards, then control for these per EPA or state/local laws and requirements.

N/A

YES  NO  MAYBE

10

**7.16 Smoke-Free Building**

Implement and enforce a no-smoking policy in all common and individual living areas, and within a 25-foot perimeter around the exterior of all residential projects.

SUBTOTAL OPTIONAL POINTS



M = MANDATORY  
# = OPTIONAL POINTS

**8. OPERATIONS, MAINTENANCE + RESIDENT ENGAGEMENT**

YES  NO  MAYBE **M** **8.1 Building Operations & Maintenance (O&M) Manual and Plan** *(For all multifamily projects)*  
Develop a manual with thorough building operations and maintenance guidance and a complementary plan. The manual and plan should be developed over the course of the project design, development and construction stages, and should include sections/chapters addressing the list of topics.

YES  NO  MAYBE **M** **8.2 Emergency Management Manual** *(For all multifamily projects)*  
Provide a manual on emergency operations targeted toward operations and maintenance staff and other building-level personnel. The manual should address responses to various types of emergencies, leading with those that have the greatest probability of negatively affecting the project. The manual should provide guidance as to how to sustain the delivery of adequate housing throughout an emergency and cover a range of topics, including but not limited to:  

- communication plans for staff and residents
- useful contact information for public utility and other service providers
- infrastructure and building “shutdown” procedures

YES  NO  MAYBE **M** **8.3 Resident Manual**  
Provide a guide for homeowners and renters that explains the intent, benefits, use and maintenance of their home’s green features and practices. The Resident Manual should encourage green and healthy activities per the list of topics.

YES  NO  MAYBE **M** **8.4 Resident and Property Staff Orientation**  
Provide a comprehensive walk-through and orientation for all residents, property manager(s) and buildings operations staff. Use the appropriate manuals (see Criteria 8.1, 8.2, 8.3) as the base of the curriculum, and review the project’s green features, operations and maintenance procedures, and emergency protocols.

YES  NO  MAYBE **M** **8.5 Project Data Collection and Monitoring System: 100% Owner-Paid Utility Accounts; 15% Tenant-Paid Utility Accounts**  
*For rental properties:* Collect and monitor project energy and water performance data for 100% of owner-paid utilities and 15% of tenant-paid utilities for at least 5 years. This data must be maintained in a manner that allows staff to easily access and monitor it, enabling them to make informed operations and capital planning decisions. Also allow Enterprise access to this data.  
*For owner-occupied units:* Collect and monitor energy and water performance data in a manner that allows for easy access and review and provides the ability to influence home operations. Also allow Enterprise access to this data.

YES  NO  MAYBE **7 or 11** **8.6 Project Data Collection and Monitoring System: Greater than 15% Tenant-Paid Utility Accounts**  
Collect and monitor project energy and water performance data for at least 5 years. This data must be maintained in a manner that allows staff to easily access and monitor it, enabling them to make informed operations and capital planning decisions. Also allow Enterprise access to this data. 16–60% of units [7 points]; 60–100% of units [11 points].

SUBTOTAL OPTIONAL POINTS

TOTAL OPTIONAL POINTS



# National Program Requirements

## ENERGY STAR Certified Homes, Version 3 (Rev. 08)

### Eligibility Requirements

The following homes are eligible to earn the ENERGY STAR:

- Detached dwelling units <sup>1</sup> (e.g. single family homes); OR
- Dwelling units <sup>1</sup> in any multifamily building with 4 units or fewer; OR
- Dwelling units <sup>1</sup> in multifamily buildings with 3 stories or fewer above-grade <sup>2,3</sup>; OR
- Dwelling units <sup>1</sup> in multifamily buildings with 4 or 5 stories above-grade <sup>2,3</sup> that have their own heating, cooling, and hot water systems <sup>4</sup>, separate from other units, and where dwelling units occupy 80% or more of the occupiable <sup>3</sup> square footage of the building <sup>5</sup>. When evaluating mixed-use buildings for eligibility, exclude commercial / retail space when assessing whether the 80% threshold has been met.

Dwelling units <sup>1</sup> in multifamily buildings that are not eligible to earn the ENERGY STAR through the Certified Homes Program may be eligible through the Multifamily High Rise Program. For more information, visit: [www.energystar.gov/mfhr/eligibility](http://www.energystar.gov/mfhr/eligibility).

Note that compliance with these requirements is not intended to imply compliance with all local code requirements that may be applicable to the home to be built. <sup>6</sup>

### Partnership, Training, and Credentialing Requirements

Builders, Raters, and HVAC contractors must meet the following requirements prior to certifying homes:

- Builders are required to sign an ENERGY STAR Partnership Agreement and complete the online Version 3 Builder Orientation, which can be found at [www.energystar.gov/homesPA](http://www.energystar.gov/homesPA).
- HVAC installing contractors are required to be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO). An explanation of this process can be found at [www.energystar.gov/newhomesHVAC](http://www.energystar.gov/newhomesHVAC).
- Raters and Field Inspectors are required to complete training, which can be found at [www.energystar.gov/newhomestraining](http://www.energystar.gov/newhomestraining).

### ENERGY STAR Certification Process <sup>7</sup>

1. The certification process provides flexibility to select a custom combination of measures for each home that is equivalent in performance to the minimum requirements of the ENERGY STAR Reference Design Home, Exhibit 1, as assessed through energy modeling. Use a RESNET-accredited Home Energy Rating software program to determine the ENERGY STAR HERS Index Target, which is the highest numerical HERS Index value that each rated home may achieve to earn the ENERGY STAR. <sup>8</sup>
2. Using the same software program, configure the preferred set of efficiency measures for the home to be certified and verify that the resulting HERS Index meets or exceeds the ENERGY STAR HERS Index Target, as determined in Step 1.

Note that, regardless of the measures selected, the Mandatory Requirements for All Certified Homes in Exhibit 2 are also required and impose certain constraints on the efficiency measures selected (e.g., insulation levels, insulation installation quality, window performance, duct leakage). Furthermore, on-site power generation may only be used to meet the ENERGY STAR HERS Index Target for homes that are larger than the Benchmark Home and only for the incremental change in the ENERGY STAR HERS Index Target caused by the Size Adjustment Factor. <sup>9</sup>

3. Construct the home using the measures selected in Step 2 and the Mandatory Requirements for All Certified Homes, Exhibit 2.
4. Using a Rater, verify that all requirements have been met in accordance with the Mandatory Requirements for All Certified Homes and with RESNET's On-Site Inspection Procedures for Minimum Rated Features. <sup>10</sup> The Rater is required to keep electronic or hard copies of the completed and signed Rater checklists and the HVAC Design Report.

The Rater must review all items on the Rater checklists. Raters are expected to use their experience and discretion to verify that the overall intent of each inspection checklist item has been met (i.e., identifying major defects that undermine the intent of the checklist item versus identifying minor defects that the Rater may deem acceptable).

In the event that a Rater finds an item that is inconsistent with the intent of the checklists, the home cannot earn the ENERGY STAR until the item is corrected. If correction of the item is not possible, the home cannot earn the ENERGY STAR. In the event that an item on a Rater checklist cannot be inspected by the Rater, the home also cannot earn the ENERGY STAR. The only exceptions to this rule are in the Thermal Enclosure System Section of the Rater Field Checklist, where the builder may assume responsibility for verifying a maximum of eight items. This option shall only be used at the discretion of the Rater. When exercised, the builder's responsibility will be formally acknowledged by the builder signing the checklist for the item(s) that they verified.

In the event that a Rater is not able to determine whether an item is consistent with the intent (e.g., an alternative method of meeting a checklist requirement has been proposed), then the Rater shall consult their Provider. If the Provider also cannot make this determination, then the Rater or Provider shall report the issue to EPA prior to project completion at: [energystarhomes@energystar.gov](mailto:energystarhomes@energystar.gov) and will typically receive an initial response within 5 business days. If EPA believes the current program requirements are sufficiently clear to determine whether the intent has been met, then this guidance will be provided to the partner and enforced beginning with the house in question. In contrast, if EPA believes the program requirements require revisions to make the intent clear, then this guidance will be provided to the partner but only enforced for homes permitted after a specified transition period after the release of the revised program requirements, typically 60 days in length.

This process will allow EPA to make formal policy decisions as partner questions arise and to disseminate these policy decisions through the periodic release of revised program documents to ensure consistent application of the program requirements.



# National Program Requirements

## ENERGY STAR Certified Homes, Version 3 (Rev. 08)

### Exhibit 1: ENERGY STAR Reference Design Home

The ENERGY STAR Reference Design Home is the set of efficiency features modeled to determine the ENERGY STAR HERS Index Target for each home pursuing certification. Therefore, while the features below are not mandatory, if they are not used then other measures will be needed to achieve the ENERGY STAR HERS Index Target. In addition, note that the Mandatory Requirements for All Certified Homes, Exhibit 2, contain additional requirements such as total duct leakage limits, minimum allowed insulation levels, and minimum allowed fenestration performance. Therefore, EPA recommends that partners review the documents in Exhibit 2 prior to selecting measures.

Hot Climates (2009 IECC Zones 1,2,3) <sup>12</sup>	Mixed and Cold Climates (2009 IECC Zones 4,5,6,7,8) <sup>12</sup>					
<b>Cooling Equipment (Where Provided)</b>						
<ul style="list-style-type: none"> <li>Cooling equipment modeled at the applicable efficiency levels below:</li> </ul>						
<ul style="list-style-type: none"> <li>14.5 SEER / 12 EER AC,</li> <li>Heat pump (See Heating Equipment)</li> </ul>	<ul style="list-style-type: none"> <li>13 SEER AC,</li> <li>Heat pump (See Heating Equipment)</li> </ul>					
<b>Heating Equipment</b>						
<ul style="list-style-type: none"> <li>Heating equipment modeled at the applicable efficiency levels below, dependent on fuel and system type:</li> </ul>						
<ul style="list-style-type: none"> <li>80 AFUE gas furnace,</li> <li>80 AFUE oil furnace,</li> <li>80 AFUE boiler,</li> <li>8.2 HSPF / 14.5 SEER / 12 EER air-source heat pump with electric or dual-fuel backup</li> </ul>	<ul style="list-style-type: none"> <li>90 AFUE gas furnace,</li> <li>85 AFUE ENERGY STAR oil furnace,</li> <li>85 AFUE ENERGY STAR boiler,</li> <li>Heat pump, with efficiency as follows:               <ul style="list-style-type: none"> <li>CZ 4: 8.5 HSPF / 14.5 SEER / 12 EER air-source w/ electric or dual-fuel backup,</li> <li>CZ 5: 9.25 HSPF / 14.5 SEER / 12 EER air-source w/ electric or dual-fuel backup,</li> <li>CZ 6: 9.5 HSPF / 14.5 SEER / 12 EER air-source w/ electric or dual-fuel backup,</li> <li>CZ 7-8: 3.5 COP / 16.1 EER ground-source w/ electric or dual-fuel backup</li> </ul> </li> </ul>					
<b>Envelope, Windows, &amp; Doors</b>						
<ul style="list-style-type: none"> <li>A radiant barrier modeled if more than 10 linear feet of ductwork are located in an unconditioned attic.</li> </ul>	<ul style="list-style-type: none"> <li>No radiant barrier modeled.</li> </ul>					
<ul style="list-style-type: none"> <li>Insulation levels modeled to 2009 IECC levels and Grade I installation per RESNET standards.</li> <li>Infiltration rates modeled as follows:</li> </ul>						
6 ACH50 in CZs 1,2		5 ACH50 in CZs 3,4		4 ACH50 in CZs 5,6,7	3 ACH50 in CZ 8	
<ul style="list-style-type: none"> <li>Windows and doors modeled, as illustrated below:</li> </ul>						
Window U-Value:	0.60 in CZs 1,2	0.35 in CZ 3	0.32 in CZ 4	0.30 in CZs 4 C,5,6,7,8		
Window SHGC:	0.27 in CZs 1,2	0.30 in CZ 3	0.40 in CZ 4	Any in CZs 4 C,5,6,7,8		
Door U-value:	Opaque: 0.21	≤½ lite: 0.27	>½ lite: 0.32			
Door SHGC:	Opaque: Any	≤½ lite: 0.30	>½ lite: 0.30			
<b>Water Heater</b>						
<ul style="list-style-type: none"> <li>DHW equipment modeled with the following efficiency levels as applicable:</li> </ul>						
Gas:	30 Gal = 0.63 EF	40 Gal = 0.61 EF	50 Gal = 0.59 EF	60 Gal = 0.57 EF	70 Gal = 0.55 EF	80 Gal = 0.53 EF
Electric:	30 Gal = 0.94 EF	40 Gal = 0.93 EF	50 Gal = 0.92 EF	60 Gal = 0.91 EF	70 Gal = 0.90 EF	80 Gal = 0.89 EF
Oil:	30 Gal = 0.55 EF	40 Gal = 0.53 EF	50 Gal = 0.51 EF	60 Gal = 0.49 EF	70 Gal = 0.47 EF	80 Gal = 0.45 EF
<b>Thermostat &amp; Ductwork</b>						
<ul style="list-style-type: none"> <li>Programmable thermostat modeled.</li> <li>Supply ducts in unconditioned attics modeled with R-8 insulation; all other ducts in unconditioned space modeled with R-6 insulation.</li> <li>Duct leakage to outdoors modeled at the greater of ≤ 4 CFM25 per 100 sq. ft. of conditioned floor area or ≤ 40 CFM25.</li> </ul>						
<b>Lighting &amp; Appliances</b>						
<ul style="list-style-type: none"> <li>ENERGY STAR refrigerators, dishwashers, and ceiling fans modeled.</li> <li>ENERGY STAR light bulbs modeled in 80% of RESNET-defined Qualifying Light Fixture Locations.</li> </ul>						





# National Program Requirements ENERGY STAR Certified Homes, Version 3 (Rev. 08)

## Exhibit 2: Mandatory Requirements for All Certified Homes

Party Responsible	Mandatory Requirements
<b>Rater</b>	<ul style="list-style-type: none"> <li>• Completion of Rater Design Review Checklist</li> <li>• Completion of Rater Field Checklist</li> </ul>
<b>HVAC System Designer</b>	<ul style="list-style-type: none"> <li>• Completion of HVAC Design Report</li> </ul>
<b>HVAC Installing Contractor</b>	<ul style="list-style-type: none"> <li>• Completion of HVAC Commissioning Checklist</li> </ul>
<b>Builder</b>	<ul style="list-style-type: none"> <li>• Completion of Water Management System Builder Requirements</li> </ul>

## Exhibit 3: Benchmark Home<sup>9</sup>

Bedrooms in Home to be Built	0	1	2	3	4	5	6	7	8
<b>Conditioned Floor Area</b> Benchmark Home	1,000	1,000	1,600	2,200	2,800	3,400	4,000	4,600	5,200

### Effective Date

All homes with a date of final inspection on or after 07/01/2012 (i.e., the date at which all of the field inspections are complete for the home, not necessarily the date when the label is issued) shall be certified under Version 3, with the following exceptions:

- Regional program requirements and associated implementation schedules have been developed for homes in CA, FL, GU, HI, the Northern Mariana Islands, and PR.
- Version 3.1 implementation timelines have been defined for the States listed in Exhibit 4. Homes permitted prior to the implementation timeline are eligible to earn the ENERGY STAR under Version 3 of the program requirements.

EPA intends to implement the Version 3.1 program requirements for homes permitted starting one year after state-level implementation of the 2012 IECC, 2015 IECC, or an equivalent code. However, EPA will make a final determination of the implementation timeline on a state-by-state basis.

## Exhibit 4: ENERGY STAR Certified Homes Version 3.1 Implementation Timeline

State	Applicable to Homes with the Following Permit Date
MA	On or after 01/01/2015
DC, IL, MD, RI	On or after 04/01/2015 (except for Calvert County and St. Mary's County in MD, for which the applicable permit date is on or after 07/01/2015)
IA	On or after 06/01/2015
DE	On or after 12/01/2015
MT, OR, WA	On or after 01/01/2016
MN, VT	On or after 04/01/2016
NV	On or after 07/01/2016
NJ	On or after 04/01/2017
TX	On or after 10/01/2017

### Notes:

1. A dwelling unit, as defined by the 2009 IECC, is a single unit that provides complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.
2. Any above-grade story with 20% or more occupiable space, including commercial space, shall be counted towards the total number of stories for the purpose of determining eligibility to participate in the program. The definition of an 'above-grade story' is one for which more than half of the gross surface area of the exterior walls is above-grade. All below-grade stories, regardless of type, shall not be included when evaluating eligibility.
3. Per ASHRAE 62.2-2010, occupiable space is any enclosed space inside the pressure boundary and intended for human activities or continual human occupancy, including, but not limited to, areas used for living, sleeping, dining, and cooking, toilets, closets, halls, storage and utility areas, and laundry areas.
4. Central domestic hot water systems are allowed if solar energy provides  $\geq 50\%$  of the domestic hot water for the residential units.



# National Program Requirements

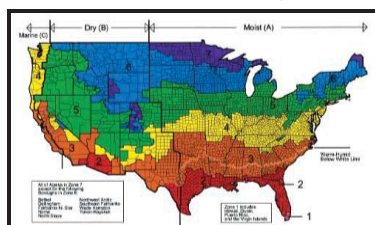
## ENERGY STAR Certified Homes, Version 3 (Rev. 08)

5. Units in multifamily buildings with 4 or 5 stories above-grade, including mixed-use buildings, that have their own heating, cooling, & hot water systems, separate from other units, *but where dwelling units occupy < 80%* of the residential (i.e., excluding commercial / retail space for mixed-use buildings) occupiable square footage of the building may earn the ENERGY STAR through either the Certified Homes Program or the Multifamily High Rise (MFHR) Program if permitted prior to July 1, 2012. Units in buildings of this type that are permitted after this date shall only be eligible to earn the ENERGY STAR through the MFHR Program.
6. Where requirements of the local codes, manufacturers' installation instructions, engineering documents, or regional ENERGY STAR programs overlap with these program requirements, EPA offers the following guidance:
  - a. Where the overlapping requirements exceed the ENERGY STAR requirements, these overlapping requirements shall be met;
  - b. Where overlapping requirements conflict with a requirement of the ENERGY STAR program (e.g., slab insulation is prohibited to allow visual access for termite inspections), then the conflicting requirement within these program requirements shall not be met. Certification shall only be allowed if the Rater has determined that no equivalent option is available that could meet the intent of the conflicting requirement (e.g., switching from exterior to interior slab edge insulation). Note that a home must still meet its ENERGY STAR HERS Index Target. Therefore, other efficiency measures may be needed to compensate for the omission of the conflicting requirement.
7. Prior to Rev. 08, homes were permitted to be certified using either a Prescriptive Path or a Performance Path. Homes with a permit date on or after 60 days after the release of Rev. 08 shall only use the Performance Path, which has been renamed the ENERGY STAR Certification Process. To minimize disruption to projects that are in process, homes with a permit date before 09/01/2015 are permitted to use a modified version of the Prescriptive Path in lieu of the Performance Path. For more information about this compliance option, visit: [www.energystar.gov/v3prescriptivepath](http://www.energystar.gov/v3prescriptivepath).
8. The software program shall automatically determine (i.e., without relying on a user-configured ENERGY STAR Reference Design) this target for each rated home by following the ENERGY STAR HERS Index Target Procedure, Version 3 (Rev. 08), available on EPA's website.
9. The average-size home with a specific number of bedrooms is termed the "Benchmark Home". The conditioned floor area of a Benchmark Home (CFA<sub>Benchmark Home</sub>) is determined by selecting the appropriate value from Exhibit 3. For homes with more than 8 bedrooms, the CFA<sub>Benchmark Home</sub> shall be determined by multiplying 600 sq. ft. by the total number of bedrooms & adding 400 sq. ft. A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

An egress window, as defined in 2009 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

  - have a sill height of not more than 44 in. above the floor; AND
  - have a minimum net clear opening of 5.7 sq. ft.; AND
  - have a minimum net clear opening height of 24 in.; AND
  - have a minimum net clear opening width of 20 in.; AND
  - be operational from the inside of the room without the use of keys, tools or special knowledge.
10. The term 'Rater' refers to the person completing the third-party inspections required for certification. This person shall: a) be a certified Home Energy Rater, Rating Field Inspector, or an equivalent designation as determined by a Verification Oversight Organization such as RESNET; and, b) have attended and successfully completed an EPA-recognized training class. See [www.energystar.gov/newhomestraining](http://www.energystar.gov/newhomestraining).

Raters who operate under a Sampling Provider are permitted to verify the Minimum Rated Features of the home and to verify any Checklist Item designated "Rater Verified" using the RESNET-approved sampling protocol for homes outside California, and the CEC-approved sampling protocol for homes in CA. No parties other than Raters are permitted to use sampling. All other items shall be verified for each certified home. For example, no items on the HVAC Commissioning Checklist are permitted to be verified using a sampling protocol.
11. This Revision of the National Program Requirements is required to certify all homes permitted after 07/01/2016, but is allowed to be used for any home permitted or completed prior to this date. The Rater may define the 'permit date' as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.
12. The following map illustrates the Climate Zone boundaries as defined by the 2009 IECC Figure 301.1.





# Rater Design Review Checklist

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

Home Address: _____ City: _____ State: _____ Permit Date: _____		
<b>1. Partnership Status</b>	<b>Must Correct</b>	<b>Rater <sup>1</sup> Verified</b>
1.1 Rater has verified that builder is an ENERGY STAR partner using <a href="http://energystar.gov/partnerlocator">energystar.gov/partnerlocator</a>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Rater has verified that HVAC contractor holds credential required to complete the HVAC Commissioning Checklist, unless all equipment to be installed in home to be certified is an exempted type, in which case check "N/A" <sup>2</sup> <input type="checkbox"/> N/A HVAC Contractor Company Name: _____	<input type="checkbox"/>	<input type="checkbox"/>
<b>2. High-Performance Fenestration</b>		
2.1 Specified fenestration meets or exceeds 2009 IECC requirements <sup>3</sup>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3. High-Performance Insulation</b>		
3.1 Specified ceiling, wall, floor, and slab insulation levels comply with one of the following options:	<input type="checkbox"/>	<input type="checkbox"/>
3.1.1 Meets or exceeds 2009 IECC levels <sup>4,5,6</sup> <b>OR</b> ;	-	-
3.1.2 Achieves $\leq$ 133% of the total UA resulting from the U-factors in 2009 IECC Table 402.1.3, per guidance in Footnote 4d, AND specified home infiltration does not exceed the following: <sup>5,6</sup> 3 ACH50 in CZs 1, 2      2.5 ACH50 in CZs 3, 4      2 ACH50 in CZs 5, 6, 7      1.5 ACH50 in CZ 8	-	-
<b>4. Review of HVAC Design Report <sup>7</sup></b>		
4.1 HVAC Design Report collected for records, with no Items left blank	<input type="checkbox"/>	<input type="checkbox"/>
4.2 HVAC Design Report reviewed by Rater for the following parameters (HVAC Design Report Item # indicated in parenthesis):		
4.2.1 Cooling season and heating season outdoor design temperatures used in loads (3.3) are within the limits defined at <a href="http://energystar.gov/hvacdesigntemps">energystar.gov/hvacdesigntemps</a> for the State and County where the home will be built, or the designer has provided an allowance from EPA to use alternative values <sup>8</sup>	<input type="checkbox"/>	<input type="checkbox"/>
4.2.2 Number of occupants used in loads (3.4) is within $\pm$ 2 of the home to be certified <sup>9</sup>	<input type="checkbox"/>	<input type="checkbox"/>
4.2.3 Conditioned floor area used in loads (3.5) is between zero and 300 sq. ft. larger than the home to be certified	<input type="checkbox"/>	<input type="checkbox"/>
4.2.4 Window area used in loads (3.6) is between zero and 60 sq. ft. larger than the home to be certified	<input type="checkbox"/>	<input type="checkbox"/>
4.2.5 Predominant window SHGC used in loads (3.7) is within 0.1 of predominant value in the home to be certified <sup>10</sup>	<input type="checkbox"/>	<input type="checkbox"/>
4.2.6 Sensible, latent, & total heat gain are documented (3.10 - 3.12) for the orientation of the home to be certified <sup>11</sup>	<input type="checkbox"/>	<input type="checkbox"/>
4.2.7 The variation in total heat gain across orientations (3.13) is $\leq$ 6 kBtuh <sup>11</sup>	<input type="checkbox"/>	<input type="checkbox"/>
4.2.8 Cooling sizing % (4.13) is within the cooling sizing limit (4.15) selected by the HVAC designer	<input type="checkbox"/>	<input type="checkbox"/>
Rater Name: _____ Date of Review: _____		
Rater Signature: _____ Rater Company Name: _____		



# Rater Design Review Checklist ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

(Intentionally Left Blank)



# Rater Field Checklist

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

Home Address: _____		City: _____		State: _____		Permit Date: _____				
Thermal Enclosure System							Must Correct	Builder Verified <sup>1</sup>	Rater Verified <sup>2</sup>	N/A <sup>3</sup>
1. High-Performance Fenestration & Insulation										
1.1 Fenestration meets or exceeds levels specified in Item 2.1 of the Rater Design Review Checklist							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
1.2 Insulation meets or exceeds levels specified in Item 3.1 of the Rater Design Review Checklist							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
1.3 All insulation achieves RESNET-defined Grade I installation. See Footnote 4 for alternatives. <sup>4</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
2. Fully-Aligned Air Barriers <sup>5</sup> At each insulated location below, a complete air barrier is provided that is fully aligned as follows:										
<u>Ceilings:</u> At interior or exterior horizontal surface of ceiling insulation in Climate Zones 1-3; at interior horizontal surface of ceiling insulation in Climate Zones 4-8. Also, at exterior vertical surface of ceiling insulation in all climate zones (e.g., using a wind baffle that extends to the full height of the insulation in every bay or a tabbed baffle in each bay with a soffit vent that prevents wind washing in adjacent bays). <sup>6</sup>										
2.1 Dropped ceilings / soffits below unconditioned attics, and all other ceilings							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Walls:</u> At exterior vertical surface of wall insulation in all climate zones; also at interior vertical surface of wall insulation in Climate Zones 4-8 <sup>7</sup>										
2.2 Walls behind showers, tubs, staircases, and fireplaces							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3 Attic knee walls and skylight shaft walls <sup>8</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4 Walls adjoining porch roofs or garages							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5 Double-walls and all other exterior walls							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
<u>Floors:</u> At exterior vertical surface of floor insulation in all climate zones and, if over unconditioned space, also at interior horizontal surface including supports to ensure alignment. See Footnotes 10 & 11 for alternatives. <sup>9, 10, 11</sup>										
2.6 Floors above garages, floors above unconditioned basements or crawlspaces, and cantilevered floors							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.7 All other floors adjoining unconditioned space (e.g., rim / band joists at exterior wall or at porch roof)							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Reduced Thermal Bridging										
3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the inside face of the exterior wall below and is $\geq R-21$ in CZ 1-5; $\geq R-30$ in CZ 6-8 <sup>12</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2 For slabs on grade in CZ 4-8, 100% of slab edge insulated to $\geq R-5$ at the depth specified by the 2009 IECC and aligned with the thermal boundary of the walls <sup>13, 14</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) $\geq R-21$ in CZ 1-5; $\geq R-30$ in CZ 6-8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4 At above-grade walls separating conditioned from unconditioned space, one of the following options used (rim / band joists exempted): <sup>15</sup>										
3.4.1 Continuous rigid insulation, insulated siding, or combination of the two is: $\geq R-3$ in CZ 1-4; $\geq R-5$ in CZ 5-8 <sup>16, 17, 18</sup> , <b>OR</b> ;							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.2 Structural Insulated Panels <b>OR</b> ; Insulated Concrete Forms <b>OR</b> ; Double-wall framing <b>OR</b> ; <sup>16, 19</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.3 Advanced framing, including all of the Items below: <sup>20</sup>										
3.4.3a Corners insulated $\geq R-6$ to edge <sup>21</sup> , <b>AND</b> ;							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.3b Headers above windows & doors insulated $\geq R-3$ for 2x4 framing or equivalent cavity width, and $\geq R-5$ for all other assemblies (e.g., with 2x6 framing) <sup>22</sup> , <b>AND</b> ;							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.3c Framing limited at all windows & doors to one pair of king studs, plus one pair of jack studs per window opening to support the header and sill, <b>AND</b> ;							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.3d Interior / exterior wall intersections insulated to same R-value as rest of exterior wall, <sup>23</sup> <b>AND</b> ;							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4.3e Minimum stud spacing of 16 in. o.c. for 2x4 framing in all Climate Zones and, in CZ 6-8, 24 in. o.c. for 2x6 framing <sup>24</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Air Sealing (Unless otherwise noted below, "sealed" indicates the use of caulk, foam, or equivalent material)										
4.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking / flashing as needed							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
4.2 Recessed lighting fixtures adjacent to unconditioned space ICAT labeled and gasketed. Also, if in insulated ceiling without attic above, exterior surface of fixture insulated to $\geq R-10$ in CZ 4-8.							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3 Above-grade sill plates adjacent to conditioned space sealed to foundation or sub-floor. Gasket also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to cond. space <sup>25, 26</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4 Continuous top plate or blocking is at top of walls adjoining unconditioned space, and sealed							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.5 Drywall sealed to top plate at all unconditioned attic / wall interfaces using caulk, foam, drywall adhesive (but not other construction adhesives), or equivalent material. Either apply sealant directly between drywall and top plate or to the seam between the two from the attic above.							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.6 Rough opening around windows & exterior doors sealed <sup>27</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
4.7 Walls that separate attached garages from occupiable space sealed and, also, an air barrier installed and sealed at floor cavities aligned with these walls							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.8 In multifamily buildings, the gap between the common wall (e.g. the drywall shaft wall) and the structural framing between units sealed at all exterior boundaries							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.9 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions made substantially air-tight with weatherstripping or equivalent gasket							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10 Attic access panels, drop-down stairs, & whole-house fans equipped with durable $\geq R-10$ cover that is gasketed (i.e., not caulked). Fan covers either installed on house side or mechanically operated. <sup>28</sup>							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# Rater Field Checklist

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

HVAC System <sup>30</sup> (HVAC Design Report Item # indicated in parenthesis)				Must Correct	Rater Verified <sup>2</sup>	N/A <sup>3</sup>
<b>5. Heating &amp; Cooling Equipment</b>						
5.1 HVAC manufacturer & model number on installed equipment matches either of the following (check box): <sup>31</sup> <input type="checkbox"/> HVAC Design Report (4.3, 4.4, & 4.17) <input type="checkbox"/> Written approval received from designer				<input type="checkbox"/>	<input type="checkbox"/>	-
5.2 External static pressure measured by Rater at contractor-provided test locations and documented below: <sup>32</sup> Return-Side External Static Pressure: _____ IWC    Supply-Side External Static Pressure: _____ IWC				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3 Permitted, but not required: HVAC Commissioning Checklist collected, with no items left blank				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>6. Duct Quality Installation - Applies to Heating, Cooling, Ventilation, Exhaust, &amp; Pressure Balancing Ducts, Unless Noted in Footnote</b>						
6.1 Ductwork installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork <sup>33</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2 Bedrooms pressure-balanced using any combination of transfer grills, jump ducts, dedicated return ducts, and / or undercut doors to achieve a Rater-measured pressure differential $\leq 3$ Pa with respect to the main body of the house when all bedroom doors are closed and all air handlers are operating. See Footnote 34 for alternative. <sup>34</sup>				<input type="checkbox"/>	<input type="checkbox"/>	-
6.3 All supply and return ducts in unconditioned space, including connections to trunk ducts, are insulated to $\geq R-6$ <sup>35</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4 Rater-measured total duct leakage meets one of the following two options. See Footnote 37 for alternative: <sup>36, 37, 38</sup>						
6.4.1 Rough-in: The greater of $\leq 4$ CFM25 per 100 sq. ft. of CFA or $\leq 40$ CFM, with air handler & all ducts, building cavities used as ducts, & duct boots installed. In addition, <u>all</u> duct boots sealed to finished surface, Rater-verified at final. <sup>39</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4.2 Final: The greater of $\leq 8$ CFM25 per 100 sq. ft. of CFA or $\leq 80$ CFM, with the air handler & all ducts, building cavities used as ducts, duct boots, & register grilles atop the finished surface (e.g., drywall, floor) installed. <sup>40</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5 Rater-measured duct leakage to outdoors the greater of $\leq 4$ CFM25 per 100 sq. ft. of CFA or $\leq 40$ CFM25 <sup>36, 38, 41</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>7. Whole-House Mechanical Ventilation System</b>						
7.1 Rater-measured ventilation rate is within either $\pm 15$ CFM or $\pm 15\%$ of design value (2.3) <sup>42</sup>				<input type="checkbox"/>	<input type="checkbox"/>	-
7.2 A readily-accessible ventilation override control installed and also labeled if its function is not obvious (e.g., a label is required for a standalone wall switch, but not for a switch that's on the ventilation equipment)				<input type="checkbox"/>	<input type="checkbox"/>	-
7.3 No outdoor air intakes connected to return side of the HVAC system, unless controls are installed to operate intermittently & automatically based on a timer and to restrict intake when not in use (e.g., motorized damper)				<input type="checkbox"/>	<input type="checkbox"/>	-
7.4 System fan rated $\leq 3$ sones if intermittent and $\leq 1$ sone if continuous, or exempted <sup>43</sup>				<input type="checkbox"/>	<input type="checkbox"/>	-
7.5 If system utilizes the HVAC fan, then the specified fan type is ECM / ICM (4.7), or the controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.6 Bathroom fans are ENERGY STAR certified if used as part of the whole-house system <sup>44</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.7 Air inlet location (Complete if ventilation air inlet location was specified (2.12, 2.13); otherwise check "N/A"): <sup>45, 46</sup>				-	-	<input type="checkbox"/>
7.7.1 Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit				<input type="checkbox"/>	<input type="checkbox"/>	-
7.7.2 Inlet is $\geq 2$ ft. above grade or roof deck; $\geq 10$ ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and $\geq 3$ ft. distance from sources exiting the roof				<input type="checkbox"/>	<input type="checkbox"/>	-
7.7.3 Inlet is provided with rodent / insect screen with $\leq 0.5$ inch mesh				<input type="checkbox"/>	<input type="checkbox"/>	-
<b>8. Local Mechanical Exhaust</b> - In each kitchen and bathroom, a system is installed that exhausts directly to the outdoors and meets one of the following Rater-measured airflow and manufacturer-rated sound level standards: <sup>42, 47</sup>						
<b>Location</b>		<b>Continuous Rate</b>		<b>Intermittent Rate<sup>48</sup></b>		
8.1 Kitchen	Airflow	$\geq 5$ ACH, based on kitchen volume <sup>49, 50</sup>		$\geq 100$ CFM and, if not integrated with range, also $\geq 5$ ACH based on kitchen volume <sup>49, 50, 51</sup>		
	Sound	Recommended: $\leq 1$ sone		Recommended: $\leq 3$ sones		
8.2 Bathroom	Airflow	$\geq 20$ CFM		$\geq 50$ CFM		
	Sound	Required: $\leq 1$ sone		Recommended: $\leq 3$ sones		
<b>9. Filtration</b>						
9.1 At least one MERV 6 or higher filter installed in each ducted mechanical system in a location that facilitates access and regular service by the owner <sup>52</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.2 Filter access panel includes gasket or comparable sealing mechanism and fits snugly against the exposed edge of filter when closed to prevent bypass <sup>53</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.3 All return air and mechanically supplied outdoor air passes through filter prior to conditioning				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>10. Combustion Appliances</b>						
10.1 Furnaces, boilers, and water heaters located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 56 for alternatives. <sup>54, 55, 56</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.2 Fireplaces located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 57 for alternatives. <sup>54, 55, 57</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.3 If unvented combustion appliances other than cooking ranges or ovens are located inside the home's pressure boundary, the Rater has followed Section 805 of RESNET's Standards, encompassing ANSI/ACCA 12 QH-2014, Appendix A, Section A3 (Carbon Monoxide Test), and verified the equipment meets the limits defined within <sup>54, 58</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rater Name: _____		Rater Pre-Drywall Inspection Date: _____		Rater Initials: _____		
Rater Name: _____		Rater Final Inspection Date: _____		Rater Initials: _____		
Builder Employee: _____		Builder Inspection Date: _____		Builder Initials: _____		



# Rater Checklist Footnotes

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

### Rater Design Review Checklist Footnotes

1. The term 'Rater' refers to the person completing the third-party inspections required for certification. This person shall: a) be a certified Home Energy Rater, Rating Field Inspector, or an equivalent designation as determined by a Verification Oversight Organization such as RESNET; and, b) have attended and successfully completed an EPA-recognized training class. See [energystar.gov/newhomestraining](http://energystar.gov/newhomestraining).
2. HVAC contractors must be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO) if a split air conditioner, unitary air conditioner, air-source heat pump, or water-source (i.e., geothermal) heat pump up to 65 kBtu/h with a forced-air distribution system (i.e., ducts) or a furnace up to 225 kBtu/h with a forced-air distribution system (i.e., ducts) will be installed in the home to be certified. For all other permutations of equipment (e.g., boilers, mini-split / multi-split systems) and distribution systems, a credential is not required. An explanation of this credentialing process and links to H-QUITOs, which maintain lists of credentialed contractors, can be found at [energystar.gov/newhomeshvac](http://energystar.gov/newhomeshvac).
3. All windows, doors and skylights shall meet or exceed the component U-factor and SHGC requirements specified in 2009 IECC Table 402.1.1. If no NFRC rating is noted on the window or in product literature (e.g., for site-built fenestration), select the U-factor and SHGC value from Tables 4 and 10, respectively, in 2013 ASHRAE Fundamentals, Chapter 15. Select the highest U-factor and SHGC value among the values listed for the known window characteristics (e.g., frame type, number of panes, glass color, and presence of low-e coating). Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion. The following exceptions apply:
  - a. An area-weighted average of fenestration products shall be permitted to satisfy the U-factor requirements;
  - b. An area-weighted average of fenestration products  $\geq 50\%$  glazed shall be permitted to satisfy the SHGC requirements;
  - c. 15 square feet of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above;
  - d. One side-hinged opaque door assembly up to 24 square feet in area shall be exempt from the U-factor requirements and shall be excluded from area-weighted averages calculated using a) and b), above;
  - e. Fenestration utilized as part of a passive solar design shall be exempt from the U-factor and SHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above. Exempt windows shall be facing within 45 degrees of true South and directly coupled to thermal storage mass that has a heat capacity  $> 20 \text{ btu} / \text{ft}^3 \times ^\circ\text{F}$  and provided in a ratio of at least 3 sq. ft. per sq. ft. of South facing fenestration. Generally, thermal mass materials will be at least 2 in. thick.

In Passive House (PHIUS+) certified homes, where triple-glazed window assemblies with thermal breaks / spacers between the panes are used, such windows meet the intent of Item 2.1 and shall be excluded when assessing compliance of a) through e), above.

4. Specified levels shall meet or exceed the component insulation levels in 2009 IECC Table 402.1.1. The following exceptions apply:
  - a. Steel-frame ceilings, walls, and floors shall meet the insulation levels of 2009 IECC Table 402.2.5. In CZ 1 and 2, the continuous insulation requirements in this table shall be permitted to be reduced to R-3 for steel-frame wall assemblies with studs spaced at 24 in. on center. This exception shall not apply if the alternative calculations in d) are used;
  - b. For ceilings with attic spaces, R-30 shall satisfy the requirement for R-38 and R-38 shall satisfy the requirement for R-49 wherever the full height of uncompressed insulation at the lower R-value extends over the wall top plate at the eaves. This exemption shall not apply if the alternative calculations in d) are used;
  - c. For ceilings without attic spaces, R-30 shall satisfy the requirement for any required value above R-30 if the design of the roof / ceiling assembly does not provide sufficient space for the required insulation value. This exemption shall be limited to 500 sq. ft. or 20% of the total insulated ceiling area, whichever is less. This exemption shall not apply if the alternative calculations in d) are used;
  - d. An alternative equivalent U-factor or total UA calculation may also be used to demonstrate compliance, as follows:

An assembly with a U-factor equal or less than specified in 2009 IECC Table 402.1.3 complies.

A total building thermal envelope UA that is less than or equal to the total UA resulting from the U-factors in Table 402.1.3 also complies. The performance of all components (i.e., ceilings, walls, floors, slabs, and fenestration) can be traded off using the UA approach. Note that Items 3.1 through 3.3 of the Rater Field Checklist shall be met regardless of the UA tradeoffs calculated. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method.

5. Consistent with the 2009 IECC, slab edge insulation is only required for slab-on-grade floors with a floor surface less than 12 inches below grade. Slab insulation shall extend to the top of the slab to provide a complete thermal break. If the top edge of the insulation is installed between the exterior wall and the edge of the interior slab, it shall be permitted to be cut at a 45-degree angle away from the exterior wall. Alternatively, the thermal break is permitted to be created using  $\geq R-3$  rigid insulation on top of an existing slab (e.g., in a home undergoing a gut rehabilitation). In such cases, up to 10% of the slab surface is permitted to not be insulated (e.g., for sleepers, for sill plates). Insulation installed on top of slab shall be covered by a durable floor surface (e.g., hardwood, tile, carpet).
6. Where an insulated wall separates a garage, patio, porch, or other unconditioned space from the conditioned space of the house, slab insulation shall also be installed at this interface to provide a thermal break between the conditioned and unconditioned slab. Where specific details cannot meet this requirement, partners shall provide the detail to EPA to request an exemption prior to the home's certification. EPA will compile exempted details and work with industry to develop feasible details for use in future revisions to the program. A list of currently exempted details is available at: [energystar.gov/slabeledge](http://energystar.gov/slabeledge).
7. The Rater shall collect one HVAC Design Report per system design per plan. Regardless of whether the "site-specific design" or "group design" box has been checked in Item 1.6 of the HVAC Design Report, the system design as documented on the HVAC Design Report must fall within the tolerances in Item 4.2 for the home to be certified. The report is only required to be collected once per system design, even if multiple homes are built using this design (e.g., in a production environment where the same plan is built multiple times, only one report is required as long as no aspect of the system design changes between homes). The Rater is only responsible for verifying that the designer has not left any items blank on the HVAC Design Report and for verifying the discrete objective parameters in Item 4.2 of this Checklist, not for verifying the accuracy of every input on the HVAC Design Report.
8. Visit [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps) for the maximum cooling season design temperature and minimum heating season design temperature permitted for ENERGY STAR certified homes and the process for a designer to obtain an allowance from EPA. The same



# Rater Checklist Footnotes

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

design report is permitted to be used in other counties, as long as the design temperature limits in those other counties meet or exceed the cooling and heating season temperature limits for the county selected. For example, if Fauquier County, VA, is used for the load calculations, with a 1% cooling temperature limit of 93 F, then the same report could be used in Fairfax County (which has a higher limit of 94 F) but not in Arlington County (which has a lower limit of 92 F).

9. To determine the number of occupants among all HVAC systems in the home, calculate the number of bedrooms, as defined below, and add one. The number of occupants used in loads must be within  $\pm 2$  of the home to be certified, unless Item 1.5 of the HVAC Design Report indicates that the system is a cooling system for temporary occupant loads.

A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A “den”, “library”, or “home office” with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

An egress window, as defined in 2009 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

- have a sill height of not more than 44 inches above the floor; AND
- have a minimum net clear opening of 5.7 sq. ft.; AND
- have a minimum net clear opening height of 24 in.; AND
- have a minimum net clear opening width of 20 in.; AND
- be operational from the inside of the room without the use of keys, tools or special knowledge.

10. “Predominant” is defined as the SHGC value used in the greatest amount of window area in the home.
11. Orientation represents the direction that the front door of the house is facing. The designer is only required to document the loads for the orientation(s) that the house might be built in. For example, if a house plan will only be built one time in a specific orientation (e.g., a site-specific design), then the designer only needs to document the loads for this one orientation.
12. This Revision of the Rater Design Review Checklist is required to certify all homes permitted after 07/01/2016, but is allowed to be used for any home permitted or completed prior to this date. The Rater may define the ‘permit date’ as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.

### Rater Field Checklist Footnotes

1. At the discretion of the Rater, the builder may verify up to eight items in Sections 1-4 of this Checklist. When exercised, the builder’s responsibility will be formally acknowledged by the builder signing off on the checklist for the item(s) that they verified. However, if a quality assurance review indicates that Items have not been successfully completed, the Rater will be responsible for facilitating corrective action.
2. The term ‘Rater’ refers to the person completing the third-party inspections required for certification. This person shall: a) be a certified Home Energy Rater, Rating Field Inspector, or an equivalent designation as determined by a Verification Oversight Organization such as RESNET; and, b) have attended and successfully completed an EPA-recognized training class. See [energystar.gov/newhomestraining](http://energystar.gov/newhomestraining).
3. The column titled “N/A,” which denotes items that are “not applicable,” should be used when the checklist Item is not present in the home or conflicts with local requirements.
4. Two alternatives are provided: a) Grade II cavity insulation is permitted to be used for assemblies that contain a layer of continuous, air impermeable insulation  $\geq R-3$  in Climate Zones 1 to 4,  $\geq R-5$  in Climate Zones 5 to 8; b) Grade II batts are permitted to be used in floors if they fill the full depth of the floor cavity, even when compression occurs due to excess insulation, as long as the R-value of the batts has been appropriately assessed based on manufacturer guidance and the only defect preventing the insulation from achieving Grade I is the compression caused by the excess insulation.
5. For purposes of this Checklist, an air barrier is defined as any durable solid material that blocks air flow between conditioned space and unconditioned space, including necessary sealing to block excessive air flow at edges and seams and adequate support to resist positive and negative pressures without displacement or damage. EPA recommends, but does not require, rigid air barriers.  
Open-cell or closed-cell foam shall have a finished thickness  $\geq 5.5$  in. or 1.5 in., respectively, to qualify as an air barrier unless the manufacturer indicates otherwise.  
If flexible air barriers such as house wrap are used, they shall be fully sealed at all seams and edges and supported using fasteners with caps or heads  $\geq 1$  in. diameter unless otherwise indicated by the manufacturer. Flexible air barriers shall not be made of kraft paper, paper-based products, or other materials that are easily torn. If polyethylene is used, its thickness shall be  $\geq 6$  mil.
6. All insulated ceiling surfaces, regardless of slope (e.g., cathedral ceilings, tray ceilings, conditioned attic roof decks, flat ceilings, sloped ceilings), must meet the requirements for ceilings.
7. All insulated vertical surfaces are considered walls (e.g., above and below grade exterior walls, knee walls) and must meet the air barrier requirements for walls. The following exceptions apply: air barriers recommended, but not required, in adiabatic walls in multifamily dwellings; and, in Climate Zones 4 through 8, an air barrier at the interior vertical surface of insulation is recommended but not required in basement walls or crawlspace walls. For the purpose of these exceptions, a basement or crawlspace is a space for which  $\geq 40\%$  of the total gross wall area is below-grade.
8. Exterior air barriers are not required for attic knee walls that are  $\leq 24$  in. in height if an interior air barrier is provided and insulation extends in all directions from the top of this interior air barrier into unconditioned space at the following levels: CZ 1-5:  $\geq R-21$ ; CZ 6-8:  $\geq R-30$ .
9. EPA highly recommends, but does not require, an air barrier at the interior vertical surface of floor insulation in Climate Zones 4-8.
10. Examples of supports necessary for permanent contact include staves for batt insulation or netting for blown-in insulation. Alternatively, supports are not required if batts fill the full depth of the floor cavity, even when compression occurs due to excess insulation, as long as the R-value of the batts has been appropriately assessed based on manufacturer guidance and the only defect preventing the insulation from achieving the required installation grade is the compression caused by the excess insulation.





# Rater Checklist Footnotes

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

11. Alternatively, an air barrier is permitted to be installed at the exterior horizontal surface of the floor insulation if the insulation is installed in contact with this air barrier, the exterior vertical surfaces of the floor cavity are also insulated, and air barriers are included at the exterior vertical surfaces of this insulation.
12. The minimum designated R-values must be achieved regardless of the trade-offs determined using an equivalent U-factor or UA alternative calculation, with the following exception:  
For homes permitted through 12/31/2012: CZ 1-5: For spaces that provide less than 5.5 in. of clearance, R-15 Grade I insulation is permitted. CZ 6-8: For spaces that provide less than 7.0 in. of clearance, R-21 Grade I insulation is permitted.  
For homes permitted on or after 01/01/2013: Homes shall achieve Item 3.1 without exception.  
Note that if the minimum designated values are used, then higher insulation values may be needed elsewhere to meet Item 1.2. Also, note that these requirements can be met by using any available strategy, such as a raised-heel truss, alternate framing that provides adequate space, and / or high-density insulation.
13. Consistent with the 2009 IECC, slab edge insulation is only required for slab-on-grade floors with a floor surface less than 12 inches below grade. Slab insulation shall extend to the top of the slab to provide a complete thermal break. If the top edge of the insulation is installed between the exterior wall and the edge of the interior slab, it shall be permitted to be cut at a 45-degree angle away from the exterior wall. Alternatively, the thermal break is permitted to be created using  $\geq$  R-3 rigid insulation on top of an existing slab (e.g., in a home undergoing a gut rehabilitation). In such cases, up to 10% of the slab surface is permitted to not be insulated (e.g., for sleepers, for sill plates). Insulation installed on top of slab shall be covered by a durable floor surface (e.g., hardwood, tile, carpet).
14. Where an insulated wall separates a garage, patio, porch, or other unconditioned space from the conditioned space of the house, slab insulation shall also be installed at this interface to provide a thermal break between the conditioned and unconditioned slab. Where specific details cannot meet this requirement, partners shall provide the detail to EPA to request an exemption prior to the home's certification. EPA will compile exempted details and work with industry to develop feasible details for use in future revisions to the program. A list of currently exempted details is available at: [energystar.gov/slabeledge](http://energystar.gov/slabeledge).
15. Mass walls utilized as the thermal mass component of a passive solar design (e.g., a Trombe wall) are exempt from this Item. To be eligible for this exemption, the passive solar design shall be comprised of the following five components: an aperture or collector, an absorber, thermal mass, a distribution system, and a control system. For more information, see: [energy.gov/sites/prod/files/guide\\_to\\_passive\\_solar\\_home\\_design.pdf](http://energy.gov/sites/prod/files/guide_to_passive_solar_home_design.pdf).  
Mass walls that are not part of a passive solar design (e.g., CMU block or log home enclosure) shall either utilize the strategies outlined in Item 3.4 or the pathway in the assembly with the least thermal resistance, as determined using a method consistent with the 2013 ASHRAE Handbook of Fundamentals, shall provide  $\geq$  50% of the applicable assembly resistance, defined as the reciprocal of the mass wall equivalent U-factor in the 2009 IECC Table 402.1.3. Documentation identifying the pathway with the least thermal resistance and its resistance value shall be collected by the Rater and any Builder Verified or Rater Verified box under Item 3.4 shall be checked.
16. Up to 10% of the total exterior wall surface area is exempted from the reduced thermal bridging requirements to accommodate intentional designed details (e.g., architectural details such as thermal fins, wing walls, or masonry fireplaces; structural details, such as steel columns). It shall be apparent to the Rater that the exempted areas are intentional designed details or the exempted area shall be documented in a plan provided by the builder, architect, or engineer. The Rater need not evaluate the necessity of the designed detail to certify the home.
17. If used, insulated siding shall be attached directly over a water-resistive barrier and sheathing. In addition, it shall provide the required R-value as demonstrated through either testing in accordance with ASTM C 1363 or by attaining the required R-value at its minimum thickness. Insulated sheathing rated for water protection can be used as a water resistant barrier if all seams are taped and sealed. If non-insulated structural sheathing is used at corners, the advanced framing details listed in Item 3.4.3 shall be met for those wall sections.
18. Steel framing shall meet the reduced thermal bridging requirements by complying with Item 3.4.1 of the Checklist.
19. Double-wall framing is defined as any framing method that ensures a continuous layer of insulation covering the studs to at least the R-value required in Item 3.4.1 of the Checklist, such as offset double-stud walls, aligned double-stud walls with continuous insulation between the adjacent stud faces, or single-stud walls with 2x2 or 2x3 cross-framing. In all cases, insulation shall fill the entire wall cavity from the interior to exterior sheathing except at windows, doors and other penetrations.
20. All advanced framing details shall be met except where the builder, architect, or engineer provides a framing plan that encompasses the details in question, indicating that structural members are required at these locations and including the rationale for these members (e.g., full-depth solid framing is required at wall corners or interior / exterior wall intersections for shear strength, a full-depth solid header is required above a window to transfer load to jacks studs, additional jack studs are required to support transferred loads, additional cripple studs are required to maintain on-center spacing, or stud spacing must be reduced to support multiple stories in a multifamily building). The Rater shall retain a copy of the detail and rationale for their records, but need not evaluate the rationale to certify the home.
21. All exterior corners shall be constructed to allow access for the installation of  $\geq$  R-6 insulation that extends to the exterior wall sheathing. Examples of compliance options include standard-density insulation with alternative framing techniques, such as using three studs per corner, or high-density insulation (e.g., spray foam) with standard framing techniques.
22. Compliance options include continuous rigid insulation sheathing, SIP headers, other prefabricated insulated headers, single-member or two-member headers with insulation either in between or on one side, or an equivalent assembly. R-value requirement refers to manufacturer's nominal insulation value.
23. Insulation shall run behind interior / exterior wall intersections using ladder blocking, full length 2x6 or 1x6 furring behind the first partition stud, drywall clips, or other equivalent alternative.
24. In Climate Zones 6 - 8, a minimum stud spacing of 16 in. o.c. is permitted to be used with 2x6 framing if  $\geq$  R-20.0 wall cavity insulation is achieved. However, all 2x6 framing with stud spacing of 16 in. o.c. in Climate Zones 6 - 8 shall have  $\geq$  R-20.0 wall cavity insulation installed regardless of any framing plan or alternative equivalent total UA calculation.
25. Existing sill plates (e.g., in a home undergoing a gut rehabilitation) on the interior side of structural masonry or monolithic walls are exempt from this Item. In addition, other existing sill plates resting atop concrete or masonry and adjacent to conditioned space are permitted, in lieu of using a gasket, to be sealed with caulk, foam, or equivalent material at both the interior seam between the sill plate and the subfloor and the seam between the top of the sill plate and the sheathing.



# Rater Checklist Footnotes

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

26. In Climate Zones 1 through 3, a continuous stucco cladding system adjacent to sill and bottom plates is permitted to be used in lieu of sealing plates to foundation or sub-floor with caulk, foam, or equivalent material.
27. In Climate Zones 1 through 3, a continuous stucco cladding system sealed to windows and doors is permitted to be used in lieu of sealing rough openings with caulk or foam.
28. Examples of durable covers include, but are not limited to, pre-fabricated covers with integral insulation, rigid foam adhered to cover with adhesive, or batt insulation mechanically fastened to the cover (e.g., using bolts, metal wire, or metal strapping).
29. This Revision of the Rater Field Checklist is required to certify all homes permitted after 07/01/2016, but is allowed to be used for any home permitted or completed prior to this date. The Rater may define the 'permit date' as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.
30. This Checklist is designed to meet the requirements of ASHRAE 62.2-2010 / 2013, and ANSI / ACCA's 5 QI-2015 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems, (e.g., those caused by a lack of maintenance by occupants). Therefore, this Checklist is not a guarantee of proper ventilation, indoor air quality, or HVAC performance.
31. If installed equipment does not match the HVAC Design Report, then prior to certification the Rater shall obtain written approval from the designer (e.g., email, updated HVAC Design Report) confirming that the installed equipment meets the requirements of the HVAC Design Report. In cases where the condenser unit is installed after the time of inspection by the Rater, the HVAC manufacturer and model numbers on installed equipment can be documented through the use of photographs provided by the HVAC Contractor after installation is complete.
32. The Rater shall measure and record the external static pressure in the return-side and supply-side of the system using the contractor-provided test locations. However, at this time, the Rater need not assess whether these values are within a specific range to certify the home.
33. Kinks are to be avoided and are caused when ducts are bent across sharp corners such as framing members. Sharp bends are to be avoided and occur when the radius of the turn in the duct is less than one duct diameter. Compression is to be avoided and occurs when flexible ducts in unconditioned space are installed in cavities smaller than the outer duct diameter and ducts in conditioned space are installed in cavities smaller than inner duct diameter. Ducts shall not include coils or loops except to the extent needed for acoustical control.
34. Item 6.2 does not apply to ventilation or exhaust ducts. For an HVAC system with a multi-speed fan, the highest design fan speed shall be used when verifying this requirement. As an alternative to the 3 Pa limit, a Rater-measured pressure differential  $\leq 5$  Pa is permitted to be used for bedrooms with a design airflow  $\geq 150$  CFM. The Rater-measured pressure shall be rounded to the nearest whole number to assess compliance.
35. Item 6.3 does not apply to ducts that are a part of local mechanical exhaust and exhaust-only whole-house ventilation systems. EPA recommends, but does not require, that all metal ductwork not encompassed by Section 6 (e.g., exhaust ducts, duct boots, ducts in conditioned space) also be insulated and that insulation be sealed to duct boots to prevent condensation.
36. Items 6.4 and 6.5 only apply to heating, cooling, and balanced ventilation ducts. Duct leakage shall be determined and documented by a Rater using a RESNET-approved testing protocol. Leakage limits shall be assessed on a per-system, rather than per-home, basis. For balanced ventilation ducts that are not connected to space heating or cooling systems, a Rater is permitted to visually verify, in lieu of duct leakage testing, that all seams and connections are sealed with mastic or metal tape and all duct boots are sealed to floor, wall, or ceiling using caulk, foam, or mastic tape.
37. For a duct system with three or more returns, the total Rater-measured duct leakage is permitted to be the greater of  $\leq 6$  CFM25 per 100 sq. ft. of CFA or  $\leq 60$  CFM25 at 'rough-in' or the greater of  $\leq 12$  CFM25 per 100 sq. ft. of CFA or  $\leq 120$  CFM25 at 'final'.
38. For a home certified in the State of ID, MT, OR, or WA that is permitted before 01/01/2016, as an alternate to Rater-verified duct leakage, a PTCS<sup>®</sup> Duct Sealing Certification Form is permitted to be collected by the Home Energy Rater.
39. Cabinets (e.g., kitchen, bath, multimedia) or ducts that connect duct boots to toe-kick registers are not required to be in place during the 'rough-in' test. For homes permitted through 12/31/2013: Homes are permitted to be certified if rough-in leakage is  $\leq 6$  CFM25 per 100 sq. ft. of CFA or  $\leq 60$  CFM25, with air handler & all ducts, building cavities used as ductwork, & duct boots installed.
40. Registers atop carpets are permitted to be removed and the face of the duct boot temporarily sealed during testing. In such cases, the Rater shall visually verify that the boot has been durably sealed to the subfloor (e.g., using duct mastic or caulk) to prevent leakage during normal operation.
41. Testing of duct leakage to the outside can be waived if all ducts & air handling equipment are located within the home's air and thermal barriers AND infiltration does not exceed the following: CZ 1-2: 3 ACH50; CZ 3-4: 2.5 ACH50; CZ 5-7: 2 ACH50; CZ 8: 1.5 ACH50. Alternatively, testing of duct leakage to the outside can be waived if total duct leakage is  $\leq 4$  CFM25 per 100 sq. ft. of conditioned floor area or 40 CFM, whichever is larger.
42. The whole-house ventilation air flow and local exhaust air flows shall be measured by the Rater using RESNET Standard 380 upon publication and, in the interim, a flow hood, flow grid, anemometer, or substantially equivalent method.
43. Whole-house mechanical ventilation fans shall be rated for sound at no less than the airflow rate in Item 2.3 of the HVAC Design Report. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated  $\geq 400$  CFM. To be considered for this exemption, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways and there shall be  $\geq 4$  ft. ductwork between the fan and intake grill. Per ASHRAE 62.2-2010, habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms.
44. Bathroom fans with a rated flow rate  $\geq 500$  CFM are exempted from the requirement to be ENERGY STAR certified.
45. Ventilation air inlets that are only visible via rooftop access are exempted from Item 7.7 and the Rater shall mark "n/a". The outlet and inlet of balanced ventilation systems shall meet these spacing requirements unless manufacturer instructions indicate that a smaller distance may be used. However, if this occurs the manufacturer's instructions shall be collected for documentation purposes.
46. Without proper maintenance, ventilation air inlet screens often become filled with debris. Therefore, EPA recommends, but does not require, that these ventilation air inlets be located so as to facilitate access and regular service by the owner.



# Rater Checklist Footnotes

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

47. Continuous bathroom local mechanical exhaust fans shall be rated for sound at no less than the airflow rate in Item 8.2. Intermittent bathroom and both intermittent and continuous kitchen local mechanical exhaust fans are recommended, but not required, to be rated for sound at no less than the airflow rate in Items 8.1 and 8.2. Per ASHRAE 62.2-2010, an exhaust system is one or more fans that remove air from the building, causing outdoor air to enter by ventilation inlets or normal leakage paths through the building envelope (e.g., bath exhaust fans, range hoods, clothes dryers). Per ASHRAE 62.2-2010, a bathroom is any room containing a bathtub, shower, spa, or similar source of moisture.
48. An intermittent mechanical exhaust system, where provided, shall be designed to operate as needed by the occupant. Control devices shall not impede occupant control in intermittent systems.
49. Kitchen volume shall be determined by drawing the smallest possible rectangle on the floor plan that encompasses all cabinets, pantries, islands, and peninsulas and multiplying by the average ceiling height for this area. Cabinet volume shall be included in the kitchen volume.
50. *For homes permitted through 01/01/2014:* Homes are permitted to be certified without enforcement of this Item to provide partners with additional time to integrate this feature into their homes.  
*For homes permitted on or after 01/01/2014:* Homes shall meet this Item. Alternatively, the prescriptive duct sizing requirements in Table 5.3 of ASHRAE 62.2-2010 are permitted to be used for kitchen exhaust fans based upon the rated airflow of the fan at 0.25 IWC. If the rated airflow is unknown,  $\geq 6$  in. smooth duct shall be used, with a rectangular to round duct transition as needed. Guidance to assist partners with these alternatives is available at [energystar.gov/newhomesresources](http://energystar.gov/newhomesresources). As an alternative to Item 8.1, homes that are PHIUS+ certified are permitted to use a continuous kitchen exhaust rate of 25 CFM per 2009 IRC Table M1507.3.
51. All intermittent kitchen exhaust fans must be capable of exhausting at least 100 CFM. In addition, if the fan is not part of a vented range hood or appliance-range hood combination (i.e., if the fan is not integrated with the range), then it must also be capable of exhausting  $\geq 5$  ACH, based on the kitchen volume.
52. Per ASHRAE 62.2-2010, ducted mechanical systems are those that supply air to an occupiable space through ductwork exceeding 10 ft. in length and through a thermal conditioning component, except for evaporative coolers. Systems that do not meet this definition are exempt from this requirement. Also, mini-split systems typically do not have MERV-rated filters available for use and are, therefore, also exempted under this version of the requirements. HVAC filters located in the attic shall be considered accessible to the owner if drop-down stairs provide access to attic and a permanently installed walkway has been provided between the attic access location and the filter.
53. The filter media box (i.e., the component in the HVAC system that houses the filter) may be either site-fabricated by the installer or pre-fabricated by the manufacturer to meet this requirement. These requirements only apply when the filter is installed in a filter media box located in the HVAC system, not when the filter is installed flush with the return grill.
54. The pressure boundary is the primary enclosure boundary separating indoor and outdoor air. For example, a volume that has more leakage to outside than to conditioned space would be outside the pressure boundary.
55. Per the 2009 International Mechanical Code, a direct-vent appliance is one that is constructed and installed so that all air for combustion is derived from the outdoor atmosphere and all flue gases are discharged to the outside atmosphere; a mechanical draft system is a venting system designed to remove flue or vent gases by mechanical means consisting of an induced draft portion under non-positive static pressure or a forced draft portion under positive static pressure; and a natural draft system is a venting system designed to remove flue or vent gases under nonpositive static vent pressure entirely by natural draft.
56. Naturally drafted equipment is allowed within the home's pressure boundary in Climate Zones 1-3 if the Rater has followed Section 805 of RESNET's Standards, encompassing ANSI/ACCA 12 QH-2014, Appendix A, Sections A3 (Carbon Monoxide Test) and A4 (Depressurization Test for the Combustion Appliance Zone), and verified that the equipment meets the limits defined within.
57. Naturally drafted fireplaces are allowed within the home's pressure boundary if the Rater has verified that the total net rated exhaust flow of the two largest exhaust fans (excluding summer cooling fans) is  $\leq 15$  CFM per 100 sq. ft. of occupiable space when at full capacity. If the net exhaust flow exceeds the allowable limit, it shall be reduced or compensating outdoor airflow provided. Per ASHRAE 62.2-2010, the term "net rated exhaust flow" is defined as flow through an exhaust fan minus the compensating outdoor airflow through any supply fan that is interlocked to the exhaust fan. Per ASHRAE 62.2-2010, the term "occupiable space" is defined as any enclosed space inside the pressure boundary and intended for human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas. See Footnote 43 for the definition of "habitable spaces".
58. The minimum volume of combustion air required for safe operation by the manufacturer and / or code shall be met or exceeded. Also, in accordance with the National Fuel Gas Code, ANSI Z223.1 / NFPA54, unvented room heaters shall not be installed in bathrooms or bedrooms.



# HVAC Design Report <sup>1</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

### HVAC Designer Responsibilities:

- Complete one HVAC Design Report for each system design for a house plan, created for either the specific plan configuration (i.e., elevation, option, orientation, & county) of the home to be certified or for a plan that is intended to be built with potentially different configurations (i.e., different elevations, options, and/or orientations). Visit [www.energystar.gov/newhomeshvacdesign](http://www.energystar.gov/newhomeshvacdesign) and see Footnote 2 for more information. <sup>2</sup>
- Obtain efficiency features (e.g., window performance, insulation levels, and infiltration rate) from the builder or Home Energy Rater.
- Provide the completed HVAC Design Report to the builder or credentialed HVAC contractor and to the Home Energy Rater.

### 1. Design Overview

1.1 Designer name: \_\_\_\_\_ Designer company: \_\_\_\_\_ Date: \_\_\_\_\_

1.2 Select which party you are providing these design services to:  Builder or  Credentialed HVAC contractor

1.3 Name of company you are providing these design services to (if different than Item 1.1): \_\_\_\_\_

1.4 Area that system serves:  Whole-house  Upper-level  Lower-level  Other \_\_\_\_\_

1.5 Is cooling system for a temporary occupant load? <sup>3</sup>  Yes  No

1.6 House plan: \_\_\_\_\_ Check box to indicate whether the system design is site-specific or part of a group: <sup>2</sup>

Site-specific design. Option(s) & elevation(s) modeled: \_\_\_\_\_

Group design. Group #: \_\_\_\_\_ out of \_\_\_\_\_ total groups for this house plan. Configuration modeled: \_\_\_\_\_

### 2. Whole-House Mechanical Ventilation Design <sup>4,5</sup>

Designer Verified

**Airflow:**

2.1 Ventilation airflow design rate & run-time meet the requirements of ASHRAE 62.2-2010 or 2013 <sup>6</sup>

2.2 Ventilation airflow rate required by 62.2 for a continuous system \_\_\_\_\_ CFM -

2.3 Design for this system: Vent. airflow rate: \_\_\_\_\_ CFM Run-time per cycle: \_\_\_\_\_ minutes Cycle time: \_\_\_\_\_ minutes -

**System Type & Controls:**

2.4 Specified system type:  Supply  Exhaust  Balanced -

2.5 Specified control location: \_\_\_\_\_ (e.g., Master bath, utility room) -

2.6 Specified controls allow the system to operate automatically, without occupant intervention

2.7 Specified controls include a readily-accessible ventilation override and a label has also been specified if its function is not obvious (e.g., a label is required for a standalone wall switch, but not for a switch that's on the ventilation equipment)

2.8 No outdoor air intakes designed to connect to the return side of the HVAC system, unless specified controls operate intermittently and automatically based on a timer and restrict intake when not in use (e.g., motorized damper) <sup>7</sup>

**Sound:** 2.9 The fan of the specified system is rated ≤ 3 sones if intermittent and ≤ 1 sone if continuous, or exempted <sup>8</sup>

**Efficiency:**

2.10 If system utilizes the HVAC fan, then the specified fan type in Item 4.7 is ECM / ICM, or the specified controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling

2.11 If bathroom fans are specified as part of the system, then they are ENERGY STAR certified <sup>9</sup>

**Air Inlet Location:** (Complete this section if system has a specified air inlet location; otherwise check "N/A") <sup>10</sup>  N/A

2.12 Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit

2.13 Inlet is ≥ 2 ft. above grade or roof deck; ≥ 10 ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and ≥ 3 ft. from known sources exiting the roof

### 3. Room-by-Room Heating & Cooling Loads

3.1 Room-by-room loads calculated using:  Unabridged ACCA Manual J v8  2013 ASHRAE Fundamentals  Other per AHJ <sup>11</sup> -

3.2 Indoor design temperatures used in loads are 70°F for heating and 75°F for cooling

3.3 Outdoor design temperatures used in loads: (See Footnote 12 and [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps)) <sup>12</sup> -

County & State selected: \_\_\_\_\_ Cooling season: \_\_\_\_\_ °F Heating season: \_\_\_\_\_ °F

3.4 Number of occupants used in loads: <sup>13</sup> \_\_\_\_\_ -

3.5 Conditioned floor area used in loads: \_\_\_\_\_ Sq. Ft. -

3.6 Window area used in loads: \_\_\_\_\_ Sq. Ft. -

3.7 Predominant window SHGC used in loads: <sup>14</sup> \_\_\_\_\_ -

3.8 Infiltration rate used in loads: <sup>15</sup> Summer: \_\_\_\_\_ Winter: \_\_\_\_\_ -

3.9 Mechanical ventilation rate used in loads: \_\_\_\_\_ CFM -

Loads At Design Conditions (kBtuh)		N	NE	E	SE	S	SW	W	NW	-
Cooling	3.10 Sensible heat gain (By orientation <sup>16</sup> )									-
	3.11 Latent heat gain (Not by orientation)									-
	3.12 Total heat gain (By orientation <sup>16</sup> )									-
	3.13 Maximum – minimum total heat gain (Item 3.12) across orientations = _____ kBtuh Variation is ≤ 6 kBtuh <sup>16,17</sup>									<input type="checkbox"/>
Heating	3.14 Total heat loss (Not by orientation)									-



# HVAC Design Report <sup>1</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

4. Heating & Cooling Equipment Selection				Designer Verified
4.1 Equipment selected per ACCA Manual S (see Footnote 19 & 20) <sup>19, 20</sup>				<input type="checkbox"/>
<b>Air Conditioner / Heat Pump</b> (Complete if air conditioner or heat pump will be installed; otherwise check "N/A")				<input type="checkbox"/> N/A
4.2 Equipment type: <input type="checkbox"/> Cooling-only air conditioner or <input type="checkbox"/> Cooling & heating heat pump				-
4.3 Condenser manufacturer & model: _____				-
4.4 Evaporator / fan coil manufacturer & model: _____				-
4.5 AHRI reference #: <sup>21</sup> _____				-
4.6 AHRI listed efficiency: _____ / _____ EER / SEER Air-source heat pump: _____ HSPF Ground-source heat pump: _____ COP				-
4.7 Evaporator fan type: <input type="checkbox"/> PSC <input type="checkbox"/> ECM / ICM <input type="checkbox"/> Other: _____				-
4.8 Compressor type: <input type="checkbox"/> Single-speed <input type="checkbox"/> Two-speed <input type="checkbox"/> Variable-speed				-
4.9 Latent capacity at design conditions, from OEM expanded performance data: _____ kBtuh				-
4.10 Sensible capacity at design conditions, from OEM expanded performance data: _____ kBtuh				-
4.11 Total capacity at design conditions, from OEM expanded performance data: _____ kBtuh				-
4.12 Air-source heat pump capacity: At 17°F: _____ kBtuh At 47°F: _____ kBtuh <input type="checkbox"/> N/A				-
4.13 Cooling sizing % = Total capacity (Item 4.11) divided by maximum total heat gain (Item 3.12): _____ %				-
4.14 Complete this Item if Condition B Climate will be used to select sizing limit in Item 4.15. Otherwise, check "N/A": <sup>22</sup> <input type="checkbox"/> N/A				-
4.14.1 Load sensible heat ratio = Max. sensible heat gain (Item 3.10) / Max. total heat gain (Item 3.12) = _____ %				-
4.14.2 HDD / CDD ratio (Visit <a href="http://energystar.gov/hvacdesigntemps">energystar.gov/hvacdesigntemps</a> to determine this value for the design location) = _____				-
4.15 Check box of applicable cooling sizing limit from chart below: <sup>19, 20</sup>				-
Equipment Type (Per Item 4.2) & Climate Condition (Per Item 4.14)	Compressor Type (Per Item 4.8)			
	Single-Speed	Two-Speed	Variable-Speed	
	<input type="checkbox"/> Recommended: 90 – 115% Allowed: 90 – 130%	<input type="checkbox"/> Recommended: 90 – 120% Allowed: 90 – 140%	<input type="checkbox"/> Recommended: 90 – 130% Allowed: 90 – 160%	
For Cooling-Only Equipment or For Cooling Mode of Heat Pump in Condition A Climate	<input type="checkbox"/> 90% - 100%, plus 15 kBtuh	<input type="checkbox"/> 90% - 100%, plus 15 kBtuh	<input type="checkbox"/> 90% - 100%, plus 15 kBtuh	
For Cooling Mode of Heat Pump in Condition B Climate				
4.16 Cooling sizing % (4.13) is within cooling sizing limit (4.15)				<input type="checkbox"/>
<b>Furnace</b> (Complete if furnace will be installed; otherwise check "N/A")				<input type="checkbox"/> N/A
4.17 Furnace manufacturer & model: _____				-
4.18 Listed efficiency: _____ AFUE				-
4.19 Total capacity: _____ kBtuh				-
4.20 Heating sizing % = Total capacity (Item 4.19) divided by total heat loss (Item 3.14): _____ %				-
4.21 Check box of applicable heating sizing limit from chart below:				-
When Used for Heating Only		When Paired With Cooling		
<input type="checkbox"/> 100 – 140%		<input type="checkbox"/> Recommended: 100 – 140% Allowed: 100 – 200%		
4.22 Heating sizing % (4.20) is within heating sizing limit (4.21)				<input type="checkbox"/>
<b>5. Duct Design</b> (Complete if heating or cooling equipment will be installed with ducts; otherwise check "N/A")				<input type="checkbox"/> N/A
5.1 Duct system designed for the equipment selected in Section 4, per ACCA Manual D				<input type="checkbox"/>
5.2 Design HVAC fan airflow: <sup>23</sup>		Cooling mode _____ CFM	Heating mode _____ CFM	-
5.3 Design HVAC fan speed setting (e.g., low, medium, high): <sup>24</sup>		Cooling mode _____	Heating mode _____	-
5.4 Design total external static pressure (corresponding to the mode with the higher airflow in Item 5.2): <sup>25</sup> _____ IWC				-
5.5 Room-by-room design airflows documented below (which must sum to the mode with the higher airflow in Item 5.2) <sup>26, 27</sup>				-
Room Name	Design Airflow (CFM)	Room Name	Design Airflow (CFM)	
1		13		
2		14		
3		15		
4		16		
5		17		
6		18		
7		19		
8		20		
9		21		
10		22		
11		23		
12		Total for all rooms		



# HVAC Design Report <sup>1</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

### Footnotes

1. This report is designed to meet ASHRAE 62.2-2010 / 2013 and ANSI / ACCA's 5 QI-2015 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems (e.g., those caused by a lack of maintenance by occupants). Therefore, system designs documented through the use of this report are not a guarantee of proper ventilation, indoor air quality, or HVAC performance.
2. The report shall represent a single system design for a house plan. Check the box for "site-specific design" if the design was created for the specific plan configuration (i.e., elevation, option, orientation, and county) of the home to be certified. Check the box for "group design" if the design was created for a plan that is intended to be built with potentially different configurations (i.e., different elevations, options, and/or orientations). Regardless of the box checked, the system design as documented on this HVAC Design Report must fall within the following tolerances for the home to be certified:
  - Item 3.3: The outdoor design temperature used in loads are within the limits defined at [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps).
  - Item 3.4: The number of occupants used in loads is within  $\pm 2$  of the home to be certified.
  - Item 3.5: The conditioned floor area used in loads is between zero and 300 sq. ft. larger than the home to be certified.
  - Item 3.6: The window area used in loads is between zero and 60 sq. ft. larger than the home to be certified.
  - Item 3.7: The predominant window SHGC is within 0.1 of the predominant value in the home to be certified.
  - Items 3.10 - 3.12: The sensible, latent, & total heat gain are documented for the orientation of the home to be certified.
  - Item 3.13: The variation in total heat gain across orientations is  $\leq 6$  kBtuh.
  - Item 4.16: The cooling sizing % is within the cooling sizing limit selected.

Provide the HVAC Design Report to the party you are providing these design services to (i.e., a builder or credentialed HVAC contractor) and to the Home Energy Rater. The report is only required to be provided once per system design, even if multiple homes are built using this design (e.g., in a production environment where the same plan is built multiple times, only one report is required). As long as a report has been provided that falls within these tolerances for the home to be certified, no additional work is required. However, if no report falls within these tolerances or if any aspect of the system design changes, then an additional report will need to be generated prior to certification.

Visit [energystar.gov/newhomeshvacdesign](http://energystar.gov/newhomeshvacdesign) for a tool to assist with group designs and for more information.

3. Check "Yes" if this system is to handle temporary occupant loads. Such a system may be required to accommodate a significant number of guests on a regular or sporadic basis and shall be handled by a supplemental cooling system (e.g., a small, single-package unit or split-coil unit) or by a system that can shift capacity from zone to zone (e.g., a variable volume system).
4. The system shall have at least one supply or exhaust fan with associated ducts and controls. Local exhaust fans are allowed to be part of a whole-house ventilation system. Designers may provide supplemental documentation as needed to document the system design.
5. In "Warm-Humid" climates as defined by 2009 IECC Figure 301.1 (i.e., CZ 1 and portions of CZ 2 and 3A below the white line), it is recommended, but not required, that equipment be specified with sufficient latent capacity to maintain indoor relative humidity at  $\leq 60\%$ .
6. Airflow design rates and run-times shall be determined using ASHRAE 62.2-2010 or later. Designers are permitted, but not required, to use published addenda and/or the 2013 version of the standard to assess compliance.
7. In addition, consult manufacturer requirements to ensure return air temperature requirements are met.
8. Whole-house mechanical ventilation fans shall be rated for sound at no less than the airflow rate in Item 2.3. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated  $\geq 400$  CFM. To be considered for this exemption, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways and there shall be  $\geq 4$  ft. ductwork between the fan and intake grill. Per ASHRAE 62.2-2010, habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms.
9. Bathroom fans with a rated flow rate  $\geq 500$  CFM are exempted from the requirement to be ENERGY STAR certified.
10. Without proper maintenance, ventilation air inlet screens often become filled with debris. Therefore, EPA recommends, but does not require, that these ventilation air inlets be located so as to facilitate access and regular service by the owner.
11. Select "2013 ASHRAE Fundamentals" if using Chapter 17 of the 2013 ASHRAE Handbook of Fundamentals. Select "Other per AHJ" if the Authority Having Jurisdiction where the home will be certified mandates the use of a load calculation methodology other than Unabridged ACCA Manual J v8 or 2013 ASHRAE Fundamentals.
12. Visit [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps) for the maximum cooling season design temperature and minimum heating season design temperature permitted for ENERGY STAR certified homes. For "County & State selected", select the County and State where the home is to be certified. The same design report is permitted to be used in other counties, as long as the design temperature limits in those other counties meet or exceed the cooling and heating season temperature limits for the county selected. For example, if Fauquier County, VA, is used for the load calculations, with a 1% cooling temperature limit of 93 F, then the same report could be used in Fairfax County (which has a higher limit of 94 F) but not in Arlington County (which has a lower limit of 92 F).
13. To determine the number of occupants among all HVAC systems in the home, calculate the number of bedrooms, as defined below, and add one. This number of occupants must be within  $\pm 2$  of the home to be certified, unless Item 1.5 indicates that the system is a cooling system for temporary occupant loads.

A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

An egress window, as defined in 2009 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:



# HVAC Design Report <sup>1</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

- have a sill height of not more than 44 inches above the floor; AND
  - have a minimum net clear opening of 5.7 sq. ft.; AND
  - have a minimum net clear opening height of 24 in.; AND
  - have a minimum net clear opening width of 20 in.; AND
  - be operational from the inside of the room without the use of keys, tools or special knowledge.
14. "Predominant" is defined as the SHGC value used in the greatest amount of window area in the home.
  15. Infiltration rate shall reflect the value used in the confirmed or projected HERS rating for home to be certified. Alternatively, use "Average" or "Semi-loose" values for the cooling season infiltration rate and "Semi-tight" or "Average" values for the heating season infiltration rate, as defined by ACCA Manual J, Eighth Edition, Version Two.
  16. Orientation represents the direction that the front door of the house is facing. The designer is only required to document the loads for the orientation(s) that the house might be built in. For example, if a house plan will only be built one time in a specific orientation (e.g., a site-specific design), then the designer only needs to document the loads for this one orientation.
  17. Determine the orientation with the largest and smallest Total Heat Gain. Verify that the difference in Total Heat Gain between the orientation with the largest and smallest value is  $\leq 6$  kBtuh. If not, then assign the orientations into one or more groups until the difference is  $\leq 6$  kBtuh and then complete a separate HVAC Design Report for each group.
  18. This Revision of the HVAC Design Report is required to certify all homes permitted after 07/01/2016, but is allowed to be used for any home permitted or completed prior to this date. The Home Energy Rater certifying the home may define the 'permit date' as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors.
  19. Equipment shall be selected using the maximum total heat gain in Item 3.12 and the total heat loss in Item 3.14 per ACCA Manual S, Second Edition, except that cooling ranges above ACCA Manual S limits are temporarily allowed, per Item 4.15.
  20. As an alternative for low-load spaces, a system match-up including a single-speed compressor with a total capacity  $\leq 20$  kBtuh is permitted to be used in spaces with a total cooling load  $\leq 15$  kBtuh. A system match-up including a two-speed or variable-speed compressor with a total capacity  $\leq 25$  kBtuh is permitted to be used in spaces with a total cooling load  $\leq 18$  kBtuh.
  21. Evaporators and condensing units shall be properly matched as demonstrated by an AHRI Reference #. If an AHRI Reference # is not available, a copy of OEM-provided catalog data indicating acceptable combination selection and performance data shall be attached.
  22. Per ACCA Manual S, Second Edition, if the load sensible heat ratio is  $\geq 95\%$  and the HDD/CDD ratio is  $\geq 2.0$ , then the Climate is Condition B, otherwise it is Condition A.
  23. Design HVAC fan airflow is the design airflow for the blower in CFM, as determined using the manufacturer's expanded performance data.
  24. Design HVAC fan speed setting is the fan speed setting on the control board (e.g., low, medium, high) that corresponds with the Design HVAC fan airflow.
  25. Design total external static pressure is the pressure corresponding to the Design HVAC fan airflow, inclusive of external components (e.g., evaporator coil, whole-house humidifier, or  $\geq$  MERV 6 filter).
  26. Designers may provide supplemental documentation with room-by-room and total design airflows in lieu of completing Item 5.5.
  27. Orientation-specific room-by-room design airflows are recommended, but not required, to distribute airflow proportional to load, thereby improving comfort and efficiency.



# HVAC Commissioning Checklist <sup>1, 2</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

### HVAC Commissioning Contractor Responsibilities:

- The commissioning contractor must be credentialed by an HVAC oversight organization to complete this checklist. One checklist must be completed and signed by the commissioning contractor for each HVAC system that is commissioned.
- The completed checklist for each commissioned system, along with the corresponding HVAC Design Report, shall be retained by the contractor for quality assurance purposes. Furthermore, the contractor shall provide the completed checklist to the builder, the Home Energy Rater responsible for certifying the home, and the HVAC oversight organization upon request.
- Visit [www.energystar.gov/newhomeshvac](http://www.energystar.gov/newhomeshvac) for information about the credential requirement and this checklist.

### 1. Commissioning Overview

1.1 Contractor name \_\_\_\_\_ Contractor company \_\_\_\_\_ Date \_\_\_\_\_

1.2 Organization that your company is credentialed with:  ACCA  Advanced Energy  NYSERDA

1.3 Builder client name: \_\_\_\_\_

1.4 Home address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip code: \_\_\_\_\_

1.5 HVAC Design Report corresponding to this system has been collected from designer or builder.  Contractor-verified

1.6 Area that system serves, per Item 1.4 of HVAC Design Report:  Whole-house  Upper-level  Lower-level  Other \_\_\_\_\_

1.7 House plan, per Item 1.6 of HVAC Design Report:  Site-specific design  Group design #: \_\_\_\_\_

### 2. Refrigerant Charge - Run system for 15 minutes before testing. If outdoor ambient temperature at the condenser is $\leq 55^{\circ}\text{F}$ or, if known, below the manufacturer-recommended minimum operating temperature for the cooling cycle, then the system shall include a TXV, the outdoor temperature shall be recorded in Item 2.1, and the contractor shall check "N/A" in this Section. <sup>3</sup>

	Contractor Verified	N/A
2.1 Outdoor ambient temperature at condenser: _____ $^{\circ}\text{F}$ DB	-	-
2.2 Return-side air temperature inside duct near evaporator, during cooling mode: _____ $^{\circ}\text{F}$ WB	-	<input type="checkbox"/>
2.3 Liquid line pressure: _____ psig	-	<input type="checkbox"/>
2.4 Liquid line temperature: _____ $^{\circ}\text{F}$ DB	-	<input type="checkbox"/>
2.5 Suction line pressure: _____ psig	-	<input type="checkbox"/>
2.6 Suction line temperature: _____ $^{\circ}\text{F}$ DB	-	<input type="checkbox"/>

#### For System with Thermal Expansion Valve (TXV):

2.7 Condenser saturation temperature: _____ $^{\circ}\text{F}$ DB (Using Item 2.3)	-	<input type="checkbox"/>
2.8 Subcooling value: _____ $^{\circ}\text{F}$ DB (Item 2.7 - Item 2.4)	-	<input type="checkbox"/>
2.9 OEM subcooling goal: _____ $^{\circ}\text{F}$ DB	-	<input type="checkbox"/>
2.10 Subcooling deviation: _____ $^{\circ}\text{F}$ DB (Item 2.8 – Item 2.9)	-	<input type="checkbox"/>

#### For System with Fixed Orifice:

2.11 Evaporator saturation temperature: _____ $^{\circ}\text{F}$ DB (Using Item 2.5)	-	<input type="checkbox"/>
2.12 Superheat value: _____ $^{\circ}\text{F}$ DB (Item 2.6 – Item 2.11)	-	<input type="checkbox"/>
2.13 OEM superheat goal: _____ $^{\circ}\text{F}$ DB (Using superheat tables and Items 2.1 & 2.2)	-	<input type="checkbox"/>
2.14 Superheat deviation: _____ $^{\circ}\text{F}$ DB (Item 2.12 – Item 2.13)	-	<input type="checkbox"/>

2.15 Item 2.10 is  $\pm 3^{\circ}\text{F}$  or Item 2.14 is  $\pm 5^{\circ}\text{F}$

2.16 An OEM test procedure (e.g., as defined for a ground-source heat pump) has been used in place of the sub-cooling or super-heat process and documentation has been attached that defines this procedure

### 3. Indoor HVAC Fan Airflow

3.1 The mode with the higher design HVAC fan airflow used, per Item 5.2 of HVAC Design Report: <input type="checkbox"/> Heating <input type="checkbox"/> Cooling	<input type="checkbox"/>	-
3.2 Static pressure test holes have been created, and test hole locations are well-marked and accessible.	<input type="checkbox"/>	-
Test hole location for <b>return</b> external static pressure: <input type="checkbox"/> Plenum <input type="checkbox"/> Cabinet <input type="checkbox"/> Transition <input type="checkbox"/> Other: _____	-	-
Test hole location for <b>supply</b> external static pressure: <input type="checkbox"/> Plenum <input type="checkbox"/> Cabinet <input type="checkbox"/> Transition <input type="checkbox"/> Other: _____	-	-
3.3 Measured <b>return</b> external static pressure (Enter value only, without negative sign): _____ IWC	-	-
3.4 Measured <b>supply</b> external static pressure (Enter value only, without positive sign): _____ IWC	-	-
3.5 Measured <b>total</b> external static pressure = Value-only from Item 3.3 + Value-only from Item 3.4 = _____ IWC	-	-
3.6 <b>Measured</b> (Item 3.5) - <b>Design</b> (Item 5.4 on HVAC Design Report) total external static pressure = _____ IWC	-	-
3.7 Measured HVAC fan airflow, using Item 3.5 and fan speed setting: _____ CFM	-	-
3.8 Measured HVAC fan airflow (Item 3.7) is $\pm 15\%$ of design HVAC fan airflow (Item 5.2 on HVAC Design Report)	<input type="checkbox"/>	-

### 4. Air Balancing of Supply Registers & Return Grilles (Recommended, but not Required) <sup>4</sup>

4.1 Balancing report attached with room-by-room design airflows from Item 5.5 on HVAC Design Report, and contractor-measured airflow using ANSI / ACCA 5 QI-2015 protocol	<input type="checkbox"/>	<input type="checkbox"/>
4.2 Room-by-room airflows verified by contractor to be within the greater of $\pm 20\%$ or 25 CFM of design airflow	<input type="checkbox"/>	<input type="checkbox"/>





# HVAC Commissioning Checklist <sup>1, 2</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

### Footnotes

1. This Checklist is designed to align with the requirements of ANSI / ACCA's 5 QI-2015 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems (e.g., those caused by a lack of maintenance by occupants). Therefore, this Checklist is not a guarantee of proper ventilation, indoor air quality, or HVAC performance.  
This Checklist applies to split air conditioners, unitary air conditioners, air-source heat pumps, and water-source (i.e., geothermal) heat pumps up to 65 kBtuh with forced-air distribution systems (i.e., ducts) and to furnaces up to 225 kBtuh with forced-air distribution systems (i.e., ducts). All other permutations of equipment (e.g., boilers, mini-split / multi-split systems) and distribution systems are exempt.
2. For a home certified in the State of ID, MT, OR, or WA, the following alternatives and exemptions apply:
  - a. For a home with an air-source heat pump up to 65 kBtuh with a forced-air distribution system (i.e., ducts), the contractor is permitted to complete the 2011 PTCS<sup>®</sup> Commissioned Heat Pump Certificate and Startup Form in lieu of this Checklist.
  - b. For a home with a split air conditioner or unitary air conditioner up to 65 kBtuh with a forced-air distribution system (i.e., ducts), the contractor is permitted to complete the Northwest Central AC Commissioning & Startup Form in lieu of this Checklist.
  - c. For a home in a location with < 600 CDD, the completion of this Checklist is recommended, but not required.
3. Either factory-installed or field-installed TXV's may be used. For field-installed TXV's, ensure that sensing bulbs are insulated and tightly clamped to the vapor line with good linear thermal contact at the recommended orientation, usually 4 or 8 o'clock.
4. Air balancing of supply registers and return grilles is highly recommended to improve the performance of the HVAC system and comfort of the occupants, but is not required at this time for certification. When air balancing is completed, balancing dampers or proper duct sizing shall be used instead of looped or coiled ductwork to limit flow to diffusers. When balancing dampers are used, they shall be located at the trunk to limit noise unless the trunk will not be accessible when the balancing process is conducted. In such cases, Opposable Blade Dampers (OBD) or dampers located in the duct boot are permitted to be used.
5. This Revision of the HVAC Commissioning Checklist is required to certify all homes permitted after 07/01/2016, but is allowed to be used for any home permitted or completed prior to this date. The Home Energy Rater certifying the home may define the 'permit date' as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors.



# Water Management System Builder Requirements<sup>1</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

### Builder Responsibilities:

- It is the exclusive responsibility of builders to ensure that each certified home is constructed to meet these requirements.
- While builders are not required to maintain documentation demonstrating compliance for each individual certified home, builders are required to develop a process to ensure compliance for each certified home (e.g., incorporate these requirements into the Scope of Work for relevant sub-contractors, require the site supervisor to inspect each home for these requirements, and / or sub-contract the verification of these requirements to a Rater).
- In the event that the EPA determines that a certified home was constructed without meeting these requirements, the home may be decertified.

### 1. Water-Managed Site and Foundation

- 1.1 Patio slabs, porch slabs, walks, and driveways sloped  $\geq 0.25$  in. per ft. away from home to edge of surface or 10 ft., whichever is less.<sup>2</sup>
- 1.2 Back-fill has been tamped and final grade sloped  $\geq 0.5$  in. per ft. away from home for  $\geq 10$  ft. See Footnote for alternatives.<sup>2</sup>
- 1.3 Capillary break beneath all slabs (e.g., slab on grade, basement slab) except crawlspace slabs using either:  $\geq 6$  mil polyethylene sheeting, lapped 6-12 in., or  $\geq 1$  in. extruded polystyrene insulation with taped joints.<sup>3, 4, 5</sup>
- 1.4 Capillary break at all crawlspace floors using  $\geq 6$  mil polyethylene sheeting, lapped 6-12 in., & installed using one of the following:<sup>3, 4, 5</sup>
- 1.4.1 Placed beneath a concrete slab; OR,
- 1.4.2 Lapped up each wall or pier and fastened with furring strips or equivalent; OR,
- 1.4.3 Secured in the ground at the perimeter using stakes.
- 1.5 Exterior surface of below-grade walls of basements & unvented crawlspaces finished as follows:
- a) For poured concrete, masonry, & insulated concrete forms, finish with damp-proofing coating.<sup>6</sup>
- b) For wood framed walls, finish with polyethylene and adhesive or other equivalent waterproofing.
- 1.6 Class 1 vapor retarder not installed on interior side of air permeable insulation in exterior below-grade walls.<sup>7</sup>
- 1.7 Sump pump covers mechanically attached with full gasket seal or equivalent.
- 1.8 Drain tile installed at basement and crawlspace walls, with the top of the drain tile pipe below the bottom of the concrete slab or crawlspace floor. Drain tile surrounded with  $\geq 6$  in. of  $\frac{1}{2}$  to  $\frac{3}{4}$  in. washed or clean gravel and with gravel layer fully wrapped with fabric cloth. Drain tile level or sloped to discharge to outside grade (daylight) or to a sump pump. If drain tile is on interior side of footing, then channel provided through footing to exterior side.<sup>8</sup>

### 2. Water-Managed Wall Assembly

- 2.1 Flashing at bottom of exterior walls with weep holes included for masonry veneer and weep screed for stucco cladding systems, or equivalent drainage system.<sup>9</sup>
- 2.2 Fully sealed continuous drainage plane behind exterior cladding that laps over flashing in Item 2.1 and fully sealed at all penetrations. Additional bond-break drainage plane layer provided behind all stucco and non-structural masonry cladding wall assemblies.<sup>9, 10</sup>
- 2.3 Window and door openings fully flashed.<sup>11</sup>

### 3. Water-Managed Roof Assembly

- 3.1 Step and kick-out flashing at all roof-wall intersections, extending  $\geq 4$ " on wall surface above roof deck and integrated shingle-style with drainage plane above; boot / collar flashing at all roof penetrations.<sup>12</sup>
- 3.2 For homes that don't have a slab-on-grade foundation and do have expansive or collapsible soils, gutters & downspouts provided that empty to lateral piping that discharges water on sloping final grade  $\geq 5$  ft. from foundation, or to underground catchment system not connected to the foundation drain system that discharges water  $\geq 10$  ft. from foundation. See Footnote for alternatives & exemptions.<sup>3, 13, 14</sup>
- 3.3 Self-adhering polymer-modified bituminous membrane at all valleys & roof deck penetrations.<sup>3, 15</sup>
- 3.4 In 2009 IECC Climate Zones 5 & higher, self-adhering polymer-modified bituminous membrane over sheathing at eaves from the edge of the roof line to  $> 2$  ft. up roof deck from the interior plane of the exterior wall.<sup>3, 15</sup>

### 4. Water-Managed Building Materials

- 4.1 Wall-to-wall carpet *not* installed within 2.5 ft. of toilets, tubs, and showers.
- 4.2 Cement board or equivalent moisture-resistant backing material installed on all walls behind tub and shower enclosures composed of tile or panel assemblies with caulked joints. Paper-faced backerboard shall not be used.<sup>16</sup>
- 4.3 In Warm-Humid climates, Class 1 vapor retarders not installed on the interior side of air permeable insulation in above-grade walls, except at shower and tub walls.<sup>7</sup>
- 4.4 Building materials with visible signs of water damage or mold *not* installed or allowed to remain.<sup>17</sup>
- 4.5 Framing members & insulation products having high moisture content *not* enclosed (e.g., with drywall).<sup>18</sup>
- 4.6 For each condensate-producing HVAC component, corrosion-resistant drain pan (e.g., galvanized steel, plastic) included that drains to a conspicuous point of disposal in case of blockage. Backflow prevention valve included if connected to a shared drainage system.

### Footnotes:

1. These requirements are designed to improve moisture control in homes. However, these features alone cannot prevent all moisture problems. For example, leaky pipes or overflowing baths can lead to moisture issues and negatively impact the performance of the home.
2. Swales or drains designed to carry water from foundation are permitted to be provided as an alternative to the slope requirements for any home, and shall be provided for a home where setbacks limit space to less than 10 ft. Also, tamping of back-fill is not required if either: proper drainage can be achieved using non-settling compact soils, as determined by a certified hydrologist, soil scientist, or engineer; OR, the builder has scheduled a site visit to provide in-fill and final grading after settling has occurred (e.g., after the first rainy season).



# Water Management System Builder Requirements<sup>1</sup>

## ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

3. Not required in Dry (B) climates as shown in 2009 IECC Figure 301.1 and Table 301.1.
4. Not required for raised pier foundations with no walls. To earn the ENERGY STAR, EPA recommends, but does not require, that radon-resistant features be included in homes built in EPA Radon Zones 1, 2 & 3. For more information, see [www.epa.gov/indoorairplus](http://www.epa.gov/indoorairplus).
5. For an existing slab (e.g., in a home undergoing a gut rehabilitation), in lieu of a capillary break beneath the slab, a continuous and sealed Class I or Class II Vapor Retarder (per Footnote 7) is permitted to be installed on top of the entire slab. In such cases, up to 10% of the slab surface is permitted to be exempted from this requirement (e.g., for sill plates). In addition, for existing slabs in occupiable space, the Vapor Retarder shall be, or shall be protected by, a durable floor surface. If Class I Vapor Retarders are installed, they shall not be installed on the interior side of air permeable insulation or materials prone to moisture damage.
6. Interior surface of an existing below-grade wall (e.g., in a home undergoing a gut rehab.) listed in Item 1.5a is permitted to be finished by:
  - Installing a continuous and sealed drainage plane, capillary break, Class I Vapor Retarder (per Footnote 7) and air barrier that terminates into a foundation drainage system as specified in Item 1.8; OR
  - If a drain tile is not required as specified in Footnote 8, adhering a capillary break and Class I Vapor Retarder (per Footnote 7) directly to the wall with the edges taped/sealed to make it continuous.

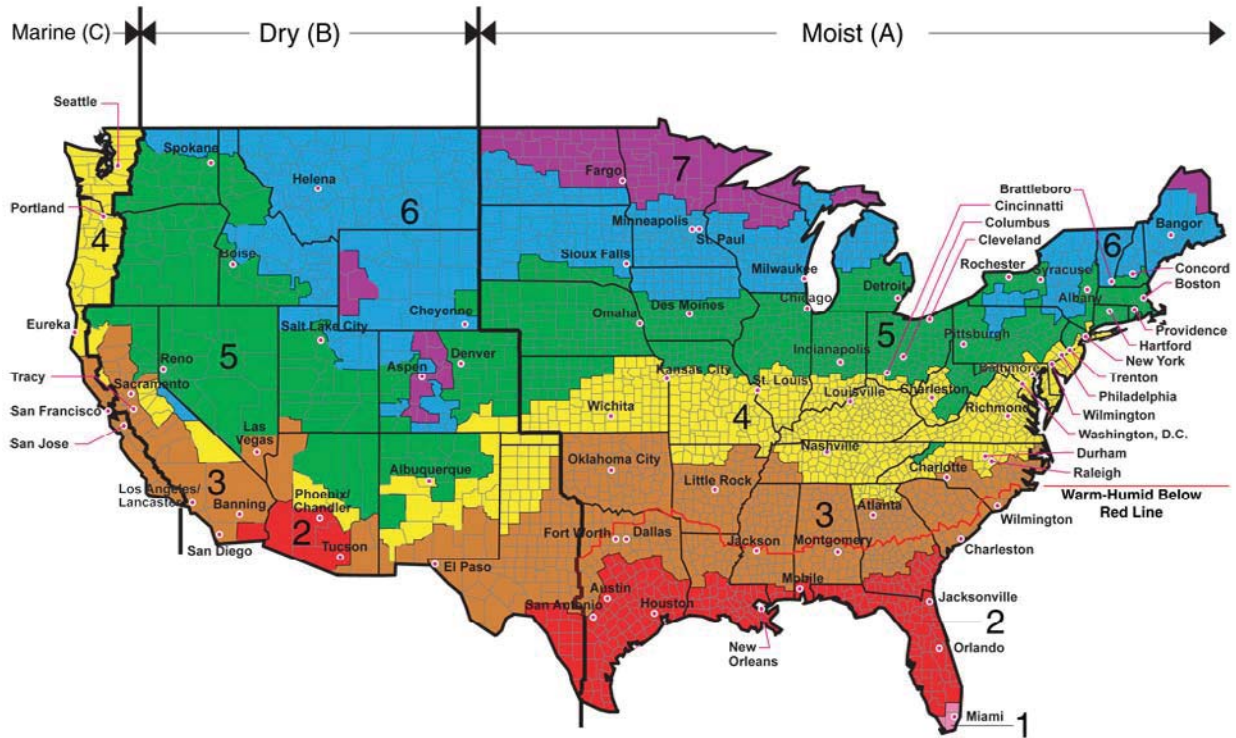
Note that no alternative compliance option is provided for existing below-grade wood-framed walls in Item 1.5b.

7. The 2009 IRC defines Class I vapor retarders as a material or assembly with a rating of  $\leq 0.1$  perm, using the desiccant method with Proc. A of ASTM E 96. The following materials are typically  $\leq 0.1$  perm and shall not be used on the interior side of air permeable insulation in above-grade exterior walls in warm-humid climates or below-grade exterior walls in any climate: rubber membranes, polyethylene film, glass, aluminum foil, sheet metal, and foil-faced insulating / non-insulating sheathings. These materials can be used on the interior side of walls if air permeable insulation is not present (e.g., foil-faced rigid foam board adjacent to a below-grade concrete foundation wall is permitted).

Note that this list is not comprehensive and other materials with a perm rating  $\leq 0.1$  also shall not be used. Also, if mfr. spec.'s for a product indicate a perm rating  $\geq 0.1$ , then it may be used, even if it is in this list. Also note that open-cell and closed-cell foam generally have ratings above this limit and may be used unless mfr. spec.'s indicate a perm rating  $\leq 0.1$ . Several exemptions to these requirements apply:

- Class I vapor retarders, such as ceramic tile, may be used at shower and tub walls;
  - Class I vapor retarders, such as mirrors, may be used if mounted with clips or other spacers that allow air to circulate behind them.
8. Alternatively, either a drain tile that is pre-wrapped with a fabric filter or a Composite Foundation Drainage System (CFDS) that has been evaluated by ICC-ES per AC 243 are permitted to be used. Note that the CFDS must include a soil strip drain or another ICC-ES evaluated perimeter drainage system to be eligible for use. In an existing home (e.g. in a home undergoing a gut rehab.) a drain tile installed only on the interior side of the footing without a channel is permitted. Additionally, a drain tile is not required when a certified hydrologist, soil scientist, or engineer has determined that a crawlspace foundation, or an existing basement foundation (e.g., in a home undergoing a gut rehab.), is installed in Group I Soils (i.e. well-drained ground or sand-gravel mixtures), as defined by 2009 IRC Table R405.1.
  9. These Items not required for existing structural masonry walls (e.g., in a home undergoing a gut rehabilitation). Note this exemption does not extend to existing wall assemblies with masonry veneers.
  10. Any of the following systems may be used: a monolithic weather-resistant barrier (i.e., house wrap) shingled at horizontal joints and sealed or taped at all joints; weather resistant sheathings (e.g., faced rigid insulation) fully taped at all "butt" joints; lapped shingle-style building paper or felts; or other water-resistive barrier recognized by ICC-ES or other accredited agency.
  11. Apply pan flashing over the rough sill framing, inclusive of the corners of the sill framing; side flashing that extends over pan flashing; and top flashing that extends over side flashing or equivalent details for structural masonry walls.
  12. Intersecting wall siding shall terminate 1 in. above the roof or higher, per manufacturer's recommendations. Continuous flashing shall be installed in place of step flashing for metal and rubber membrane roofs.
  13. The assessment of whether the soil is expansive or collapsible shall be completed by a certified hydrologist, soil scientist, or engineer.
  14. Any of the following are permitted to be used as alternatives to Item 3.2: a) a roof design that deposits rainwater to a grade-level rock bed with a waterproof liner and a lateral drain pipe that meets discharge requirements per Item 3.2; b) a rainwater harvesting system that drains overflow to meet discharge requirements per Item 3.2; or c) a continuous rubber membrane (e.g. EPDM) that is aligned with the foundation wall from final grade to  $\geq 8$  in. below grade and then slopes  $\geq 0.5$  in. per ft. away from the home for at least 5 ft., with Group I Soils (as defined in Footnote 8) covering the membrane to within 3 in. of final grade.
  15. As an alternative, any applicable option in 2009 IRC Section R905.2.8.2 is permitted to be used to meet Item 3.3 and any option in 2009 IRC Section R905.2.7.1 is permitted to be used to meet Item 3.4. EPA recommends, but does not require, that products meet ASTM D1970.
  16. In addition to cement board, materials that have been evaluated by ICC-ES per AC 115 may also be used to meet this requirement. Monolithic tub and shower enclosures (e.g., fiberglass with no seams) are exempt from this backing material requirement unless required by the manufacturer. Paper-faced backerboard may only be used behind monolithic enclosures or waterproof membranes that have been evaluated by ICC-ES per AC 115, and then only if it meets ASTM mold-resistant standards ASTM D3273 or ASTM D6329.
  17. If mold is present, effort should be made to remove all visible signs of mold (e.g., by damp wipe with water and detergent). If removal methods are not effective, then the material shall be replaced. However, stains that remain after damp wipe are acceptable. Lumber with "sap stain fungi" is exempt from this Item as long as the lumber is structurally intact.
  18. For wet-applied insulation, follow manufacturer's drying recommendations. EPA recommends that lumber moisture content be  $\leq 18\%$ .
  19. This Revision is required to certify all homes permitted after 07/01/2016, but can be used to certify any home permitted or completed prior to this date. The Rater may define the 'permit date' as either the date that the permit was issued or the date of the contract on the home. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.

2012 IECC CLIMATE ZONE MAP



Zone 1 includes Hawaii, Guam, Puerto Rico and the Virgin Islands

Alaska is Zone 7, except for the following boroughs in Zone 8: Bethel, Dellingham, Fairbanks, North Star, Nome North Slope, Northwest Arctic, Southeast Fairbanks, Wade Hampton and Yukin-Koyukuk

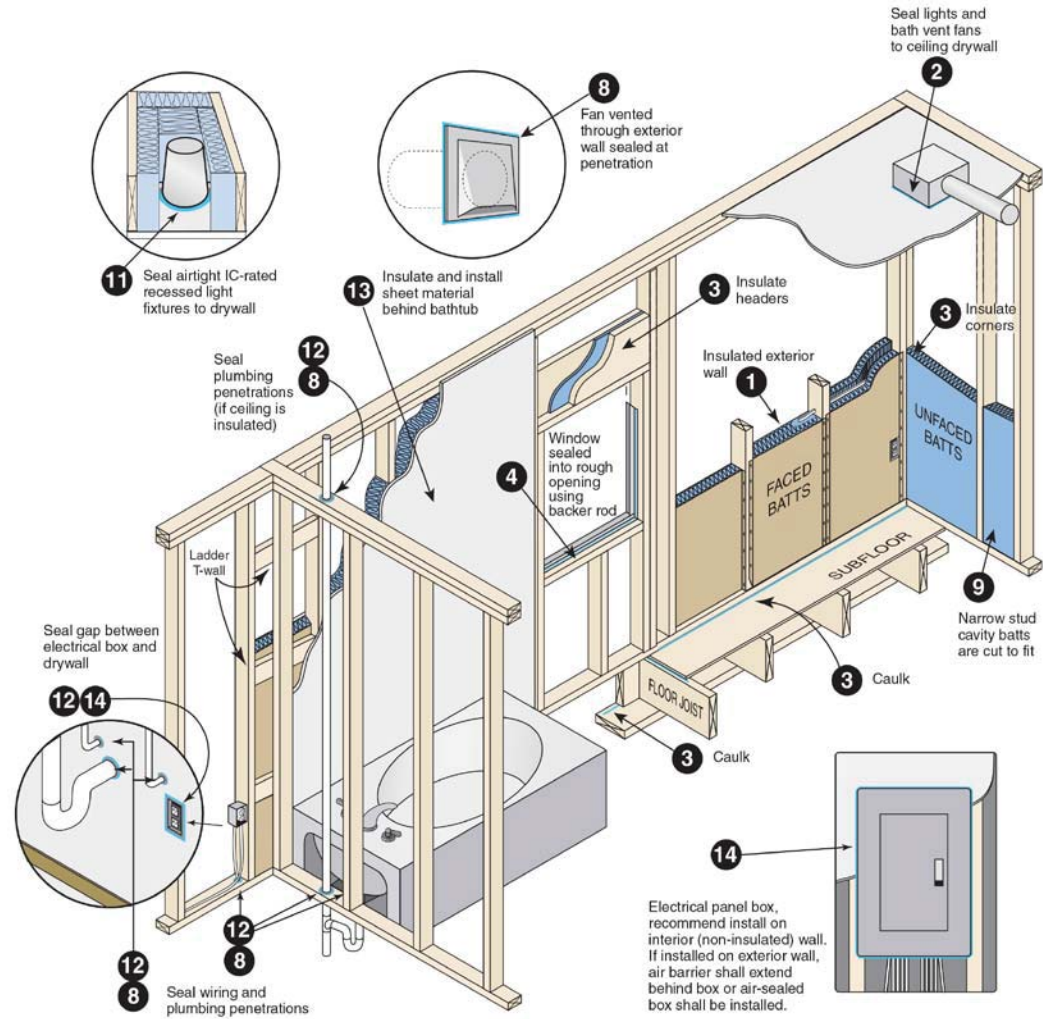
---

**AIR BARRIER AND INSULATION INSPECTION COMPONENT GUIDE**

NO.	COMPONENT	CRITERIA
1	Air barrier and thermal barrier	<ul style="list-style-type: none"> <li>Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier.</li> <li>Breaks or joints in the air barrier are filled or repaired.</li> <li>Air-permeable insulation is not used as a sealing material.</li> <li>Air-permeable insulation is inside of an air barrier.</li> </ul>
2	Ceiling/attic	<ul style="list-style-type: none"> <li>Air barrier in any dropped ceiling/soffit is substantially aligned with insulation, and any gaps are sealed.</li> <li>Attic access (except unvented attic), knee wall door or pull down stair is sealed.</li> </ul>
3	Walls	<ul style="list-style-type: none"> <li>Corners and headers are insulated.</li> <li>Junction of foundation and sill plate is sealed.</li> </ul>
4	Windows and doors	<ul style="list-style-type: none"> <li>Space between window/door jambs and framing is sealed.</li> </ul>
5	Rim joists	<ul style="list-style-type: none"> <li>Rim joists are insulated and include an air barrier.</li> </ul>
6	Floors (including above-garage and cantilevered floors)	<ul style="list-style-type: none"> <li>Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.</li> </ul>
7	Crawl space walls	<ul style="list-style-type: none"> <li>Insulation is permanently attached to walls.</li> <li>Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.</li> </ul>
8	Shafts, penetrations	<ul style="list-style-type: none"> <li>Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.</li> </ul>
9	Narrow cavities	<ul style="list-style-type: none"> <li>Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.</li> </ul>
10	Garage separation	<ul style="list-style-type: none"> <li>Air sealing is provided between the garage and conditioned spaces.</li> </ul>
11	Recessed lighting	<ul style="list-style-type: none"> <li>Recessed light fixtures are air tight, IC rated and sealed to drywall.</li> <li>Exception—fixtures in conditioned space.</li> </ul>
12	Plumbing and wiring	<ul style="list-style-type: none"> <li>Insulation is placed between outside and pipes.</li> <li>Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.</li> </ul>
13	Shower/tub on exterior wall	<ul style="list-style-type: none"> <li>Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.</li> </ul>
14	Electrical/phone box on exterior walls	<ul style="list-style-type: none"> <li>Air barrier extends behind boxes, or air sealed-type boxes are installed.</li> </ul>
15	Common wall	<ul style="list-style-type: none"> <li>Air barrier is installed in common wall between dwelling units.</li> </ul>
16	HVAC register boots	<ul style="list-style-type: none"> <li>HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.</li> </ul>
17	Fireplace	<ul style="list-style-type: none"> <li>Fireplace walls include an air barrier.</li> </ul>

This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2009 IECC. It does not cover all airsealing locations or techniques. Other code provisions may be applicable as well.

**AIR SEALING KEY POINTS**

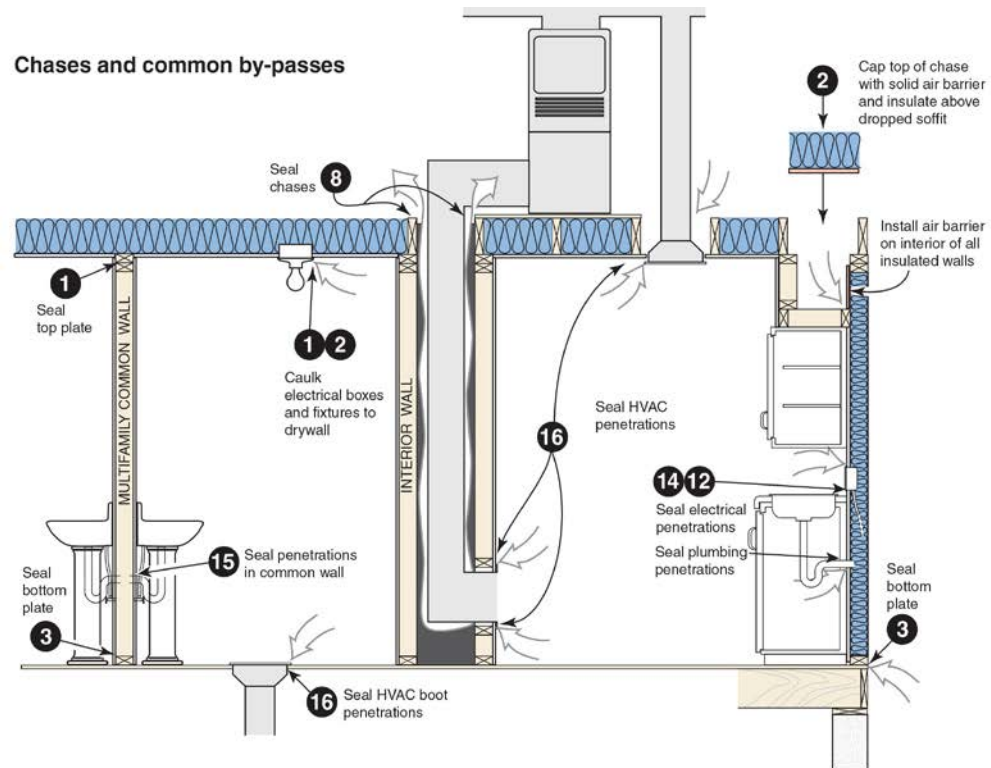


This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

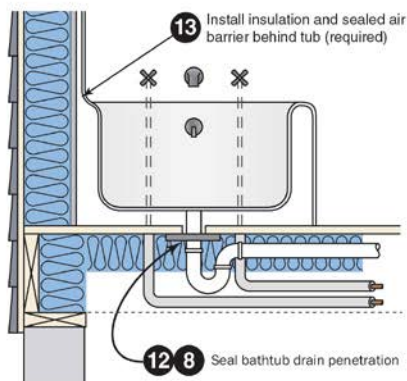
Image courtesy of Southface. Reprinted with permission.

AIR SEALING KEY POINTS (CONTINUED)

Chases and common by-passes



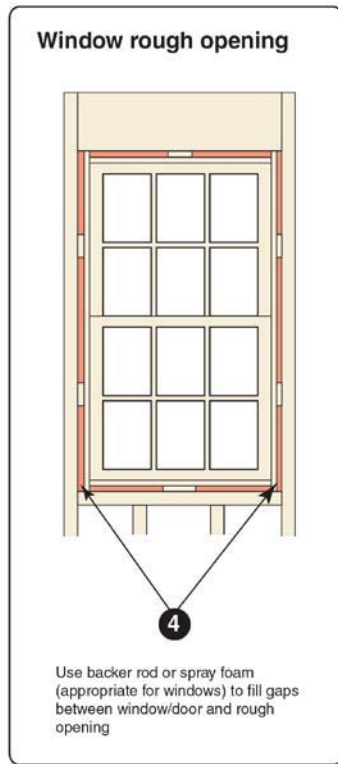
Shower/tub drain rough opening



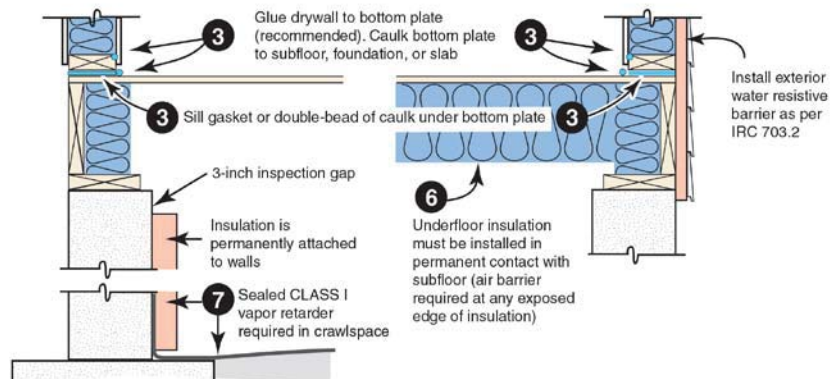
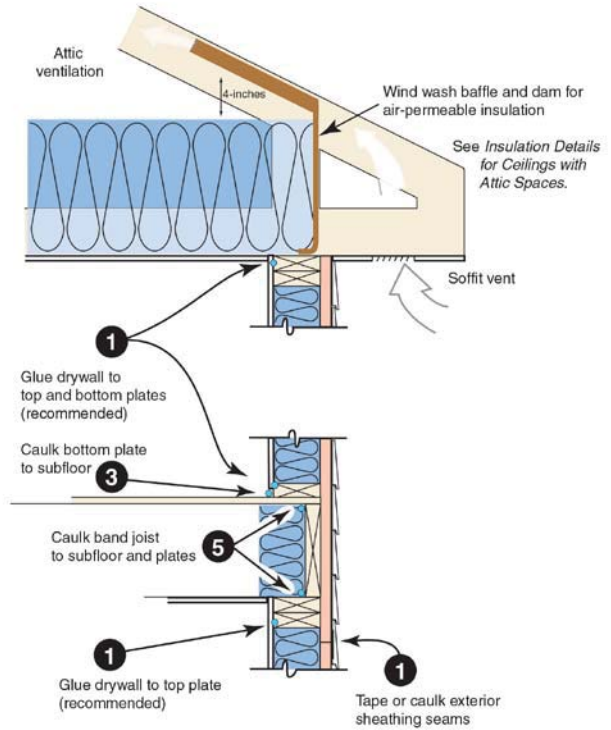
This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

AIR SEALING KEY POINTS (CONTINUED)



**Wall cross-section**

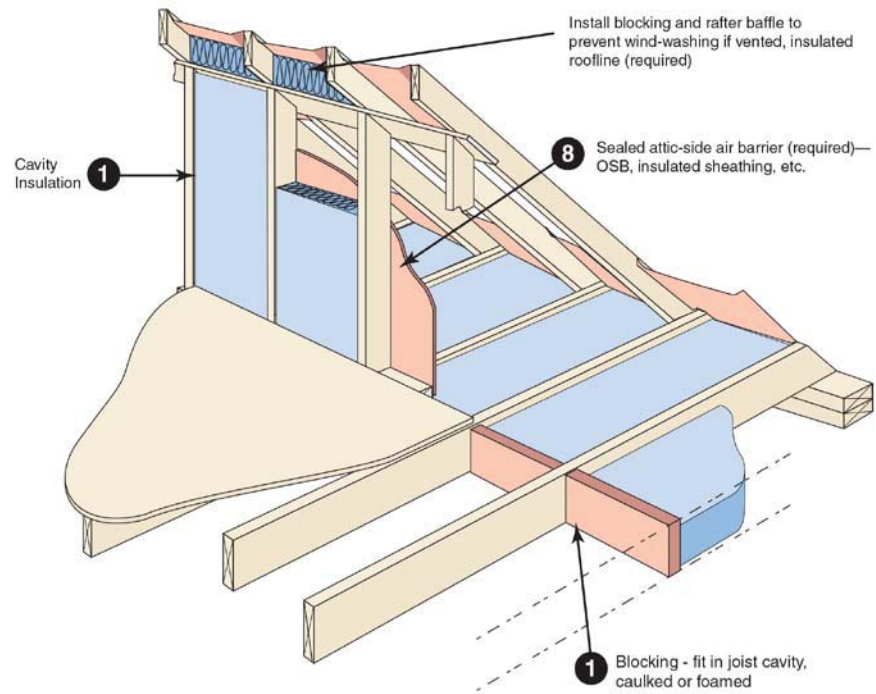


This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

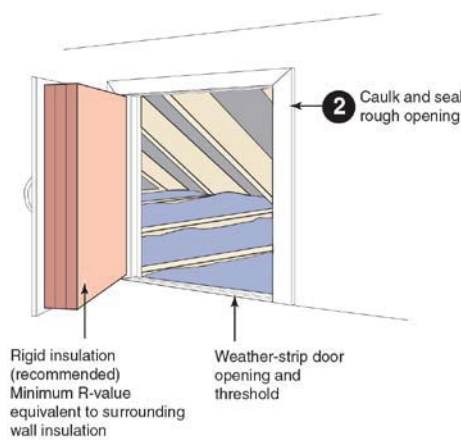
Image courtesy of Southface. Reprinted with permission.



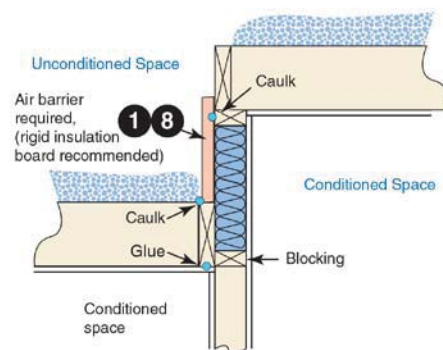
AIR SEALING KEY POINTS (CONTINUED)



Attic knee-walls



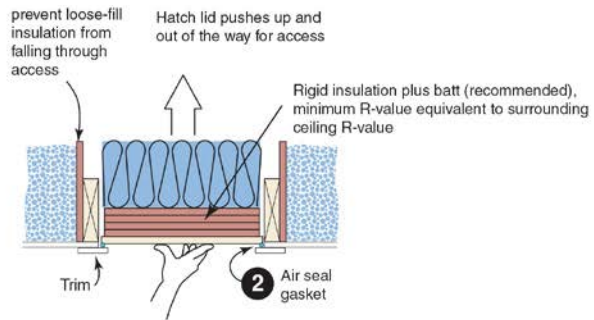
Two-level attic



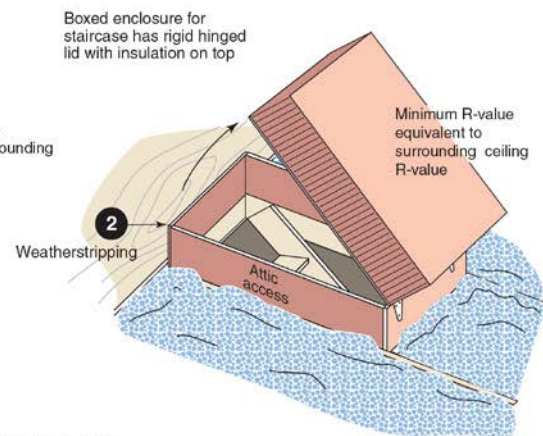
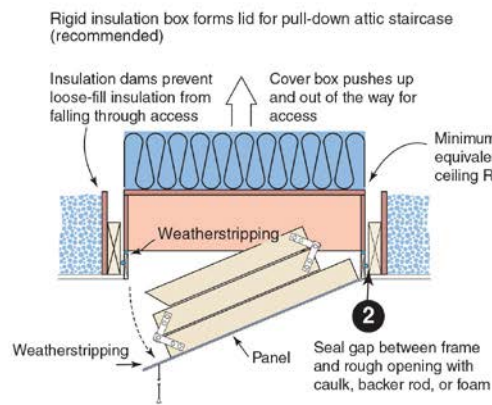
This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 or the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

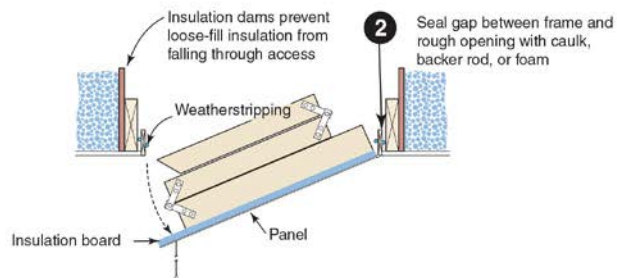
**AIR SEALING KEY POINTS (CONTINUED)**



**Attic pull-down stairs**



**Attic pull-down stairs**



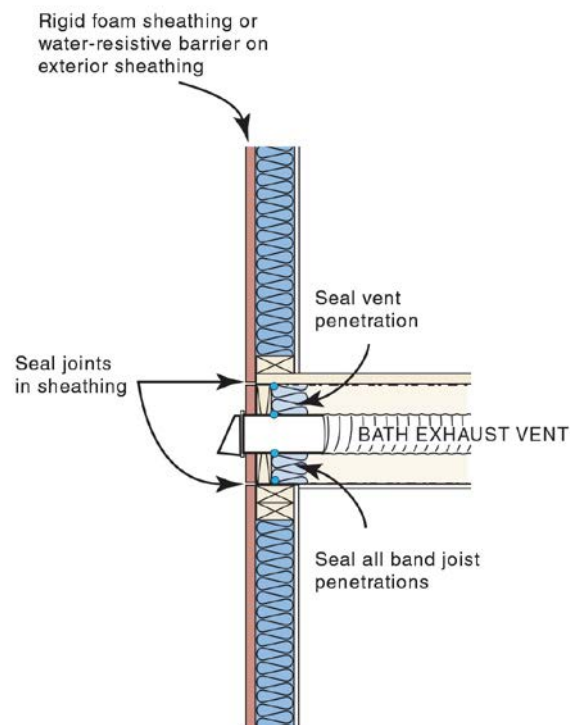
This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

---

**AIR SEALING KEY POINTS (CONTINUED)**
**Multifamily**

1. Cap and seal all chases, including chases for grouped utility lines and radon vents.
2. Seal penetrations in mechanical closet, including penetrations for the:
  - supply plenum
  - outside air ventilation
  - refrigerant line
  - plumbing
  - electrical
  - gas fuel
3. Seal band area at exterior sheathing side and all penetrations through band.
4. Air-seal at drywall finishing for any wall adjacent to stairwell or elevator.  
Air-seal this gap at every change in floor level.
5. Seal miscellaneous clustered penetrations through building envelope (e.g., refrigerant lines).

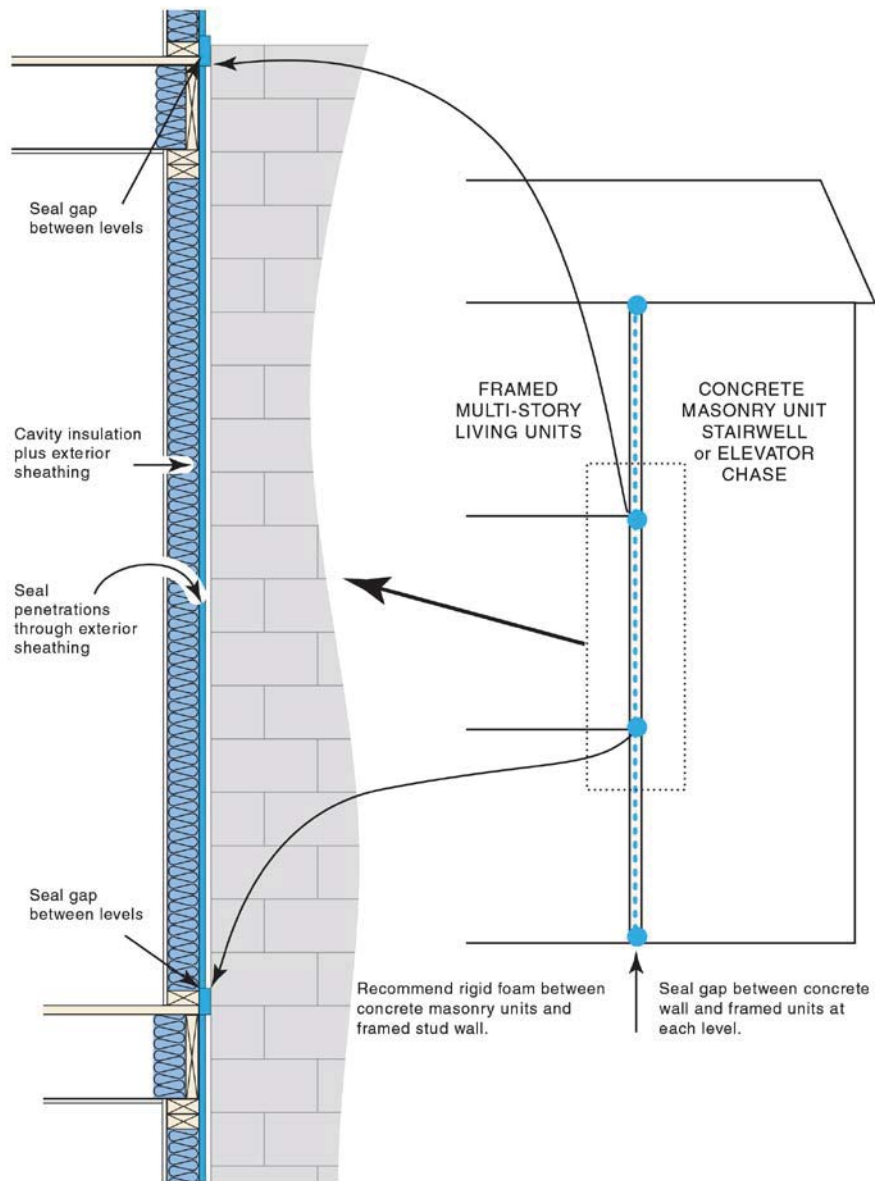


This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

AIR SEALING KEY POINTS (CONTINUED)

Multifamily

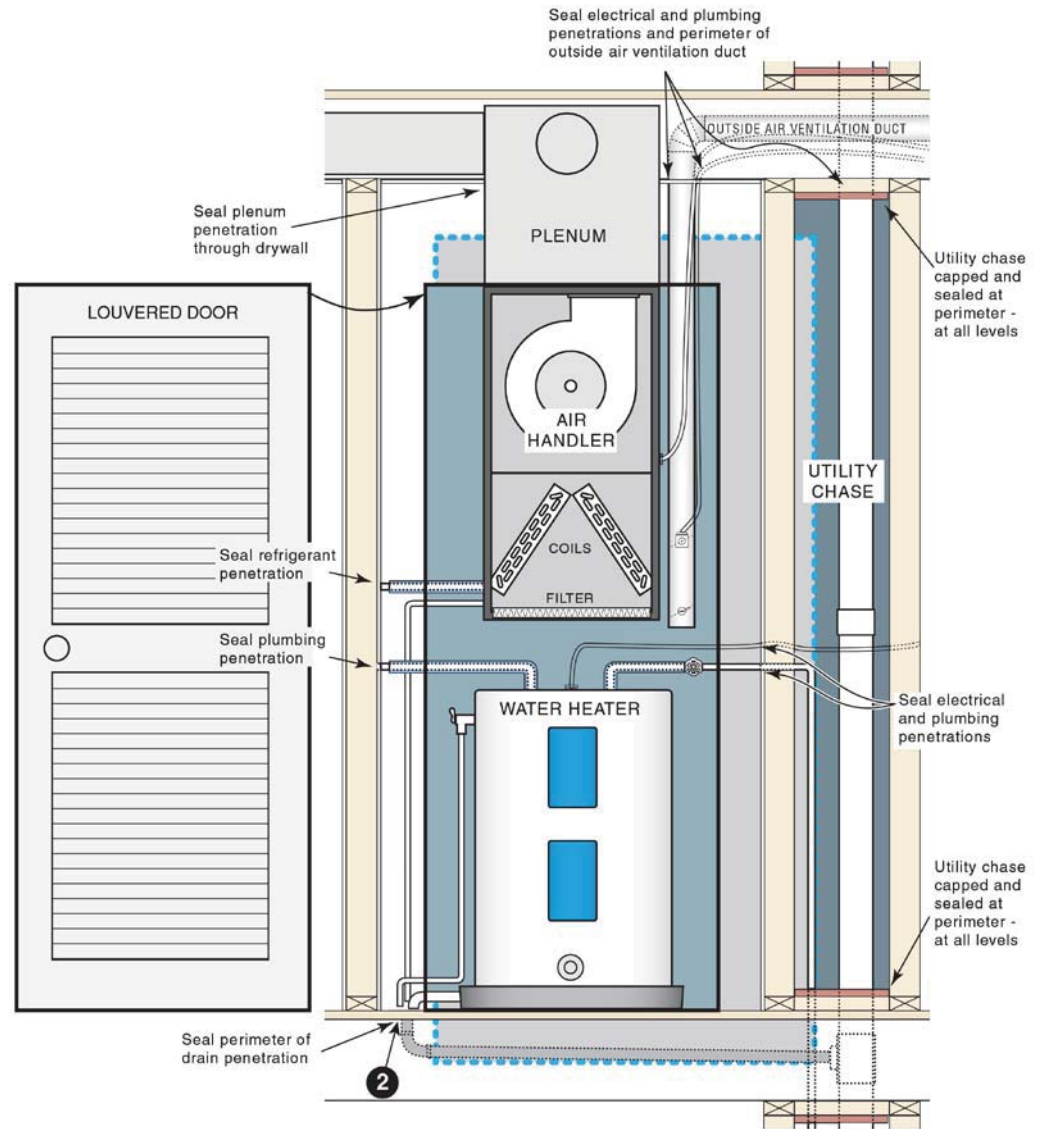


This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

AIR SEALING KEY POINTS (CONTINUED)

Mechanical closet



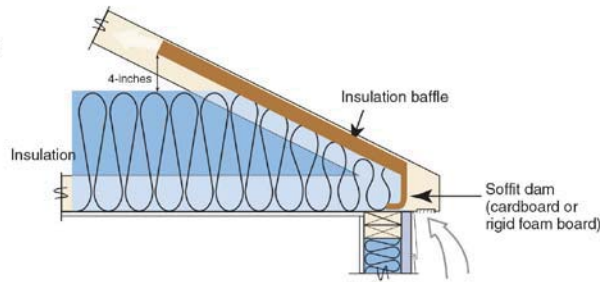
This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

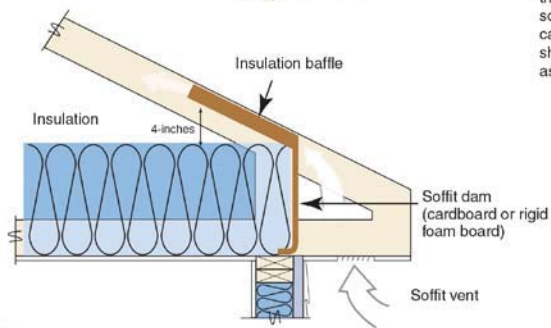
**AIR SEALING KEY POINTS (CONTINUED)**

**Roof and truss**

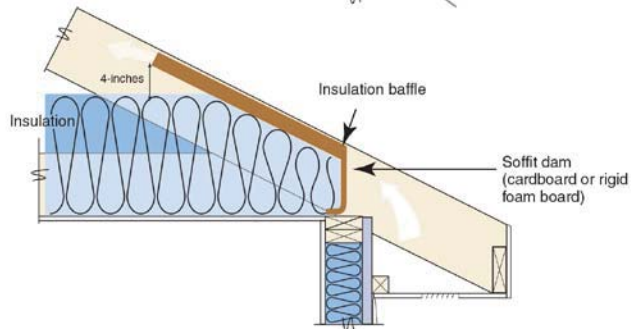
**Standard Truss with tapered insulation depth**



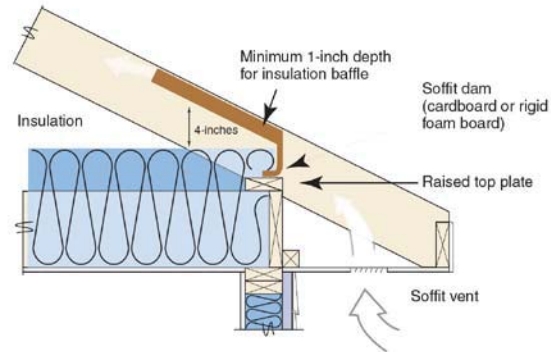
**Energy Truss with full height insulation (recommended)**



**Standard rafter and top plate with tapered insulation depth**



**Rafter on raised top plate with full height insulation (recommended)**



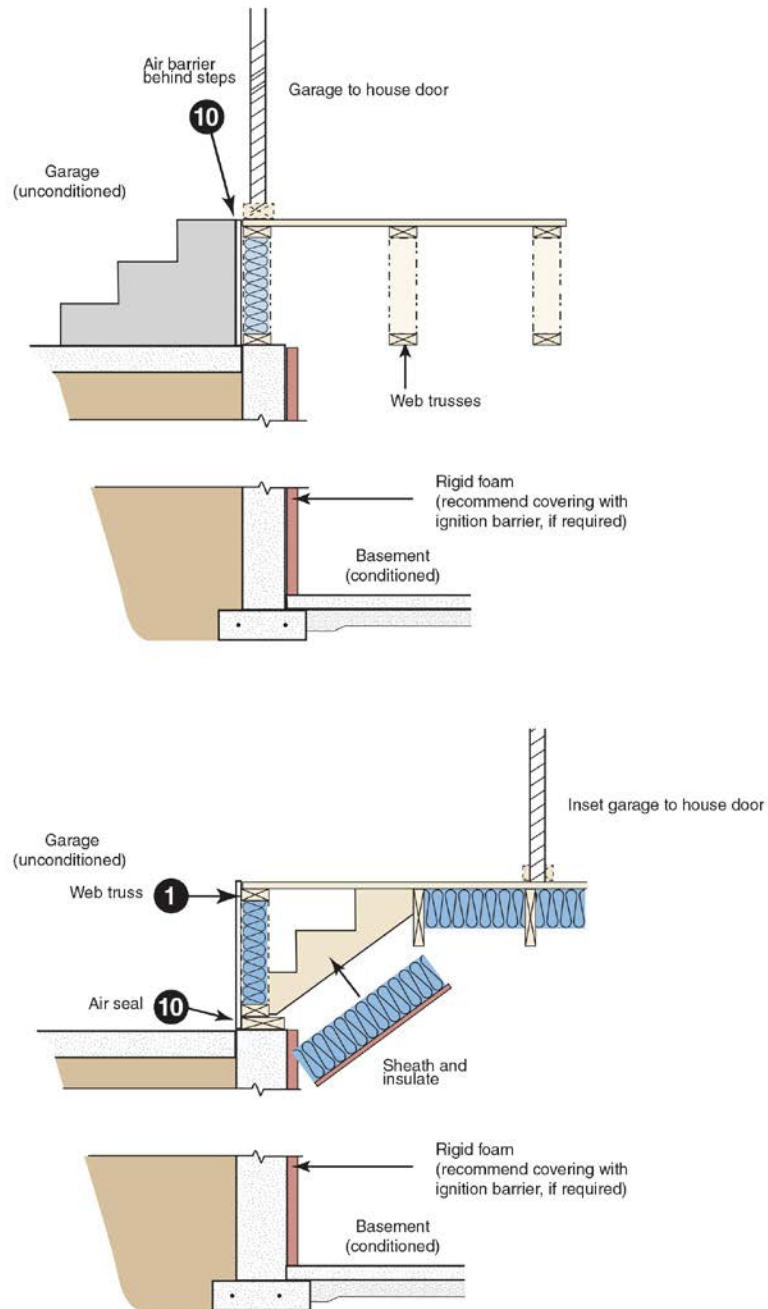
**Note: Wind wash baffle and air-permeable insulation dam.** For air permeable insulation in vented attics, baffles shall be installed adjacent to soffit and eave vents. A minimum of a 1-inch of space shall be provided between the insulation and the roof sheathing and at the location of the vent. The baffle shall extend over the top of the insulation inward until it is at least 4 inches vertically above the top of the insulation. Any solid material such as cardboard or thin insulating sheathing shall be permissible as the baffle.

This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

**AIR SEALING KEY POINTS (CONTINUED)**

**Garage**



This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2012 IECC. It does not cover all air sealing location or techniques. Other code provisions may be applicable as well.

Image courtesy of Southface. Reprinted with permission.

## Knox Housing Partnership, Inc. HERS Verification/Rater Services Agreement

THIS AGREEMENT made and entered into this \_\_\_ day of \_\_\_\_\_, 2017, between **Knox Housing Partnership, Inc. (KHP)**(referred to as "**Rater**"), whose address is: 109 North Winona Street, Knoxville, TN 37917 and \_\_\_\_\_ regarding the **FIVE POINTS Phase 3 project**] (referred to as "**Client**"), whose billing address is: \_\_\_\_\_.

This Agreement is for the **FIVE POINTS Phase 3** project, whereas, Client desires to construct 80 new multi-family units; (twenty eight) buildings, five (5) unit types; all residential dwellings: upon certain real property located at 304 S Kyle Street, with unique address to be specified, Knoxville, Tennessee 37917, and seeking EPA's ENERGY STAR® Certification Process v3 Rev8 certification. Rater is in the business of providing EPA's ENERGY STAR® Certification Process v3 Rev8 field verification services (Testing and Inspection onsite) and ENERGY STAR® Certification Process v3 Rev8 energy modeling, administrative file assembly, and Providership Quality Assurance QAD; all in accordance with RESNET™ HERS standards. Client desires to retain the services of Rater in connection with obtaining EPA's ENERGY STAR® Certification Process v3 Rev8 certification upon Client's completion of the improvements to the Property pursuant to the terms and conditions set forth by RESNET™, and U.S. EPA. This contract does not guarantee certification.

### SCOPE OF WORK

- ❖ Rater shall provide RESNET™ HERS Certified Rater Services, in accordance with RESNET™ standards and protocols, <http://www.natresnet.org>, by means of Ken Block, RESNET™ HERS Certified Rater.
- ❖ Rater shall provide RESNET™ HERS Quality Assurance Designee (QAD) Services, by means of, Southface at, <http://www.southface.org/services/residential/hers-providership/> in accordance with RESNET™ standards and protocols.
- ❖ Rater shall not be responsible for forcing any entities involved with the **FIVE POINTS Phase 3** project to comply with any of the standards promulgated pursuant to the RESNET™ HERS program.

### DESIGN DEVELOPMENT PHASE:

- ❖ Rater shall meet (locally in Knoxville area) with, the Project Team; in collaboration with the Project Team requirements' develop a HERS energy model projection; participate in the Design Charrette; perform additional projected HERS energy modeling, as needed.
- ❖ If and when, after the Charrette energy design modeling, the Project Team makes any design changes impacting the energy design model, such changes shall be promptly communicated and documented to the Rater/Provider for Preliminary Verification in the energy design model.
- ❖ If the residential dwelling(s) does not meet the EPA's ENERGY STAR® Certification Process v3 Rev8 requirements at plan analysis, changes must be made and communicated by the **Client**, so the **Rater** can model and analyze the proposed improvements.
- ❖ **NOTE #1:** The **Project Team** is solely responsible for the selection, design, and installation of all the elements of the project.



### **CONSTRUCTION PHASE: [Testing and Inspection Services on site]**

- ❖ Rater understands this project is to be constructed in one (1) iteration(s).
- ❖ HVAC Contractor shall complete the EPA's ENERGY STAR® Certification Process v3 Rev8 *HVAC Design Report* and provide to Rater for review.
- ❖ Rater shall review the *HVAC Design Report*, as per EPA's ENERGY STAR® Certification Process v3 Rev8, via the *Rater Design Review Checklist*.
- ❖ Rater shall conduct below slab radon piping installation verification, WVB and below grade foundation and slab insulation installation.
- ❖ Rater shall complete a pre-insulation installation evaluation for air-seal integrity; complete a pre-drywall EPA's ENERGY STAR® Certification Process v3 Rev8, *Rater Field Checklist*; advise the Client regarding conformance to the EPA's ENERGY STAR® Certification Process v3 Rev8 program components.
- ❖ Builder shall be solely responsible for the EPA's ENERGY STAR® Certification Process v3 Rev8 *Water Management System Builder Requirements* checklist. In the event that the EPA determines that a certified home was constructed without meeting these requirements, the home may be decertified.
- ❖ Rater will provide site visits to verify the EPA's ENERGY STAR Checklist items, such verification, testing and inspections will be assessed throughout the duration of the construction process and documented on the field checklists; and/or through digital photography, and/or e-mailed progress and performance reports, as deemed appropriate solely by the **Rater**.

### **FINAL PHASE/PERFORMANCE TESTING: [Testing and Inspection Services on site]**

- ❖ Rater is not responsible for the performance of the constructed dwelling.
- ❖ HVAC Contractor shall complete the EPA's ENERGY STAR Certification Process v3 Rev8 *HVAC Commissioning Checklist*, and provide the AHRI Match Certificate Number for HVAC Unit, and provide the related documentation such as; documentation of AHU air filtration media at MERV 6 or above.
- ❖ Builder shall complete and sign verifying the EPA's ENERGY STAR® Certification Process v3 Rev8 *Water Management System Builder Requirements* checklist. Provide the Rater a copy along with the domestic hot water storage heater AHRI Certificate number.
- ❖ Rater is responsible in providing the following Performance Verification & Testing to support the EPA's ENERGY STAR® Certification Process v3 Rev8 and RESNET™ HERS Rating requirements for each home:
  - Blower Door analysis and measurement
  - Whole House Ventilation measurements
  - Local Exhaust (Kitchen Range Hood and all full bath-room airflow measurement)
  - Duct Leakage (TDL & LTO) measurements
  - Room-by-Room HVAC system design flow measurements
  - Room-by-Room Zonal Pressure conformance (Return Air Pathway measurements)
  - Rater Field Checklist conformance items
- ❖ Rater requires one (1) work-day of un-interrupted access to each four (4) Units, for final Verification, Measurements & Testing. The Verification, Measurements & Testing schedules shall be determined as a component of construction schedules.

## **FINAL DOCUMENTATION:**

- ❖ **Rater** will collect (from **Project Team**) and compile the project: EPA's ENERGY STAR® Certification Process v3 Rev8; *HVAC Design Report, Rater Design Review Checklist, Rater Field Checklist, HVAC Commissioning Checklist, Water Management System Builder Requirements checklist*. Additional supporting documentation, as necessary, and synthesize the documents in a final ENERGY STAR and RESNET Provider QAD documentation package.
- ❖ Rater will forward the final documentation package to Rater's RESNET QAD Provider, <http://www.southface.org/services/residential/hers-providership/> whom will review the final documentation package for accuracy and completeness, request of Rater and/or Project Team any additional information, if necessary, and process the documentation to RESNET certification standards.

## **FINANCIAL RESPONSIBILITIES**

- ❖ **Rater DESIGN DEVELOPMENT PHASE and FINAL DOCUMENTATION Fees: \$19,372.**

To be paid by **Owner/Client**, including the following:

- All RESNET™ HERS Quality Assurance Designee (QAD) fees,
- All RESNET™ HERS Certified Rater fees,
- ALL ENERGY STAR Certificate fees.

- ❖ **Rater CONSTRUCTION PHASE: [Testing and Inspection Services on site] and**
- ❖ **FINAL PHASE/PERFORMANCE TESTING: [Testing and Inspection Services on site] Fees: \$23,371.**

To be paid by **Owner/Client**, for on-site third party **Testing and Inspection services.**

**The total Agreement Price for all Consulting Fees, Rater [RESNET™ HERS] Provider and Verification, Testing and Inspection Rater Services, including all materials and labor, and all work performed by contractor, subcontractors, or others under this agreement, shall be \$42,743.**

- Payment is due within 30 days of each Invoice date.
- An Invoice will be submitted for 25% of the total amount, when this agreement is signed, and
- For each iteration, 50% after plan analysis, recommendations, Charrette, and Field Rater Checklists are completed, and
- For each iteration, the remaining 25% upon acceptance, as complete, by the RESNET HERS Provider, <http://www.southface.org/services/residential/hers-providership/> in accordance with U.S. EPA, and RESNET™ standards and protocols seeking EPA's ENERGY STAR® Certification Process v3 Rev8 certification.

**HERS Rater Additional Fees are charged:** If, the Client, Client Representative, Prime (General) Contractor or Prime's Sub-Contractors requests a verification and the project is not ready for verification when the Rater arrives, the dwelling unit, apartment or townhouse, fails an insulation installation or energy star v3 performance test (foundation insulation, pre-drywall air seal or insulation installation RESNET grade 1, blower door, duct blaster, zonal pressure or exhaust ventilation), the HVAC Contractor's Energy Star required documentation is inaccurate or incomplete; then, each additional retest, verification or documentation review, shall be billed the Client at \$160.00 per/each mobilization needed and \$85 per/hour of additional testing or verification, minimum one hour charge. No ENERGY Star certificate will be provided the Client, until all Additional Charges are paid in full. No refunds are allowed. If the project becomes dormant (in active for 90 days) because the Client, Client Representative, Prime (General) Contractor or Prime's Sub-Contractors fail to make appropriate field corrections, and/or complete appropriately the administrative documentation resulting in delays, then a \$300 re-activation fee is imposed and required to be paid in full prior to the Rater resuming work on the project. The \$300 re-activation fee shall be imposed as many times as the project becomes dormant.

This Agreement shall be deemed to be a contract under the laws of the State of Tennessee and, together with the rights and obligations of the parties to this Agreement shall be construed and enforced in accordance with and governed by the internal laws of such State without regard to the conflict of laws or provisions of the State of Tennessee.

Any conflicts or controversies which may arise from the performance of this agreement shall be submitted to a neutral arbitrator for the purpose of binding arbitration. If the parties cannot agree upon an arbitrator, the parties will submit a request to the American Arbitration Association ("A") for selection of an arbitrator.

Any conflicts or controversies which may arise from the performance of this Agreement will be the exclusive jurisdiction of the Knox County Chancery Court, and this Agreement is governed exclusively by Tennessee law unless specifically preempted by federal law. The foregoing has no effect on the previous paragraph.

This Agreement constitutes the entire agreement between the parties, and all prior negotiations are null and void, as superseded by this Agreement.

**Client:**

---

**Authorized Representative**

**DATE**

**Rater :** **Knox Housing Partnership, Inc.**

---

**Jackie Mayo, Executive Director**

**DATE**

**Knox Housing Partnership, Inc.  
Energy Rater HERS Rating Agreement  
Addendum**

Scheduling for ***FIVE POINTS Phase 3 Project*** located at:

**304 So Kyle Street, Knoxville, TN 37915**

<b>Task</b>	<b>Condition</b>	<b>Projected Date</b>	<b>Actual Date</b>
>Air Sealing and Advanced Framing	<ul style="list-style-type: none"> <li>• After ductwork rough-in and air handler installation</li> <li>• Prior to insulation installation</li> </ul>		
>Thermal Enclosure System Rater Checklist	<ul style="list-style-type: none"> <li>• After the framing rough inspection has been passed</li> <li>• Prior to insulation installation</li> </ul>		
>Insulation Grading Verification	<ul style="list-style-type: none"> <li>• After insulation is installed in walls and floors</li> <li>• Prior to installation of gypsum wall board</li> </ul>		
>Blower Door Test >Duct Leakage Test >Room-by-Room Supply air measurements	<ul style="list-style-type: none"> <li>• After the home is complete, outdoor condensing unit is installed, and the home has permanent power.</li> <li>• This test needs to be performed at least 14 days prior to closing in order to allow time for the builder to correct any deficiencies that may be revealed</li> </ul>		

Rater requires Client's General Contractor to inform Rater of the projected construction schedule on this project. Please fill in the projected date for each of these tasks and e-mail to: [kblock@khp.org](mailto:kblock@khp.org) using SUBJECT: "***FIVE POINTS Phase 3 project, HERS Schedule***".

## **Ken Block, M.Sc., LEED AP Homes RESNET™ HERS Rater Standards of Practice**

Rater warrants that he is qualified and has met the national requirements of the Home Energy Ratings System [HERS] for performing HERS Ratings. Performance tests shall be performed according to RESNET™-approved protocols. The estimated energy use information contained in the rating report does not constitute any guarantee or warranty of actual energy cost or usage. Inspections performed to the RESNET™ Standards of Practice are not technically exhaustive, will not identify concealed conditions or latent defects, and are not intended to be an inspection of the structural integrity of the home or any other attribute of the home other than the home's energy features. Rater makes no further warranties, assurances, nor guarantees with regard to any provision of this agreement and its addenda unless otherwise specifically provided.

Rater is not required to:

- Perform any action or make any determination unless required in the RESNET™ Standards of Practice
- Determine the condition of systems or components that are not readily available, remaining life of any system or component, compliance with regulatory requirements such as construction codes, future conditions including but not limited to failures of systems or components, market value of the home or its marketability, environmental hazards including mold, effectiveness of any system installed or method used to control or remove suspected hazardous materials, presence of potentially dangerous plants or animals including termites and diseases, and acoustical properties of any system or component
- Offer or perform any act or service contrary to law, engineering or design services, HVAC system design or sizing consultation, indoor air quality consultation, and work in any trade or professional service other than the Home Energy Rating, and any warranty or guarantee of any kind
- Operate any system or component that is shut down or inoperable, does not respond to normal operating conditions, and shut off valves
- Inspect or test systems or components that are not installed in the rated home, are located in areas that are not entered in accordance with the RESNET™ Standards of Practice, or in detached structures
- Enter any area or perform any procedure or operation that, in the opinion of KHP, is likely to be dangerous to our employees or others or may damage the property, systems or components
- Move any suspended ceiling tiles, personal property, furniture, debris, equipment, plants, soil, ice, or snow
- Dismantle any system or component except as explicitly required in the RESNET™ Standards of Practice

Rater may choose to use default values for features that are not present or available for verification according to the exclusions listed above or the Rater may conclude that a legitimate rating is not possible under the circumstances. Under no circumstances shall the Rater be required to use default values that are not allowed under the RESNET™ Standards of Practice to produce a rating. Rater shall keep the property where he performs the Services, clean and orderly during the course of his work, and remove all debris generated by Rater at the completion of the Services.

## SECTION 01 21 00 - ALLOWANCES

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.

#### 1.02 DEFINITIONS

- A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

#### 1.03 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

#### 1.04 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### 1.06 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.
- D. At Project closeout, credit unused amounts remaining in the lump-sum allowance to Owner by Change Order.

#### 1.07 UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.
- D. At Project closeout, credit unused amounts remaining in the unit-cost allowance to Owner by Change Order.

#### 1.08 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
  - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
  - 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
  - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
  - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
  - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

### 3.02 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

### 3.03 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Lump-Sum Allowance: Include the sum of \$65,000 for playground equipment.
  - 1. This allowance includes material cost, receiving, handling, and installation, and Contractor overhead and profit.
- B. Allowance No. 2 Unit-Cost Allowance: Include the sum of \$450.00 per thousand for face brick as specified in Section 04 20 00 "Unit Masonry" and as shown on Drawings.

END OF SECTION 01 21 00



## SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Requests for Information (RFIs).
  - 3. Project meetings.

#### 1.02 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.03 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

#### 1.04 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
  
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.
  
- D. Conservation: Coordinate construction activities to ensure that operations are carried out 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.

#### 1.05 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
  
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Architect.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Specification Section number and title and related paragraphs, as appropriate.
  - 9. Drawing number and detail references, as appropriate.
  - 10. Field dimensions and conditions, as appropriate.
  - 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 12. Contractor's signature.

13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
  - C. RFI Forms: AIA Document G716.
    1. Attachments shall be electronic files in Adobe Acrobat PDF format.
  - D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
    1. The following Contractor-generated RFIs will be returned without action:
      - a. Requests for approval of submittals.
      - b. Requests for approval of substitutions.
      - c. Requests for approval of Contractor's means and methods.
      - d. Requests for coordination information already indicated in the Contract Documents.
      - e. Requests for adjustments in the Contract Time or the Contract Sum.
      - f. Requests for interpretation of Architect's actions on submittals.
      - g. Incomplete RFIs or inaccurately prepared RFIs.
    2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
    3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
      - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
  - E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
    1. Project name.
    2. Name and address of Contractor.
    3. Name and address of Architect.
    4. RFI number including RFIs that were returned without action or withdrawn.
    5. RFI description.
    6. Date the RFI was submitted.
    7. Date Architect's response was received.
  - F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
    1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- 1.06 PROJECT MEETINGS
- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Lines of communications.
    - f. Procedures for processing field decisions and Change Orders.
    - g. Procedures for RFIs.
    - h. Procedures for testing and inspecting.
    - i. Procedures for processing Applications for Payment.
    - j. Distribution of the Contract Documents.
    - k. Submittal procedures.
    - l. SUSTAINABLE DESIGN requirements.
    - m. Preparation of record documents.
    - n. Use of the premises and existing building.
    - o. Work restrictions.
    - p. Working hours.
    - q. Owner's occupancy requirements.
    - r. Responsibility for temporary facilities and controls.
    - s. Procedures for moisture and mold control.
    - t. Procedures for disruptions and shutdowns.
    - u. Construction waste management and recycling.
    - v. Parking availability.
    - w. Office, work, and storage areas.
    - x. Equipment deliveries and priorities.
    - y. First aid.
    - z. Security.
    - aa. Progress cleaning.
  4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

- C. Sustainable Design Coordination Conference: Owner's Representative will schedule and conduct a Sustainable Design coordination conference before starting construction, at a time convenient to Owner, Architect, and Contractor.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent and sustainable design coordinator; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect meeting requirements for sustainable design certification, including the following:
    - a. Sustainable Design Project Checklists.
    - b. General requirements for sustainable design-related procurement and documentation.
    - c. Project closeout requirements and sustainable design certification procedures.
    - d. Role of Sustainable Design coordinator.
    - e. Construction waste management.
    - f. Construction operations and Sustainable Design requirements and restrictions.
  3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- D. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Sustainable Design requirements
    - i. Review of mockups.
    - j. Possible conflicts.
    - k. Compatibility requirements.
    - l. Time schedules.
    - m. Weather limitations.
    - n. Manufacturer's written instructions.
    - o. Warranty requirements.
    - p. Compatibility of materials.
    - q. Acceptability of substrates.
    - r. Temporary facilities and controls.
    - s. Space and access limitations.
    - t. Regulations of authorities having jurisdiction.
    - u. Testing and inspecting requirements.

- v. Installation procedures.
  - w. Coordination with other work.
  - x. Required performance results.
  - y. Protection of adjacent work.
  - z. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- E. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for completing Sustainable Design documentation.
    - e. Requirements for preparing operations and maintenance data.
    - f. Requirements for delivery of material samples, attic stock, and spare parts.
    - g. Requirements for demonstration and training.
    - h. Preparation of Contractor's punch list.
    - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - j. Submittal procedures.
    - k. Owner's partial occupancy requirements.
    - l. Installation of Owner's furniture, fixtures, and equipment.
    - m. Responsibility for removing temporary facilities and controls.
  4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- F. Progress Meetings: Conduct progress meetings at biweekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - 1) Review schedule for next period.
  - b. Review present and future needs of each entity present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Status of sustainable design documentation.
    - 5) Deliveries.
    - 6) Off-site fabrication.
    - 7) Access.
    - 8) Site utilization.
    - 9) Temporary facilities and controls.
    - 10) Progress cleaning.
    - 11) Quality and work standards.
    - 12) Status of correction of deficient items.
    - 13) Field observations.
    - 14) Status of RFIs.
    - 15) Status of proposal requests.
    - 16) Pending changes.
    - 17) Status of Change Orders.
    - 18) Pending claims and disputes.
    - 19) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- G. Coordination Meetings: Conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
- 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be

expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
  - c. Review present and future needs of each contractor present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site utilization.
    - 8) Temporary facilities and controls.
    - 9) Work hours.
    - 10) Hazards and risks.
    - 11) Progress cleaning.
    - 12) Quality and work standards.
    - 13) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00



## SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Slabs-on-grade.

#### 1.02 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

#### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Sustainable Design Submittals:
  - 1. Product Data for Low VOC Content: For curing and sealing compounds, documentation including printed statement of VOC content.
  - 2. Design Mixtures for Recycled Content Credit: For each concrete mixture containing fly ash as a replacement for portland cement or other portland cement replacements, and for equivalent concrete mixtures that do not contain portland cement replacements.
- C. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- E. Samples: For vapor retarder.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Welding certificates.
- C. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.

4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Curing compounds.
7. Bonding agents.
8. Adhesives.
9. Vapor retarders.
10. Semirigid joint filler.
11. Joint-filler strips.
12. Repair materials.

- D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
  1. Aggregates.
- E. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- F. Field quality-control reports.
- G. Minutes of preinstallation conference.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  1. ACI 301, "Specifications for Structural Concrete."
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

- H. Preinstallation Conference: Conduct conference at Project site.
1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
  2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, forms and form removal limitations, vapor-retarder installation, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

## PART 2 - PRODUCTS

### 2.01 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

### 2.02 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- D. Deformed-Steel Wire: ASTM A 496/A 496M.

- E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- F. Anchor Bolts: Conform to ASTM F1554 Grade 36 unless otherwise indicated on drawings. Nuts shall conform to ASTM A563, hex nuts.

### 2.03 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

### 2.04 For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I/II, gray. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class F.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

### 2.05 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

### 2.06 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A or B (10 MIL minimum thickness) Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Carlisle Coatings & Waterproofing, Inc.; Blackline 400.
  - b. Fortifiber Building Systems Group; Moistop Ultra 10.
  - c. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
  - d. Insulation Solutions, Inc.; Viper VaporCheck 10.
  - e. Meadows, W. R., Inc.; Perminator 10 mil.
  - f. Raven Industries Inc.; Vapor Block 10.
  - g. Reef Industries, Inc.; Griffolyn 10 mil Green.
  - h. Stego Industries, LLC; Stego Wrap 10 mil Class A.

## 2.07 CURING MATERIALS

- A. Evaporation Retarder for areas scheduled to receive floor covering: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
    - b. BASF Construction Chemicals - Building Systems; Confilm.
    - c. ChemMasters; SprayFilm.
    - d. Conspec by Dayton Superior; Aquafilm.
    - e. Dayton Superior Corporation; Sure Film (J-74).
    - f. Edoco by Dayton Superior; BurkeFilm.
    - g. Euclid Chemical Company (The), an RPM company; Eucobar.
    - h. Kaufman Products, Inc.; Vapor-Aid.
    - i. Lambert Corporation; LAMBCO Skin.
    - j. L&M Construction Chemicals, Inc.; E-CON.
    - k. Meadows, W. R., Inc.; EVAPRE.
    - l. Metalcrete Industries; Waterhold.
    - m. Nox-Crete Products Group; MONOFILM.
    - n. Sika Corporation; SikaFilm.
    - o. SpecChem, LLC; Spec Film.
    - p. Symons by Dayton Superior; Finishing Aid.
    - q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
    - r. Unitex; PRO-FILM.
    - s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.
  
- B. Clear, Waterborne, Membrane-Forming Dissipating Curing Compound: ASTM C309, Type 1, Class B, dissipating.
  1. Products: Subject to compliance with requirements. Available products that may be incorporated into the work include, but are not limited to, the following:
    - a. Euclid Chemical Company: Kurex DR VOX
    - b. L & M Construction Materials, Inc.: L & M Cure R
    - c. Nox-Crete Products Group: Bro-Cure
    - d. Spec Chem - SpecRez
  
- C. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A. – Only seal concrete where no flooring materials will be applied or where specifically required on construction documents.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Construction Chemicals - Building Systems; Kure 1315.
    - b. ChemMasters; Polyseal WB.
    - c. Conspec by Dayton Superior; Sealcure 1315 WB.

- d. Edoco by Dayton Superior; Cureseal 1315 WB.
  - e. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
  - f. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
  - g. Lambert Corporation; UV Safe Seal.
  - h. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
  - i. Meadows, W. R., Inc.; Vocomp-30.
  - j. Metalcrete Industries; Metcure 30.
  - k. Right Pointe; Right Sheen WB30.
  - l. Symons by Dayton Superior; Cure & Seal 31 Percent E.
  - m. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.
  - n. SpecChem E-Cure – Compatible with most Flooring compounds
2. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.08 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
  - 1. Granular fill below slab-on-grade (slab sub-base) shall consist of a densely graded, compactable “crusher run” material per ASTM D1241. This material should have a uniform distribution of particle sizes ranging from 100 percent passing a 1-1/2” sieve down to 0 – 10% passing a No. 100 sieve. If crusher run material is not available, compact open graded granular fill (#57) and choke off with ½” – 1” of Fine-Graded Granular Material (#10 aggregate per ASTM D448) as listed below for slab sub-base.
- D. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

## 2.09 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
  4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
  4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

## 2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Use fly ash, as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## 2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi at 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.50.
  3. Slump Limit: 5 inches, plus or minus 1.5 inches.
  4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
- B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi at 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.50.
  3. Minimum Cementitious Materials Content: 470 lb/CY for interior slabs
  4. Minimum Cementitious Materials Content: 520 LB/CY for exterior slabs
  5. Maximum Aggregate Size: 1 1/2"

6. If Fly-Ash is added into slabs-on-grade mix, the addition shall not be less than 15% nor more than 20% of cementitious materials.
7. Slump Limit: 4, plus or minus 1 inch.
8. Air Content for Exterior Slabs-on-Grade: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
9. Air Content for Interior Slabs-on-Grade: Do not allow air content of trowel-finished floors to exceed 3 percent.

## 2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
  2. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
  3. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
  4. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

## PART 3 - EXECUTION

### 3.01 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  1. Class A, 1/8 inch for smooth-formed finished surfaces.
  2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.



1. Install keyways, reglets, recesses, and the like, for easy removal.
  2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.02 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

### 3.03 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
1. Leave formwork for slabs and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.04 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
  - 2. Install under all interior slab areas indicated to receive any type of floor covering.
  - 3. Seal all joints and penetrations per manufacturer's instructions.
  - 4. Terminate the vapor retarder per manufacturer's instructions.
  - 5. Extend Vapor Barrier to outside edge of thickened slab edge and turn up 6", min.

### 3.05 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
  - 1. For slabs-on-grade, provide 2" chairs on a 3'-0" x 3'-0" grid to fully support welded wire fabric at all locations.

### 3.06 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate joints for slabs in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

4. Locate horizontal joints in walls at underside of floors and slabs and at the top of footings or floor slabs.
  5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  7. Install slab-on-grade construction joints in a similar pattern to contraction joints as designated on construction documents.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
  3. Install contraction joints as designated on construction documents.
- D. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.07 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
  
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
  
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

### 3.08 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to public view.
  
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces to receive a rubbed finish.
  
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where exposed to view:
  - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.09 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  - 2. Finish and measure surface so gap at any point between concrete surface and an unveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
- C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

### 3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and

during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
    - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
  - 2. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections:
1. Steel reinforcement placement.
  2. Steel reinforcement welding.
  3. Headed bolts and studs.
  4. Verification of use of required design mixture.
  5. Concrete placement, including conveying and depositing.

6. Curing procedures and maintenance of curing temperature.
  7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  5. Compression Test Specimens: ASTM C 31/C 31M.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
  9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.



12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03 30 00

## SECTION 06 66 30 – EXTERIOR PVC RAILINGS AND GUARDS

### PART 1 - GENERAL

#### 1.01 SUMMARY:

- A. Section includes the furnishing and installing PVC Railing products, including but not limited to:
  - 1. Posts
  - 2. Post Caps and Sleeves
  - 3. Post Base, Trim and Accessories
  - 4. Top and Bottom Rails
  - 5. Balusters
  - 6. Aluminum and Synthetic Inserts
  - 7. Mounting Brackets

#### 1.02 DESIGN / PERFORMANCE REQUIREMENTS:

- A. Minimum Load Requirements: When installed correctly following the Manufacturer's Instructions the railing system shall withstand the following:
  - 1. Minimum concentrated load of 200 pounds applied horizontally or vertically down at any point on top railing.
  - 2. Uniform load of 50 pounds per foot applied vertically down and horizontally, but not simultaneously, on top railing.

#### 1.03 SUBMITTALS:

- A. Product Data: Provide Manufacturer's Data for each product to be used, including:
  - 1. Storage and handling requirements and recommendations.
  - 2. Preparation instructions and recommendations.
  - 3. Installation instructions.
- B. Shop drawings:
  - 1. Submit detailed drawings showing sections and plans of stairs, dimensions and assembly of components including railings, brackets, reinforcements, anchors and welded and bolted connections.
  - 2. Show all field connections.
  - 3. Provide setting diagrams for installation of anchors, location of pockets, plates for attachment of rails to structure and blocking for attachment of wall rail.
  - 4. Indicate all required field measurements.
  - 5. Indicate component details, materials, finishes, connection and joining methods and the relationship to adjoining work.
  - 6. Submit one set of CAD files for approval.
- C. Product Samples: Submit duplicate samples of railings showing style and finish. One approved sample will be returned to contractor.

#### 1.04 QUALITY ASSURANCE:

- A. **Manufacturer Qualifications:** Manufacturer shall have not less than 5 years successful experience in producing the type of prefabricated components required for project applications equivalent to the requirements for this project.
- B. **Installer Qualifications:** Installer shall have a minimum of 5 years experience with the type of prefabricated components specified.
- C. **Pre-installation meetings:** Conduct a pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver all materials in original packaging, unopened with no visible damage.
- B. Label each package with product contents and stock number of contents, with warranty, installation, and handling and storage recommendations enclosed, on-line or on packaging.
- C. Allow for receiving, unloading, handling and movement to approved storage areas within project, and final movement to point of installation.
- D. Store and protect all materials in accordance with manufacturer's requirements for environmental and physical protection. Keep temporary protective coverings in place.
- E. Store products on flat level surface to prevent warping.
- F. Protect materials and finish from damage during handling and installation.

1.06 PROJECT CONDITIONS:

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results.
- B. Do not install products under environmental conditions outside manufacturer's recommendations.
  - 1. Allow at least 24 hours for materials to adapt to conditions at project site prior to installation.

1.07 WARRANTY:

- A. Upon completion of work, provide a written Manufacturer's Lifetime Limited Warranty for products installed as part of this project to the Original Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. **Acceptable Manufacturer:**

1. Fypon, LLC., 1750 Indian Wood Circle, Maumee, Ohio 43537, Phone: 800/446-3040.

2.02 MATERIALS:

- A. Manufactured PVC Railings: Provide PVC railings in configuration indicated on the Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Site Verification of Conditions:
  1. Prior to the start of installation, inspect all preceding work to ensure that there are no conditions which will cause an unsatisfactory installation of work involving PVC Railings.
  2. Notify Architect in writing of any unacceptable conditions that would adversely affect installation or subsequent use of railings.
  3. Do not install any work involving PVC Railing until unsatisfactory conditions are corrected and acceptable for proper installation of work.
  4. Contractor shall be responsible for correcting or replacing all unacceptable work involving PVC Railings, which were installed over unsatisfactory conditions at no cost to Owner.

3.02 PREPARATION:

- A. Protect surrounding and adjacent work as required preventing damage to preceding work during execution of this work.
- B. Perform all preparation necessary for a successful installation of products as specified in manufacturer's installation instructions.

3.03 INSTALLATION:

- A. Obtain Manufacturer's instructions for successful installation of work to be performed and become knowledgeable with all material handling and installation recommendations.
- B. Ensure full compliance with Manufacturer's instructions in all aspects of tasks required by this work. Install railings in accordance with manufacturer's instructions at locations indicated on the drawings.
- C. Coordinate all work with all other project trades and provide proper accommodations for following work by other trades.

3.04 FIELD QUALITY CONTROL:

- A. After installation, check all work for flaws and defects.
- B. Repair all defective work.

- C. Remove and replace all damaged components that cannot be successfully repaired as determined by the Project Architect.

3.05 PROTECTION:

- A. Install temporary protective materials necessary to prevent damage to materials installed in this work until final acceptance of the project.
- B. Remove protection materials and clean all surfaces following manufacturer's recommendations prior to final project completion.
- C. Dispose properly of all protection and cleaning materials.

3.06 CLEANING:

- A. Clean railings prior to final acceptance in accordance with manufacturer's instructions.
- B. Remove labels and temporary protective coverings.
- C. Do not use harsh cleaning materials or methods that would damage finish.

END OF SECTION 06 66 30

## SECTION 07 46 00 - SIDING

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

#### 1.02 SUMMARY

- A. Section Includes:
  - 1. Fiber-cement siding.
  - 2. Fiber-cement soffit.
  - 3. Extruded aluminum trim and vents.

#### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Initial Selection: For siding and soffit including related accessories.
- C. Samples for Verification: For each type, color, texture, and pattern required.
  - 1. 12-inch- long-by-actual-width Sample of siding.
  - 2. 12-inch- long-by-actual-width Sample of soffit.
  - 3. 12-inch- long-by-actual-width Samples of trim and accessories.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of siding and soffit, from manufacturer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.
- C. Research/Evaluation Reports: For each type of siding required, from the ICC.
- D. Warranty: Sample of special warranty.

#### 1.05 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of siding and soffit and related accessories to include in maintenance manuals.

#### 1.06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish full lengths of siding and soffit including related accessories, in a quantity equal to 2 percent of amount installed.

## 1.07 QUALITY ASSURANCE

- A. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.
- B. Source Limitations: Obtain siding and soffit, including related accessories, from single source from single manufacturer.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockups for siding and soffit including accessories.
    - a. Size: 48 inches long by 60 inches high.
    - b. Include outside corner on one end of mockup and inside corner on other end.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site.

## 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in a dry, well-ventilated, weathertight place.

## 1.09 COORDINATION

- A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

## 1.10 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace siding and soffit that fail(s) in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including cracking, deforming.
  - 2. Warranty Period: 50 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.01 FIBER-CEMENT SIDING

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Cemplank.
    - b. CertainTeed Corp.
    - c. James Hardie.

2. Horizontal Pattern: Boards 6 inches and 4 inches, as indicated on the Drawings, wide in plain style.
  - a. Texture: Smooth.
3. Factory Priming: Manufacturer's standard acrylic primer.

## 2.02 FIBER-CEMENT SOFFIT

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Cemplank.
    - b. CertainTeed Corp.
    - c. James Hardie.
- B. Pattern: 24-inch wide sheets with smooth texture.
- C. Ventilation: Provide perforated soffit unless otherwise indicated.
- D. Factory Priming: Manufacturer's standard acrylic primer.

## 2.03 ACCESSORIES

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
  1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.
- B. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:
  1. Door and window casings.
  2. Entrance and window head pediments.
  3. Fasciae.
  4. Moldings and trim.
- C. Colors for Decorative Accessories: Match adjacent siding.
- D. Flashing: Provide stainless-steel flashing complying with Division 07 Section "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
- E. Fasteners:
  1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch into substrate.
  2. For fastening fiber cement, use stainless-steel fasteners.
- F. Insect Screening for Soffit Vents: Stainless steel, 18-by-18 mesh.
- G. Continuous Soffit Vents: Aluminum, hat-channel shape, with perforations; 2 inches wide and not less than 96 inches long.



1. Net-Free Area: 6 sq. in./linear ft.
  2. Finish: Mill finish
- H. Aluminum Trim and Reveals: Extruded accessories of profiles and dimensions indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Fry Reglet Corp.
    - b. Gordon, Inc.
    - c. Pittcon Industries.
  2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
  3. Finish: Clear anodized, Class II.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding and soffit and related accessories.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.02 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

#### 3.03 INSTALLATION

- A. General: Comply with siding and soffit manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
  1. Do not install damaged components.
  2. Install fasteners no more than 16 inches o.c.
- B. Install fiber-cement siding and soffit and related accessories.
  1. Install fasteners no more than 16 inches o.c.
- C. Install joint sealants as specified in Division 07 Section "Joint Sealants" and to produce a weathertight installation.

#### 3.04 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 07 46 00

## SECTION 08 53 13 - VINYL WINDOWS

### PART 1 - GENERAL

#### 1.01 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and color Samples.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. CertainTeed Corporation.
  2. Jeld-Wen, Inc.
  3. Kolbe & Kolbe Millwork Co., Inc.
  4. Pella Corporation.
  5. Weather Shield Mfg., Inc.
  6. YKK AP America Inc.

#### 2.02 PERFORMANCE REQUIREMENTS

- A. Product Standard: AAMA/WDMA/CSA 101/I.S.2/A440.
  1. Window Certification: WDMA certified with label attached to each window.
  2. Performance Class: LC.
  3. Performance Grade: 30.
- B. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.31 Btu/sq. ft. x h x deg F.
- C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.30.

#### 2.03 VINYL WINDOWS

- A. Window Types: As indicated on Drawings.
- B. Window Color: As selected by Architect from manufacturer's full range.
- C. Equip units with grilles located within the insulating glass units as indicated.
- D. Trim: Provide indicated trim, matching material and finish of frame members.
- E. Provide stainless-steel, ball-bearing sash rollers with nylon tires for sliding windows.
- F. Equip units with vinyl-coated, glass-fiber mesh insect screens at operable sashes.
- G. Glaze units with low-E-coated, argon-filled, sealed insulating glass, complying with Section 08 80 00 "Glazing."

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Set units level, plumb, and true to line, without warp or rack of frames and panels. Provide proper support and anchor securely in place.
- B. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- C. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- D. Adjust operating panels, screens, and hardware to provide a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- E. Clean glass and vinyl surfaces immediately after installing windows. Remove nonpermanent labels from glass surfaces.

END OF SECTION 08 53 13

## SECTION 09 29 00 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
1. Interior gypsum board.

#### 1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
  2. For products and materials required to comply with requirements for regional materials, certificates indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating distance to Project, cost for each regional material, and fraction by weight that is considered regional.
  3. For adhesives used to laminate gypsum board panels to substrates, documentation including printed statement of VOC content.
  4. For adhesives used to laminate gypsum board panels to substrates, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Samples: For the following products:
1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

#### 1.03 QUALITY ASSURANCE

- A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Install mockups for the following:
    - a. Each level of gypsum board finish indicated for use in exposed locations.
    - b. Each texture finish indicated.
  2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
  3. Simulate finished lighting conditions for review of mockups.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.05 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### PART 2 - PRODUCTS

#### 2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

#### 2.02 GYPSUM BOARD, GENERAL

- A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles of Project site.
- C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

## 2.03 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. American Gypsum.
  2. CertainTeed Corp.
  3. Georgia-Pacific Gypsum LLC.
  4. Lafarge North America Inc.
  5. National Gypsum Company.
  6. PABCO Gypsum.
  7. Temple-Inland.
  8. USG Corporation.
- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch.
  2. Long Edges: Tapered.
- C. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch.
  2. Long Edges: Tapered.
- D. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
1. Thickness: 1/4 inch.
  2. Long Edges: Tapered.
- E. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch.
  2. Long Edges: Tapered.
- F. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Thickness: 5/8 inch.
  2. Long Edges: Tapered.
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
  4. Provide moisture and mold resistant gypsum board in all kitchens, bathrooms, laundry rooms and utility closets.

## 2.04 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
  2. Shapes:
    - a. Cornerbead.
    - b. Bullnose bead.
    - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - d. L-Bead: L-shaped; exposed long flange receives joint compound.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - f. Expansion (control) joint.
    - g. Curved-Edge Cornerbead: With notched or flexible flanges.

- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Fry Reglet Corp.
    - b. Gordon, Inc.
    - c. Pittcon Industries.
  - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
  - 3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.
  - 4. Provide factory-formed corner and tee sections.

## 2.05 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.
    - a. Use setting-type compound for installing paper-faced metal trim accessories.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
  - 4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.
  - 5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

## 2.06 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
  - 1. Configuration: Asymmetrical.
  - 2. Minimum Base-Metal Thickness: 0.018 inch.
- C. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of

Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- D. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112-inch thick, or wood members.
- E. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
  - 2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.
- F. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
    - b. Grabber Construction Products; Acoustical Sealant GSC.
    - c. Pecora Corporation; AC-20 FTR.
    - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
    - e. USG Corporation; SHEETROCK Acoustical Sealant.
  - 2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- G. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."
- H. Vapor Retarder: As specified in Section 07 21 00 "Thermal Insulation."

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.



### 3.02 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840 and ASTM C 754.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Wallboard Type: As indicated on Drawings.
- B. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
  - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
  - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
  - 3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
  - 4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.
- D. Curved Surfaces:
  - 1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
  - 2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

### 3.04 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

- B. Control Joints: Install control joints [at locations indicated on Drawings] [according to ASTM C 840 and in specific locations approved by Architect for visual effect].
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. L-Bead: Use where indicated.
  - 4. U-Bead: Use at exposed panel edges.
  - 5. Curved-Edge Cornerbead: Use at curved openings.
  - 6. Cornerbead: Use at outside corners.
  - 7. LC-Bead: Use at exposed panel edges.
- D. Aluminum Trim: Install in locations indicated on Drawings.

### 3.05 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated
    - a. Primer and its application to surfaces are specified in other Section 09 91 00 "Interior Painting." Level 5 is suitable for surfaces receiving gloss and semigloss enamels and other surfaces subject to severe lighting. It is considered a high-quality gypsum board finish.
  - 3. Level 5: Ceilings.
    - a. Primer and its application to surfaces are specified in other Section 09 91 00 "Interior Painting."

### 3.06 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

OPENING SCHEDULE - TYPE A1											
NO.	DOOR			FRAME				HARDWARE SET NO.	FIRE LABEL	NOTES	
	SIZE	HEIGHT	MATL	MATL	TYPE	HEAD	JAMB				SILL
A1-101	3'-0"	6'-8"	STL	P4-T3	HM	2	5/A701	2/A701	1	INSULATED DOOR SLAB	
A1-102	3'-0"	6'-8"	STL	P4-T3	HM	2	5/A701	2/A701	2	INSULATED DOOR SLAB	
A1-103	4'-0"	6'-8"	HM	P4	HM	1	4/A701	12/A701	2		
A1-104	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3	20 MIN.	
A1-107	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		
A1-108	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A1-109	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-110	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-111	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A1-112	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		
A1-113	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3	20 MIN.	
A1-116	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		
A1-117	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A1-118	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-119	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-120	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A1-121	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		
A1-202	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3	20 MIN.	
A1-205	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		
A1-206	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A1-207	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-208	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-209	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A1-210	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		
A1-211	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3	20 MIN.	
A1-214	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		
A1-215	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A1-216	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-217	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A1-218	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A1-219	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		

ROOM FINISH SCHEDULE - TYPE A1							
NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK	CEILING	COMMENTS
A1-101	STAIR HALL	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-102	REAR FOYER	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-103	RISER	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-104	LIVING ROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-105	KITCHEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-106	HALL	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-107	LINEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-108	CLOSET	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-109	BEDROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-110	BATHROOM	CT	CB	PNT	P.LAM1	GYP./PNT	
A1-111	UTILITIES	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-112	LAUNDRY	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-113	LIVING ROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-114	KITCHEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-115	HALL	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-116	LINEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-117	CLOSET	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-118	BEDROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-119	BATHROOM	CT	CB	PNT	P.LAM1	GYP./PNT	
A1-120	UTILITIES	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-121	LAUNDRY	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-201	STAIR HALL	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-202	LIVING ROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-203	KITCHEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-204	HALL	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-205	LINEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-206	CLOSET	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-207	BEDROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-208	BATHROOM	CT	CB	PNT	P.LAM1	GYP./PNT	
A1-209	UTILITIES	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-210	LAUNDRY	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-211	LIVING ROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-212	KITCHEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-213	HALL	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-214	LINEN	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-215	CLOSET	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-216	BEDROOM	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-217	BATHROOM	CT	CB	PNT	P.LAM1	GYP./PNT	
A1-218	UTILITIES	VCT	RB	PNT	P.LAM1	GYP./PNT	
A1-219	LAUNDRY	VCT	RB	PNT	P.LAM1	GYP./PNT	

### FINISH LEGEND

FLOOR FINISHES  
 VCT VINYL COMPOSITION TILE  
 CT CERAMIC TILE  
 RB RUBBER BASE  
 CB CERAMIC BASE

WALL FINISHES  
 PNT PAINT

MILLWORK FINISHES  
 P.LAM1 PLASTIC LAMINATE  
 P.LAM2 PLASTIC LAMINATE

CEILING FINISHES  
 GYP.BD GYPSUM BOARD, PAINTED

STAIR FINISHES  
 RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE

### REFLECTED CEILING PLAN GENERAL NOTES

- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" WHERE NOT NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILINGS.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE STRUCTURAL SUPPORT FOR CEILING-MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A202 FOR REFLECTED CEILING PLAN LEGEND.

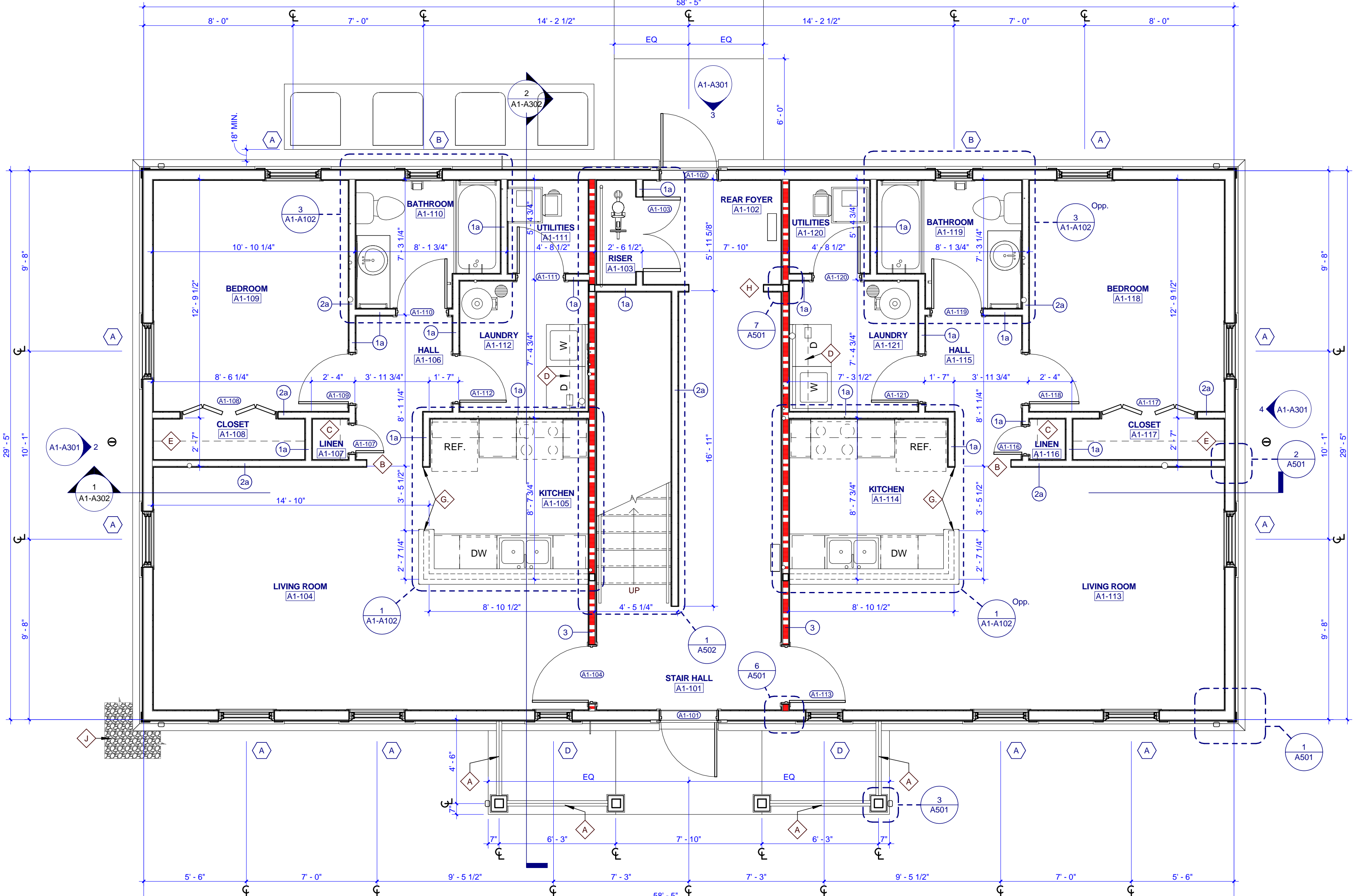
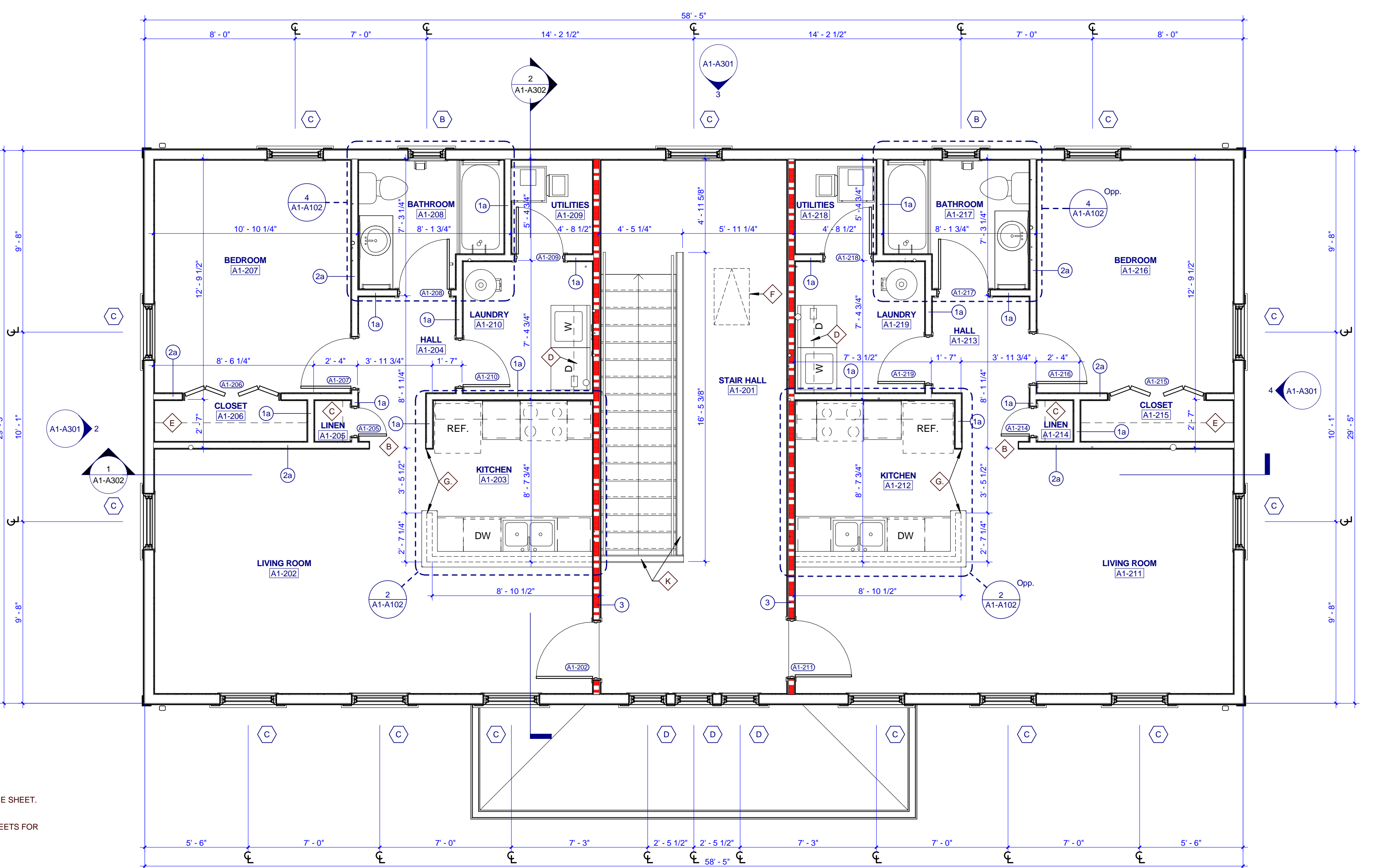
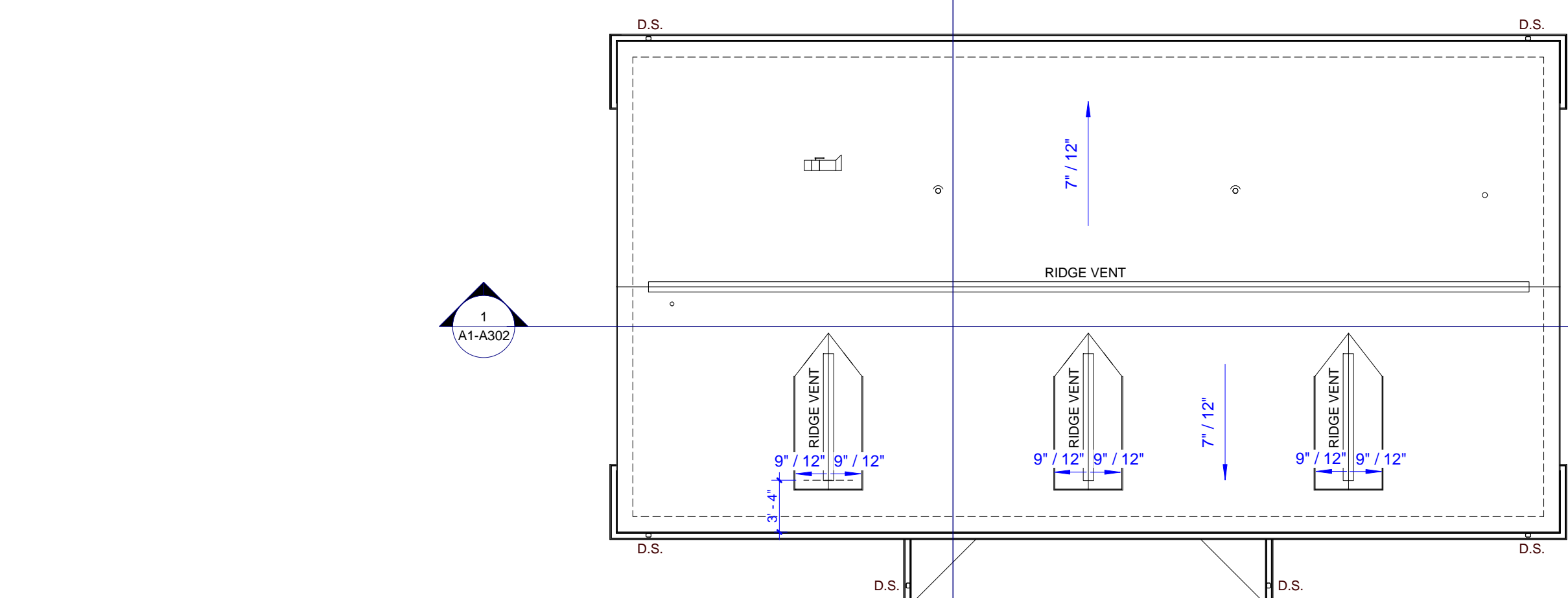
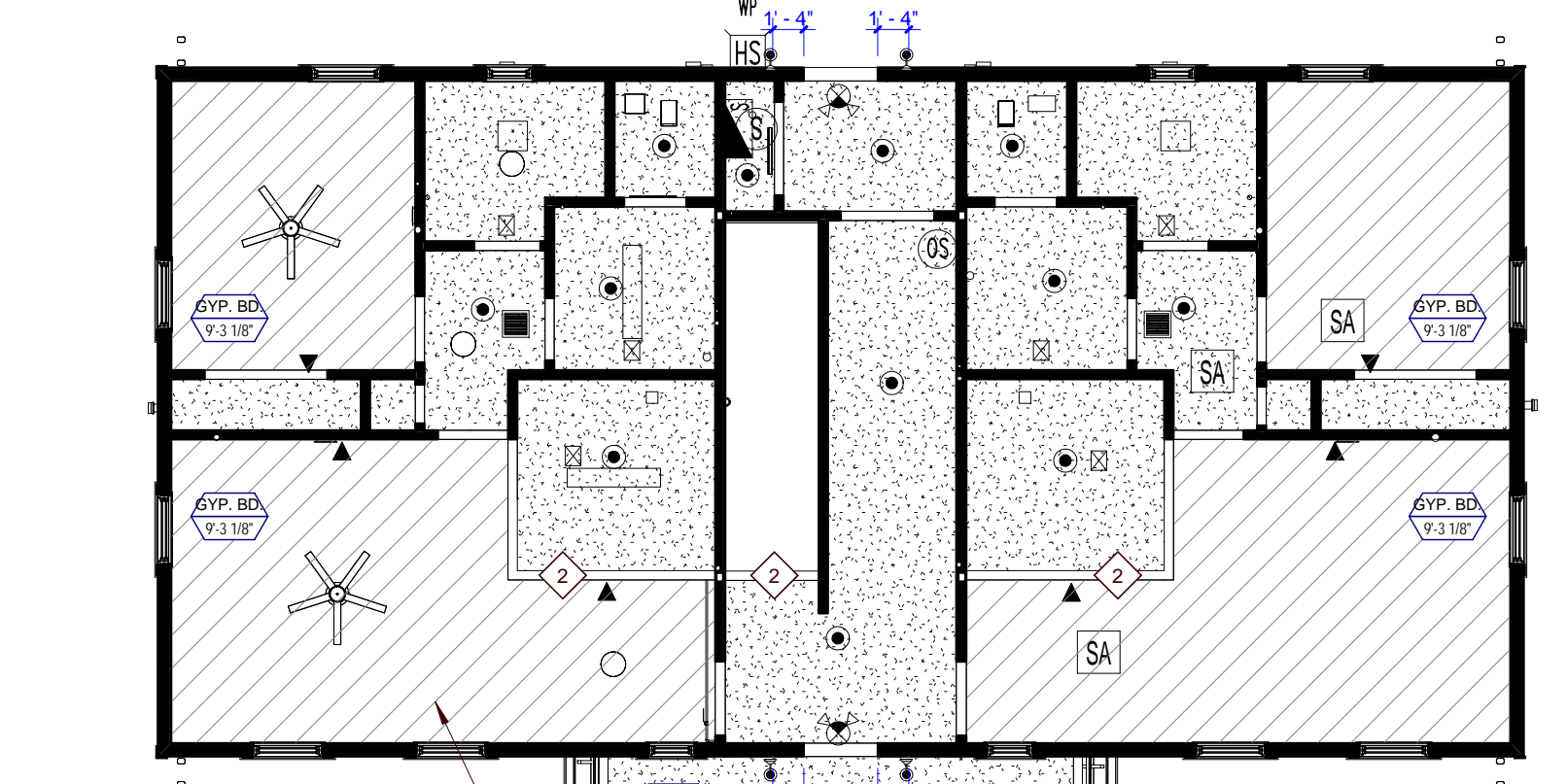
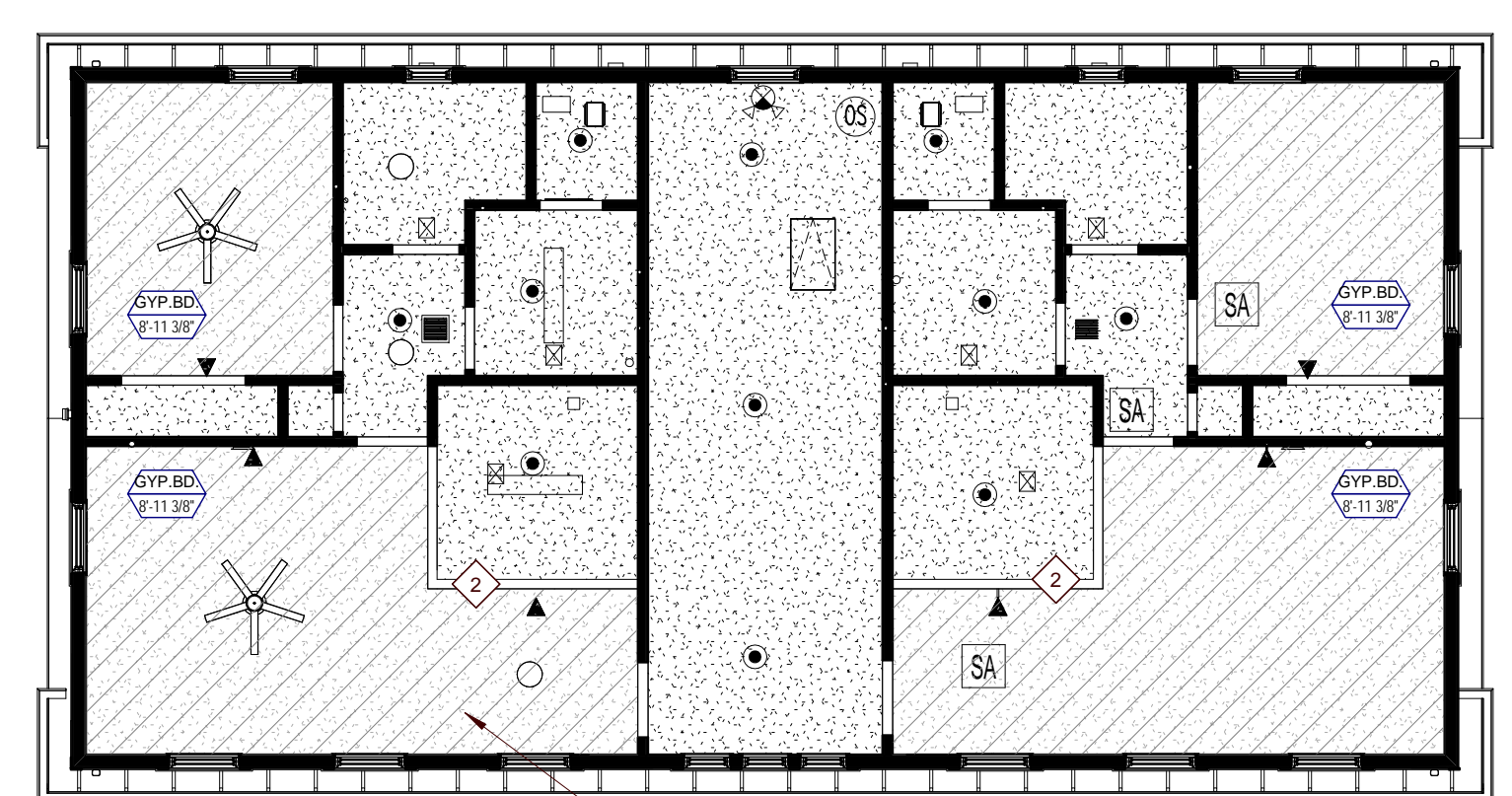
### REFLECTED CEILING PLAN LEGEND

GYP.BD GYPSUM BOARD (INTERIOR)  
 FIBER CEMENT BOARD SOFFIT (EXTERIOR)  
 1 HOUR RATED GYPSUM BOARD

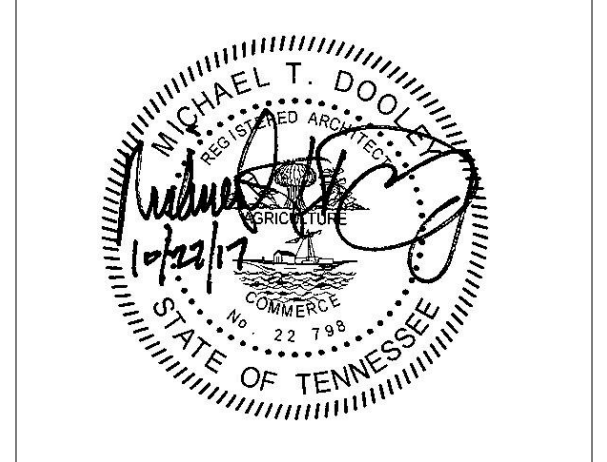
1/4" FLUORESCENT LIGHT FIXTURE  
 CEILING MOUNTED LIGHT FIXTURE  
 CEILING FAN

EXHAUST REGISTER  
 SA SMOKE DETECTOR  
 SPRINKLER HEAD  
 24" WALL MOUNTED LIGHT FIXTURE  
 SUPPLY REGISTER  
 ATTIC ACCESS HATCH

\* CENTER LIGHT FIXTURES IN ROOMS UNLESS NOTED OTHERWISE. ADJUST LOCATION OF SPRINKLER HEADS TO WORK WITH CENTER OF LIGHT FIXTURE.



505 Market St Suite 300 Knoxville, TN 37902  
 1 865.934.1915  
 bma1915.com



PROJECT NUMBER  
**166200**

PROJECT NAME  
**FIVE POINTS - PHASE 3**

OWNER  
**KNOXVILLE COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
 KNOXVILLE, TN 37915**

- ### GENERAL NOTES
- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
  - NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
  - PROVIDE BLOCKING, ROUGH HARDWARE, ETC. AS REQUIRED TO MOUNT EQUIPMENT.
  - SYMBOL (D) INDICATES PARTITION TYPE. SEE SHEETS A200 FOR PARTITION TYPE.
  - ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH 1/2" LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
  - SYMBOL (W) INDICATES WINDOW TYPE. SEE SHEETS A202 FOR WINDOW ELEVATIONS AND DETAILS.
  - SYMBOL (O) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
  - ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
  - ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHERS SURFACE MOUNTED WITHIN BASE CABINET.

- ### PLAN KEYNOTES
- SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4" O.C. MAX.
  - 3'-0" x 7'-0" HEIGHT OPENING
  - 16" DEEP SHELVES, SPACED EVENLY
  - 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-0" A.F.F.
  - 12" DEEP SHELF @ 6'-0" & ROOF @ 5'-0" A.F.F.
  - ATTIC ACCESS HATCH
  - ALIGN FACE OF WALL WITH ADJACENT WALL
  - 4'-0" x 7'-0" HEIGHT OPENING
  - 18" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING.
  - LOW WALL 3'-6" A.F.F.
  - SHEAR WALL, REFER TO STRUCTURAL

- ### ROOF PLAN GENERAL NOTES
- P.AINT ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF SINGLE BLOCK.
  - COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS. WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
  - ALL VALLEYS TO BE CLOSED AND FLASHED.

- ### RCP KEYNOTES
- 1 HOUR FIRE RATED CEILING
  - 2.7'-8" A.F.F. BULKHEAD
  - 3.6'-8" A.F.F. BULKHEAD
  - 4.7'-11" A.F.F. BULKHEAD

### WALL LEGEND

---	UNRATED PARTITION
---	1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TVM
ISSUE DATE	10.27.2017

### REVISIONS

1	ADDENDUM NO. 1	2017/11/13
---	----------------	------------

**A1-A101**  
 TYPE A1 - BUILDING PLANS & SCHEDULES (COLONIAL REVIVAL)

OPENING SCHEDULE - TYPE A2											
NO.	DOOR		MAT'L	TYPE	FRAME		DETAILS		HARDWARE SET NO.	FIRE LABEL	NOTES
	WIDTH	HEIGHT			MAT'L	TYPE	HEAD	JAMB SILL			
A2-101	3'-0"	6'-8"	STL	P3-T1	HM	2	11/A701	8/A701	1		INSULATED DOOR SLAB
A2-102	3'-0"	6'-8"	STL	P3-T1	HM	2	11/A701	8/A701	1		INSULATED DOOR SLAB
A2-103	4'-0"	6'-8"	HM	P4	HM	1	4/A701	12/A701	2		
A2-104	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3		
A2-107	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		20 MIN.
A2-108	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A2-109	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-110	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-111	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A2-112	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		
A2-113	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3		20 MIN.
A2-116	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		
A2-117	3'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A2-118	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-119	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-120	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A2-121	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		20 MIN.
A2-202	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3		
A2-205	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		
A2-206	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A2-207	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-208	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-209	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A2-210	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		
A2-211	3'-0"	6'-8"	HM	P4	HM	1	9/A701	6/A701	3		20 MIN.
A2-214	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701	4		
A2-215	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5		
A2-216	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-217	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6		
A2-218	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	7		
A2-219	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4		

ROOM FINISH SCHEDULE - TYPE A2							
NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK	CEILING	COMMENTS
A2-101	STAIR HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-102	REAR FOYER	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-103	RISER	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-104	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-105	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-106	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-107	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-108	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-109	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-110	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-111	UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-112	LAUNDRY	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-113	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-114	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-115	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-116	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-117	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-118	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-119	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-120	UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-121	LAUNDRY	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-201	STAIR HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-202	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-203	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-204	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-205	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-206	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-207	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-208	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-209	UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-210	LAUNDRY	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-211	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-212	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-213	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-214	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-215	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-216	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-217	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-218	UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT
A2-219	LAUNDRY	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT

### FINISH LEGEND

FLOOR FINISHES:  
VCT VINYL COMPOSITION TILE  
CT CERAMIC TILE

WALL BASE FINISHES:  
CB RUBBER BASE  
CB CERAMIC BASE

WALL FINISHES:  
PNT PAINT

MILLWORK FINISHES:  
P.LAM1 PLASTIC LAMINATE  
P.LAM2 PLASTIC LAMINATE

CEILING FINISHES:  
GYP.BD. GYPSUM BOARD, PAINTED

STAIR FINISHES:  
RUBBER STAIR TREAD WITH RISER - TEXTURE, RAISED SQUARE

### REFLECTED CEILING PLAN GENERAL NOTES

- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" WHERE NOT NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILING.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE STRUCTURAL SUPPORT FOR CEILING MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A202 FOR REFLECTED CEILING PLAN LEGEND.

### REFLECTED CEILING PLAN LEGEND

GYPSUM BOARD (INTERIOR)  
FIBER CEMENT BOARD SOFFIT (EXTERIOR)

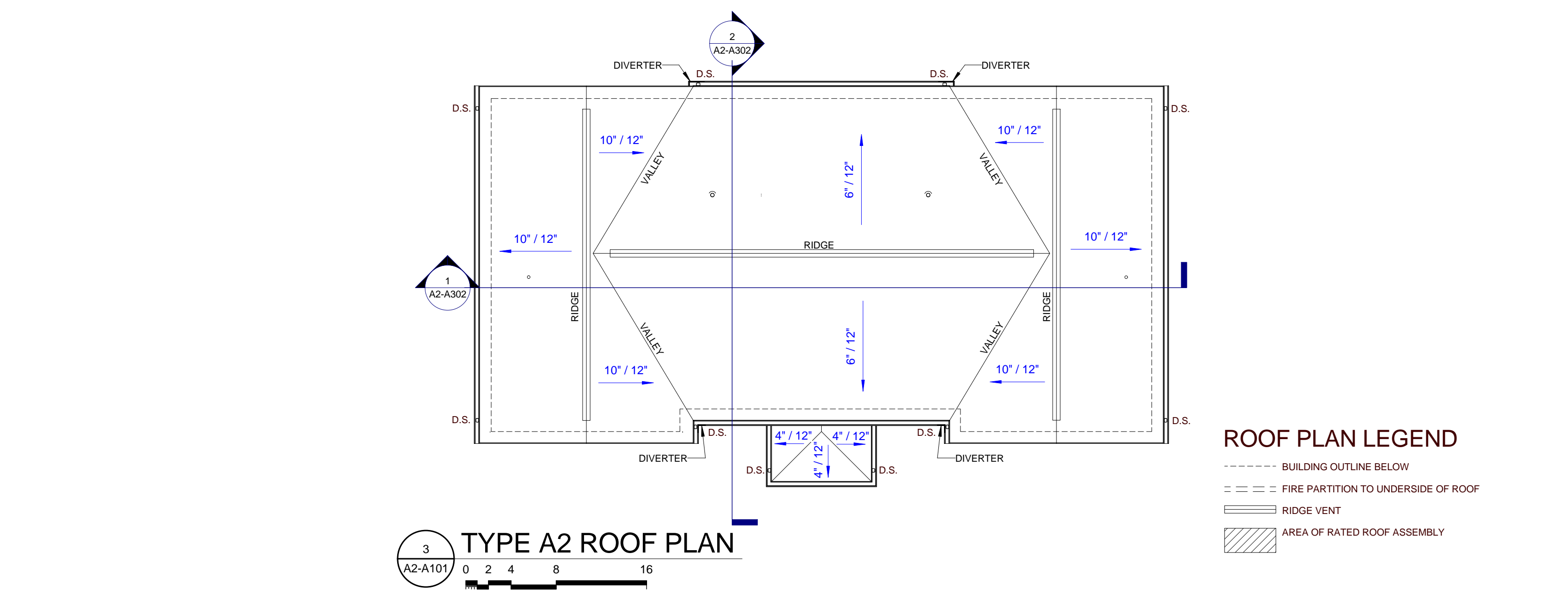
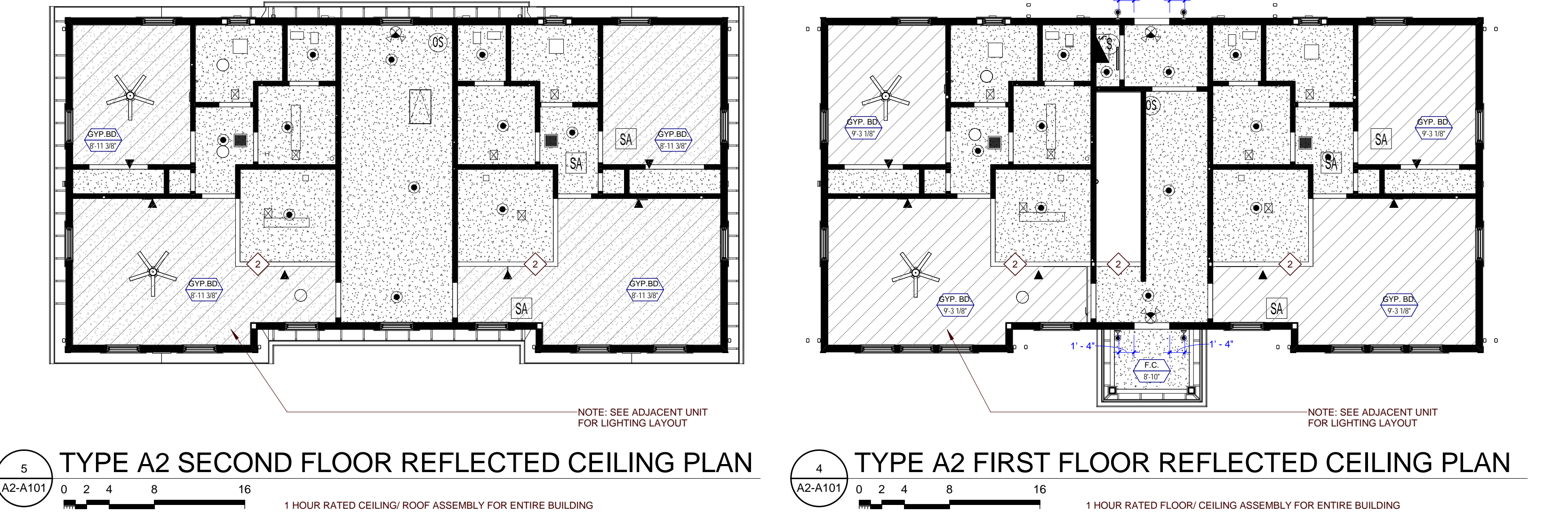
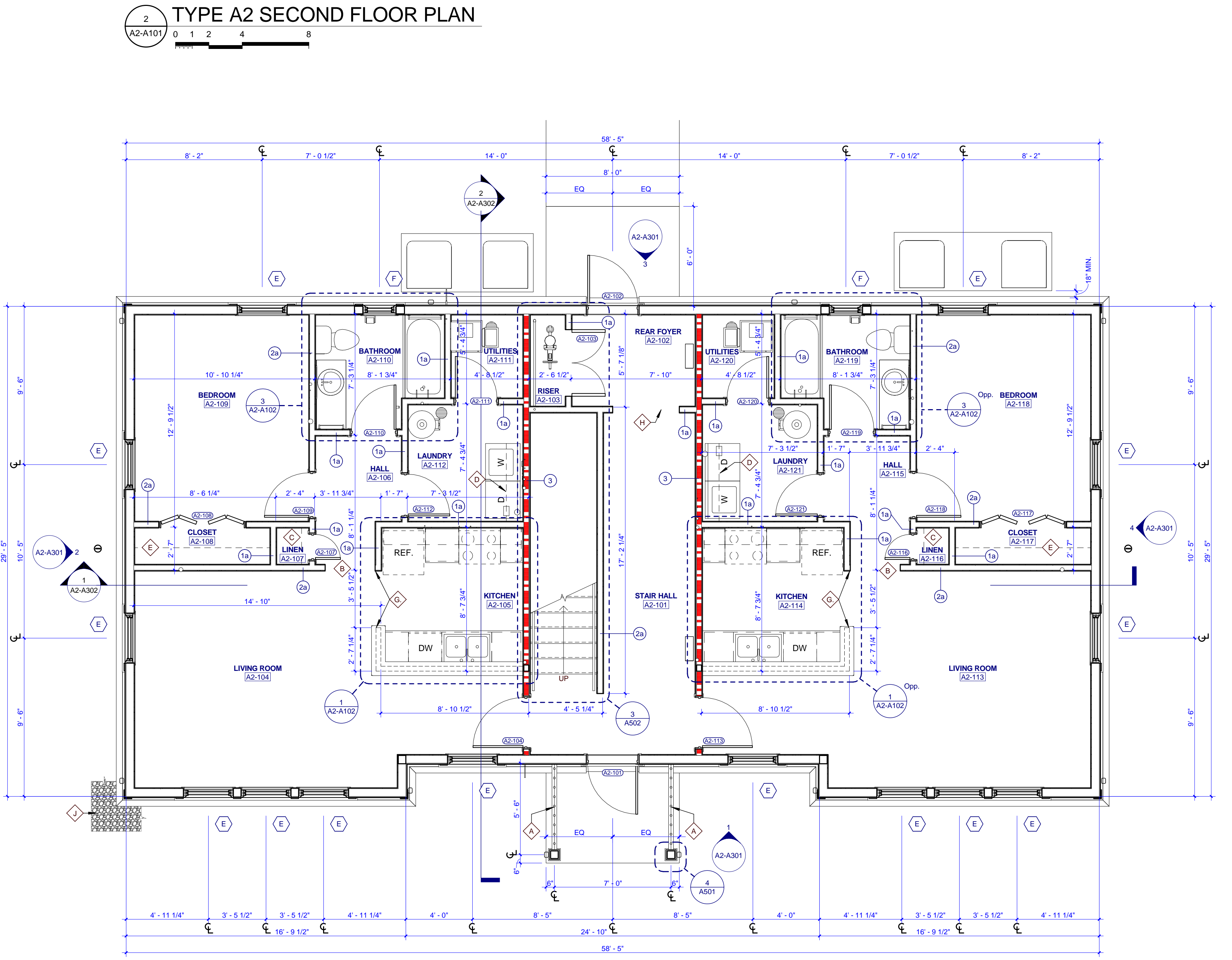
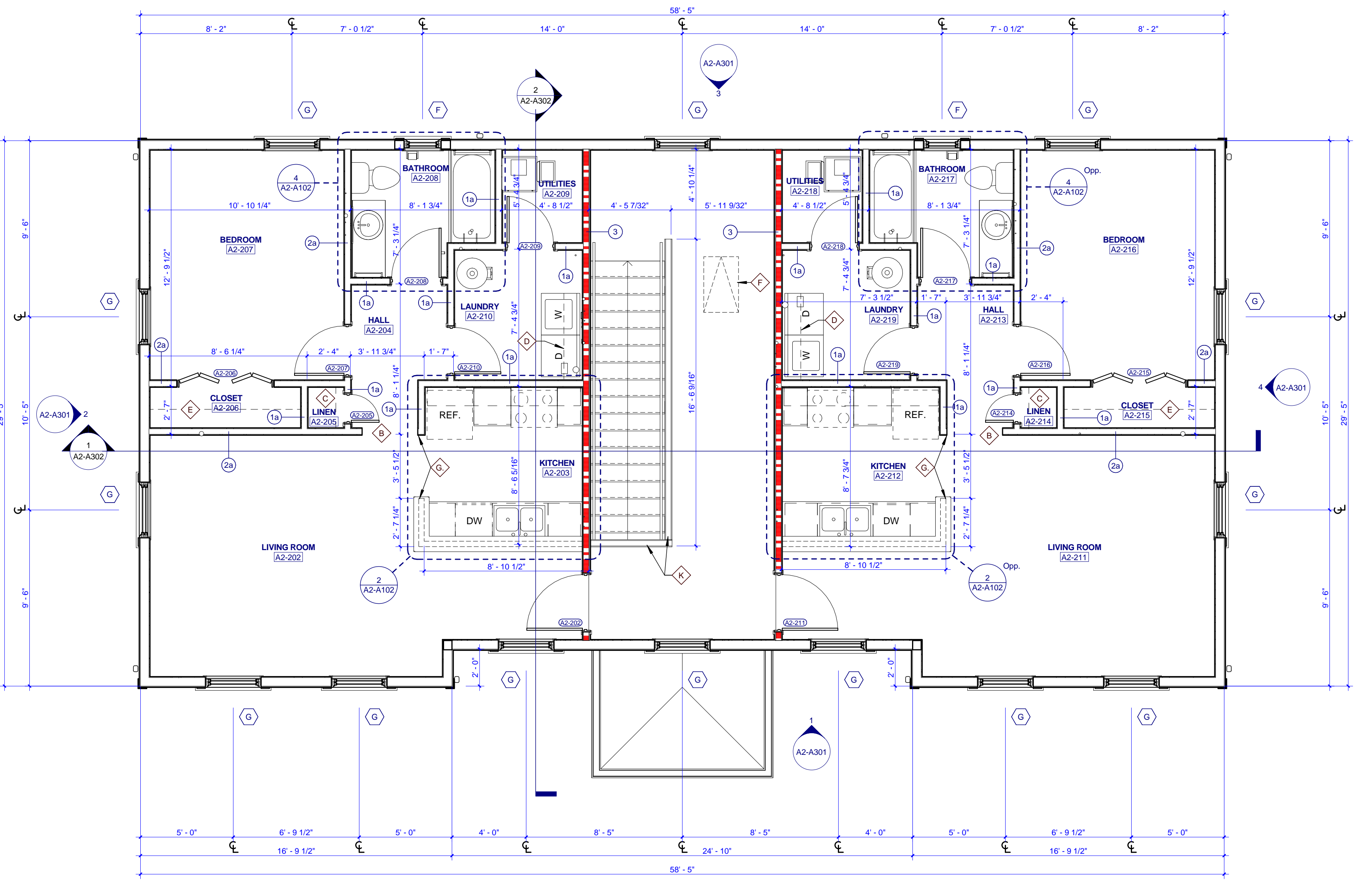
1 HOUR RATED GYPSUM BOARD

1x4 FLUORESCENT LIGHT FIXTURE  
CEILING MOUNTED LIGHT FIXTURE

CEILING FAN

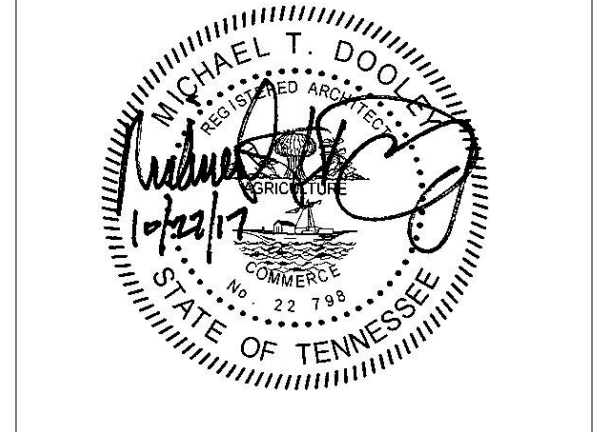
EXHAUST REGISTER  
SMOKE DETECTOR  
SPRINKLER HEAD  
2x4 WALL MOUNTED LIGHT FIXTURE  
SUPPLY REGISTER  
ATTIC ACCESS HATCH

\* CENTER LIGHT FIXTURES IN ROOMS UNLESS NOTED OTHERWISE. ADJUST LOCATION OF SPRINKLER HEADS TO WORK WITH CENTER OF LIGHT FIXTURE.



**oma**  
**BARBERMcMURRY**  
architects since 1915

505 Market St Suite 300 Knoxville, TN 37902  
1.865.934.1915  
oma1915.com



PROJECT NUMBER  
**166200**

PROJECT NAME  
**FINLEYS - PHASE 3**

OWNER  
**KNOXVILLE COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
KNOXVILLE, TN 37915**

### GENERAL NOTES

- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- PROVIDE BLOCKING, ROUGH HARDWARE, ETC. AS REQUIRED TO MOUNT EQUIPMENT.
- SYMBOL (1) INDICATES PARTITION TYPE. SEE SHEETS A500 FOR PARTITION TYPES.
- ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH 1/2" LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
- SYMBOL (2) INDICATES WINDOW TYPE. SEE SHEETS A100 FOR WINDOW ELEVATIONS AND DETAILS.
- SYMBOL (3) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
- ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
- ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHER SURFACE MOUNTED WITHIN BASE CABINET.

### PLAN KEYNOTES

- SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4' O.C. MAX.
- 3'-0" x 7'-0" HEIGHT OPENING
- (4) 16" DEEP SHELVES, SPACED EVENLY
- 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-6" A.F.F.
- 12" DEEP SHELF @ 6'-0" & ROD @ 9'-0" A.F.F.
- ATTIC ACCESS HATCH
- ALIGN FACE OF WALL WITH ADJACENT WALL
- 4'-0" x 7'-0" HEIGHT OPENING
- 1/2" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING
- LOW WALL 3'-6" A.F.F.
- SHEAR WALL, REFER TO STRUCTURAL

### ROOF PLAN GENERAL NOTES

- PAIN ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF SHINGLE COLOR.
- COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS. WHERE NOT TAGEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
- ALL VALLEYS TO BE CLOSED AND FLASHED.

### RCP KEYNOTES

- 1 HOUR FIRE RATED CEILING
- 7'-8" A.F.F. BULKHEAD
- 3'-8" A.F.F. BULKHEAD
- 4'-7" A.F.F. BULKHEAD

### WALL LEGEND

--- UNRATED PARTITION  
--- 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE **MTD**  
PROJECT MANAGER **ELD**  
DRAWN BY **ELD**  
REVIEWED BY **TWM**  
ISSUE DATE **10.27.2017**

### REVISIONS

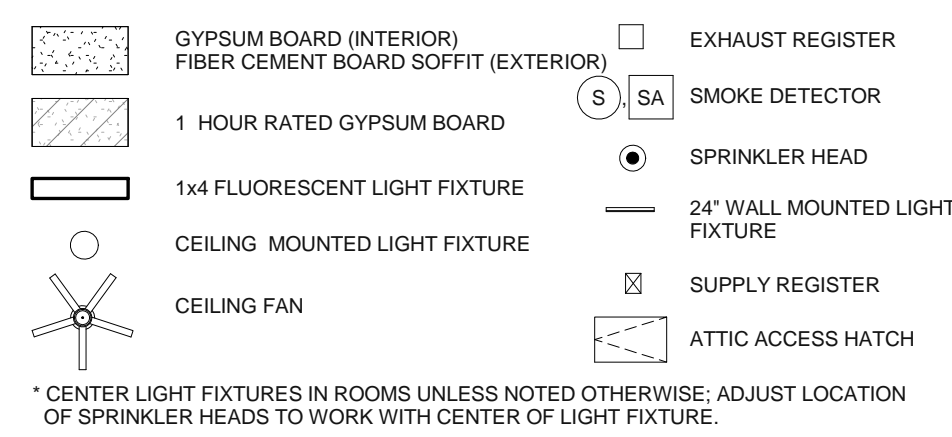
1	ADDENDUM NO.1	2017/11/13
---	---------------	------------

**A2-A101**  
TYPE A2 - BUILDING PLANS AND SCHEDULES (VICTORIAN)



NO.	DOOR			FRAME			DETAILS			HARDWARE SET NO.	FIRE LABEL	NOTES
	SIZE	HEIGHT	MAT'L	TYPE	MAT'L	TYPE	HEAD	JAMB	SILL			
							11/A701	8/A701	11/A701			
C1-101	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-102	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-103	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-104	5'-0"	6'-8"	WD	P4-DBL	WD	1	4/A701	12/A701	8			
C1-105	4'-0"	6'-8"	WD	P4-DBL	WD	1	4/A701	12/A701	8			
C1-107	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-108	3'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-110	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-111	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-202	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-203	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-204	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-205	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-206	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-207	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5			
C1-208	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5			
C1-210	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5			
C1-211	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-212	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-213	5'-0"	6'-8"	CT	P4-BIF	WD	1	10/A701	7/A701	5			
C1-214	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-215	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-216	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-217	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-218	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			

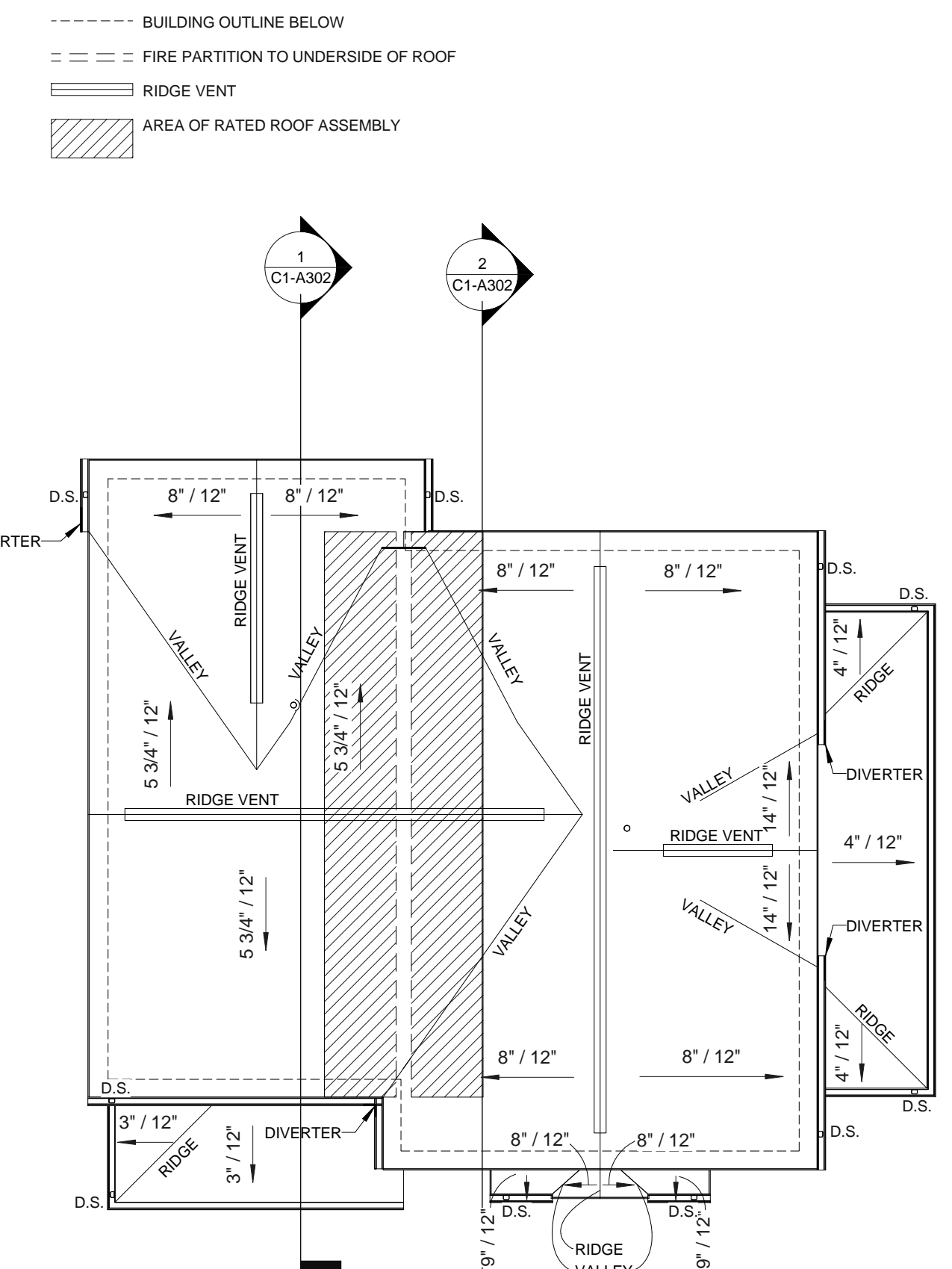
### REFLECTED CEILING PLAN LEGEND



### REFLECTED CEILING PLAN GENERAL NOTES

- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" WHERE NOT NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILING.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE STRUCTURAL SUPPORT FOR CEILING-MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A302 FOR REFLECTED CEILING PLAN LEGEND.

### ROOF PLAN LEGEND



### ROOM FINISH SCHEDULE - TYPE C1

NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK	HORIZONTAL	CEILING FINISH	COMMENTS
C1-101	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-102	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-103	BATHROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-104	LAUNDRY	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-105	UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-106	DINING	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-107	FOYER	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-108	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-109	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-110	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-111	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-112	DINING	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-201	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-202	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-203	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-204	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-205	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-206	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-207	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-208	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-209	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-210	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-211	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-212	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-213	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-214	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-215	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-216	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-217	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-218	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	

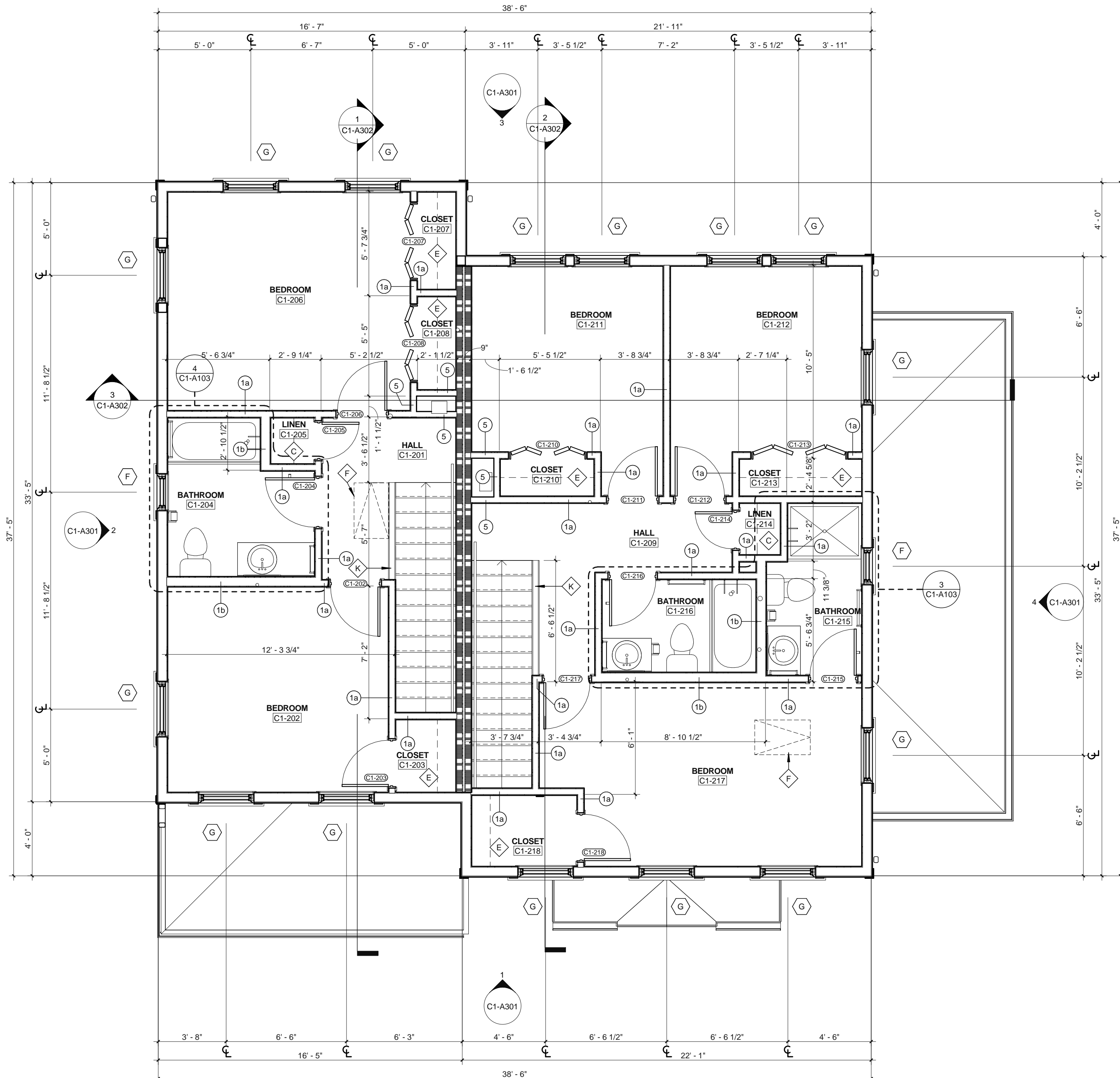
5 TYPE C1 SECOND FLOOR REFLECTED CEILING PLAN

4 TYPE C1 FIRST FLOOR REFLECTED CEILING PLAN

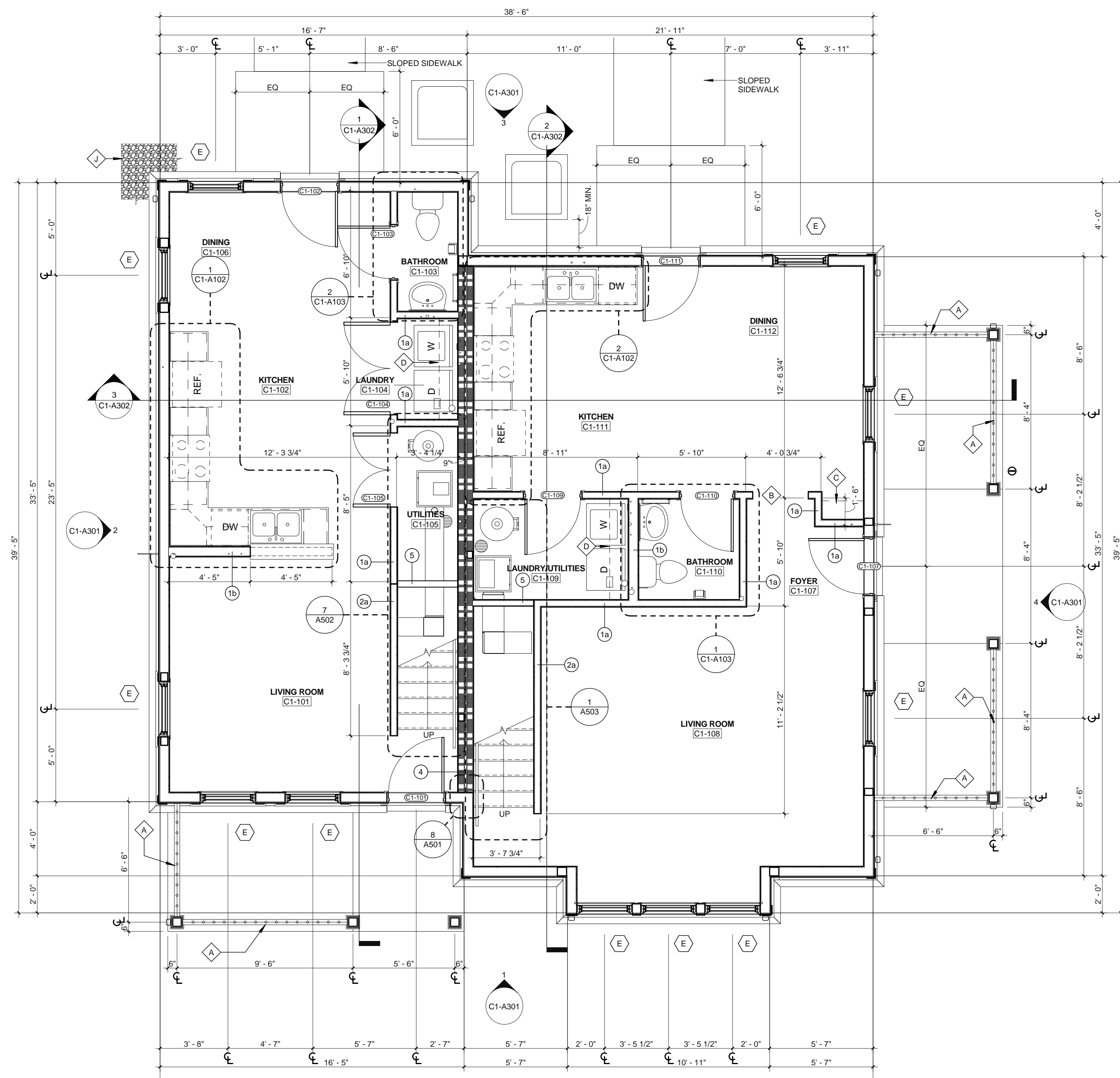
3 TYPE C1 ROOF PLAN

### FINISH LEGEND

- FLOOR FINISHES: VCT VINYL COMPOSITION TILE, CT CERAMIC TILE
- WALL BASE FINISHES: RB RUBBER BASE, CB CERAMIC BASE
- WALL FINISHES: PNT PAINT
- MILLWORK FINISHES: P.LAM1 PLASTIC LAMINATE, P.LAM2 PLASTIC LAMINATE
- CEILING FINISHES: GYP.BD GYPSUM BOARD, PAINTED
- STAIR FINISHES: RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE



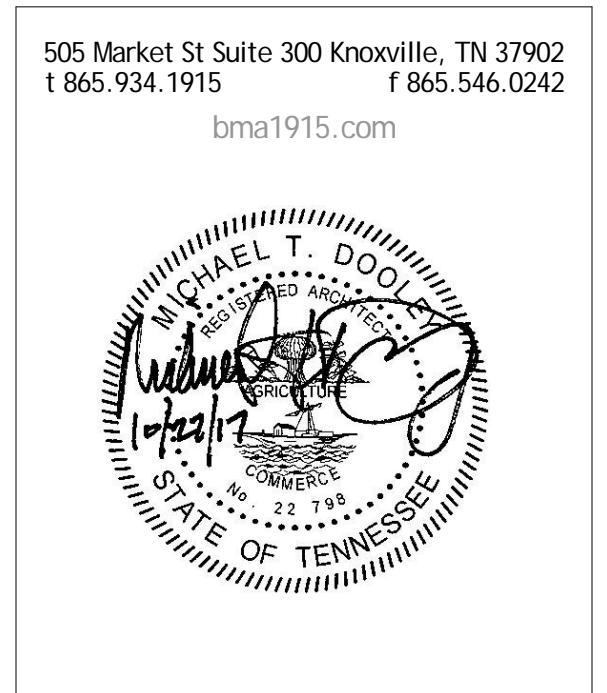
2 TYPE C1 SECOND FLOOR PLAN



1 TYPE C1 FIRST FLOOR PLAN

**BarberMcMurry**  
architects since 1915

505 Market St Suite 300 Knoxville, TN 37902  
1 865.934.1915  
bma1915.com



PROJECT NUMBER  
166200

PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION

PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915

- ### GENERAL NOTES
- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
  - NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
  - PROVIDE BLOCKING, ROUGH HARDWARE, ETC. AS REQUIRED TO MOUNT EQUIPMENT.
  - SYMBOL (C) INDICATES PARTITION TYPE. SEE SHEETS A550 FOR PARTITION TYPES.
  - ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH 1/2" LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
  - SYMBOL (W) INDICATES WINDOW TYPE. SEE SHEETS A702 FOR WINDOW ELEVATIONS AND DETAILS.
  - SYMBOL (D) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
  - ALL CEILING TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
  - ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHERS SURFACE MOUNTED WITHIN BASE CABINET.

- ### PLAN KEYNOTES
- A. SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4" O.C. MAX.
  - B. 3'-0" x 7'-0" HEIGHT OPENING.
  - C. (4) 16" DEEP SHELVES, SPACED EVENLY.
  - D. 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-6" A.F.F.
  - E. 12" DEEP SHELF @ 6'-0" & ROD @ 5'-0" A.F.F.
  - F. ATTIC ACCESS HATCH
  - G. ALIGN FACE OF WALL WITH ADJACENT WALL
  - H. 4'-0" x 7'-0" HEIGHT OPENING
  - J. 18" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING
  - K. LOW WALL 3'-6" A.F.F.
  - L. SHEAR WALL, REFER TO STRUCTURAL

- ### ROOF PLAN GENERAL NOTES
- PAINT ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF SHINGLE COLOR.
  - COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS, WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
  - ALL VALLEYS TO BE CLOSED AND FLASHED.

- ### RCP KEYNOTES
- 1 HOUR FIRE RATED CEILING
  - 7'-8" A.F.F. BULKHEAD
  - 3'-8" A.F.F. BULKHEAD
  - 4'-7"-11" A.F.F. BULKHEAD

### WALL LEGEND



PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TVM
ISSUE DATE	10.27.2017

### REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	2017/11/13

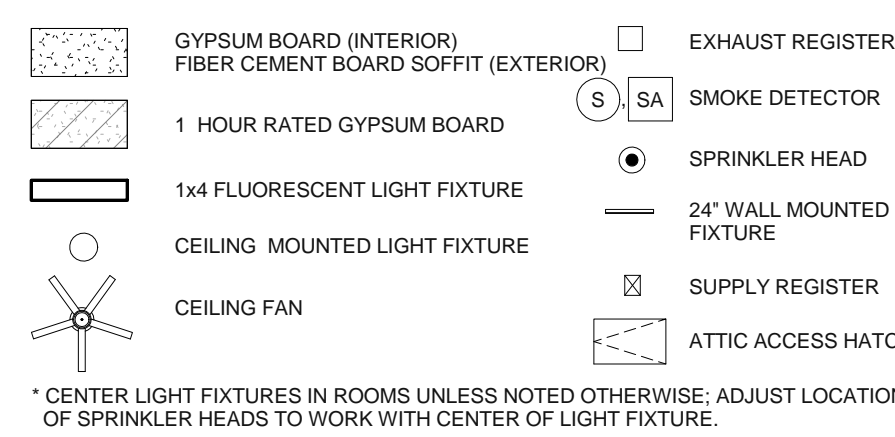
# C1-A101

TYPE C1 - BUILDING PLANS AND SCHEDULES (VICTORIAN)



NO.	DOOR			FRAME		DETAILS			HARDWARE SET NO.	FIRE LABEL	NOTES
	WIDTH	HEIGHT	MAT'L	TYPE	MAT'L	TYPE	HEAD	JAMB			
C2-101	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB
C2-102	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB
C2-103	2'-10"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-104	5'-0"	6'-8"	WD	P4-DBL	WD	1	4A/701	12/A/701	8		
C2-105	4'-0"	6'-8"	WD	P4-DBL	WD	1	4A/701	12/A/701	8		
C2-107	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB
C2-109	3'-0"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4		
C2-110	2'-10"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-111	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB
C2-202	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-203	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4		
C2-204	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-205	2'-0"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4		
C2-206	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-207	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A/701	7/A/701	5		
C2-208	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A/701	7/A/701	5		
C2-210	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A/701	7/A/701	5		
C2-211	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-212	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-213	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A/701	7/A/701	5		
C2-214	2'-0"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4		
C2-215	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-216	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-217	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6		
C2-218	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4		

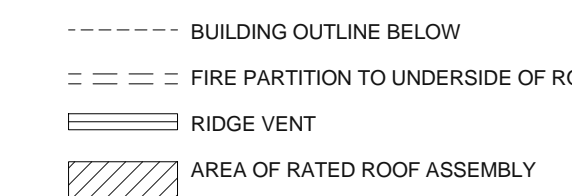
### REFLECTED CEILING PLAN LEGEND



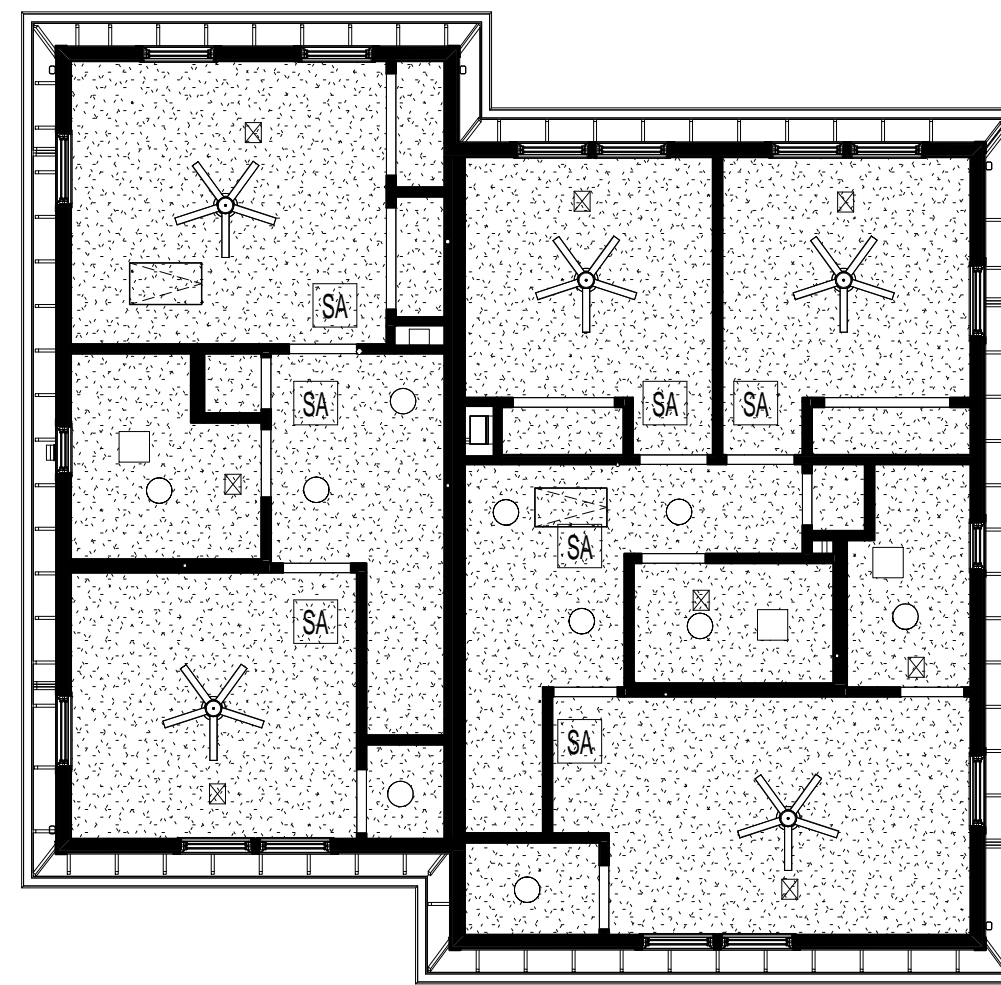
### REFLECTED CEILING PLAN GENERAL NOTES

- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" UNLESS NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILINGS.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE PROTECTION SUPPORT FOR CEILING-MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A202 FOR REFLECTED CEILING PLAN LEGEND.

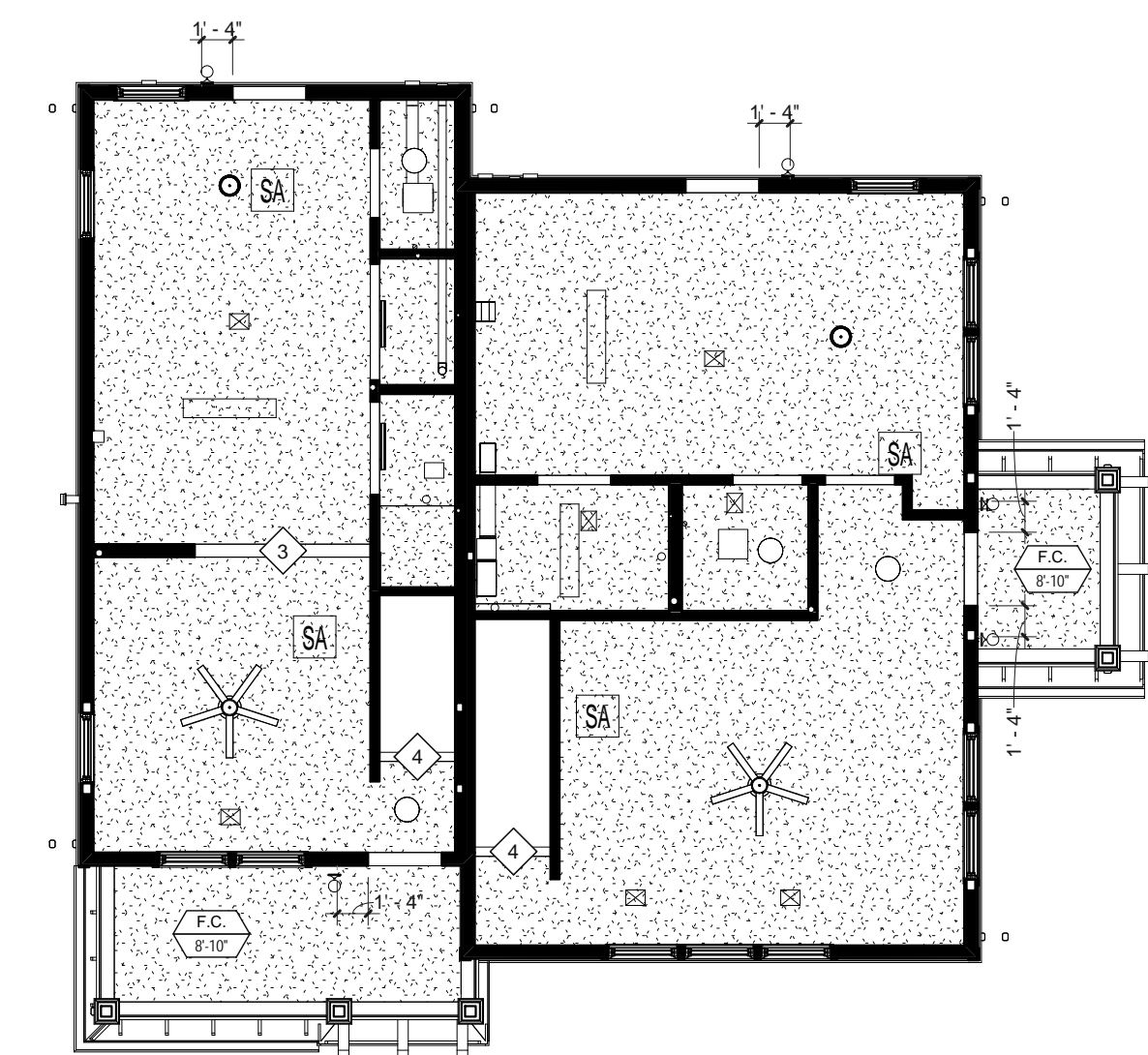
### ROOF PLAN LEGEND



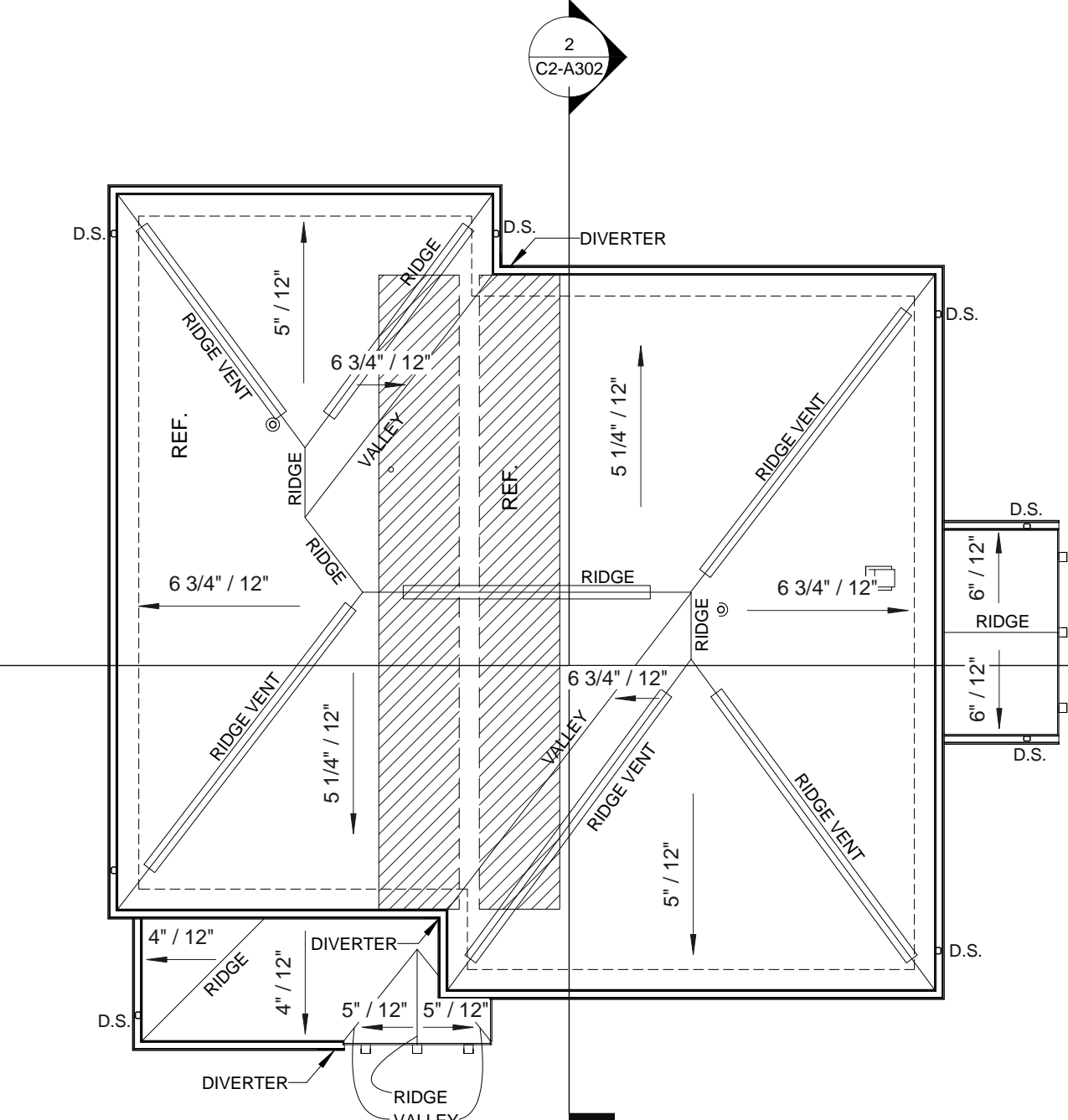
NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK			COMMENTS
					VERTICAL	HORIZONTAL	CEILING FINISH	
C2-101	LIVING ROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-102	KITCHEN	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-103	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-104	LAUNDRY	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-105	UTILITIES	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-106	DINING	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-107	FOYER	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-108	LIVING ROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-109	LAUNDRY/UTILITIES	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-110	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-111	KITCHEN	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-112	DINING	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-201	HALL	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-202	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-203	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-204	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-205	LINEN	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-206	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-207	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-208	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-209	HALL	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-210	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-211	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-212	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-213	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-214	LINEN	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-215	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-216	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-217	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C2-218	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	



5 TYPE C2 SECOND FLOOR REFLECTED CEILING PLAN



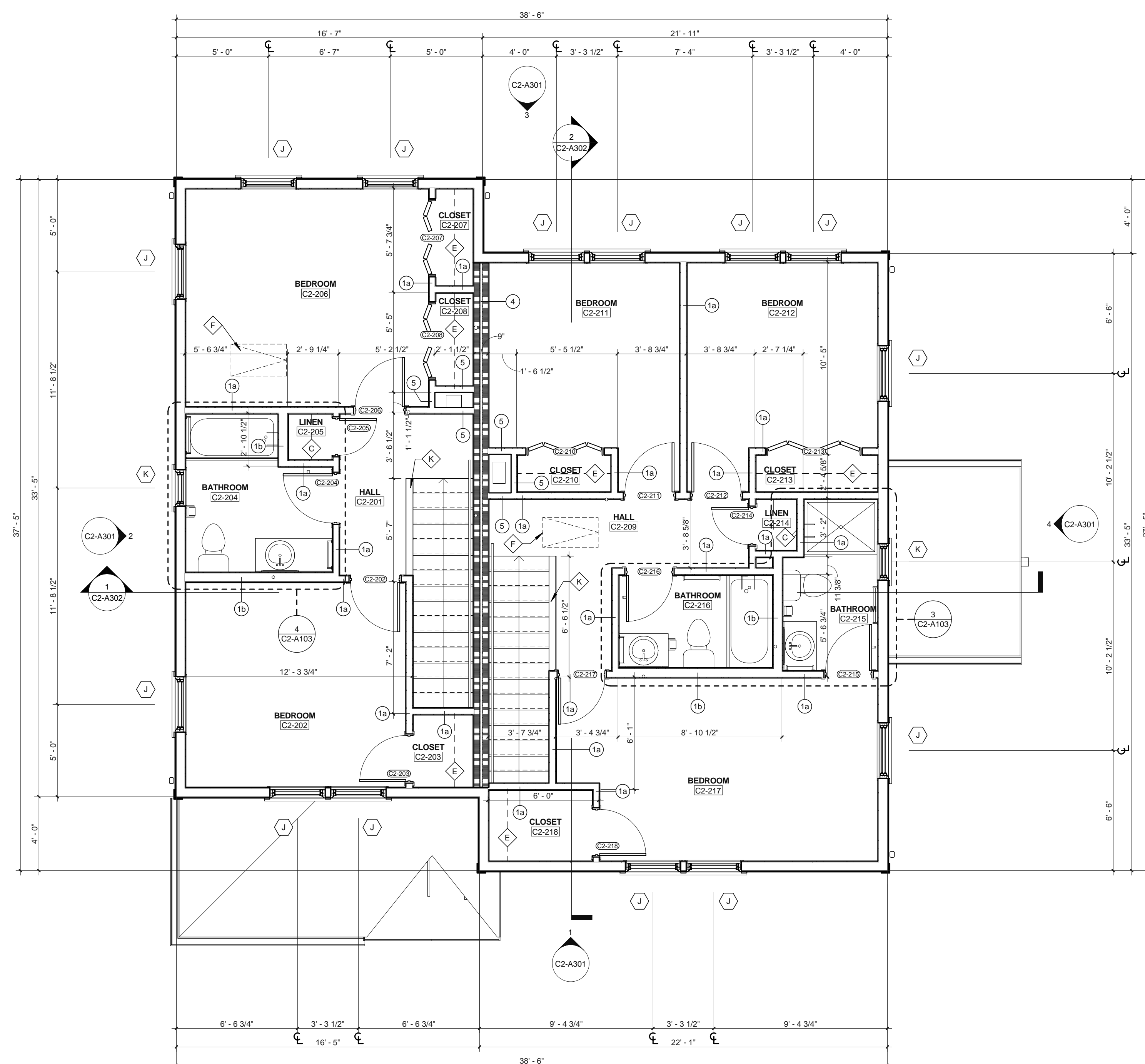
4 TYPE C2 FIRST FLOOR REFLECTED CEILING PLAN



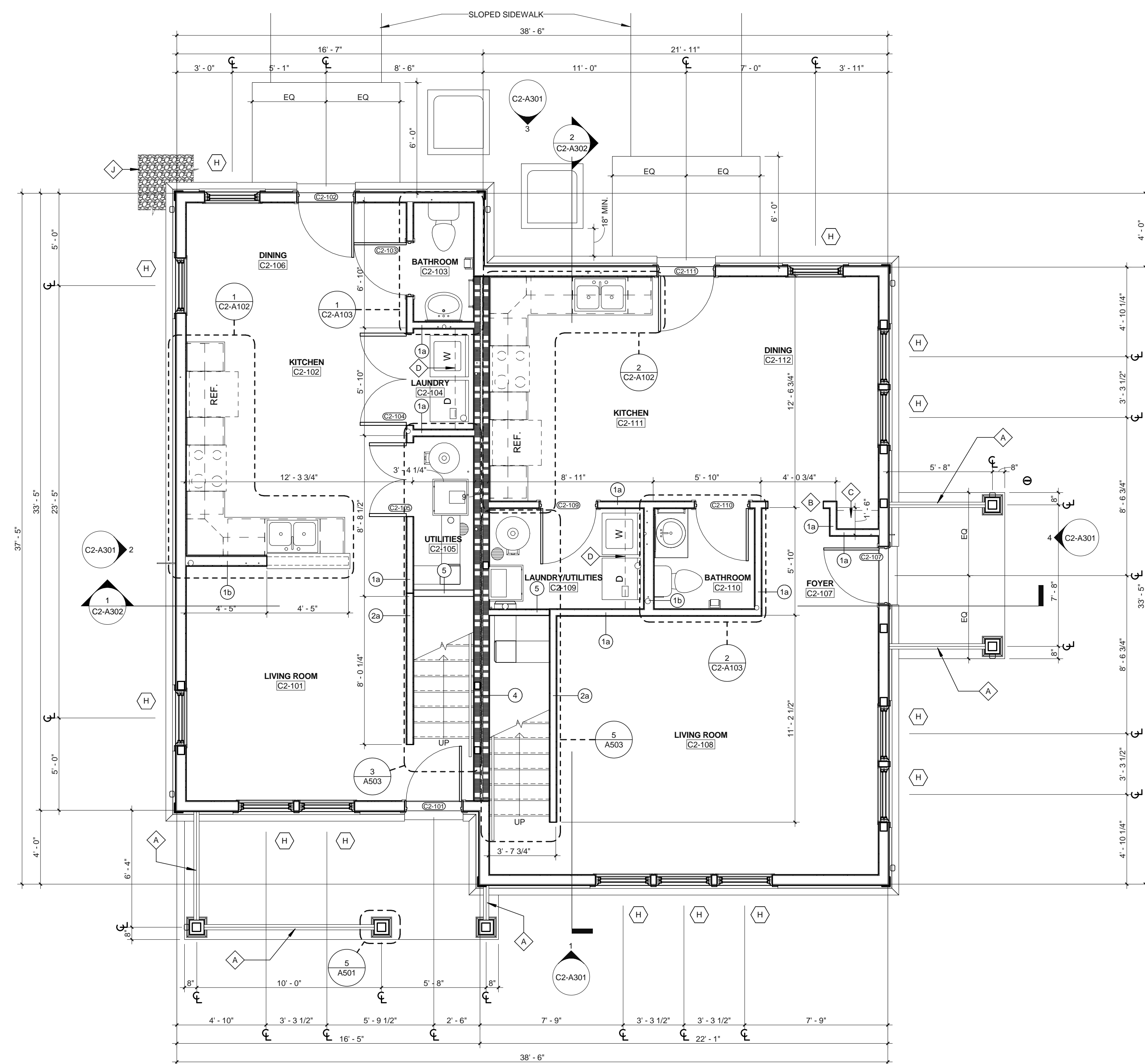
3 TYPE C2 ROOF PLAN

### FINISH LEGEND

- FLOOR FINISHES
  - VCCT VINYL COMPOSITION TILE
  - CT CERAMIC TILE
- WALL BASE FINISHES
  - RB RUBBER BASE
  - CB CERAMIC BASE
- WALL FINISHES
  - PNT PAINT
- MILLWORK FINISHES
  - P.LAM1 PLASTIC LAMINATE
  - P.LAM2 PLASTIC LAMINATE
- CEILING FINISHES
  - GYP.BD. GYPSUM BOARD, PAINTED
- STAIR FINISHES
  - RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE



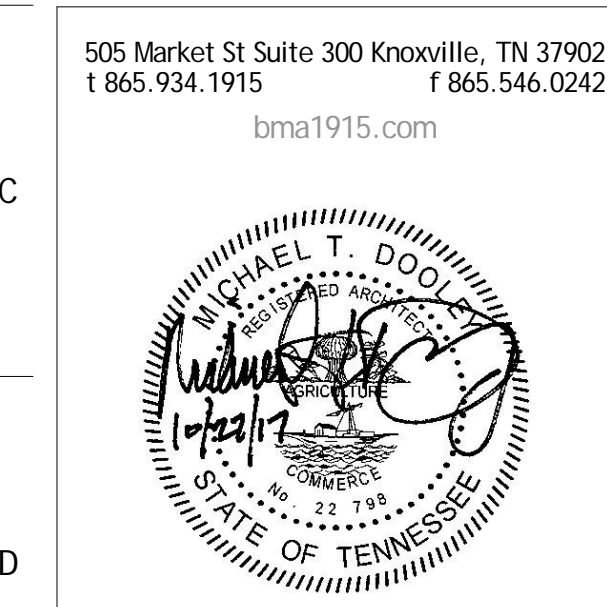
2 TYPE C2 SECOND FLOOR PLAN



1 TYPE C2 FIRST FLOOR PLAN

**BarberMcMurry**  
architects since 1915

505 Market St Suite 300 Knoxville, TN 37902  
1.865.934.1915  
bma1915.com



PROJECT NUMBER  
166200

PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION

PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915

- ### GENERAL NOTES
- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
  - NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
  - PROVIDE BLOCKING, ROUGH HARDWARE, ETC. AS REQUIRED TO MOUNT EQUIPMENT.
  - SYMBOL (1) INDICATES PARTITION TYPE. SEE SHEETS A500 FOR PARTITION TYPES.
  - ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH 1/2" LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
  - SYMBOL (2) INDICATES WINDOW TYPE. SEE SHEETS A702 FOR WINDOW ELEVATIONS AND DETAILS.
  - SYMBOL (3) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
  - ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
  - ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHERS SURFACE MOUNTED WITHIN BASE CABINET.

- ### PLAN KEYNOTES
- SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4" O.C. MAX.
  - 3'-0" x 7'-0" HEIGHT OPENING
  - (4) 1/2" DEEP SHELVES, SPACED EVENLY
  - 1/2" DEEP SHELF ABOVE WASHER & DRYER @ 5'-6" A.F.F.
  - 1/2" DEEP SHELF @ 6'-0" & ROD @ 5'-0" A.F.F.
  - ATTIC ACCESS HATCH
  - ALIGN FACE OF WALL WITH ADJACENT WALL
  - 4'-0" x 7'-0" HEIGHT OPENING
  - 1/8" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING
  - LOW WALL 3'-6" A.F.F.
  - SHEAR WALL REFER TO STRUCTURAL

- ### ROOF PLAN GENERAL NOTES
- PRINT ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF FINISH COLOR.
  - COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS. WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
  - ALL VALLEYS TO BE CLOSED AND FLASHED

- ### RCP KEYNOTES
- 1 HOUR FIRE RATED CEILING
  - 7'-8" A.F.F. BULKHEAD
  - 3'-8" A.F.F. BULKHEAD
  - 7'-11" A.F.F. BULKHEAD

- ### WALL LEGEND
- UNRATED PARTITION
  - 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TVM
ISSUE DATE	10.27.2017

REVISIONS		
1	ADDENDUM NO. 1	2017/11/13

**C2-A101**  
TYPE C2 - BUILDING PLANS AND SCHEDULES (ARTS & CRAFTS)





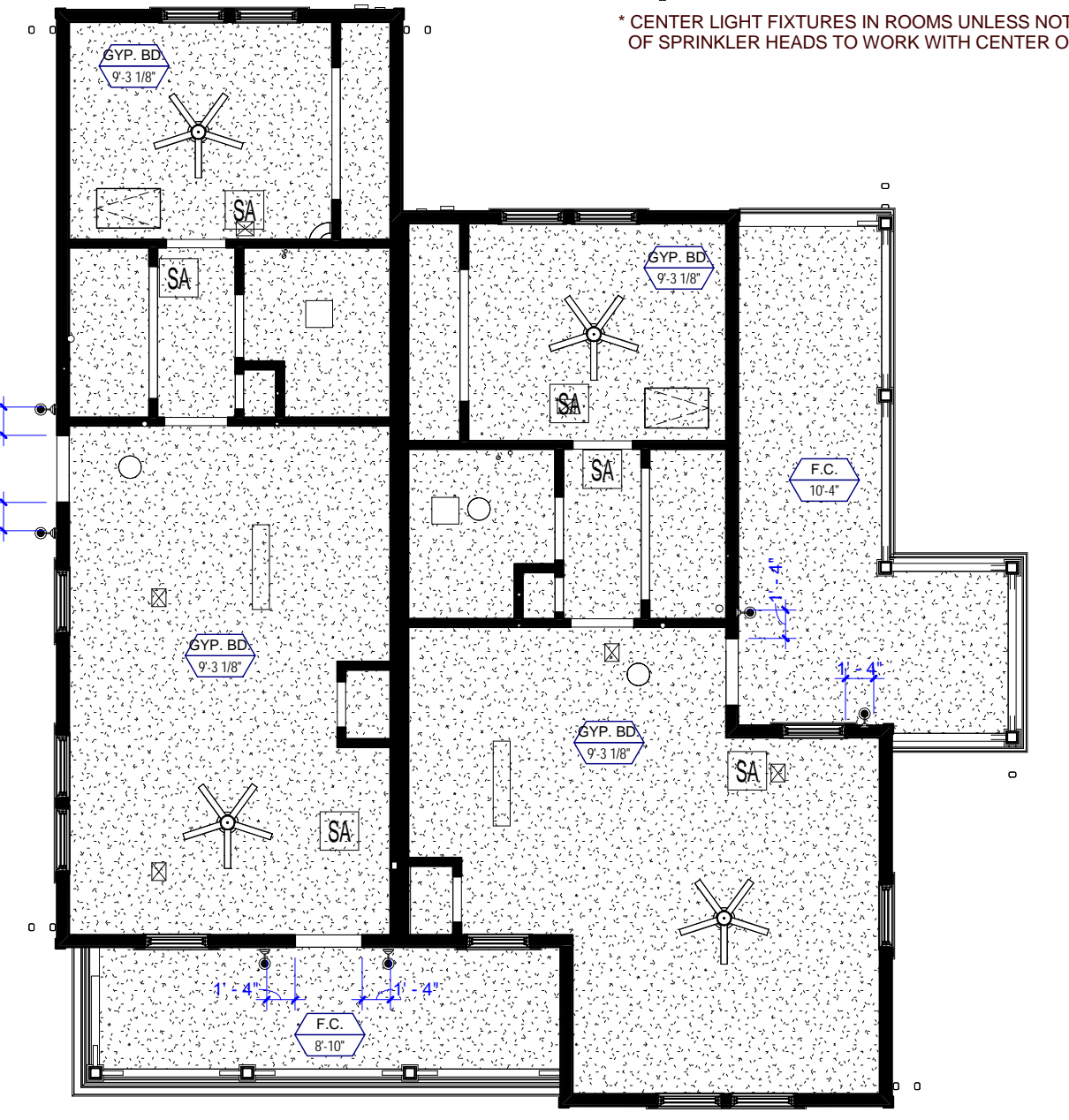
OPENING SCHEDULE - TYPE E1												
NO.	DOOR			FRAME			DETAILS			HARDWARE SET NO.	FIRE LABEL	NOTES
	WIDTH	HEIGHT	MAT'L	MAT'L	TYPE	HEAD	JAMB	SILL				
E1-101A	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701		3		INSULATED DOOR SLAB
E1-101B	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701		3		INSULATED DOOR SLAB
E1-102	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-103	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701		5		
E1-104	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-106	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6		
E1-106	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701		4		
E1-107	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701		3		INSULATED DOOR SLAB
E1-108	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701		4		
E1-109	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701		4		
E1-110	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6		
E1-111	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-112	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6		
E1-113	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-114	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701		4		

ROOM FINISH SCHEDULE - TYPE E1								COMMENTS
NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK VERTICAL	MILLWORK HORIZONTAL	CEILING FINISH	
E1-101	KITCHEN/LIVING ROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-102	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-103	BEDROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-104	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-106	BATHROOM	CT	CB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-106	LINEN	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-107	KITCHEN/LIVING ROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-108	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-109	LINEN	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-110	BATHROOM	CT	CB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-111	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-112	BEDROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-113	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-114	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	

FINISH LEGEND	
FLOOR FINISHES	VCT VINYL COMPOSITION TILE CT CERAMIC TILE
WALL BASE FINISHES	RB RUBBER BASE CB CERAMIC BASE
WALL FINISHES	PNT PAINT
MILLWORK FINISHES	P.LAM PLASTIC LAMINATE P.LAM2 PLASTIC LAMINATE
CEILING FINISHES	GYP./PNT GYPSUM BOARD, PAINTED
STAIR FINISHES	RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE

### REFLECTED CEILING PLAN GENERAL NOTES

- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" WHERE NOT NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILINGS.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE STRUCTURAL SUPPORT FOR CEILING-MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A302 FOR REFLECTED CEILING PLAN LEGEND.



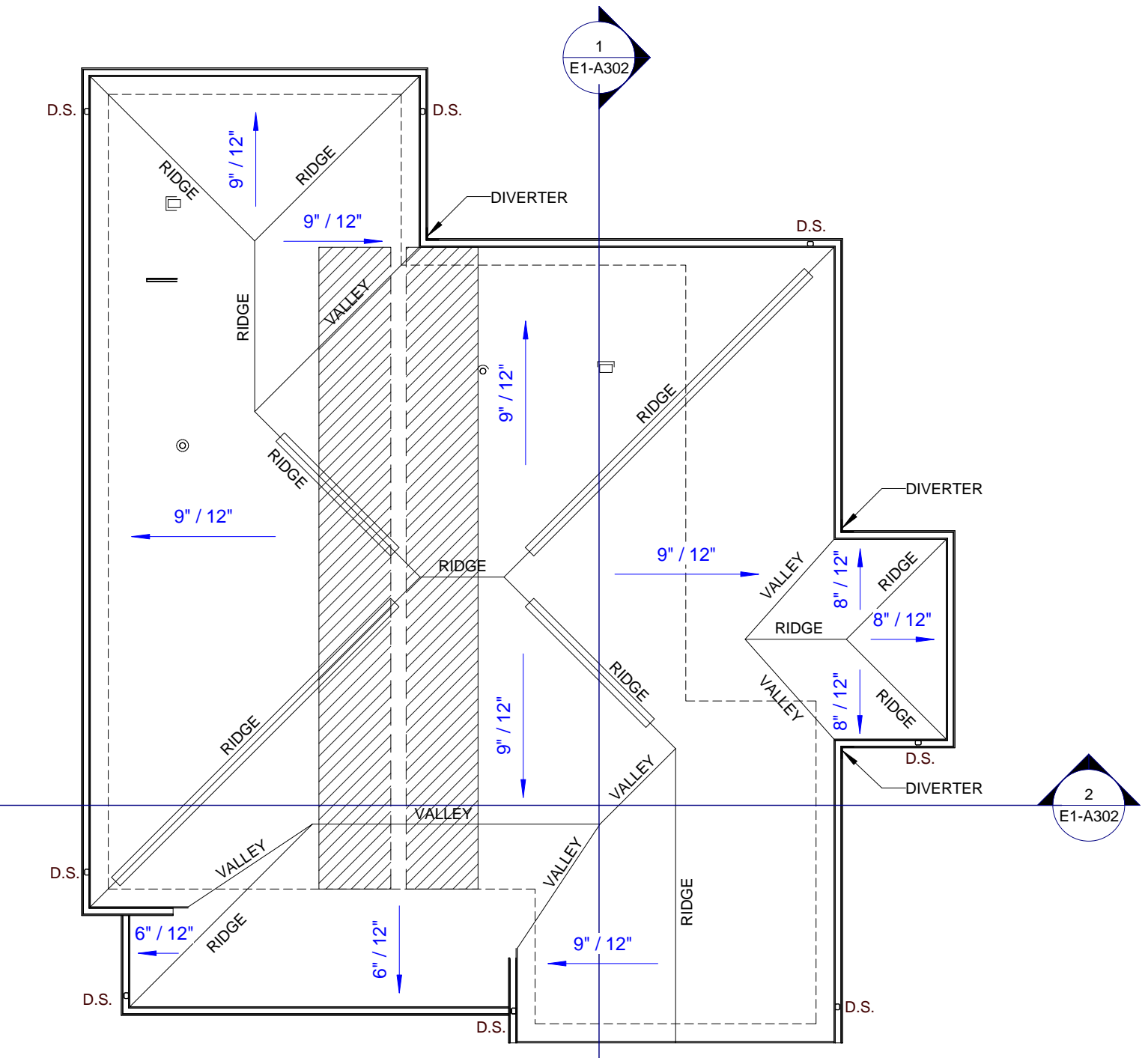
3 TYPE E1 REFLECTED CEILING PLAN

### REFLECTED CEILING PLAN LEGEND

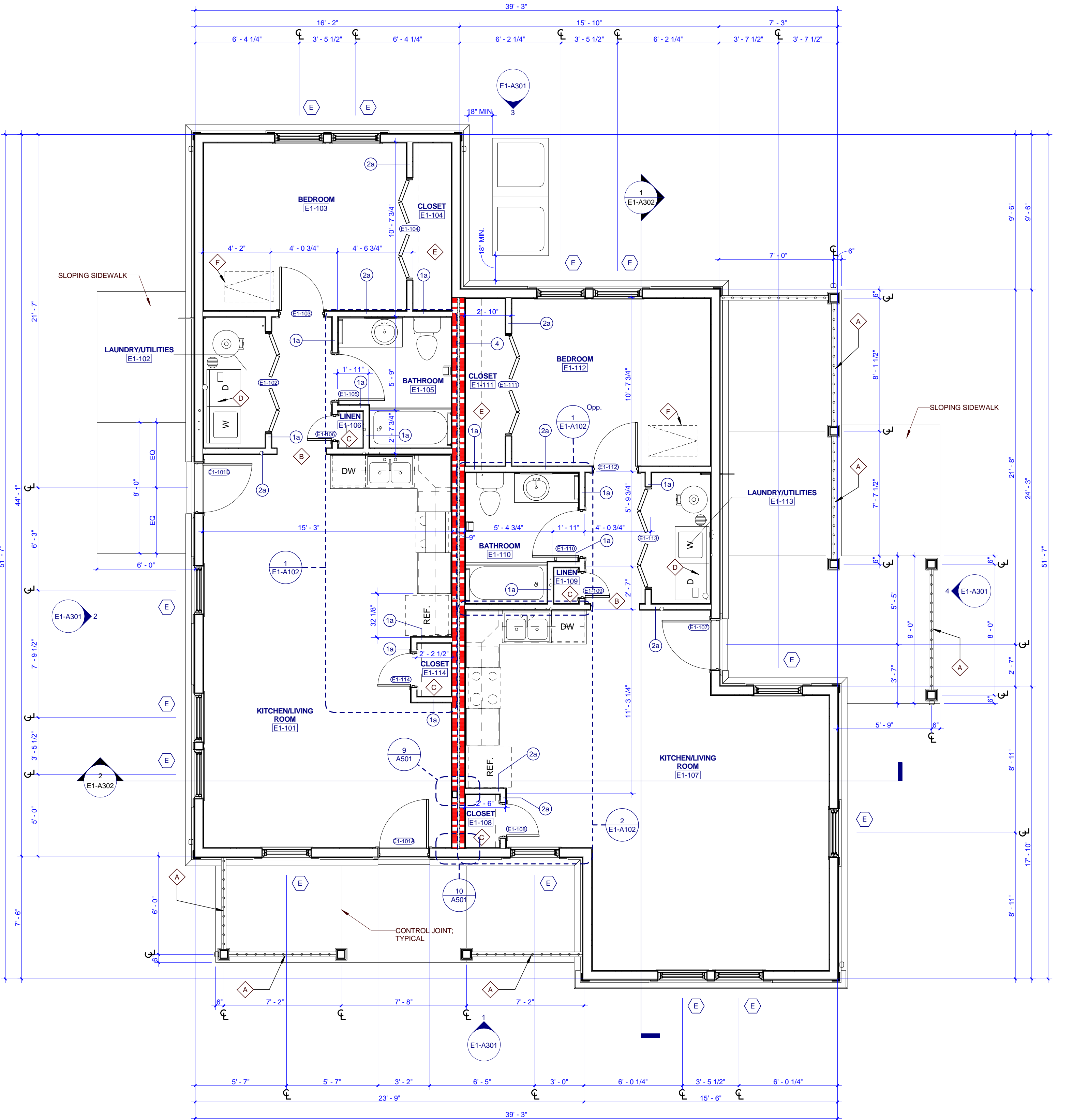
- GYPSUM BOARD (INTERIOR)
- FIBER CEMENT BOARD SOFFIT (EXTERIOR)
- 1 HOUR RATED GYPSUM BOARD
- 1x4 FLUORESCENT LIGHT FIXTURE
- CEILING MOUNTED LIGHT FIXTURE
- CEILING FAN
- EXHAUST REGISTER
- SMOKE DETECTOR
- SPRINKLER HEAD
- 2'x2' WALL MOUNTED LIGHT FIXTURE
- SUPPLY REGISTER
- ATTIC ACCESS HATCH

### ROOF PLAN LEGEND

- BUILDING OUTLINE BELOW
- FIRE PARTITION TO UNDERSIDE OF ROOF
- RIDGE VENT
- AREA OF RATED ROOF ASSEMBLY



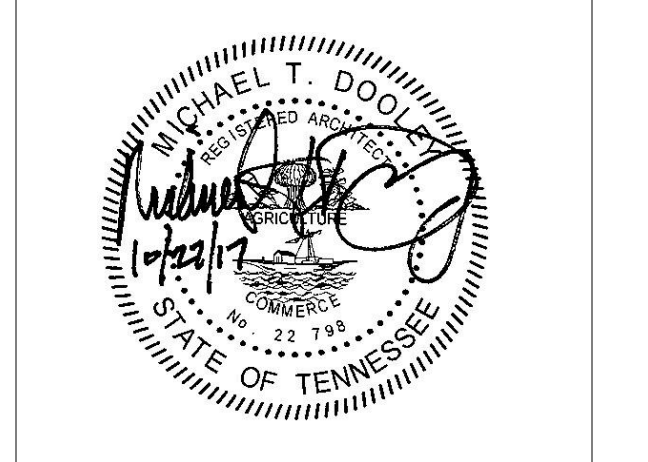
2 TYPE E1 ROOF PLAN



1 TYPE E1 FLOOR PLAN

**oma**  
BARBER McMURRY  
architects since 1915

505 Market St Suite 300 Knoxville, TN 37902  
1 865.934.1915  
oma1915.com



PROJECT NUMBER  
**166200**

PROJECT NAME  
**FIVE PIONS - PHASE 3**

OWNER  
**KNOXVILLE COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET KNOXVILLE, TN 37915**

### GENERAL NOTES

- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- PROVIDE BLOCKING, ROUGH HARDWARE, ETC., AS REQUIRED TO MOUNT EQUIPMENT.
- SYMBOL (D) INDICATES PARTITION TYPE. SEE SHEETS A302 FOR PARTITION TYPES.
- ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH (1) LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
- SYMBOL (W) INDICATES WINDOW TYPE. SEE SHEETS A702 FOR WINDOW ELEVATIONS AND DETAILS.
- SYMBOL (DOOR) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
- ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
- ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHERS SURFACE MOUNTED WITHIN BASE CABINET

### PLAN KEYNOTES

- A. SECURE BENCH RAILING TO CONCRETE PORCH SLAB @ 4" O.C. MAX.
- B. 3'-0" x 7'-0" HEIGHT OPENING
- C. (4) 16" DEEP SHELVES, SPACED EVENLY
- D. 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-6" A.F.F.
- E. 12" DEEP SHELF @ 6'-0" & ROO @ 5'-0" A.F.F.
- F. ATTIC ACCESS HATCH
- G. ALIGN FACE OF WALL WITH ADJACENT WALL
- H. 4'-0" x 7'-0" HEIGHT OPENING
- I. 18" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING.
- K. LOW WALL, 3'-6" A.F.F.
- L. SHEAR WALL, REFER TO STRUCTURAL

### ROOF PLAN GENERAL NOTES

- PAINT ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF SHINGLE COLOR.
- COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS. WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
- ALL VALLEYS TO BE CLOSED AND FLASHED.

### RCP KEYNOTES

- 1 HOUR FIRE RATED CEILING
- 2'-7" A.F.F. BULKHEAD
- 3'-6" A.F.F. BULKHEAD
- 4'-7"-11" A.F.F. BULKHEAD

### WALL LEGEND

- UNRATED PARTITION
- 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TWM
ISSUE DATE	10.27.2017

REVISIONS		
1	ADDENDUM NO. 1	2017/11/13

## E1-A101

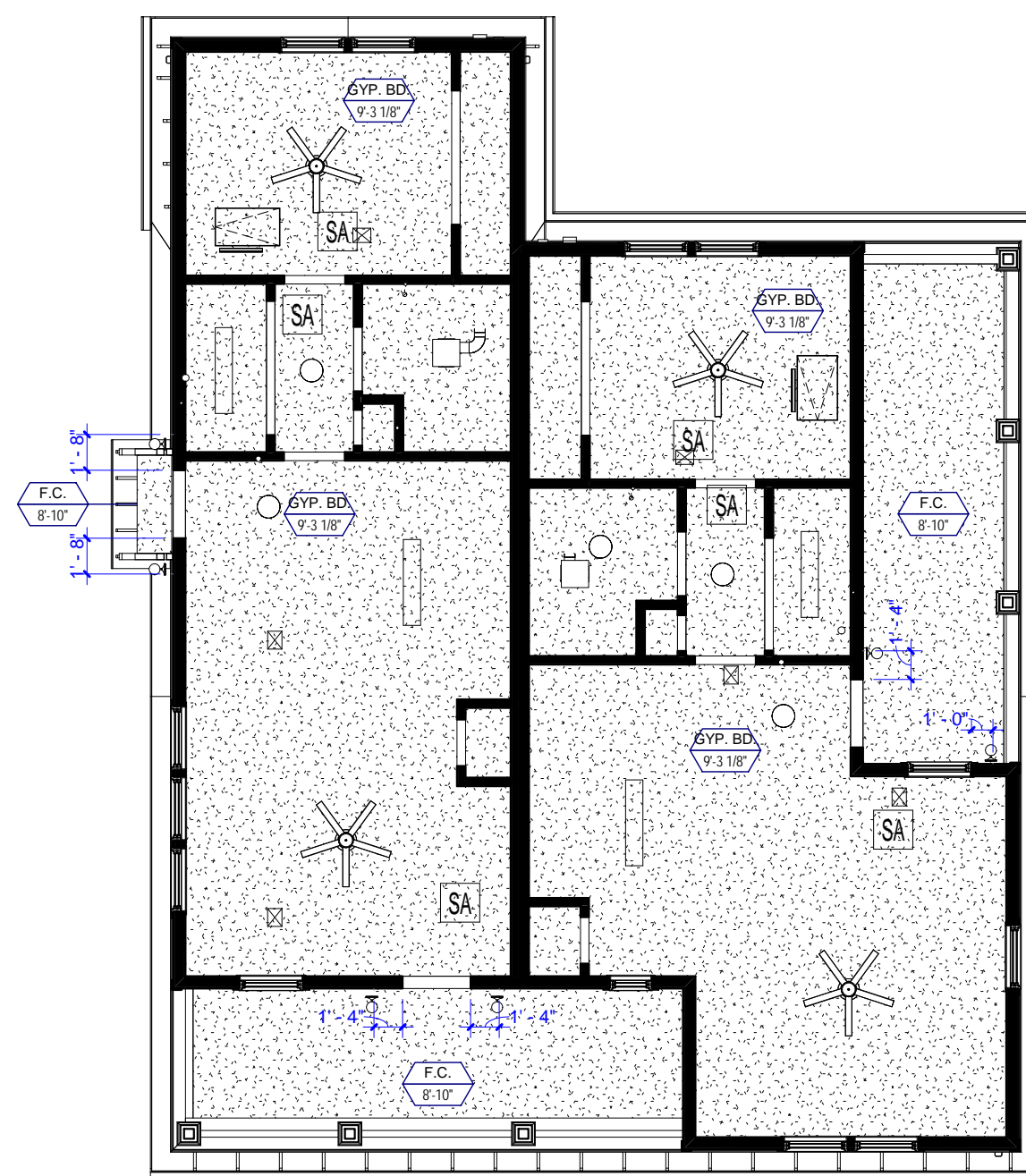
TYPE E1 - BUILDING PLANS AND SCHEDULES (VICTORIAN)

OPENING SCHEDULE - TYPE E2											
NO.	DOOR			FRAME			HARDWARE SET NO.	FIRE LABEL	NOTES		
	SIZE	HEIGHT	MAT'L	TYPE	MAT'L	TYPE				HEAD	JAMB
E2-101	3'-0"	6'-8"	HM	P3-T4	HM	2	3/A701	8/A701	2/A402	3	INSULATED DOOR SLAB
E2-101B	3'-0"	6'-8"	HM	P3-T4	HM	2	3/A701	8/A701	2/A402	3	INSULATED DOOR SLAB
E2-102	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5	
E2-103	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6	
E2-104	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5	
E2-105	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6	
E2-106	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701		4	
E2-107	3'-0"	6'-8"	HM	P3-T4	HM	2	3/A701	8/A701	2/A402	3	INSULATED DOOR SLAB
E2-108	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701		4	
E2-109	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701		4	
E2-110	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6	
E2-111	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5	
E2-112	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6	
E2-113	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701		5	
E2-114	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701		4	

ROOM FINISH SCHEDULE - TYPE E2								
NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK		CEILING FINISH	COMMENTS
					VERTICAL	HORIZONTAL		
E2-101	KITCHEN/LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-102	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-103	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-104	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-105	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-106	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-107	KITCHEN/LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-108	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-109	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-110	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-111	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-112	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-113	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
E2-114	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	

**FINISH LEGEND**

- FLOOR FINISHES
  - VCT VINYL COMPOSITION TILE
  - CT CERAMIC TILE
- WALL BASE FINISHES
  - RB RUBBER BASE
  - CB CERAMIC BASE
- WALL FINISHES
  - PNT PAINT
- MILLWORK FINISHES
  - P.LAM1 PLASTIC LAMINATE
  - P.LAM2 PLASTIC LAMINATE
- CEILING FINISHES
  - GYP./PNT GYPSUM BOARD, PAINTED
- STAIR FINISHES
  - RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE



**TYPE E2 REFLECTED CEILING PLAN**

**REFLECTED CEILING PLAN LEGEND**

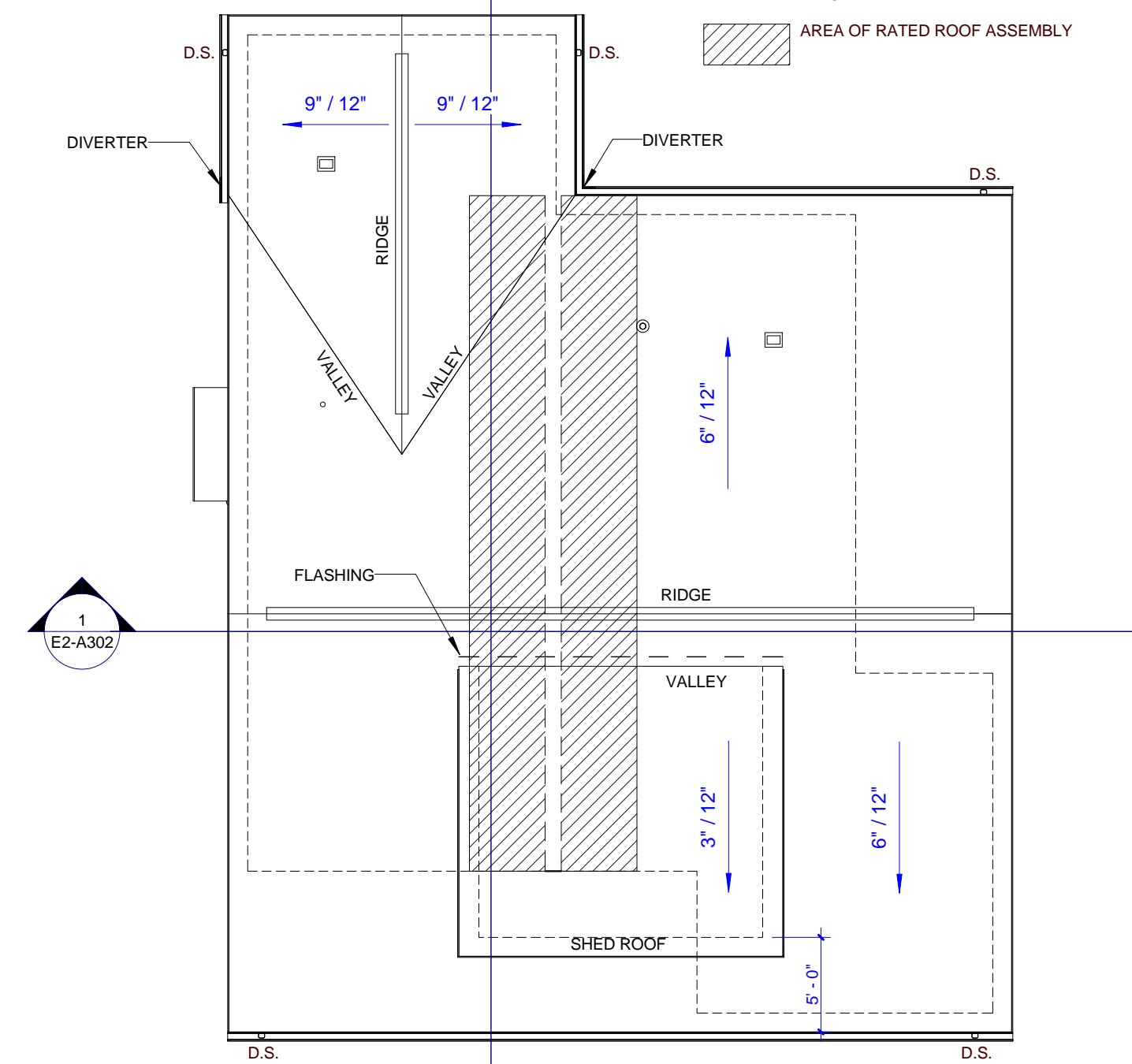
- GYPSUM BOARD (INTERIOR)
- FIBER CEMENT BOARD (EXTERIOR)
- 1 HOUR RATED GYPSUM BOARD
- 14 FLUORESCENT LIGHT FIXTURE
- CEILING MOUNTED LIGHT FIXTURE
- CEILING FAN
- EXHAUST REGISTER
- SMOKE DETECTOR
- SPRINKLER HEAD
- 24" WALL MOUNTED LIGHT FIXTURE
- SUPPLY REGISTER
- ATTIC ACCESS HATCH

**REFLECTED CEILING PLAN GENERAL NOTES**

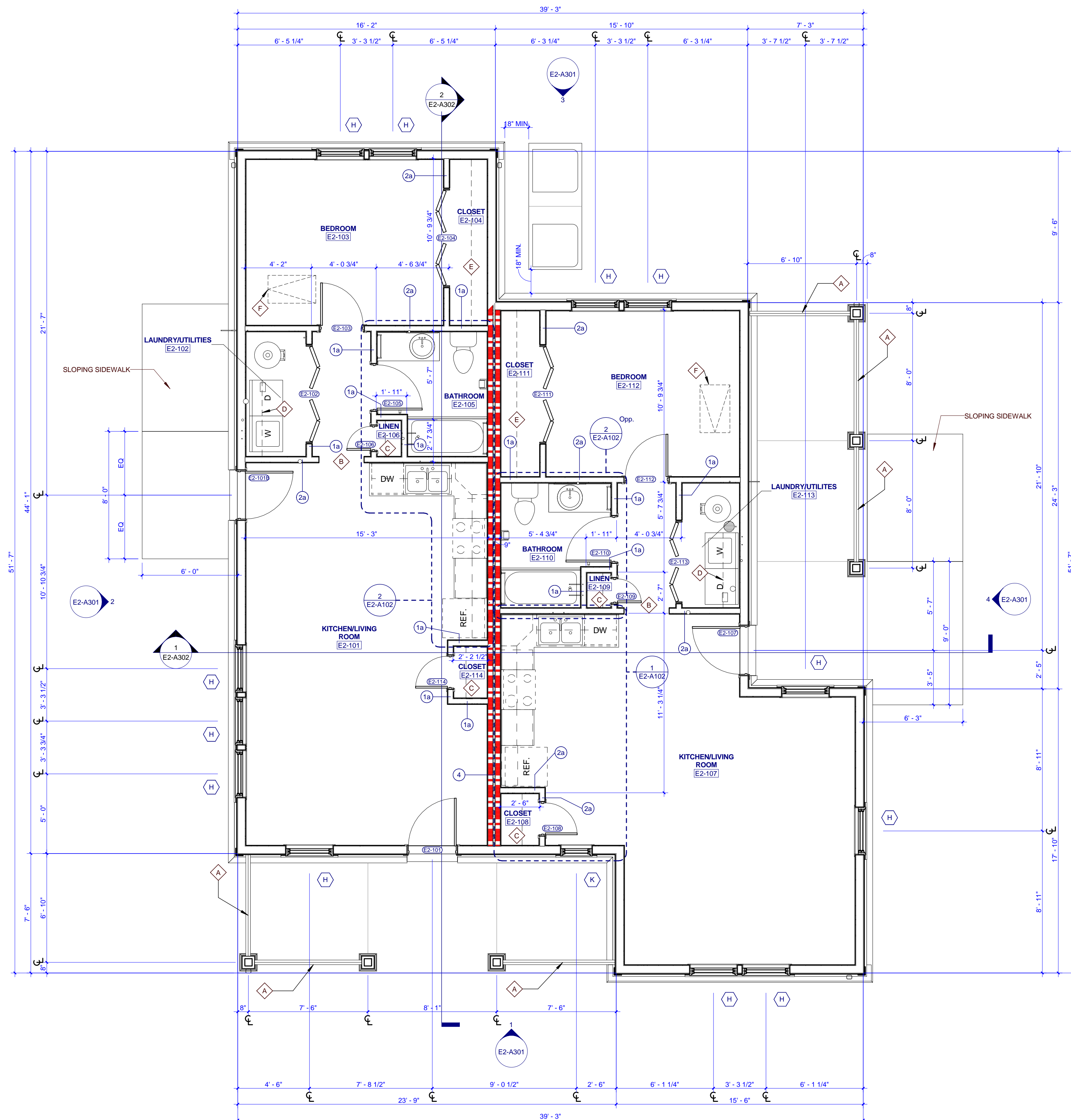
- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" WHERE NOT NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILINGS.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE STRUCTURAL SUPPORT FOR CEILING MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BALANCE ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A202 FOR REFLECTED CEILING PLAN LEGEND.

**ROOF PLAN LEGEND**

- BUILDING OUTLINE BELOW
- FIRE PARTITION TO UNDERSIDE OF ROOF
- RIDGE VENT
- AREA OF RATED ROOF ASSEMBLY



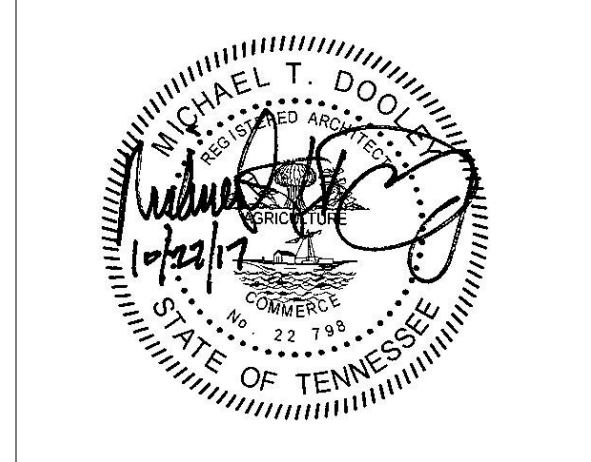
**TYPE E2 ROOF PLAN**



**TYPE E2 FLOOR PLAN**



505 Market St Suite 300 Knoxville, TN 37902  
1.865.934.1915  
bma1915.com



PROJECT NUMBER  
**166200**

PROJECT NAME  
**FIVE POINTS - PHASE 3**

OWNER  
**KNOXVILLE COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET KNOXVILLE, TN 37915**

**GENERAL NOTES**

- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- PROVIDE BLOCKING, ROUGH HARDWARE, ETC. AS REQUIRED TO MOUNT EQUIPMENT.
- SYMBOL (1) INDICATES PARTITION TYPE. SEE SHEETS A200 FOR PARTITION TYPES.
- ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH (1) LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
- SYMBOL (2) INDICATES WINDOW TYPE. SEE SHEETS A200 FOR WINDOW ELEVATIONS AND DETAILS.
- SYMBOL (3) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
- ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
- ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHER'S SURFACE MOUNTED WITHIN BASE CABINET.

**PLAN KEYNOTES**

- A. SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4" O.C. MAX.
- B. 3'-0" x 7'-0" HEIGHT OPENING
- C. (4) 16" DEEP SHELVES, SPACED EVENLY
- D. 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-0" A.F.F.
- E. 12" DEEP SHELF @ 6'-0" & ROD @ 5'-0" A.F.F.
- F. ATTIC ACCESS HATCH
- G. ALIGN FACE OF WALL WITH ADJACENT WALL
- H. 4'-0" x 7'-0" HEIGHT OPENING
- J. 18" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING.
- K. LOW WALL, 3'-6" A.F.F.
- L. SHEAR WALL, REFER TO STRUCTURAL

**ROOF PLAN GENERAL NOTES**

- PAINT ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF FINISH COLOR.
- COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS. WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
- ALL VALLEYS TO BE CLOSED AND FLASHED.

**RCP KEYNOTES**

- 1 HOUR FIRE RATED CEILING
- 7'-8" A.F.F. BULKHEAD
- 6'-8" A.F.F. BULKHEAD
- 7'-11" A.F.F. BULKHEAD

**WALL LEGEND**

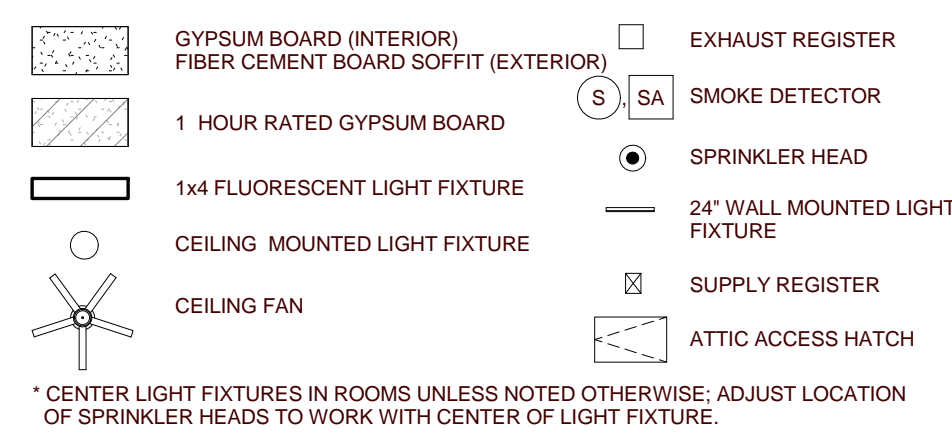
- UNRATED PARTITION
- 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TWM
ISSUE DATE	10.27.2017
REVISIONS	
1	ADDENDUM NO. 1 2017/11/13

**E2-A101**  
TYPE E2 - BUILDING PLANS AND SCHEDULES (ARTS & CRAFTS)

NO.	DOOR			FRAME			DETAILS			HARDWARE SET NO.	FIRE LABEL	NOTES
	SIZE	HEIGHT	MAT'L	TYPE	MAT'L	TYPE	HEAD	JAMB	SILL			
							11/A701	8/A701	11/A701			
C1-101	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-102	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-103	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-104	5'-0"	6'-8"	WD	P4-DBL	WD	1	4/A701	12/A701	8			
C1-105	4'-0"	6'-8"	WD	P4-DBL	WD	1	4/A701	12/A701	8			
C1-107	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-108	3'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-110	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-111	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701	3		INSULATED DOOR SLAB	
C1-202	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-203	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-204	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-205	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-206	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-207	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5			
C1-208	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5			
C1-210	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5			
C1-211	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-212	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-213	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A701	7/A701	5			
C1-214	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			
C1-215	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-216	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-217	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	6			
C1-218	2'-6"	6'-8"	WD	P4	WD	1	4/A701	12/A701	4			

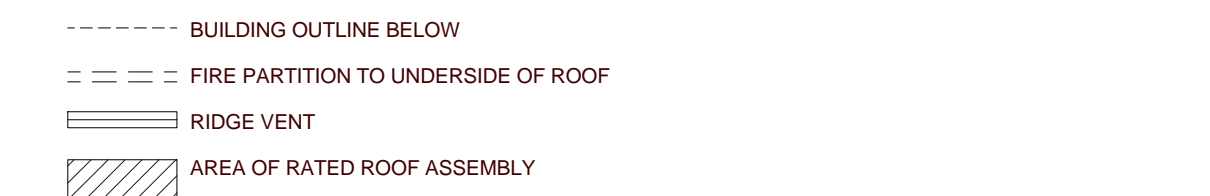
### REFLECTED CEILING PLAN LEGEND



### REFLECTED CEILING PLAN GENERAL NOTES

- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" WHERE NOT NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILING.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE STRUCTURAL SUPPORT FOR CEILING-MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A302 FOR REFLECTED CEILING PLAN LEGEND.

### ROOF PLAN LEGEND



NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK		CEILING FINISH	COMMENTS
					VERTICAL	HORIZONTAL		
C1-101	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-102	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-103	BATHROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-104	LAUNDRY	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-105	UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-106	DINING	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-107	FOYER	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-108	LIVING ROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-109	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-110	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-111	KITCHEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-112	DINING	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-201	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-202	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-203	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-204	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-205	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-206	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-207	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-208	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-209	HALL	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-210	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-211	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-212	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-213	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-214	LINEN	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-215	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-216	BATHROOM	CT	CB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-217	BEDROOM	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	
C1-218	CLOSET	VCT	RB	PNT	P.LAM1	P.LAM2	GYP./PNT	

5 TYPE C1-M SECOND FLOOR REFLECTED CEILING PLAN

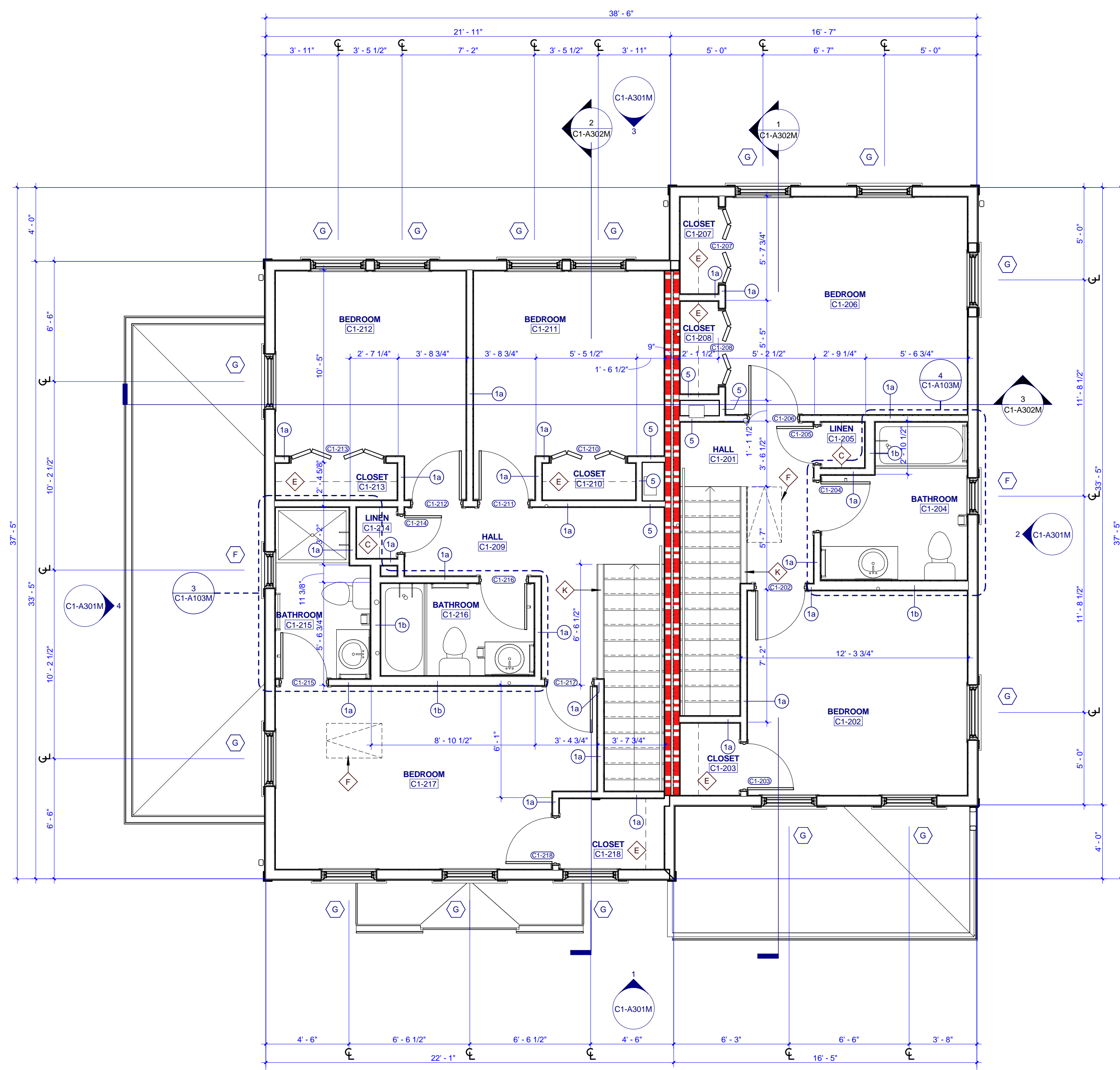
4 TYPE C1-M FIRST FLOOR REFLECTED CEILING PLAN

3 TYPE C1-M ROOF PLAN

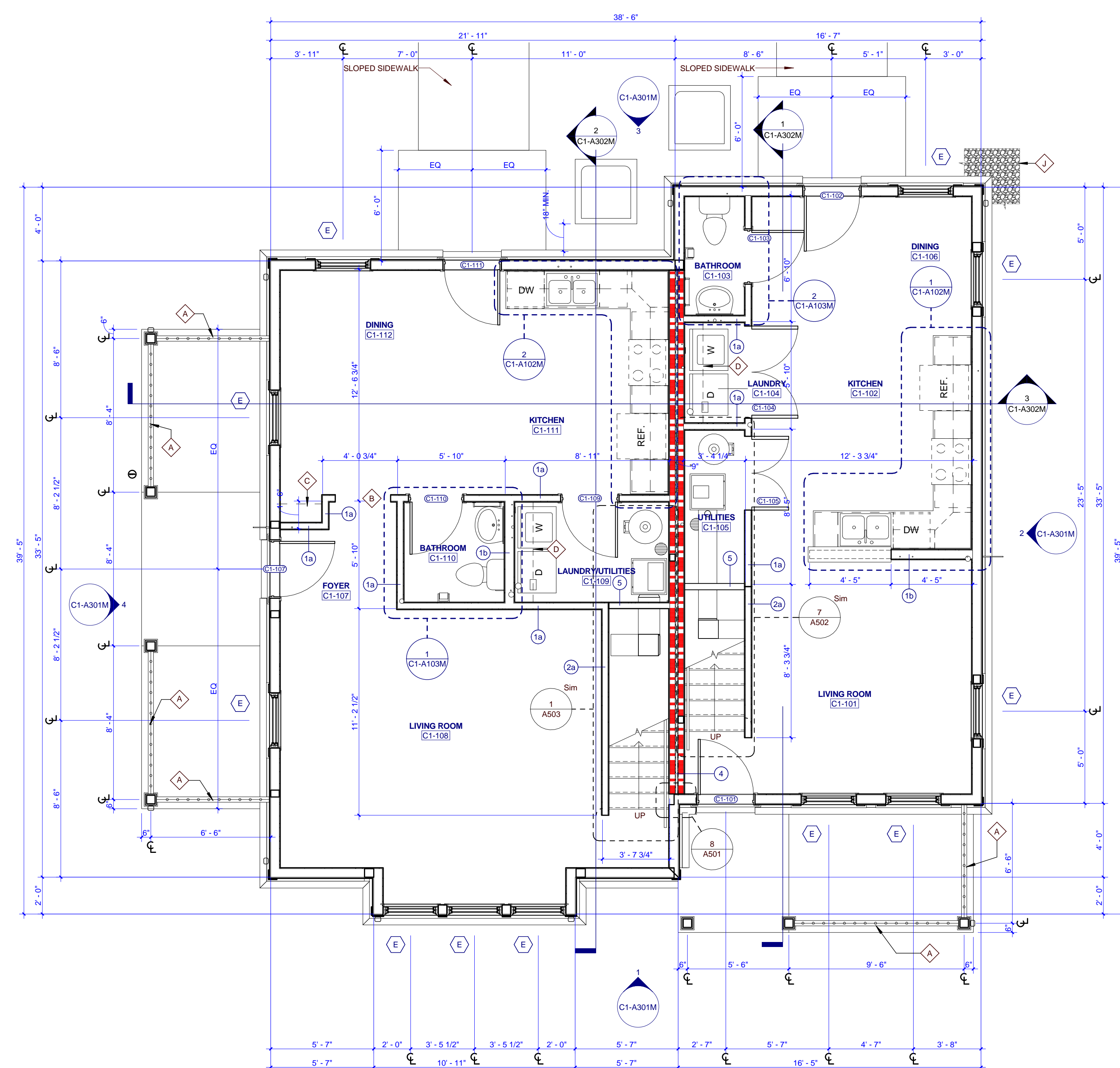
NOTE: THIS BUILDING IS A MIRROR IMAGE OF BUILDING TYPE C1 SHOWN ON SHEETS C1-A101 - C1-A302. REFER TO ORIGINAL DETAIL SHEETS AND CONSULTANT DRAWINGS FOR COORDINATION WITH MIRRORED BUILDINGS.

### FINISH LEGEND

- FLOOR FINISHES: VCT VINYL COMPOSITION TILE, CT CERAMIC TILE
- WALL BASE FINISHES: RB RUBBER BASE, CB CERAMIC BASE
- WALL FINISHES: PNT PAINT
- MILLWORK FINISHES: P.LAM1 PLASTIC LAMINATE, P.LAM2 PLASTIC LAMINATE
- CEILING FINISHES: GYP./PNT GYPSUM BOARD, PAINTED
- STAIR FINISHES: RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE



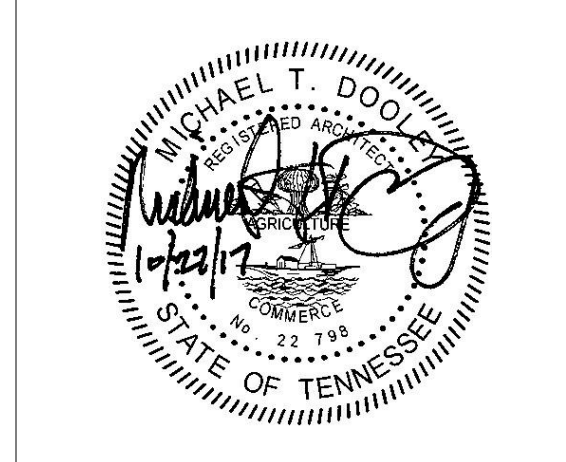
2 TYPE C1 MIRRORED SECOND FLOOR PLAN



1 TYPE C1 MIRRORED FIRST FLOOR PLAN



505 Market St Suite 300 Knoxville, TN 37902  
1 865.934.1915  
bma1915.com



PROJECT NUMBER: 166200  
PROJECT NAME: FIVE POINTS - PHASE 3  
OWNER: KNOXVILLE COMMUNITY DEVELOPMENT CORPORATION  
PROJECT ADDRESS: 304 S. KYLE STREET KNOXVILLE, TN 37915

- ### GENERAL NOTES
- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
  - NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
  - PROVIDE BLOCKING, ROUGH HARDWARE, ETC. AS REQUIRED TO MOUNT EQUIPMENT.
  - SYMBOL (I) INDICATES PARTITION TYPE. SEE SHEETS A550 FOR PARTITION TYPES.
  - ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH 1/2" LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
  - SYMBOL (W) INDICATES WINDOW TYPE. SEE SHEETS A702 FOR WINDOW ELEVATIONS AND DETAILS.
  - SYMBOL (D) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
  - ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
  - ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHERS SURFACE MOUNTED WITHIN BASE CABINET.

- ### PLAN KEYNOTES
- SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4'-0" O.C. MAX.
  - 3'-0" x 7'-0" HEIGHT OPENING.
  - 16" DEEP SHELVES, SPACED ENJOY.
  - 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-6" A.F.F.
  - 12" DEEP SHELF @ 6'-0" & ROD @ 5'-0" A.F.F.
  - ATTIC ACCESS HATCH.
  - ALIGN FACE OF WALL WITH ADJACENT WALL.
  - 4'-0" x 7'-0" HEIGHT OPENING.
  - 1/8" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING.
  - LOW WALL, 3'-6" A.F.F.
  - SHEAR WALL, REFER TO STRUCTURAL.

- ### ROOF PLAN GENERAL NOTES
- PAINT ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF SHINGLE COLOR.
  - COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS, WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
  - ALL VALLEYS TO BE CLOSED AND FLASHED.

- ### RCP KEYNOTES
- 1 HOUR FIRE RATED CEILING
  - 7'-8" A.F.F. BULKHEAD
  - 8'-8" A.F.F. BULKHEAD
  - 7'-11" A.F.F. BULKHEAD

### WALL LEGEND

(---)	UNRATED PARTITION
(---)	1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TVM
ISSUE DATE	10.27.2017

### REVISIONS

1	ADDENDUM NO. 1	2017/11/13
---	----------------	------------

C1-A101M  
TYPE C1 MIRRORED - BUILDING PLANS AND SCHEDULES (VICTORIAN)

OPENING SCHEDULE - TYPE C2												
NO.	DOOR			FRAME			DETAILS			HARDWARE SET NO.	FIRE LABEL	NOTES
	WIDTH	HEIGHT	MAT'L	TYPE	MAT'L	TYPE	HEAD	JAMB	SILL			
C2-101	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB	
C2-102	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB	
C2-103	2'-10"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-104	5'-0"	6'-8"	WD	P4-DBL	WD	1	4A/701	12/A/701	8			
C2-105	4'-0"	6'-8"	WD	P4-DBL	WD	1	4A/701	12/A/701	8			
C2-107	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB	
C2-109	3'-0"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4			
C2-110	2'-10"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-111	3'-0"	6'-8"	HM	P3-T4	HM	2	3A/701	8/A/701	3		INSULATED DOOR SLAB	
C2-202	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-203	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4			
C2-204	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-205	2'-0"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4			
C2-206	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-207	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A/701	7/A/701	5			
C2-208	4'-0"	6'-8"	WD	P4-BIF	WD	1	10/A/701	7/A/701	5			
C2-211	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-212	2'-8"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-213	5'-0"	6'-8"	WD	P4-BIF	WD	1	10/A/701	7/A/701	5			
C2-214	2'-0"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	4			
C2-215	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-216	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-217	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			
C2-218	2'-6"	6'-8"	WD	P4	WD	1	4A/701	12/A/701	6			

ROOM FINISH SCHEDULE - TYPE C2						
NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK	CEILING FINISH
					VERTICAL	HORIZONTAL
C2-101	LIVING ROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-102	KITCHEN	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-103	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-104	LAUNDRY	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-105	UTILITIES	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-106	DINING	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-107	FOYER	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-108	LIVING ROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-109	LAUNDRY/UTILITIES	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-110	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-111	KITCHEN	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-112	DINING	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-201	HALL	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-202	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-203	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-204	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-205	LINEN	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-206	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-207	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-208	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-209	HALL	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-210	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-211	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-212	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-213	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-214	LINEN	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-215	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-216	BATHROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-217	BEDROOM	VCCT	RB	PNT	P.LAM1	P.LAM2
C2-218	CLOSET	VCCT	RB	PNT	P.LAM1	P.LAM2

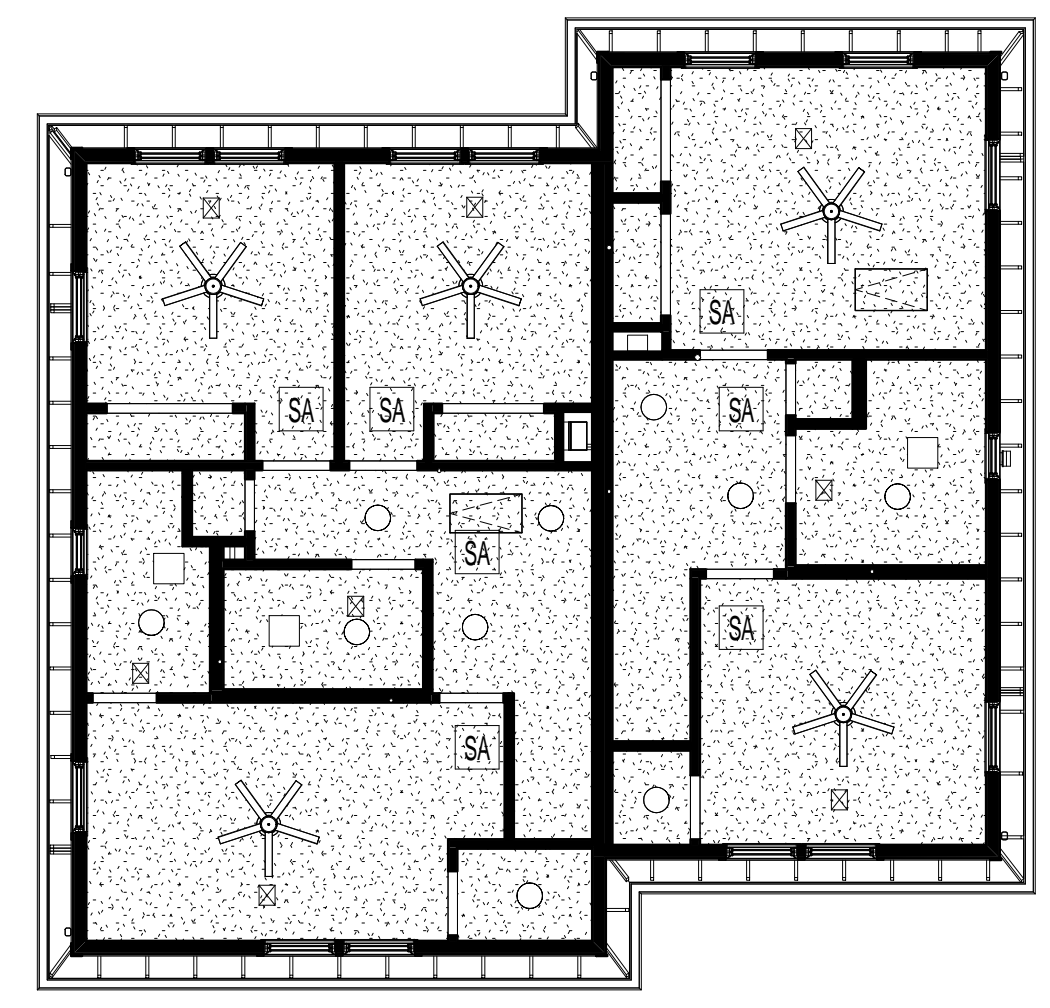
**FINISH LEGEND**

- FLOOR FINISHES
  - VCCT VINYL COMPOSITION TILE
  - CT CERAMIC TILE
- WALL BASE FINISHES
  - RB RUBBER BASE
  - CB CERAMIC BASE
- WALL FINISHES
  - PNT PAINT
- MILLWORK FINISHES
  - P.LAM1 PLASTIC LAMINATE
  - P.LAM2 PLASTIC LAMINATE
- CEILING FINISHES
  - GYP.BD. GYPSUM BOARD, PAINTED
- STAIR FINISHES
  - RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE

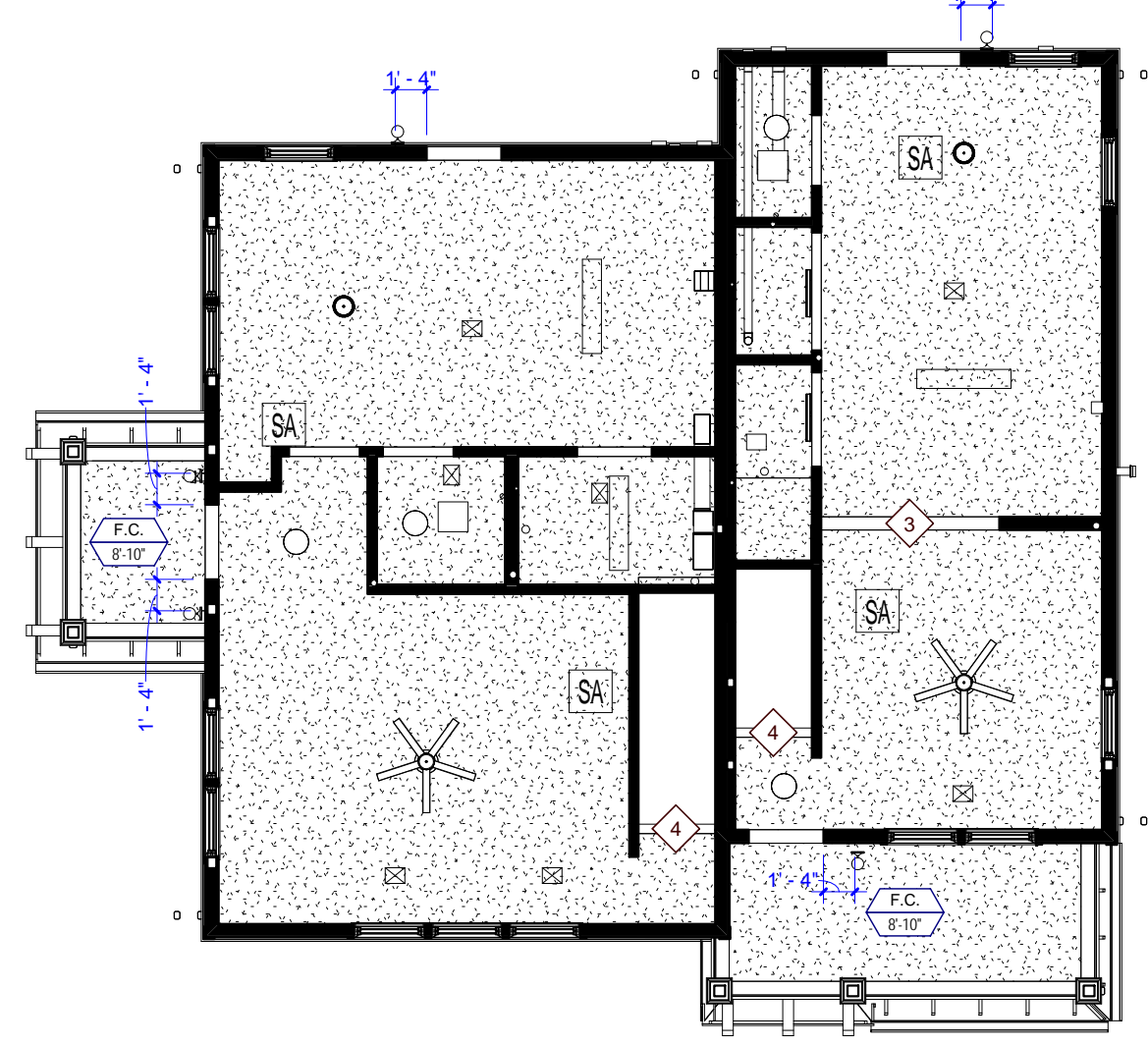
- REFLECTED CEILING PLAN LEGEND**
- GYP.SUM BOARD (INTERIOR) / FIBER CEMENT BOARD SOFFIT (EXTERIOR)
  - 1 HOUR RATED GYP.SUM BOARD
  - 1/4" FLUORESCENT LIGHT FIXTURE
  - CEILING MOUNTED LIGHT FIXTURE
  - CEILING FAN
  - EXHAUST REGISTER
  - SMOKE DETECTOR
  - SPRINKLER HEAD
  - 24" WALL MOUNTED LIGHT FIXTURE
  - SUPPLY REGISTER
  - ATTIC ACCESS HATCH
- \* CENTER LIGHT FIXTURES IN ROOMS UNLESS NOTED OTHERWISE; ADJUST LOCATION OF SPRINKLER HEADS TO WORK WITH CENTER OF LIGHT FIXTURE.

- REFLECTED CEILING PLAN GENERAL NOTES**
- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
  - NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
  - CEILING HEIGHT SHALL BE 8'-0" UNLESS NOTED OTHERWISE.
  - EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILINGS.
  - SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
  - PROVIDE STRUCTURAL SUPPORT FOR CEILING-MOUNTED EQUIPMENT AS REQUIRED.
  - PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
  - REFER TO SHEET A202 FOR REFLECTED CEILING PLAN LEGEND.

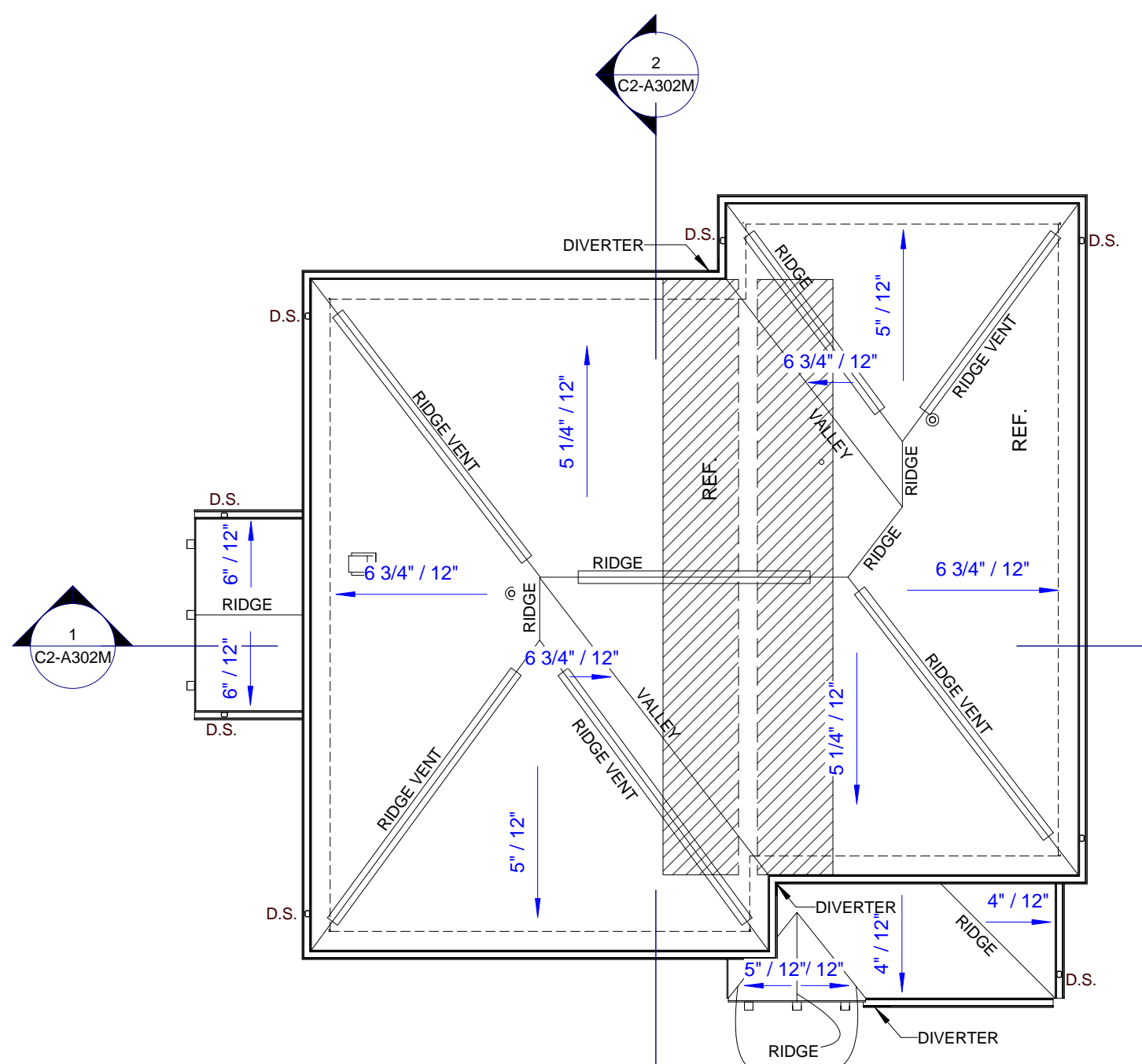
- ROOF PLAN LEGEND**
- BUILDING OUTLINE BELOW
  - FIRE PARTITION TO UNDERSIDE OF ROOF
  - RIDGE VENT
  - AREA OF RATED ROOF ASSEMBLY



5 TYPE C2-M SECOND FLOOR REFLECTED CEILING PLAN

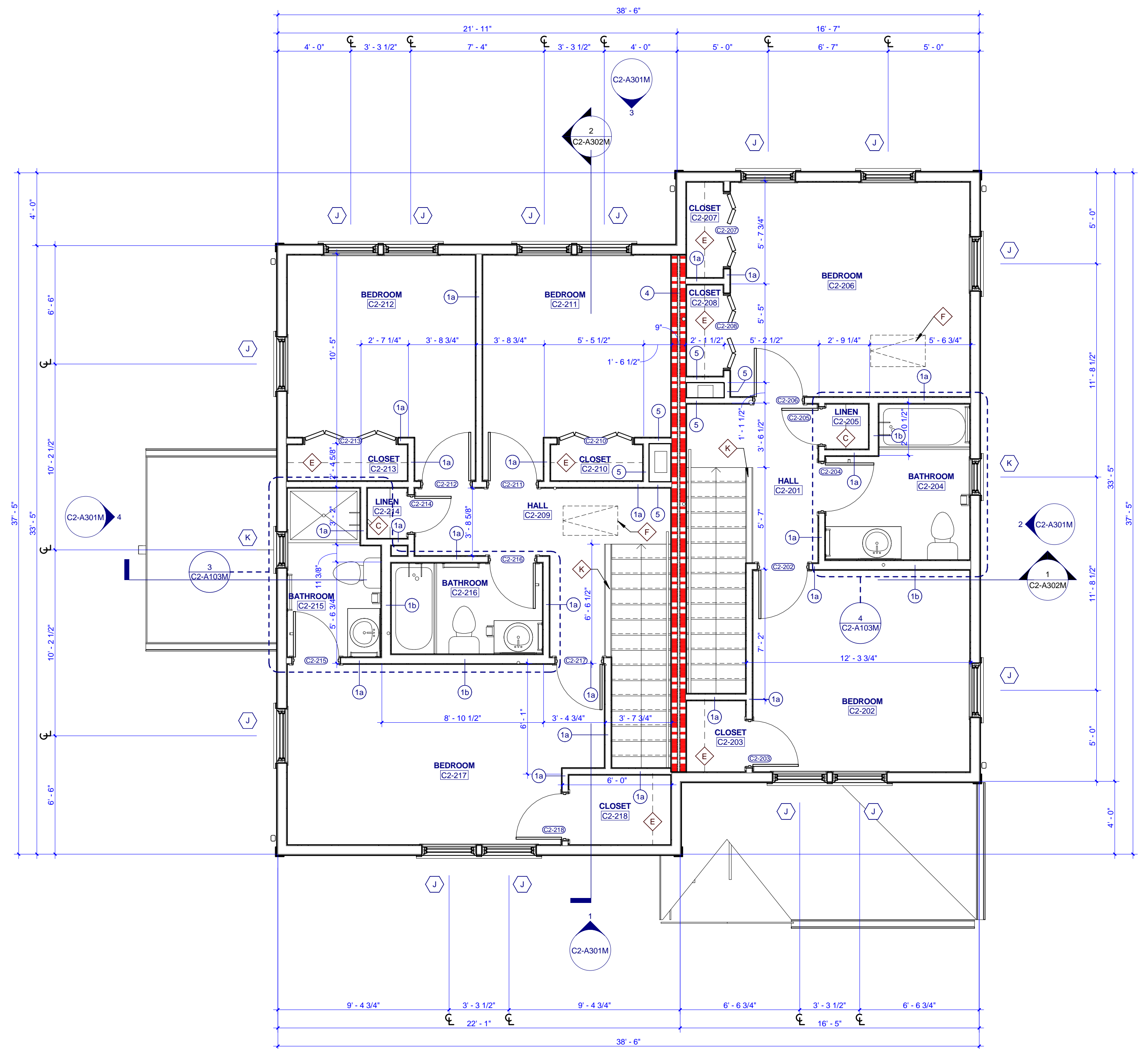


4 TYPE C2-M FIRST FLOOR REFLECTED CEILING PLAN

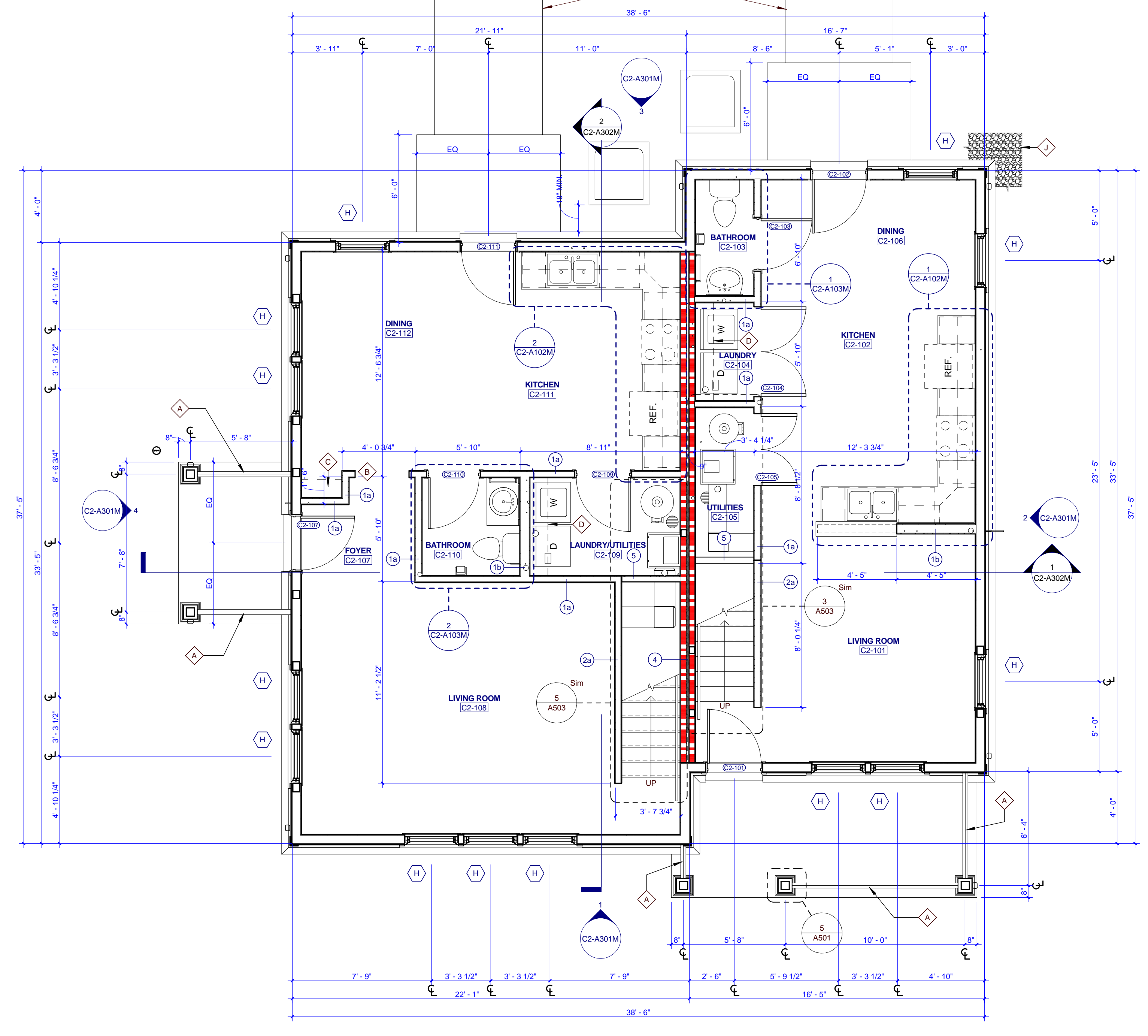


3 TYPE C2-M ROOF PLAN

NOTE: THIS BUILDING IS A MIRROR IMAGE OF BUILDING TYPE C2 SHOWN ON SHEETS C2-A101 - C2-A302. REFER TO ORIGINAL DETAIL SHEETS AND CONSULTANT DRAWINGS FOR COORDINATION WITH MIRRORED BUILDINGS.



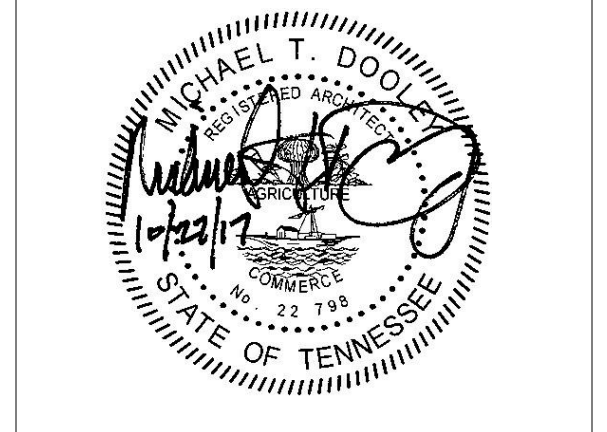
2 TYPE C2 MIRRORED SECOND FLOOR PLAN



1 TYPE C2 MIRRORED FIRST FLOOR PLAN

**oma**  
BARBERMcMURRY  
architects since 1915

505 Market St Suite 300 Knoxville, TN 37902  
1.865.934.1915  
bma1915.com



PROJECT NUMBER  
166200

PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION

PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915

- GENERAL NOTES**
- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
  - NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
  - PROVIDE BLOCKING, ROUGH HARDWARE, ETC. AS REQUIRED TO MOUNT EQUIPMENT.
  - SYMBOL (1) INDICATES PARTITION TYPE. SEE SHEETS A500 FOR PARTITION TYPES.
  - ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH A LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
  - SYMBOL (2) INDICATES WINDOW TYPE. SEE SHEETS A702 FOR WINDOW ELEVATIONS AND DETAILS.
  - SYMBOL (3) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
  - ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
  - ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHER SURFACE MOUNTED WITHIN BASE CABINET.

- PLAN KEYNOTES**
- SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4'-0" C.C. MAX.
  - 3'-0" x 7'-0" HEIGHT OPENING
  - 14" DEEP SHELVES, SPACED EVENLY
  - 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-6" A.F.F.
  - 12" DEEP SHELF @ 6'-0" & RDR @ 5'-0" A.F.F.
  - ATTIC ACCESS HATCH
  - ALIGN FACE OF WALL WITH ADJACENT WALL PERIMETER OF BUILDING
  - 1/8" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING
  - LOW WALL 3'-6" A.F.F.
  - SHEAR WALL REFER TO STRUCTURAL

- ROOF PLAN GENERAL NOTES**
- PAINT ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF SHINGLE COLOR.
  - COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS. WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
  - ALL VALLEYS TO BE CLOSED AND FLASHED

- RCP KEYNOTES**
- 1 HOUR FIRE RATED CEILING
  - 2'-8" A.F.F. BULKHEAD
  - 3'-8" A.F.F. BULKHEAD
  - 4'-7"-11" A.F.F. BULKHEAD

- WALL LEGEND**
- UNRATED PARTITION
  - 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TVM
ISSUE DATE	10.27.2017
REVISIONS	
1	ADDENDUM NO. 1 2017/11/13

**C2-A101M**  
TYPE C2 MIRRORED - BUILDING PLANS AND SCHEDULES (ARTS & CRAFTS)

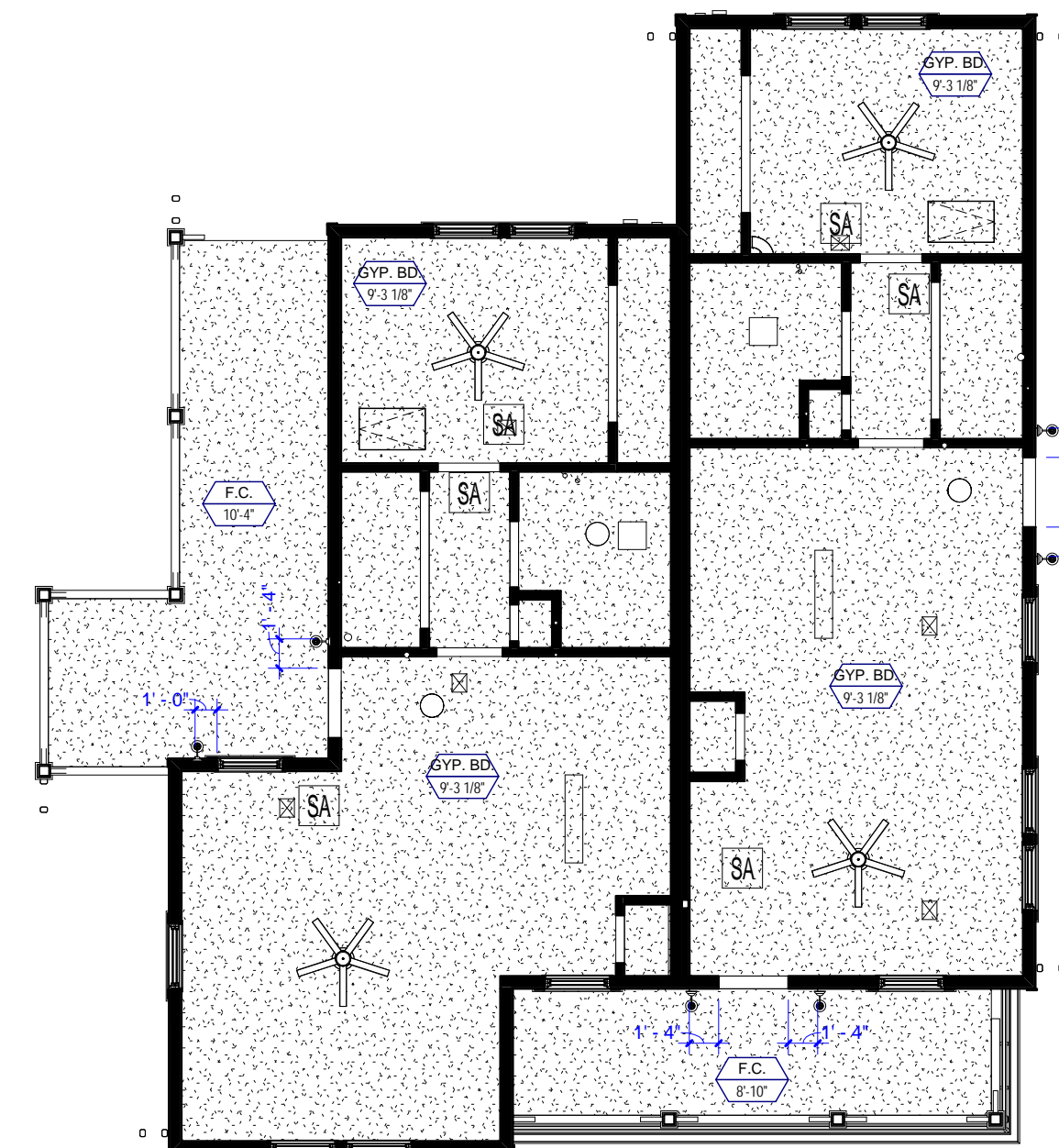
OPENING SCHEDULE - TYPE E1												
NO.	DOOR			FRAME			DETAILS			HARDWARE SET NO.	FIRE LABEL	NOTES
	WIDTH	HEIGHT	MAT'L	MAT'L	TYPE	HEAD	JAMB	SILL				
E1-101A	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701		3		INSULATED DOOR SLAB
E1-101B	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701		3		INSULATED DOOR SLAB
E1-102	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-103	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701		5		
E1-104	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-105	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6		
E1-106	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701		4		
E1-107	3'-0"	6'-8"	HM	P3-T2	HM	2	11/A701	8/A701		3		INSULATED DOOR SLAB
E1-108	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701		4		
E1-109	1'-6"	6'-8"	WD	P2	WD	1	4/A701	12/A701		4		
E1-110	2'-10"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6		
E1-111	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-112	2'-8"	6'-8"	WD	P4	WD	1	4/A701	12/A701		6		
E1-113	6'-0"	6'-8"	WD	P4-BIF	WD	1	4/A701	12/A701		5		
E1-114	2'-0"	6'-8"	WD	P4	WD	1	4/A701	12/A701		4		

ROOM FINISH SCHEDULE - TYPE E1								
NUMBER	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH	MILLWORK	HORIZONTAL	CEILING FINISH	COMMENTS
E1-101	KITCHEN/LIVING ROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-102	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-103	BEDROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-104	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-105	BATHROOM	CT	CB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-106	LINEN	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-107	KITCHEN/LIVING ROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-108	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-109	LINEN	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-110	BATHROOM	CT	CB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-111	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-112	BEDROOM	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-113	LAUNDRY/UTILITIES	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	
E1-114	CLOSET	VCT	RB	PNT	P.LAM	P.LAM	GYP./PNT	

FINISH LEGEND	
FLOOR FINISHES	VCT VINYL COMPOSITION TILE
	CT CERAMIC TILE
WALL BASE FINISHES	RB RUBBER BASE
	CB CERAMIC BASE
WALL FINISHES	PNT PAINT
MILLWORK FINISHES	P.LAM PLASTIC LAMINATE
	P.LAM2 PLASTIC LAMINATE
CEILING FINISHES	GYP.BD. GYPSUM BOARD, PAINTED
STAIR FINISHES	RUBBER STAIR TREAD WITH RISER - TEXTURE: RAISED SQUARE

### REFLECTED CEILING PLAN GENERAL NOTES

- COORDINATE WITH APPLICABLE NOTES AND DIMENSIONS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- CEILING HEIGHT SHALL BE 8'-0" WHERE NOT NOTED OTHERWISE.
- EXTEND WALL CONSTRUCTION TO DECK IN AREAS WITHOUT FINISHED CEILINGS.
- SEE FIRE PROTECTION SHEETS FOR SPRINKLER HEAD LOCATIONS AND ELECTRICAL SHEETS FOR SMOKE DETECTOR LOCATIONS.
- PROVIDE STRUCTURAL SUPPORT FOR CEILING MOUNTED EQUIPMENT AS REQUIRED.
- PROVIDE BULKHEAD ABOVE WALL CABINETS TO CEILING TYPICALLY.
- REFER TO SHEET A202 FOR REFLECTED CEILING PLAN LEGEND.



3 TYPE E1-M REFLECTED CEILING PLAN

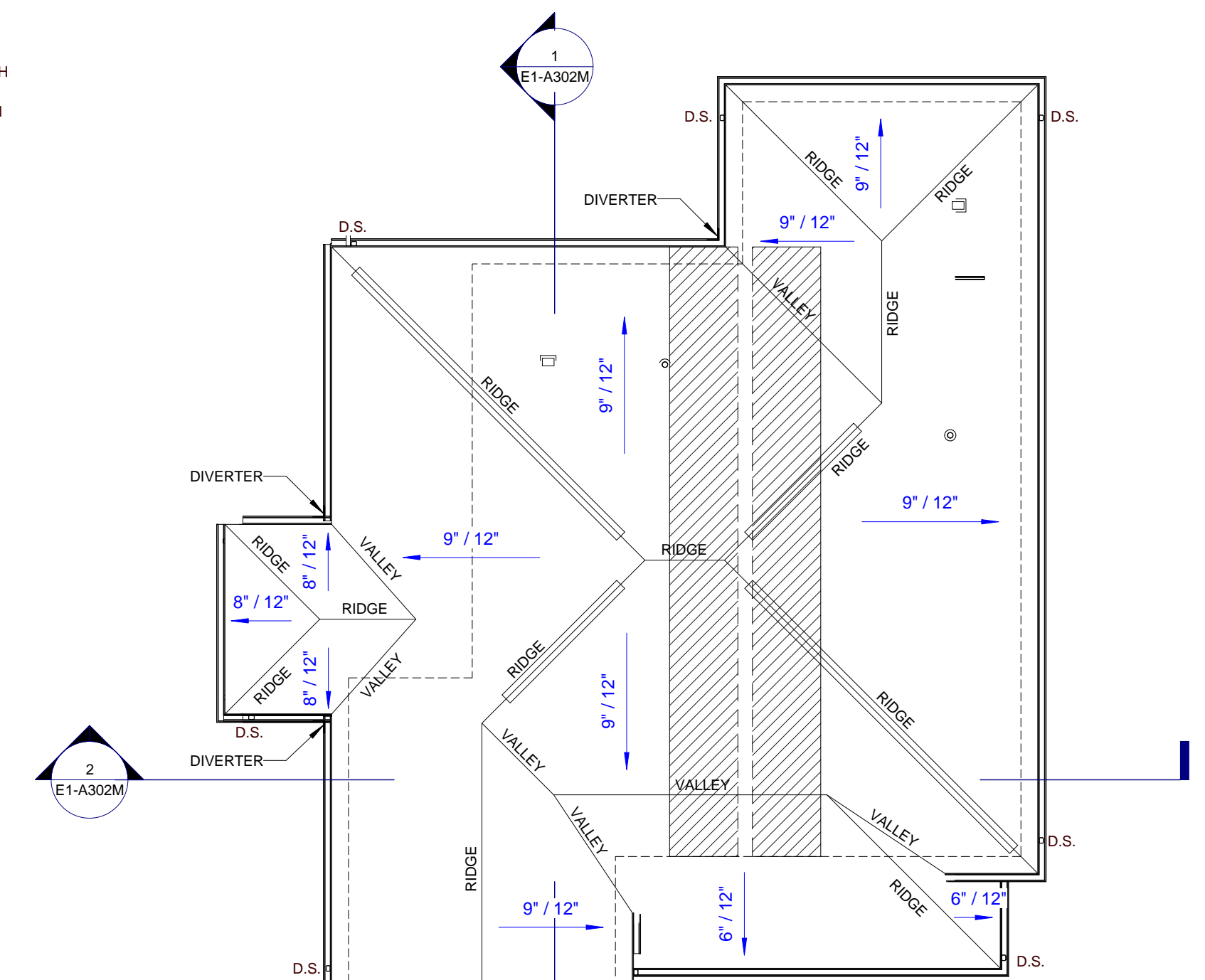
### REFLECTED CEILING PLAN LEGEND

- GYPSUM BOARD (INTERIOR)
- FIBER CEMENT BOARD (EXTERIOR)
- 1 HOUR RATED GYPSUM BOARD
- 1x4 FLUORESCENT LIGHT FIXTURE
- CEILING MOUNTED LIGHT FIXTURE
- CEILING FAN
- EXHAUST REGISTER
- SMOKE DETECTOR
- SPRINKLER HEAD
- 3x3 WALL MOUNTED LIGHT FIXTURE
- SUPPLY REGISTER
- ATTIC ACCESS HATCH

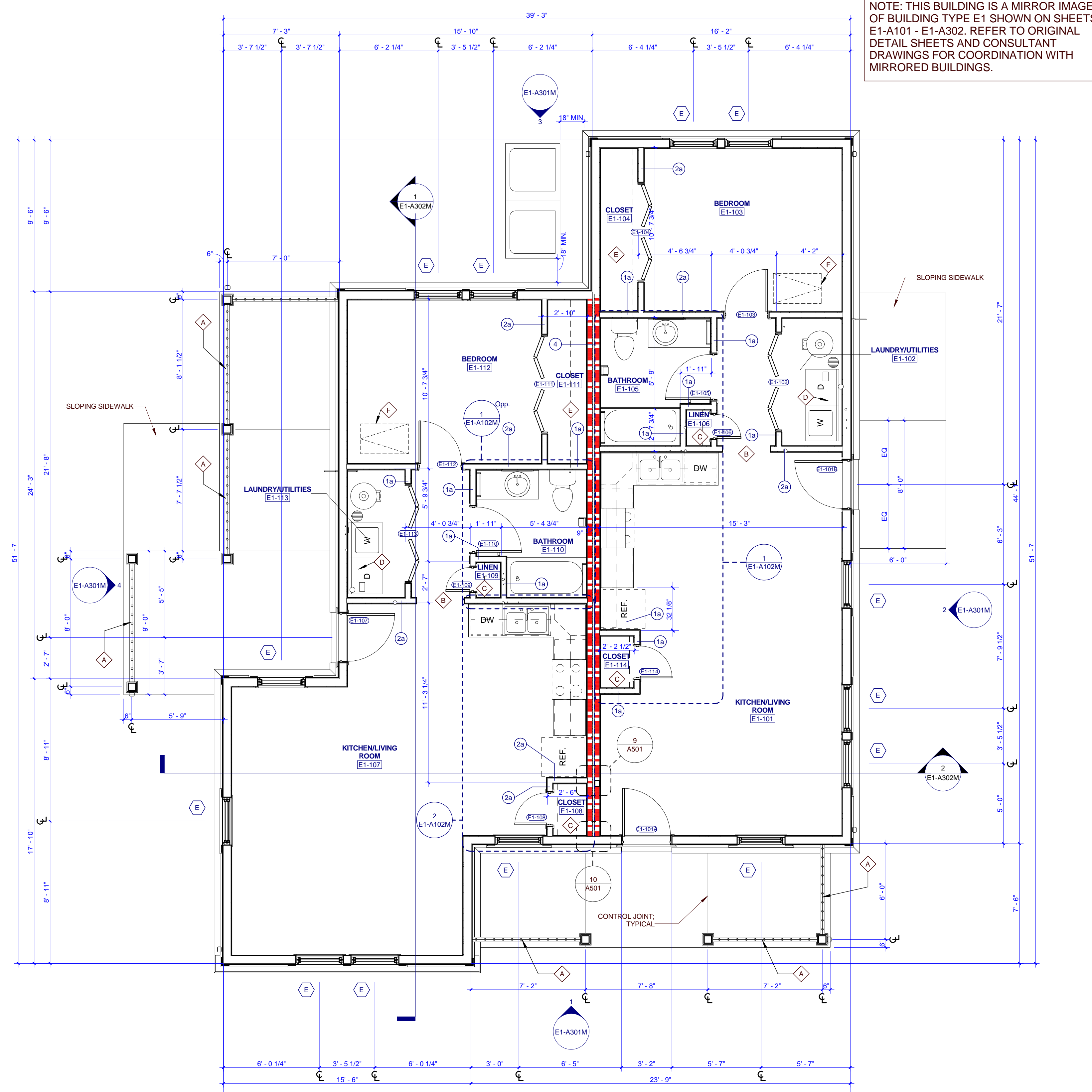
\* CENTER LIGHT FIXTURES IN ROOMS UNLESS NOTED OTHERWISE. ADJUST LOCATION OF SPRINKLER HEADS TO WORK WITH CENTER OF LIGHT FIXTURE.

### ROOF PLAN LEGEND

- BUILDING OUTLINE BELOW
- FIRE PARTITION TO UNDERSIDE OF ROOF
- RIDGE VENT
- AREA OF RATED ROOF ASSEMBLY



2 TYPE E1-M ROOF PLAN

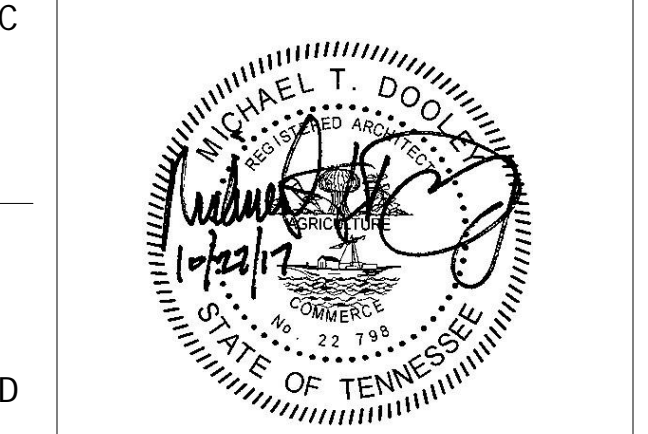


1 TYPE E1 MIRRORED FLOOR PLAN

NOTE: THIS BUILDING IS A MIRROR IMAGE OF BUILDING TYPE E1 SHOWN ON SHEETS E1-A101 - E1-A302. REFER TO ORIGINAL DETAIL SHEETS AND CONSULTANT DRAWINGS FOR COORDINATION WITH MIRRORED BUILDINGS.



505 Market St Suite 300 Knoxville, TN 37902  
1 865.934.1915



PROJECT NUMBER  
166200

PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE COMMUNITY DEVELOPMENT CORPORATION

PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915

### GENERAL NOTES

- COORDINATE WITH APPLICABLE DIMENSIONS AND DETAILS ON OTHER SHEETS.
- NOTES AND DETAILS ARE TYPICALLY APPLICABLE TO SIMILAR ITEMS ELSEWHERE ON THE SHEET.
- PROVIDE BLOCKING, ROUGH HARDWARE, ETC., AS REQUIRED TO MOUNT EQUIPMENT.
- SYMBOL (D) INDICATES PARTITION TYPE. SEE SHEETS A202 FOR PARTITION TYPES.
- ALL INTERIOR PARTITIONS TO BE 2x4 WOOD STUD CONSTRUCTION WITH (1) LAYER OF 5/8" GYPSUM BOARD, EACH SIDE, UNLESS NOTED OTHERWISE.
- SYMBOL (W) INDICATES WINDOW TYPE. SEE SHEETS A202 FOR WINDOW ELEVATIONS AND DETAILS.
- SYMBOL (D) INDICATES DOOR. SEE A701 FOR OPENING SCHEDULE.
- ALL CEILINGS TO BE 8'-0" A.F.F. UNLESS NOTED OTHERWISE.
- ALL KITCHEN SINKS TO HAVE FIRE EXTINGUISHERS SURFACE MOUNTED WITHIN BASE CABINET.

### PLAN KEYNOTES

- A. SECURE PORCH RAILING TO CONCRETE PORCH SLAB @ 4" O.C. MAX.
- B. 3'-0" x 7'-0" HEIGHT OPENING
- C. (4) 16" DEEP SHELVES, SPACED EVENLY
- D. 12" DEEP SHELF ABOVE WASHER & DRYER @ 5'-6" A.F.F.
- E. 12" DEEP SHELF @ 6'-0" & ROD @ 5'-0" A.F.F.
- F. ATTIC ACCESS HATCH
- G. ALONG FACE OF WALL WITH ADJACENT WALL
- H. 4'-0" x 7'-0" HEIGHT OPENING
- I. 18" WIDE GRAVEL BED BORDER AROUND PERIMETER OF BUILDING
- K. LOW WALL, 3'-6" A.F.F.
- L. SHEAR WALL, REFER TO STRUCTURAL

### ROOF PLAN GENERAL NOTES

- PAIN ALL ROOF VENTS AND PENETRATIONS TO MATCH ASPHALT ROOF SHINGLE COLOR.
- COORDINATE DOWNSPOUT DISCHARGE WITH CIVIL DRAWINGS. WHERE NOT TAKEN TO STORM SEWER, PROVIDE SPLASH BLOCK.
- ALL VALLEYS TO BE CLOSED AND FLASHED.

### RCP KEYNOTES

- 1 HOUR FIRE RATED CEILING
- 2'-7" A.F.F. BULKHEAD
- 3'-6" A.F.F. BULKHEAD
- 4'-7"-11" A.F.F. BULKHEAD

### WALL LEGEND

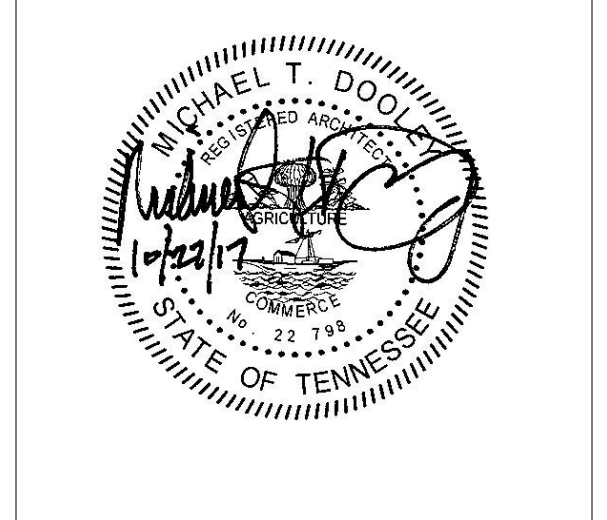
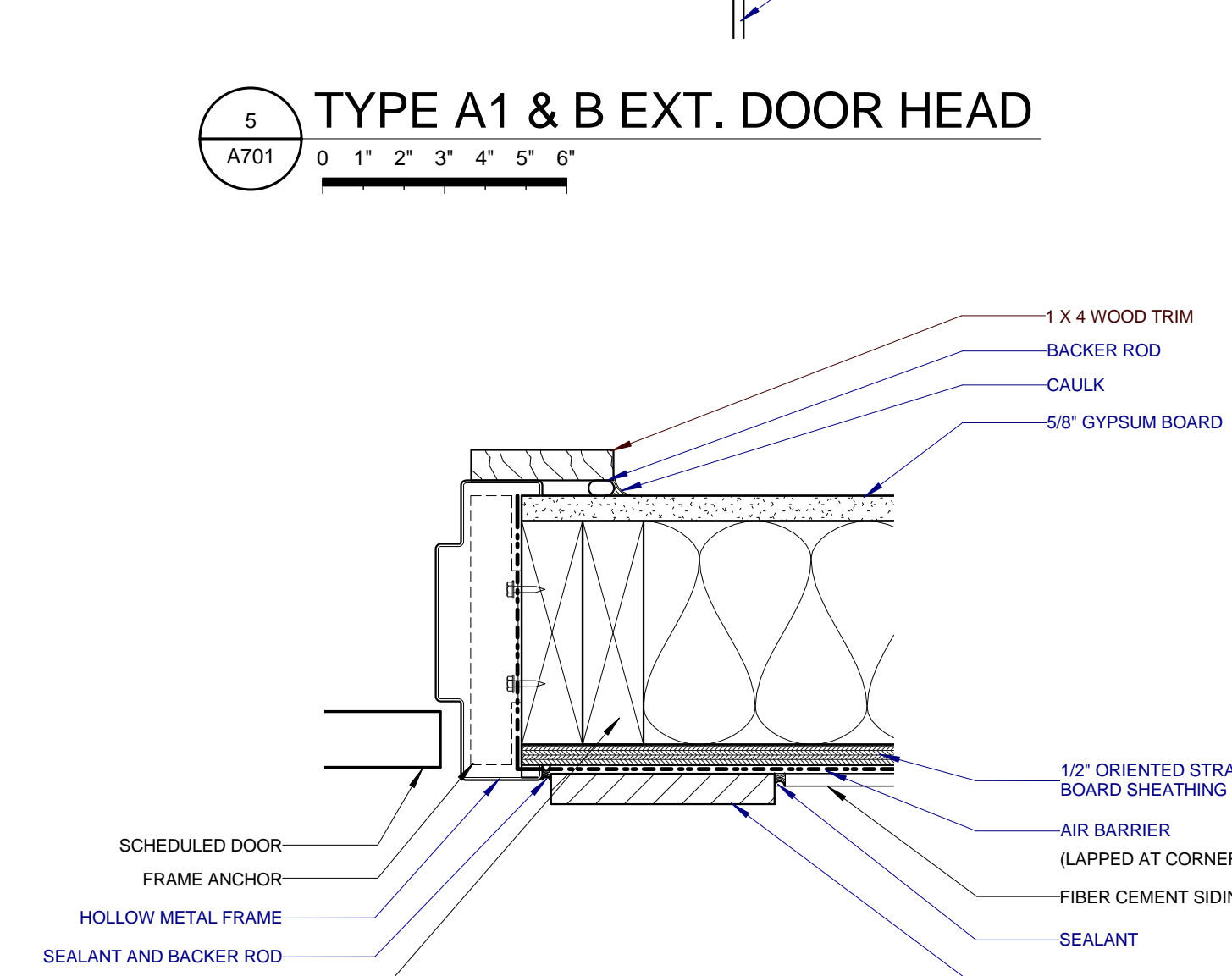
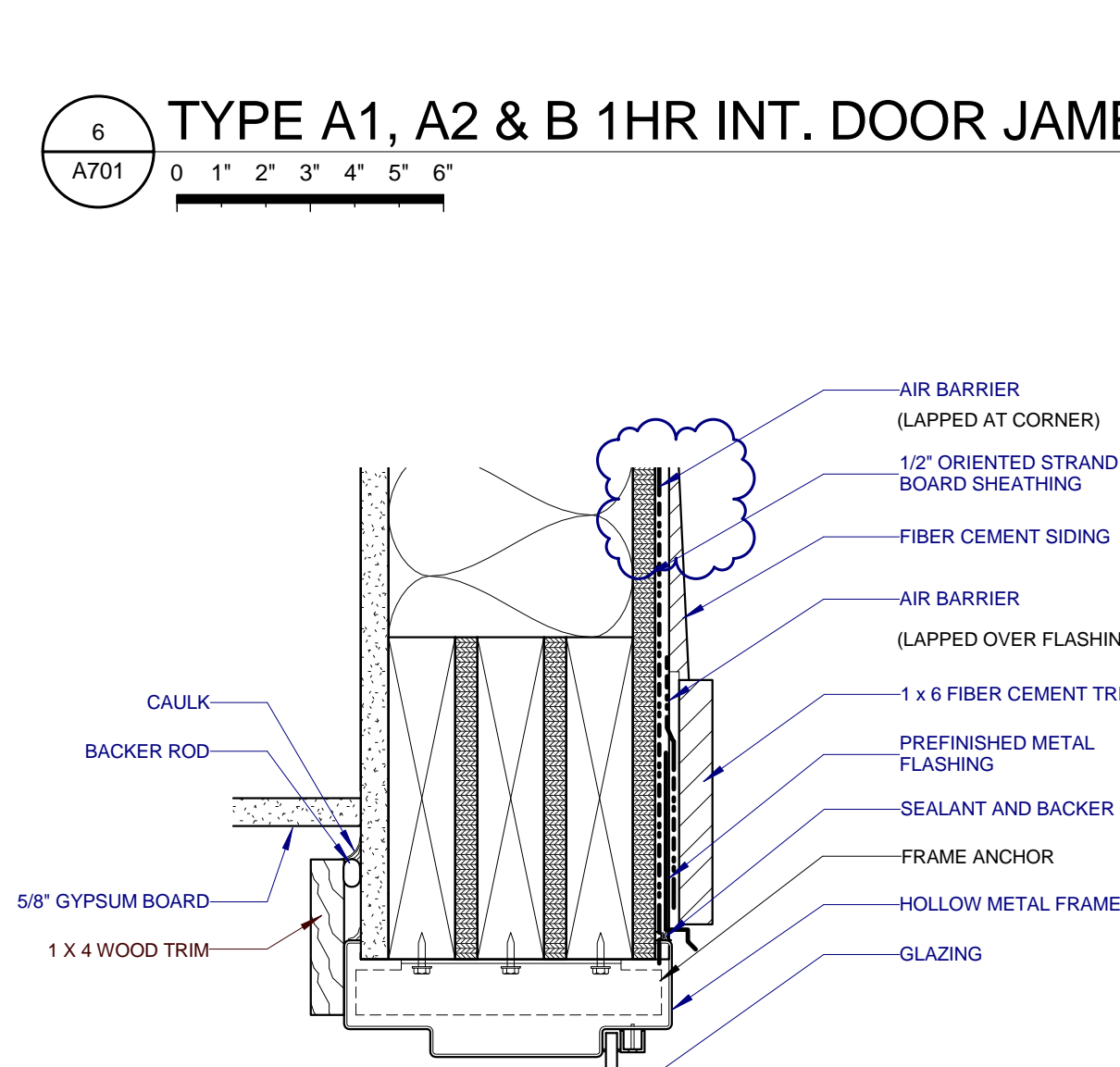
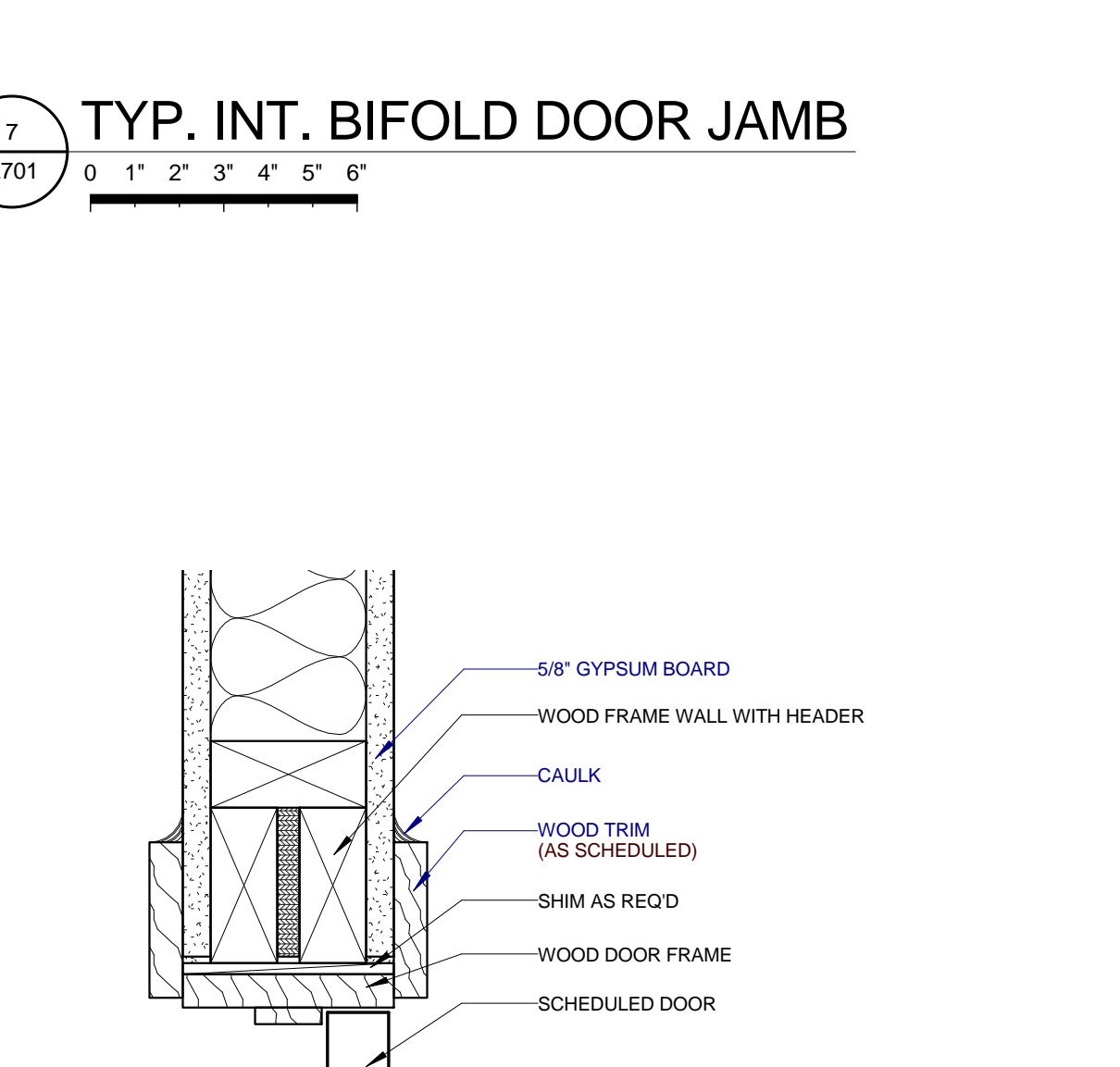
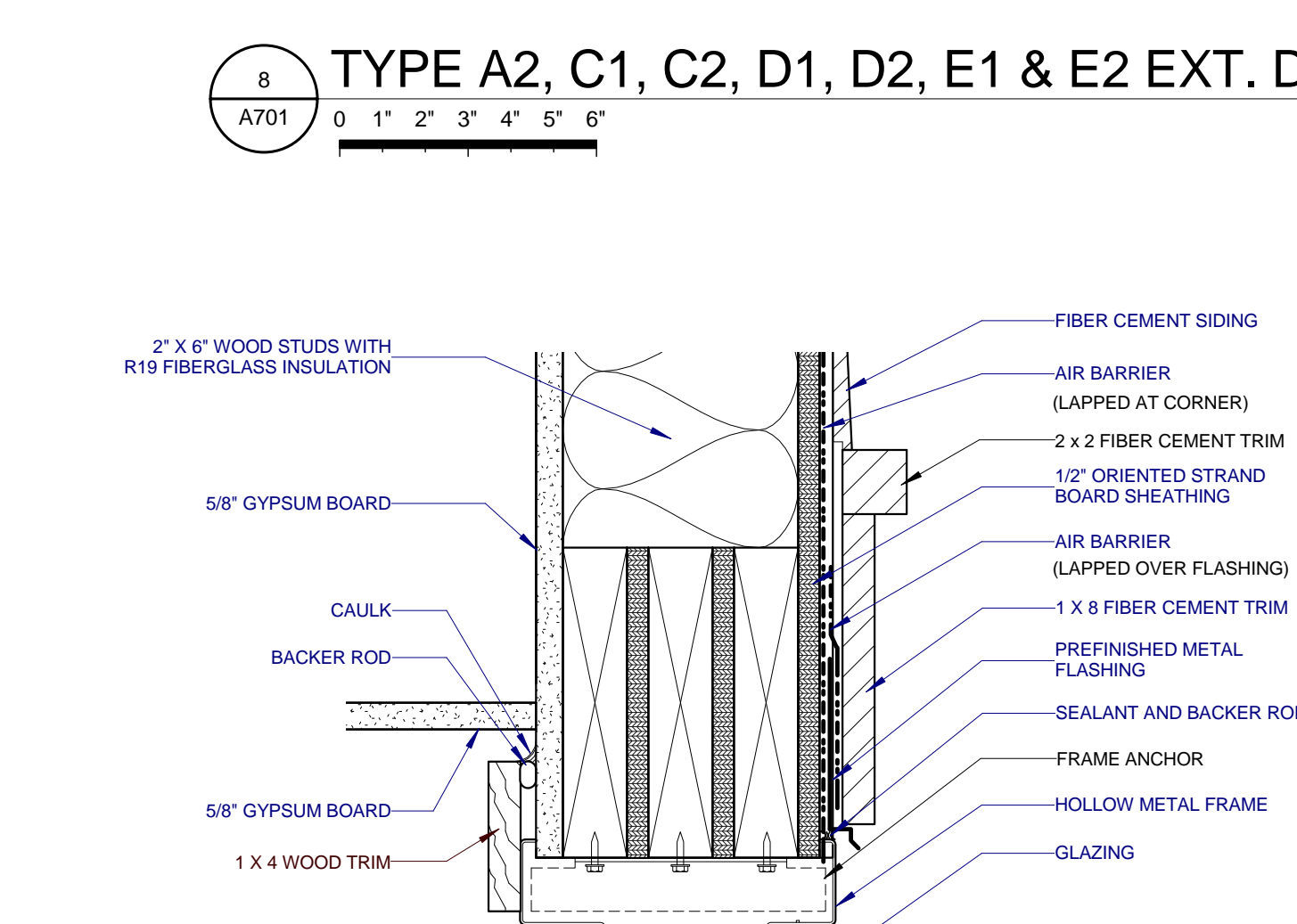
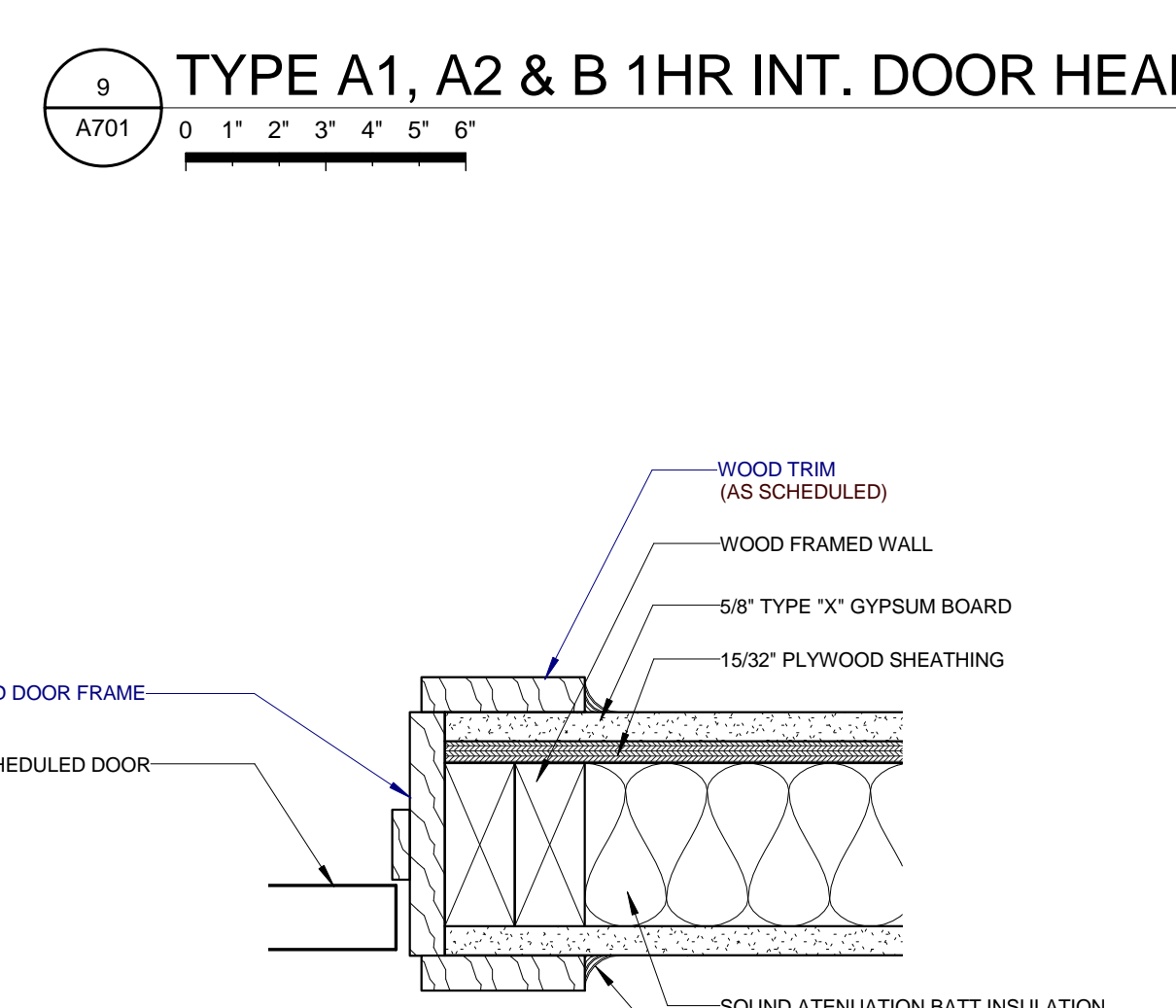
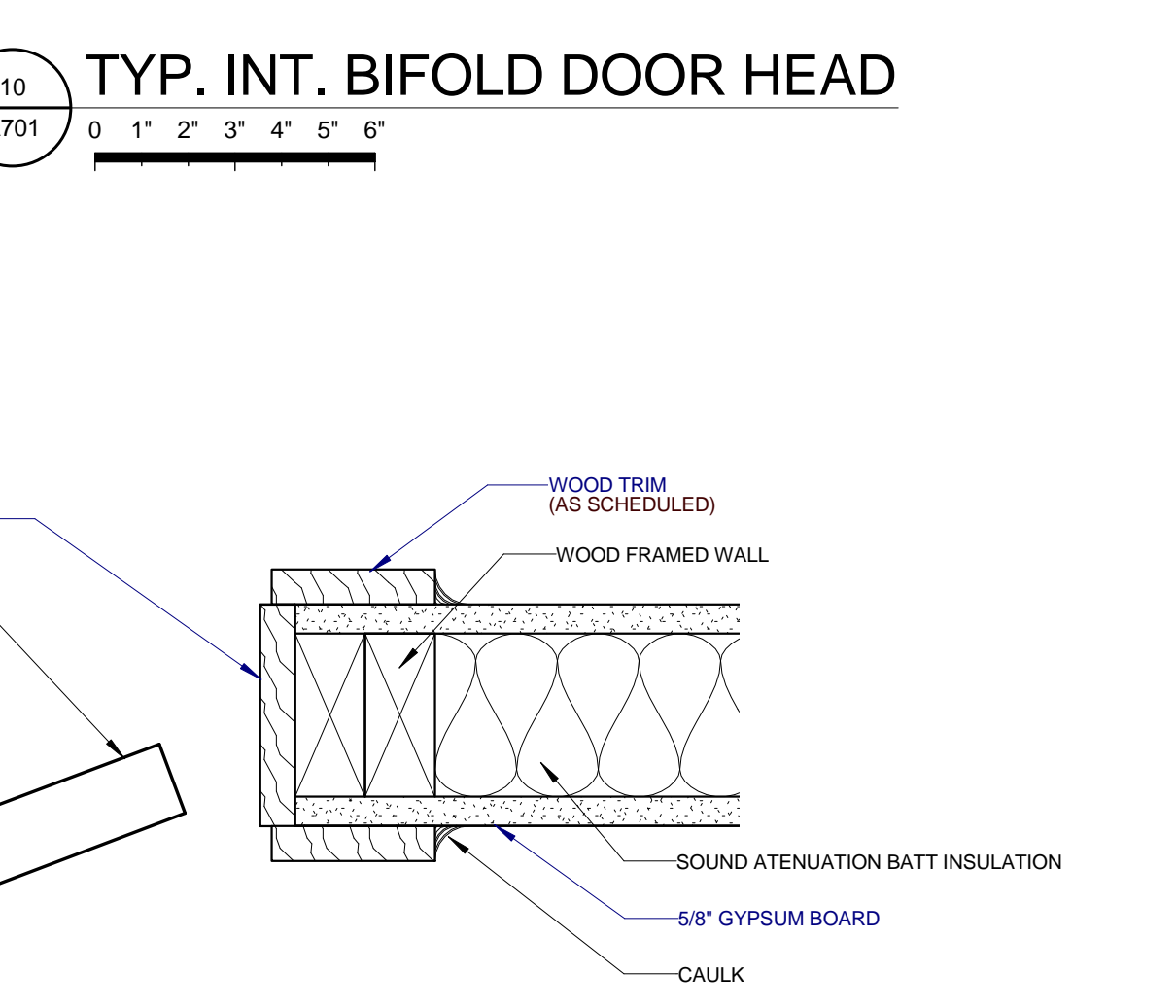
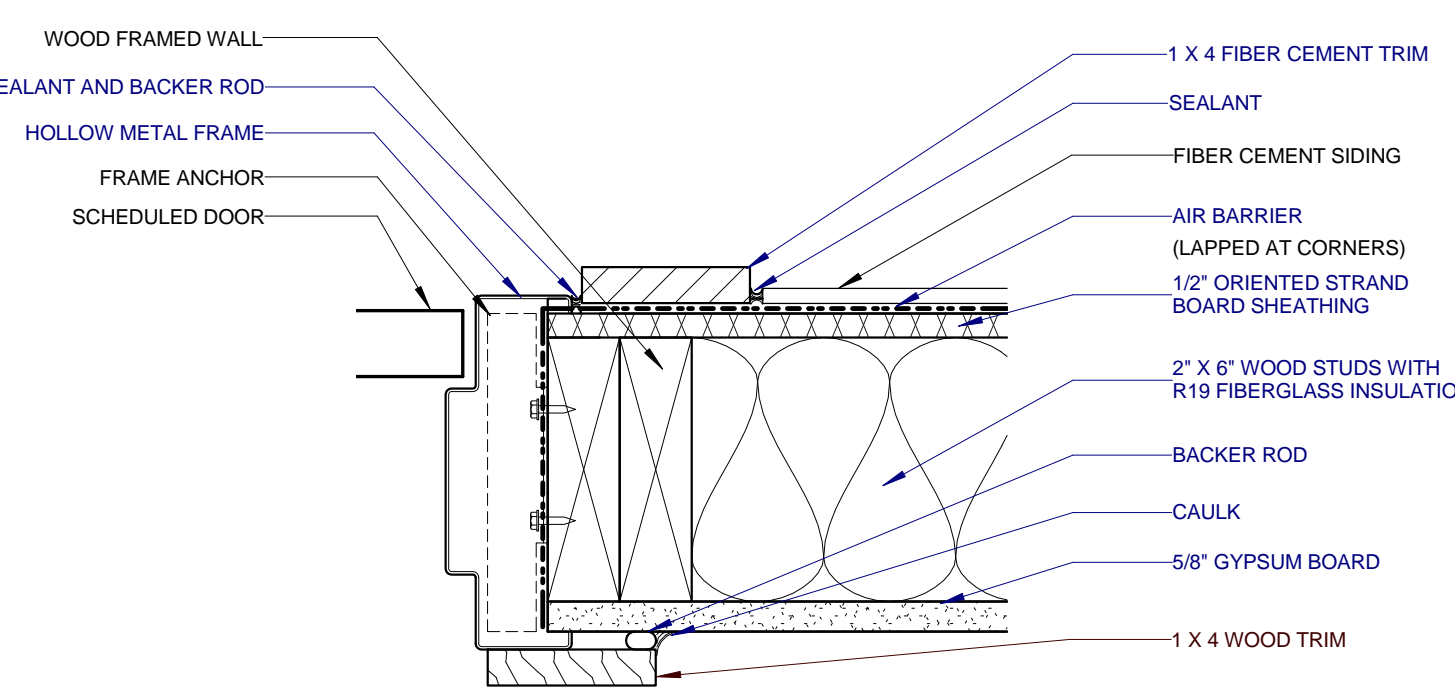
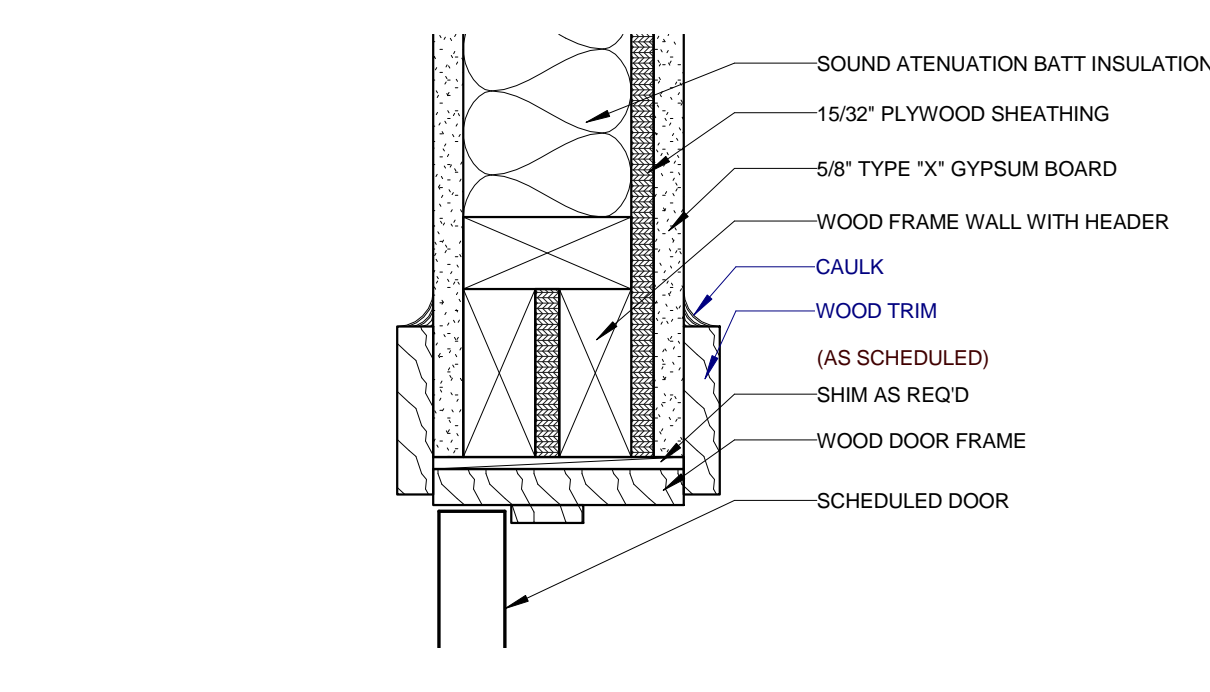
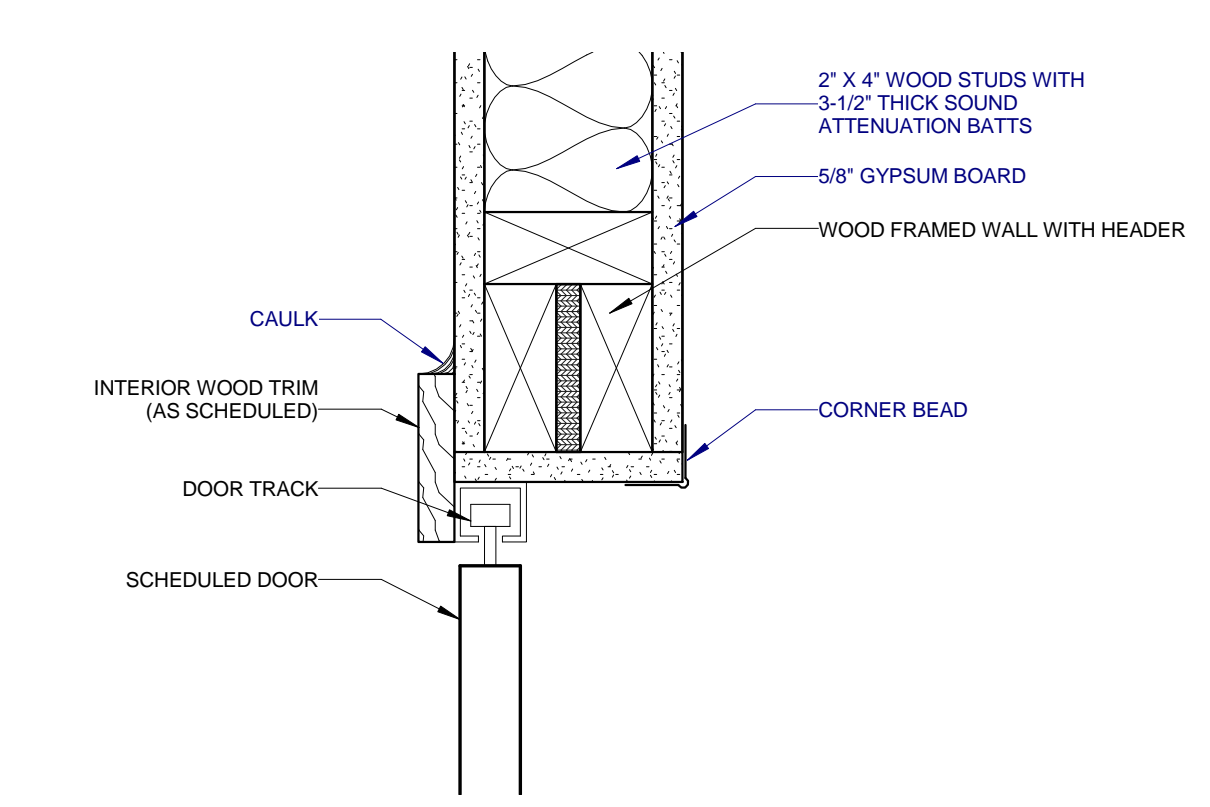
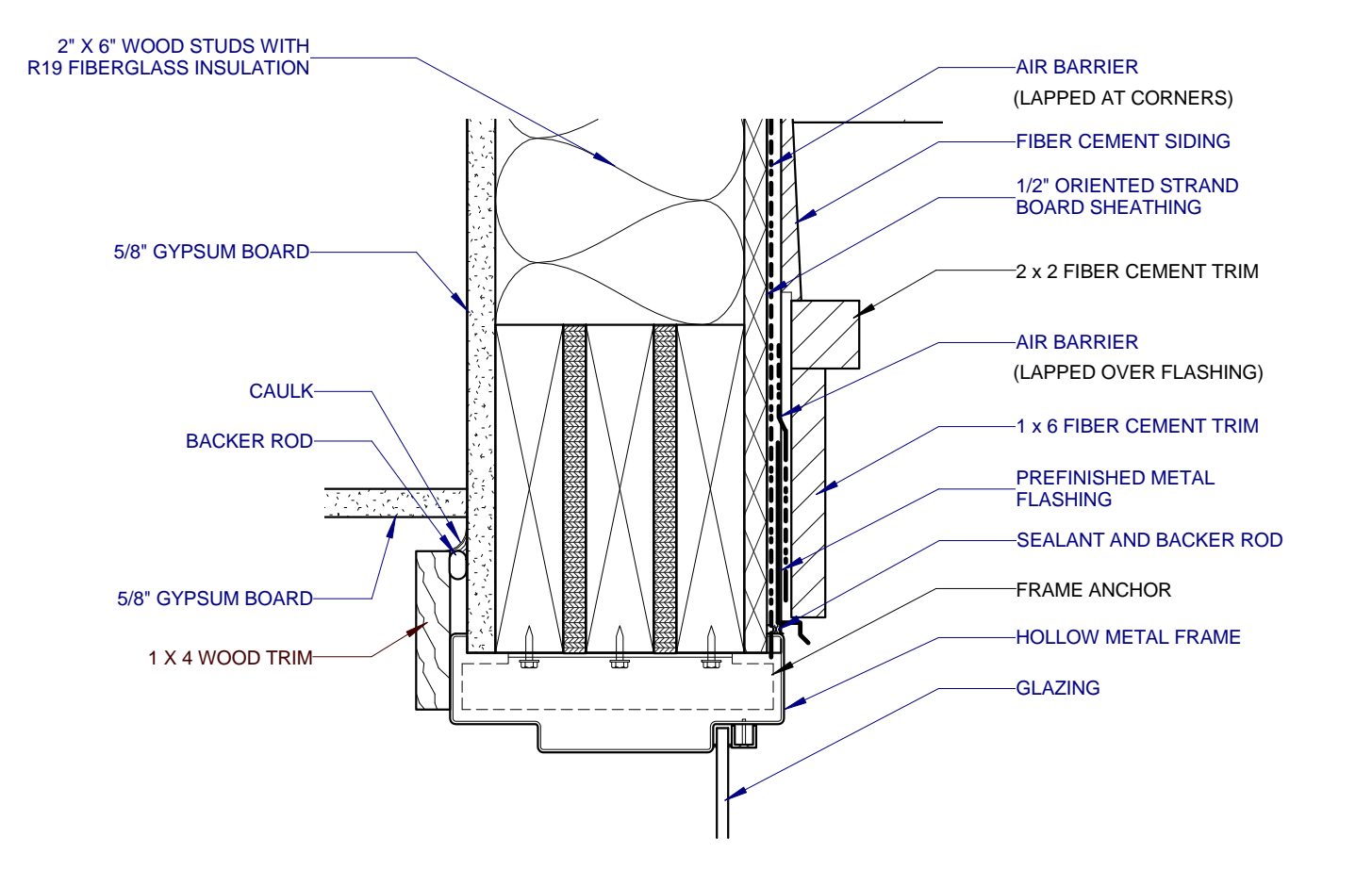
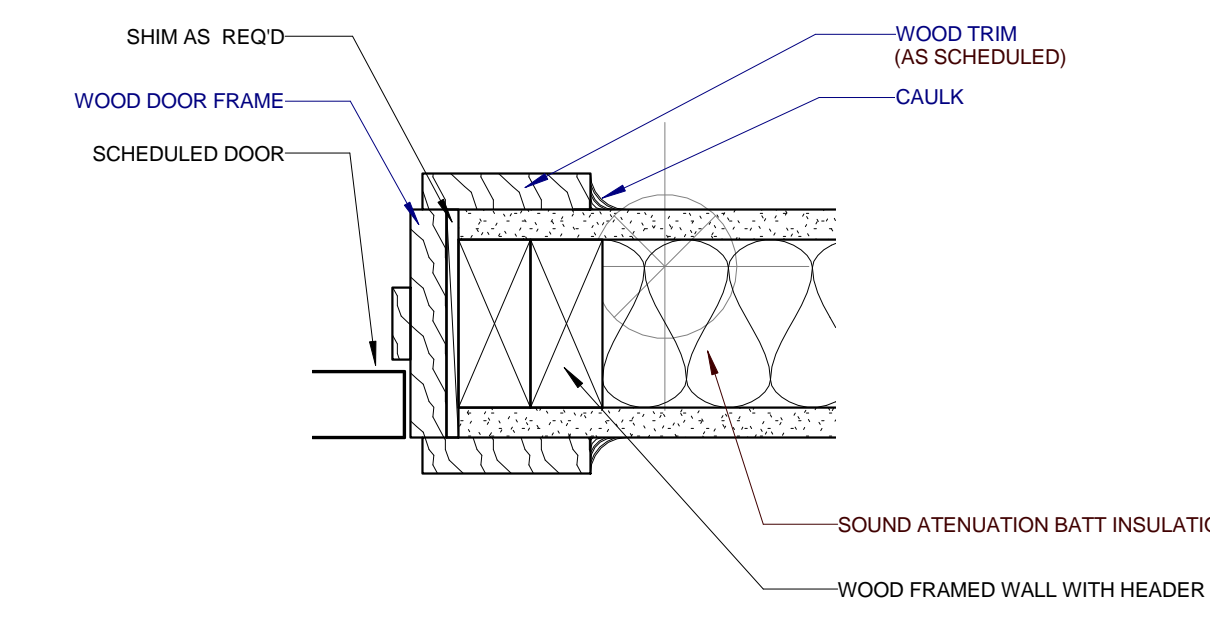
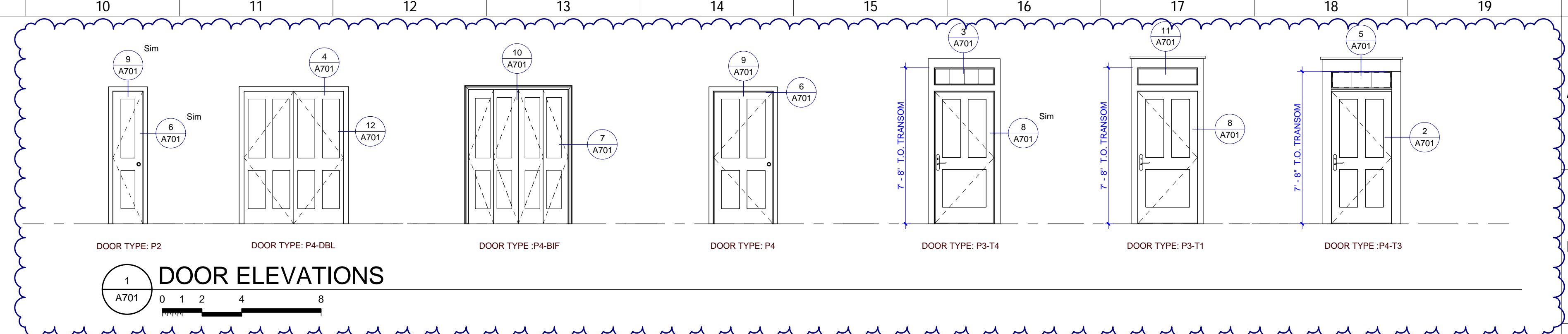
- UNRATED PARTITION
- 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TVM
ISSUE DATE	10.27.2017
REVISIONS	
1	ADDENDUM NO. 1 2017/11/13

## E1-A101M

TYPE E1 MIRRORED - BUILDING PLANS AND SCHEDULES (VICTORIAN)





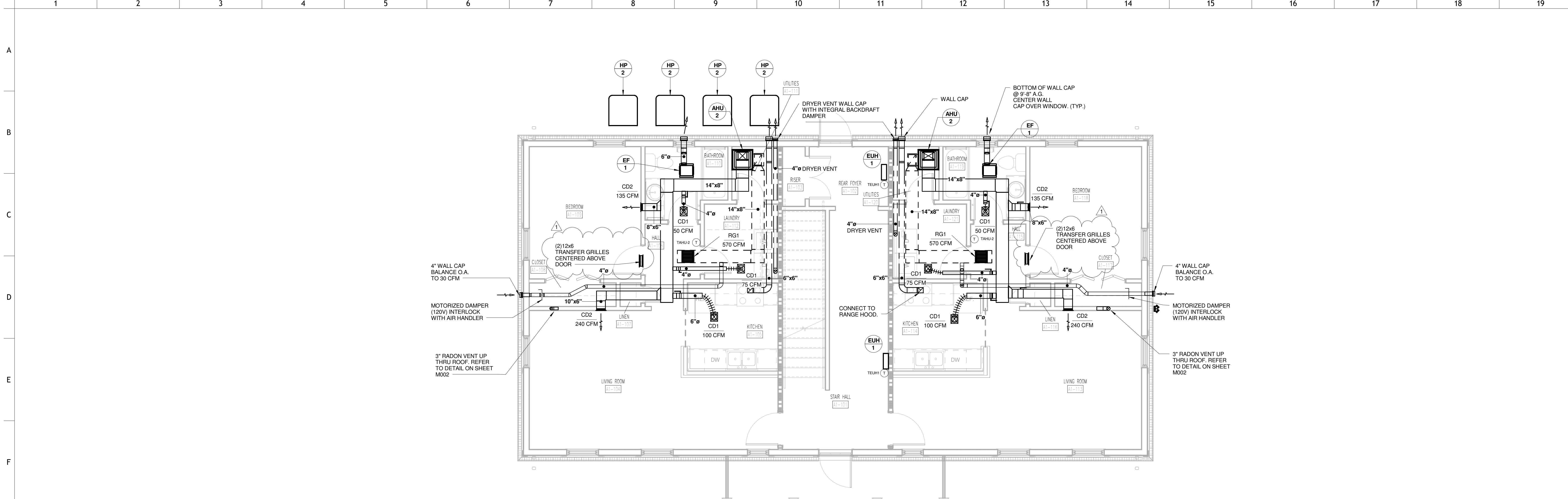
PROJECT NUMBER  
**166200**

PROJECT NAME  
**FIVE POINTS - PHASE 3**

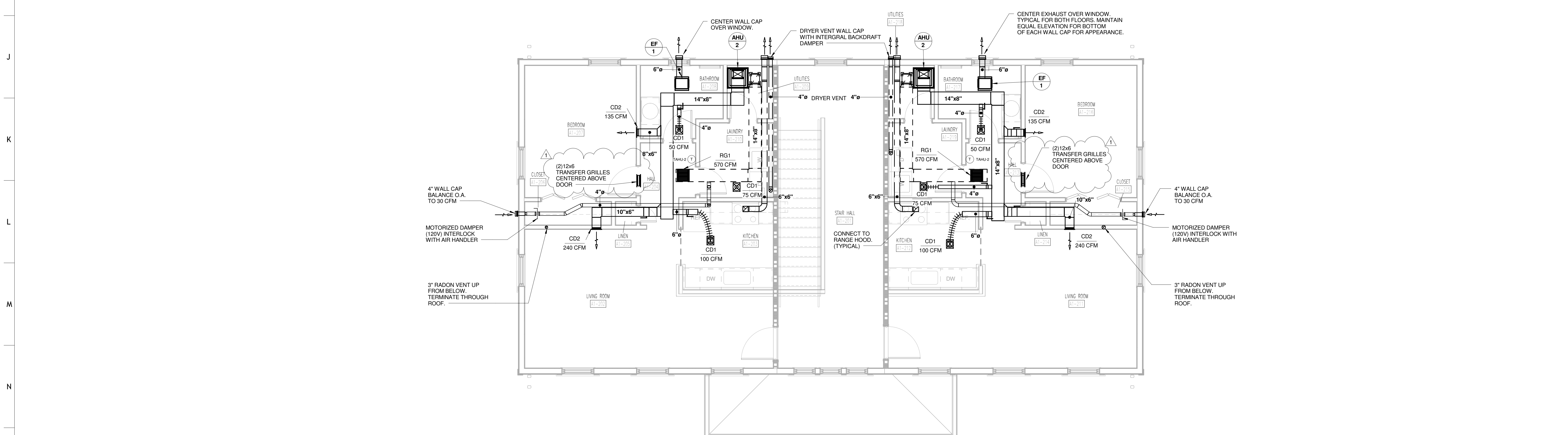
OWNER  
**KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
 KNOXVILLE, TN 37915**

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	ELD
REVIEWED BY	TWM
ISSUE DATE	10.27.2017
REVISIONS	
1	ADDENDUM NO. 1 2017/11/13



1 TYPE A1 FIRST FLOOR HVAC PLAN  
A1-M101 0 1 2 4 8

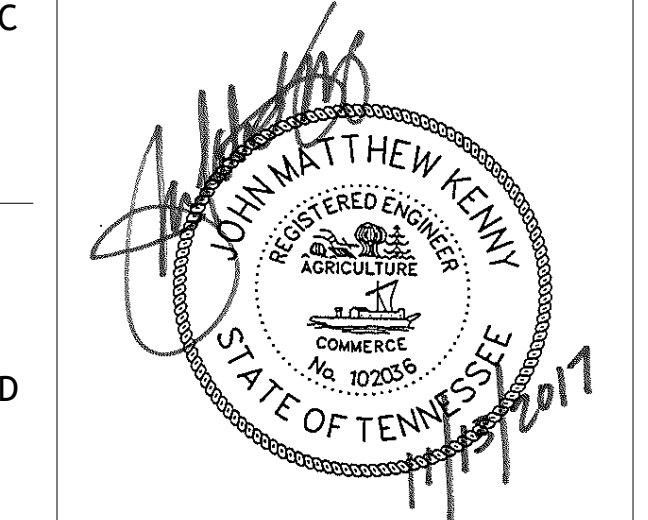


2 TYPE A1 SECOND FLOOR HVAC PLAN  
A1-M101 0 1 2 4 8



BARBERMcMURRY  
architects since 1915

505 Market St Suite 300 Knoxville, TN 37902  
t 865.934.1915 f 865.546.0242  
bma1915.com



PROJECT NUMBER  
166200

PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE'S COMMUNITY  
DEVELOPMENT  
CORPORATION

PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915

**WALL LEGEND**

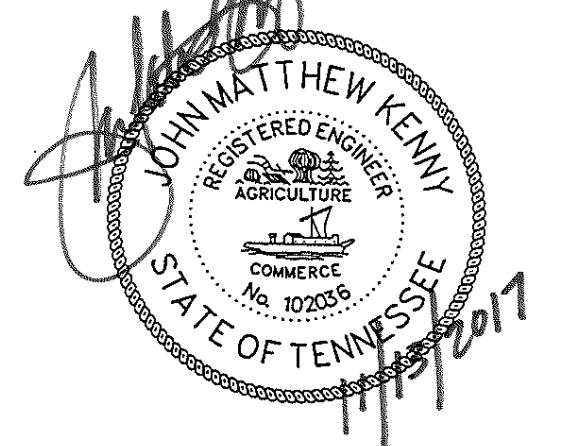
	UNRATED PARTITION
	1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

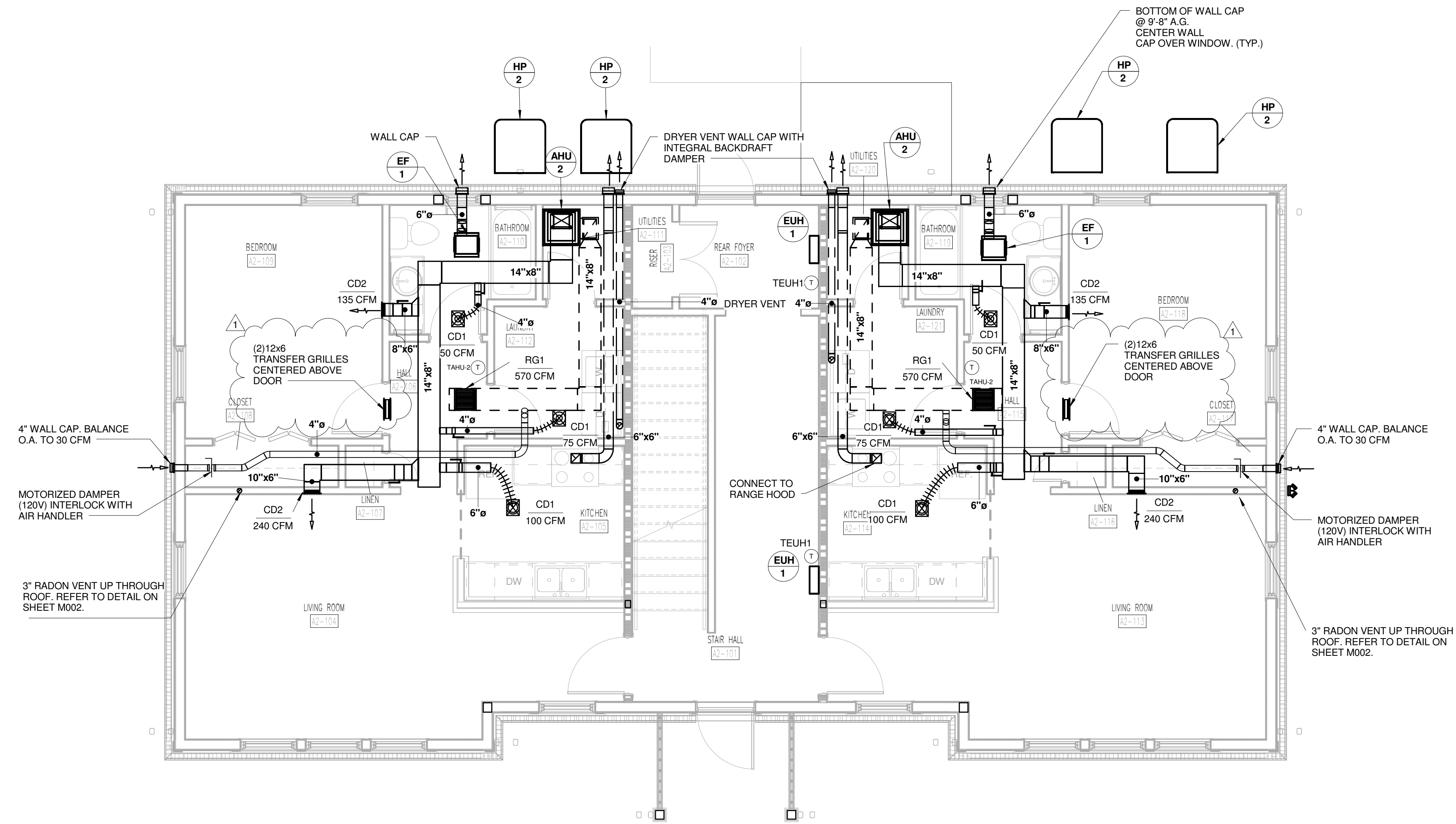
REVISIONS

1	Addendum 1	11/13/17
---	------------	----------

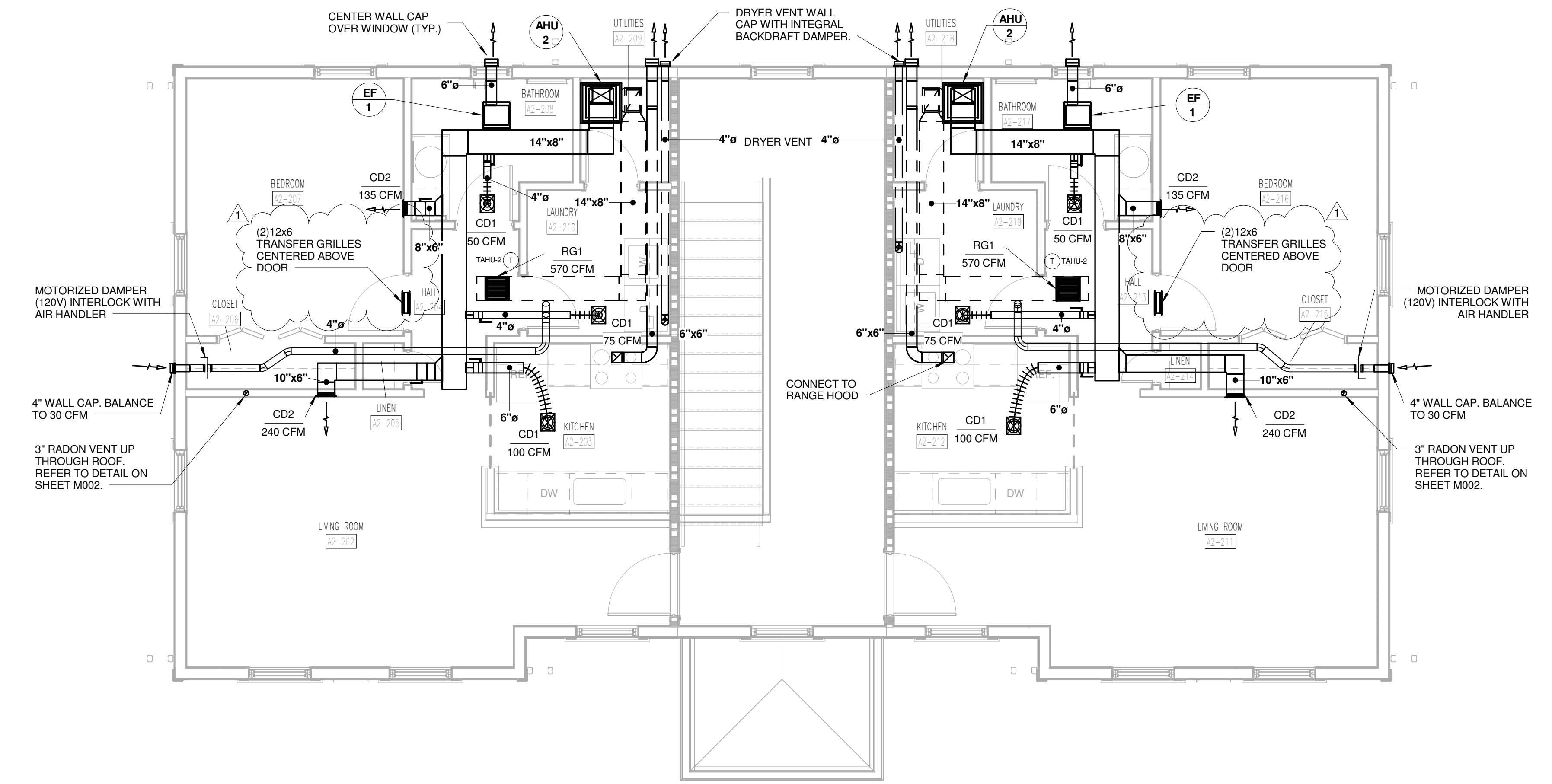
**A1-M101**  
A1 FIRST AND SECOND FLOOR HVAC  
PLAN



PROJECT NUMBER  
166200  
PROJECT NAME  
FIVE POINTS - PHASE 3  
OWNER  
KNOXVILLE'S COMMUNITY  
DEVELOPMENT  
CORPORATION  
PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915



1 TYPE A2 FIRST FLOOR HVAC PLAN  
A2-M101 0 1 2 4 8



2 TYPE A2 SECOND FLOOR HVAC PLAN  
A2-M101 0 1 2 4 8

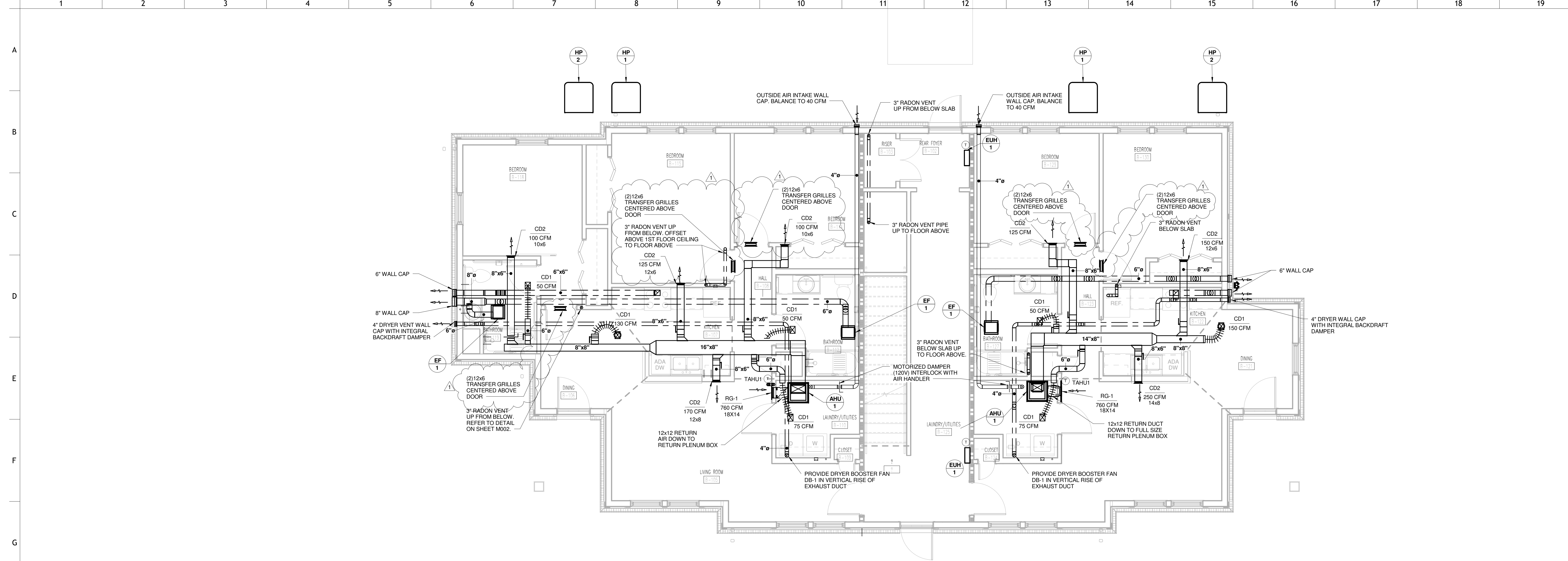
WALL LEGEND

[Symbol]	UNRATED PARTITION
[Symbol]	1 HOUR RATED PARTITION

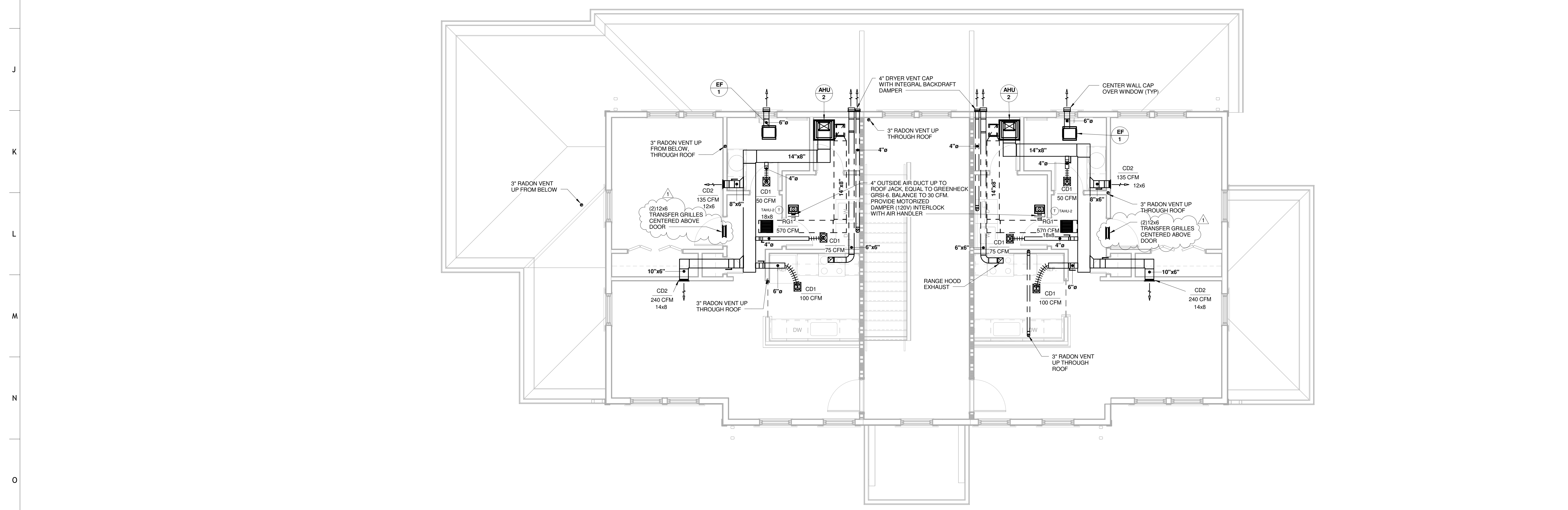
PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS

1	Addendum 1	11/13/17
---	------------	----------



1 TYPE B1 FIRST FLOOR HVAC PLAN  
B-M101 0 1 2 4 8



2 TYPE B1 SECOND FLOOR HVAC PLAN  
B-M101 0 1 2 4 8



PROJECT NUMBER  
**166200**

PROJECT NAME  
**FIVE POINTS - PHASE 3**

OWNER  
**KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
KNOXVILLE, TN 37915**

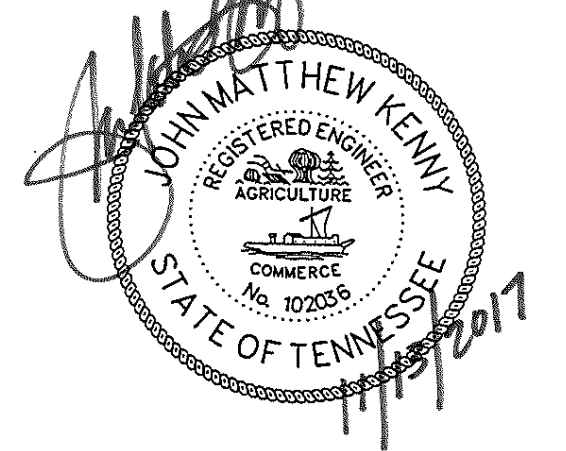
**WALL LEGEND**

	UNRATED PARTITION
	1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

**REVISIONS**

1	Addendum 1	11/13/17
---	------------	----------

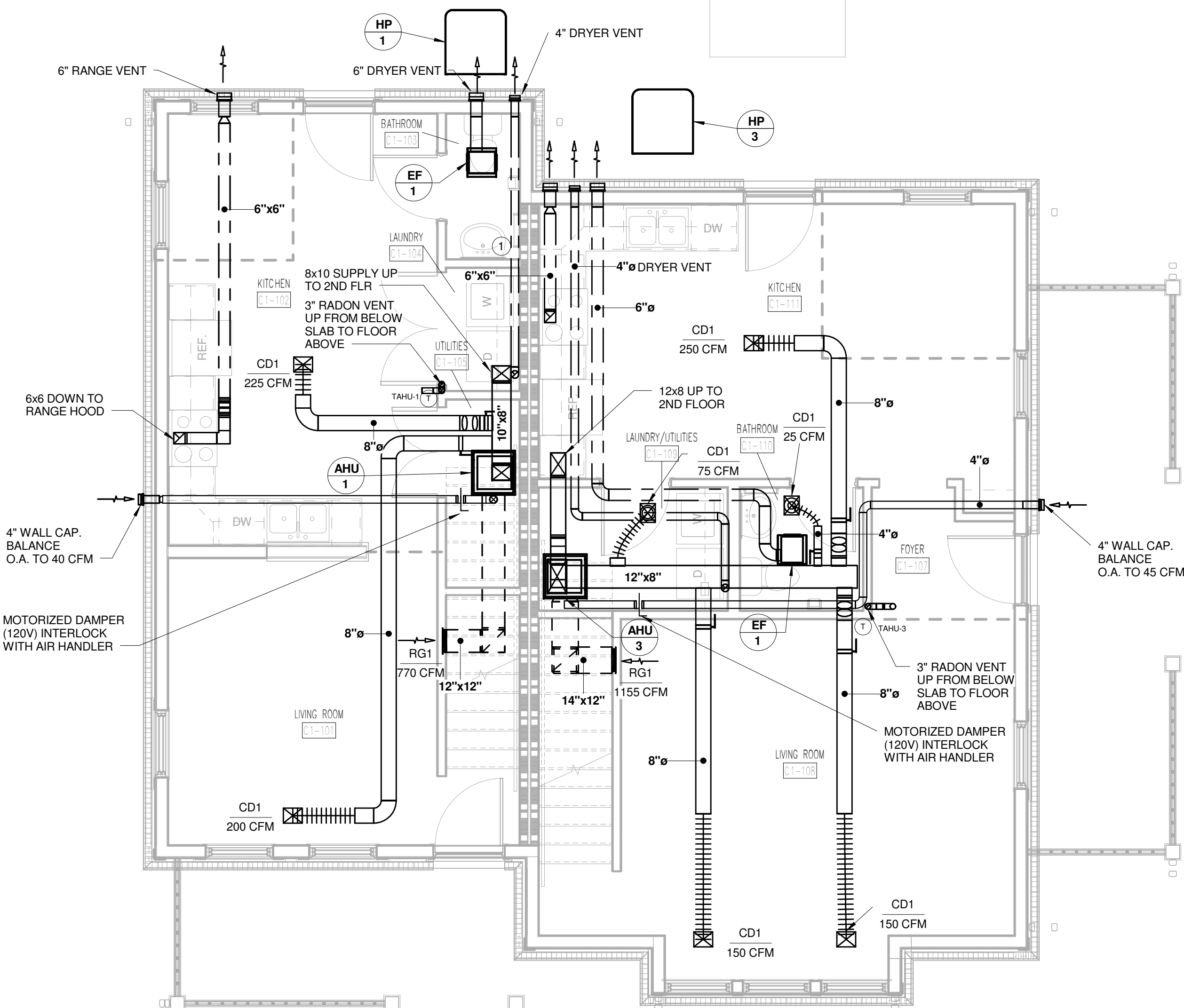


PROJECT NUMBER  
166200

PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE'S COMMUNITY  
DEVELOPMENT  
CORPORATION

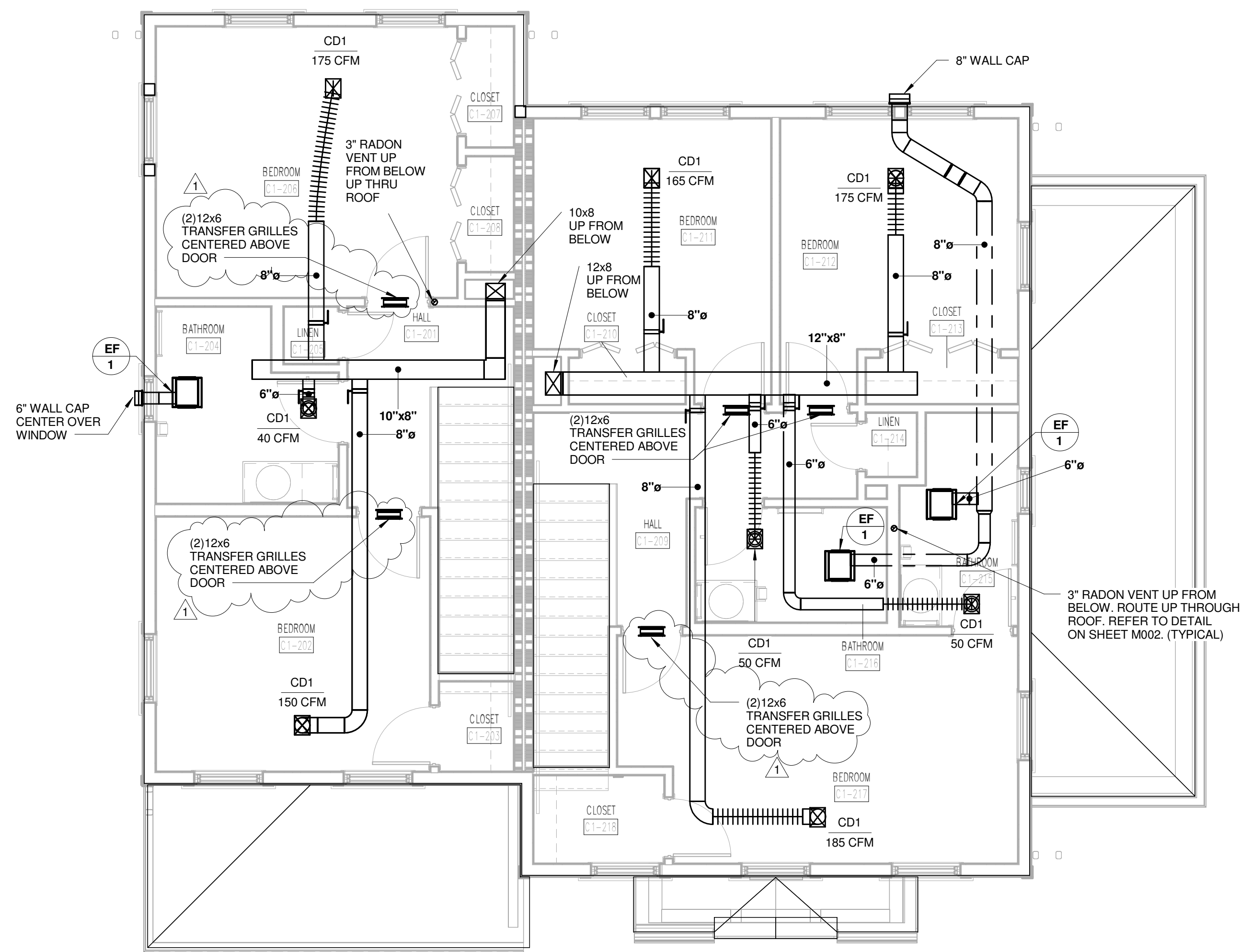
PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915



DRAWING NOTES:  
① 6x6 DOWN TO RANGE HOOD

1 TYPE C1 FIRST FLOOR HVAC PLAN

C1-M101 0 1 2 4 8



2 TYPE C1 SECOND FLOOR HVAC PLAN

C1-M101 0 1 2 4 8

WALL LEGEND

- UNRATED PARTITION
- 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS		
1	Addendum 1	11/13/17

C1-M101  
C1 FIRST AND SECOND FLOOR HVAC  
PLAN

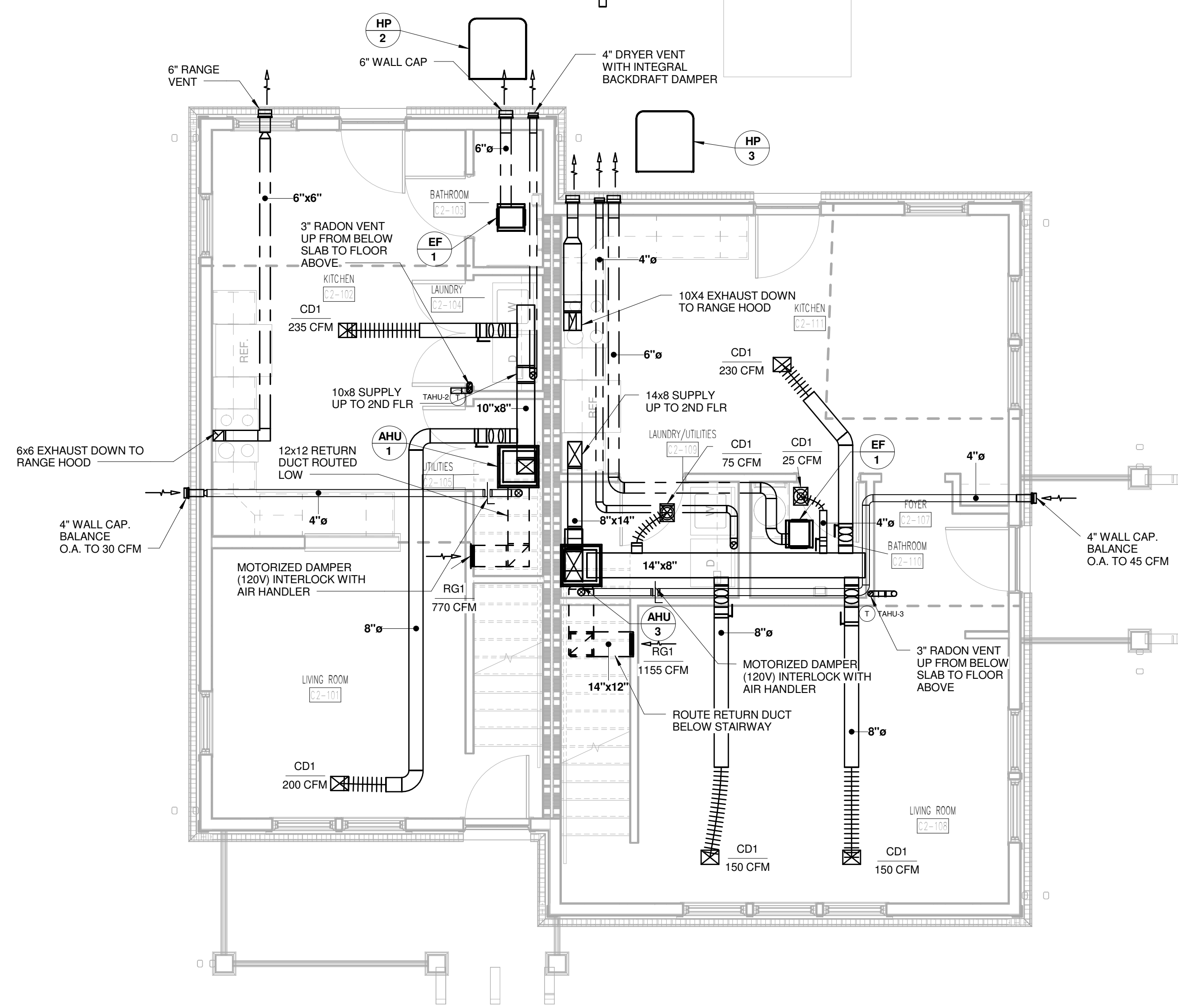


PROJECT NUMBER  
**166200**

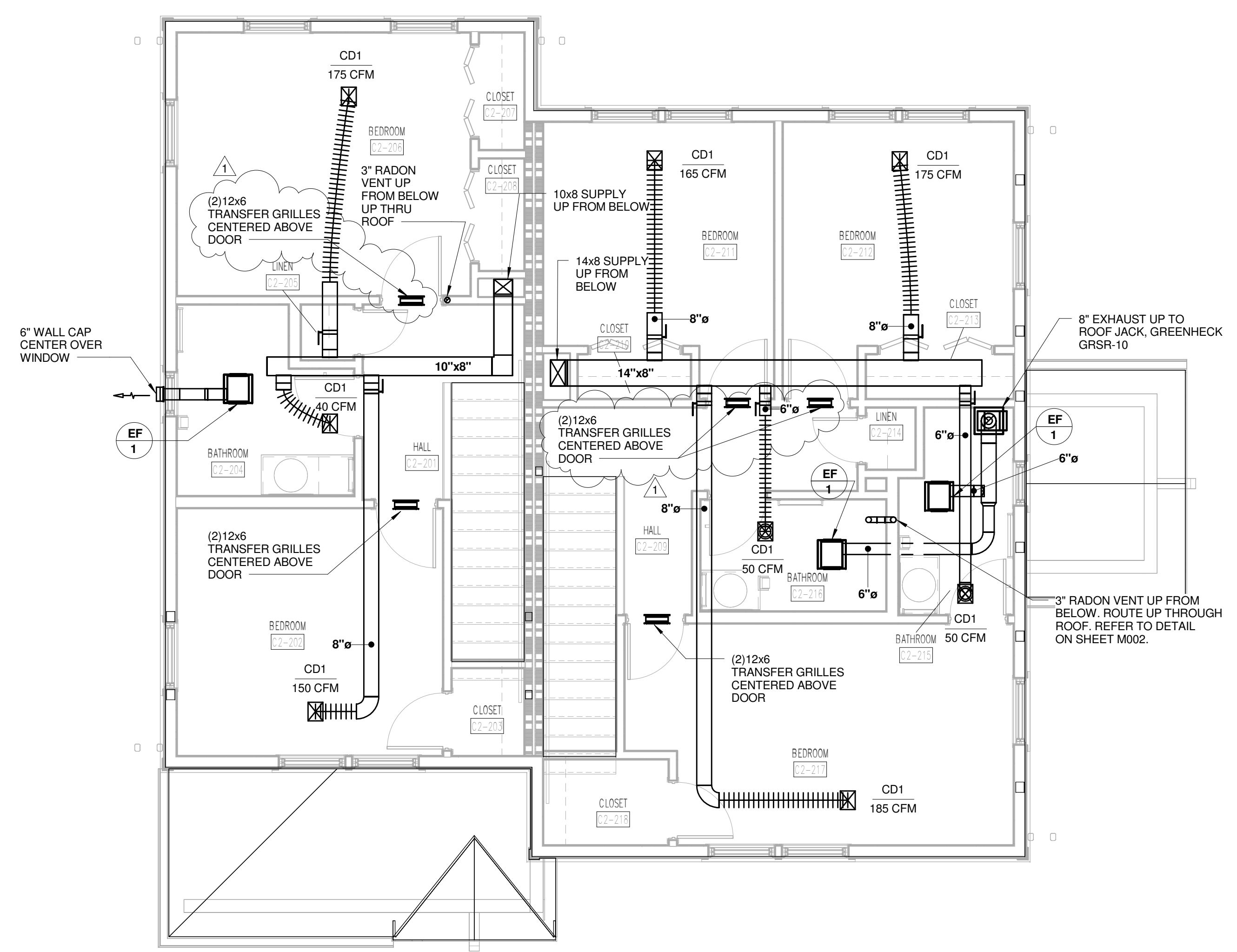
PROJECT NAME  
**FIVE POINTS - PHASE 3**

OWNER  
**KNOXVILLE'S COMMUNITY  
DEVELOPMENT  
CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
KNOXVILLE, TN 37915**



1 TYPE C2 FIRST FLOOR HVAC PLAN  
C2-M101 0 1 2 4 8



2 TYPE C2 SECOND FLOOR HVAC PLAN  
C2-M101 0 1 2 4 8

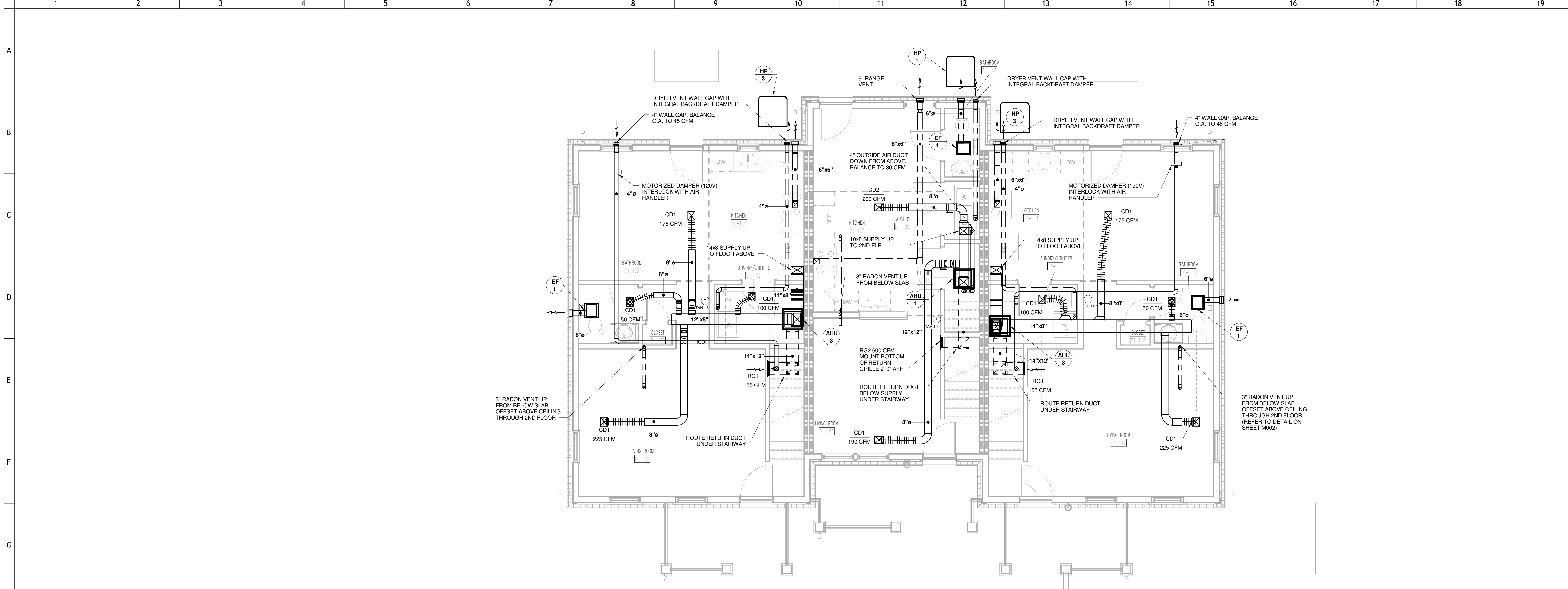
**WALL LEGEND**

	UNRATED PARTITION
	1 HOUR RATED PARTITION

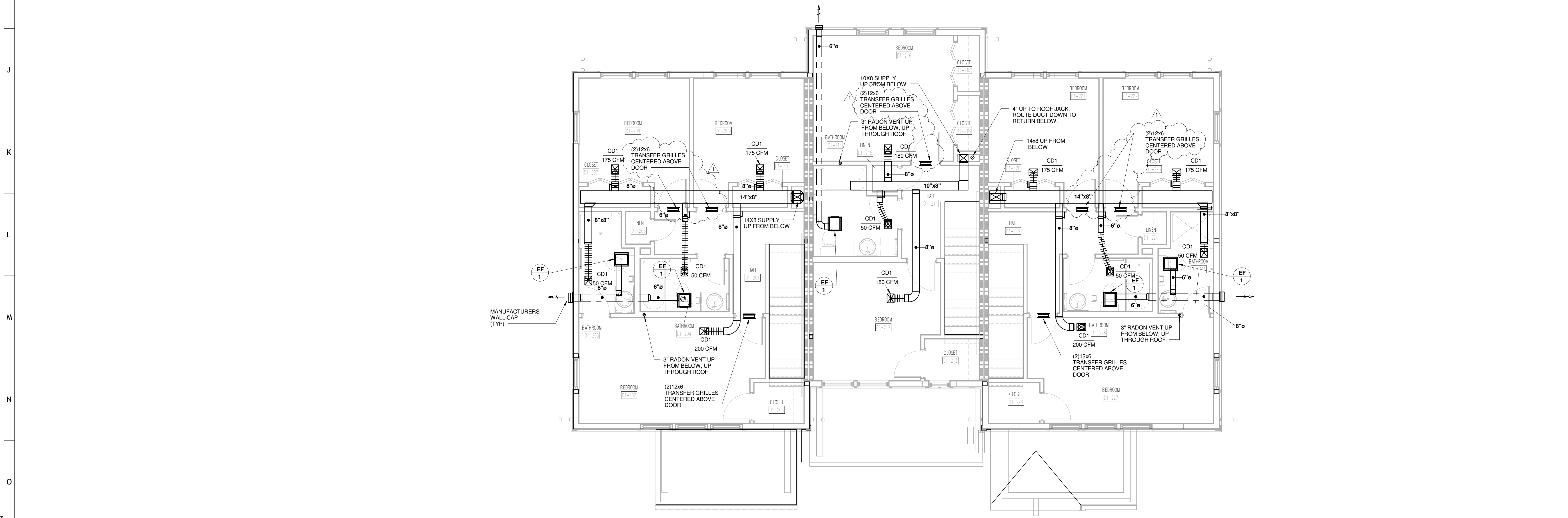
PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS

1	Addendum 1	11/13/17
---	------------	----------



1 TYPE D1 FIRST FLOOR HVAC PLAN  
 D1-M101 0 1 2 4 8



2 TYPE D1 SECOND FLOOR HVAC PLAN  
 D1-M101 0 1 2 4 8



PROJECT NUMBER  
**166200**

PROJECT NAME  
**FIVE POINTS - PHASE 3**

OWNER  
**KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
 KNOXVILLE, TN 37915**

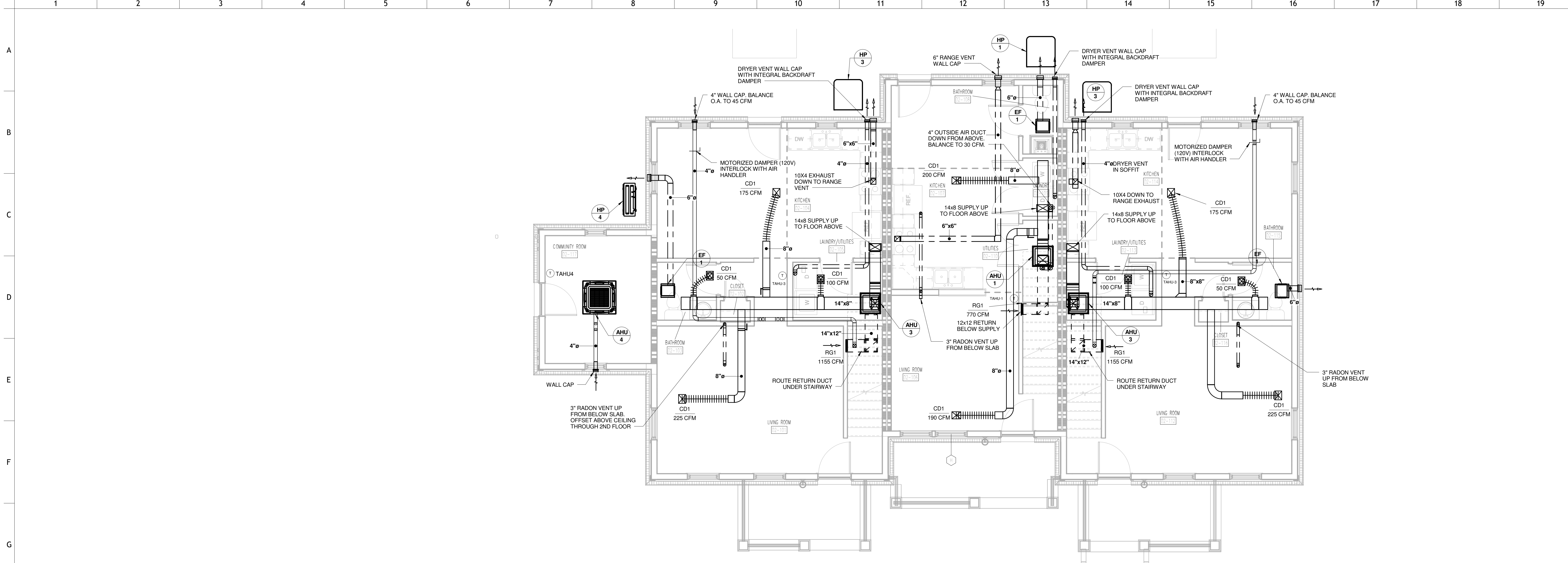
**WALL LEGEND**

	UNRATED PARTITION
	1 HOUR RATED PARTITION

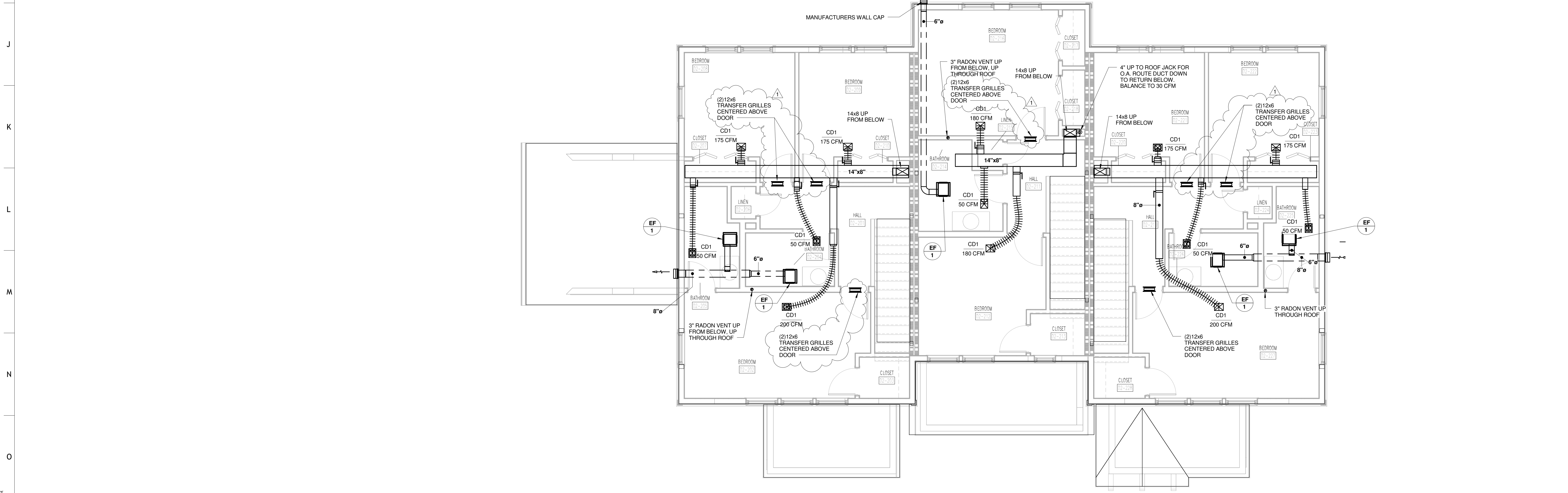
PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS

1	Addendum 1	11/13/17
---	------------	----------



1 TYPE D2 FIRST FLOOR HVAC PLAN  
 D2-M101 0 1 2 4 8



2 TYPE D2 SECOND FLOOR HVAC PLAN  
 D2-M101 0 1 2 4 8



PROJECT NUMBER  
**166200**

PROJECT NAME  
**FIVE POINTS - PHASE 3**

OWNER  
**KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
 KNOXVILLE, TN 37915**

**WALL LEGEND**

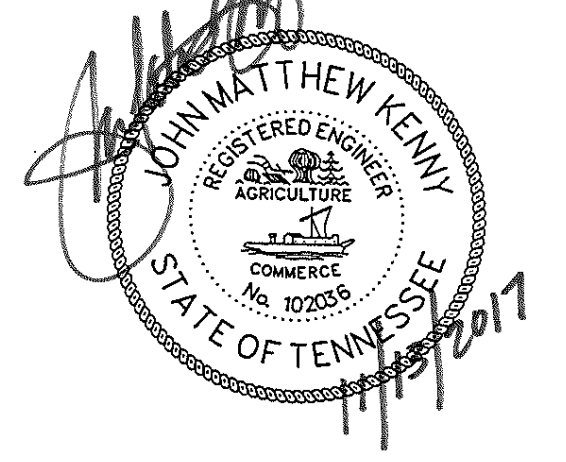
	UNRATED PARTITION
	1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS

1	Addendum 1	11/13/17
---	------------	----------



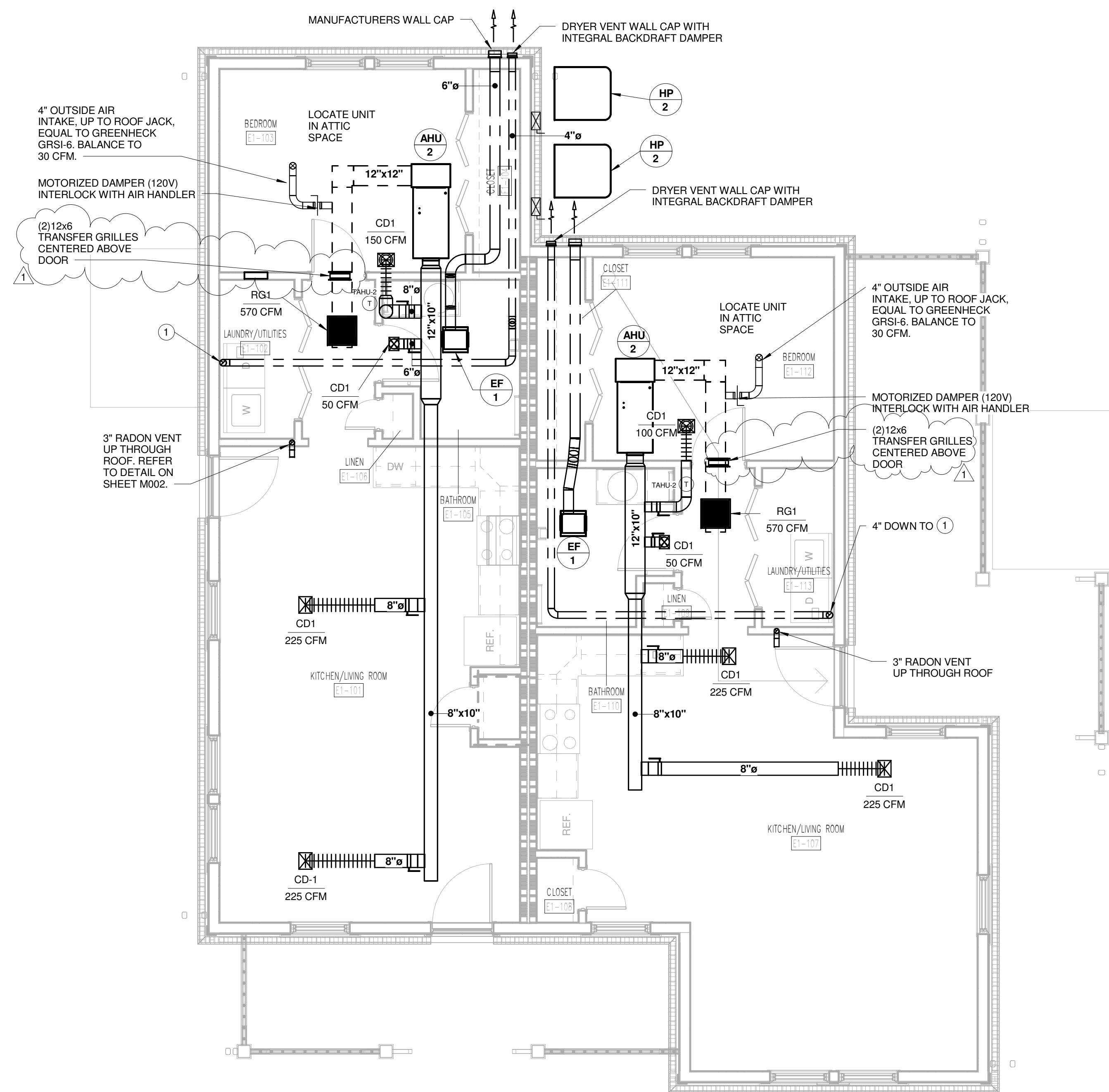


PROJECT NUMBER  
**166200**

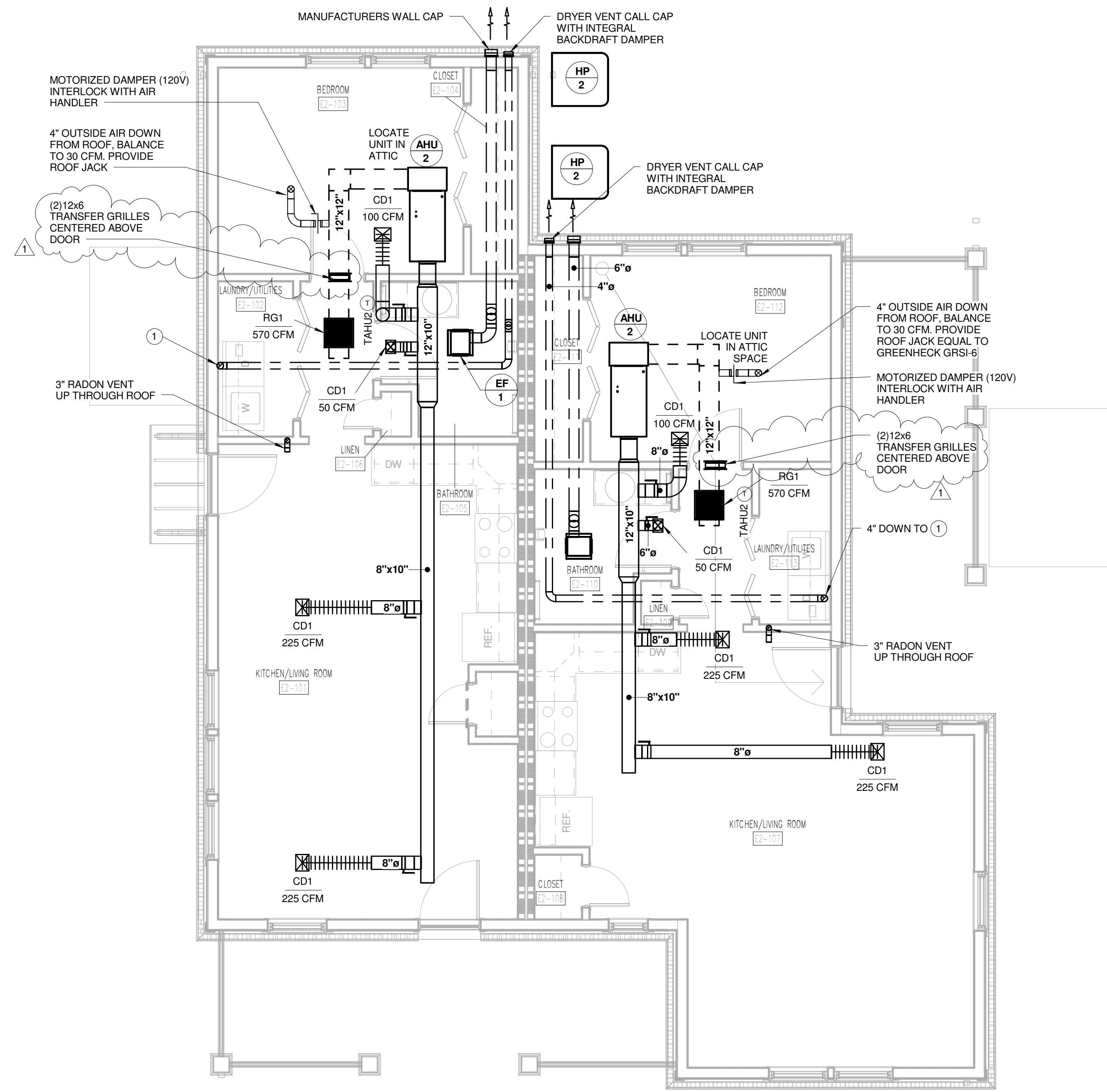
PROJECT NAME  
**FIVE POINTS - PHASE 3**

OWNER  
**KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION**

PROJECT ADDRESS  
**304 S. KYLE STREET  
KNOXVILLE, TN 37915**



**1 TYPE E1 HVAC FLOOR PLAN**  
E1-M101 0 1 2 4 8



**2 TYPE E2 HVAC FLOOR PLAN**  
E1-M101 0 1 2 4 8

**DRAWING NOTES:**  
1 PROVIDE IN-LINE DRYER BOOSTER FAN (DBF-1) IN VERTICAL POSITION. PROVIDE WITH IN-LINE DRYER LINT TAP.

**WALL LEGEND**

	UNRATED PARTITION
	1 HOUR RATED PARTITION

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	WAR
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

**REVISIONS**

1	Addendum 1	11/13/17
---	------------	----------

**E1-M101**  
E1 & E2 - FIRST FLOOR HVAC PLAN

PLUMBING FIXTURE SCHEDULE				
DESIGNATION	FIXTURE TYPE	MANUFACTURER	MODEL #	DESCRIPTION
WCO	CLEANOUT	ZURN	ZN-1466	INTERIOR WALL W/ROUND ACCESS COVER
FOO	CLEANOUT	ZURN	ZN-1400	INTERIOR FINISH FLOOR (SEE NOTES)
GCO	CLEANOUT	ZURN	ZN-1400	EXTERIOR GRADE (SEE NOTES)
FD1	FLOOR DRAIN CONNECTION SIZES	ZURN PROSET SYSTEMS	ZN415-S TG33	GENERAL SERVICE DRAIN W/ SQUARE STRAINER & DEEP SEAL STRAP 3" FLEXIBLE BUSHING INSERT WASTE 2", VENT 1 1/2" (8" SQUARE TOP)
KS1	SINK FAUCET DRAIN TRAP SUPPLIES CONNECTION SIZES	ELKAY ELKAY ZURN ZURN ZURN	LR-3322 LK0243 Z8743-1 Z8702 Z8808-LR-LK	DOUBLE COMPARTMENT, STAINLESS STEEL 18.4 HOLE PUNCHED HIGH ARC CHROME PLATED TUBULAR BRASS 360° SWING SPOUT WITH AERATOR FAUCET W/ BLADE HANDLES GRID STRAINER W/ 2" TAILPIECE 2" CAST BRASS P-TRAP W/ C.O. PLUS ANGLE SUPPLIES W/ CHROME HANDED STOPS WASTE 2", VENT 1 1/2", H&DW 1/2"
KS2 ADA	SINK FAUCET DRAIN TRAP SUPPLIES CONNECTION SIZES	ELKAY ELKAY ZURN ZURN ZURN	LR4032255 LK0243 Z8743-1 Z8702 Z8808-LR-LK	DOUBLE COMPARTMENT, STAINLESS STEEL 18.4 HOLE PUNCHED, 5 1/2" DEEP HIGH ARC CHROME PLATED TUBULAR BRASS 360° SWING SPOUT WITH AERATOR FAUCET W/ BLADE HANDLES GRID STRAINER W/ 2" TAILPIECE 2" CAST BRASS P-TRAP W/ C.O. PLUS ANGLE SUPPLIES W/ CHROME HANDED STOPS WASTE 2", VENT 1 1/2", H&DW 1/2"
L1	SINK FAUCET DRAIN TRAP SUPPLIES CONNECTION SIZES	KOHLER SYMMONS ZURN ZURN ZURN	K-2196-4 S-20 Z8743-PC Z8702-PC Z8808-LR-LK-PC	"PENNINGTON" VITREOUS CHINA, SELF-RIMMING COUNTERTOP LAVATORY WITH 4" FAUCET CENTERS "SYMMETRI" SINGLE HANDLE CHROME PLATED FAUCET, 5 GPM FLOW GRID STRAINER W/ 1-1/4" TAILPIECE 1-1/4" CAST BRASS P-TRAP W/ C.O. PLUS ANGLE SUPPLIES W/ CHROME HANDED STOPS WASTE 1-1/4" VENT 1-1/4" H&DW 1/2"
L2 ADA	SINK FAUCET DRAIN TRAP SUPPLIES INSULATION KIT CONNECTION SIZES	KOHLER SYMMONS ZURN ZURN TRUEBRO	K-2196-4 S-20 Z8743-PC Z8702-PC Z8808-LR-LK-PC 102	"PENNINGTON" VITREOUS CHINA, SELF-RIMMING COUNTERTOP LAVATORY WITH 4" FAUCET CENTERS "SYMMETRI" SINGLE HANDLE CHROME PLATED FAUCET, 5 GPM FLOW GRID STRAINER W/ 1-1/4" TAILPIECE 1-1/4" CAST BRASS P-TRAP W/ C.O. PLUS ANGLE SUPPLIES W/ CHROME HANDED STOPS HAND GUARD, MOLDED CLOSED CELL W/ VYL INSULATION WASTE 1-1/4" VENT 1-1/4" H&DW 1/2"
L3	SINK FAUCET DRAIN TRAP SUPPLIES INSULATION KIT CONNECTION SIZES	KOHLER MOEN ZURN ZURN ZURN TRUEBRO	K-2382-8-0 T8620 Z8743-PC Z8702-PC Z8808-LR-LK-PC 102	"MARRON" VITREOUS CHINA, PEDESTAL LAVATORY WITH 8" CENTERS "BRANTFORD" DUAL HANDLE CHROME PLATED FAUCET, 5 GPM FLOW GRID STRAINER W/ 1-1/4" TAILPIECE 1-1/4" CAST BRASS P-TRAP W/ C.O. PLUS ANGLE SUPPLIES W/ CHROME HANDED STOPS HAND GUARD, MOLDED CLOSED CELL W/ VYL INSULATION WASTE 1-1/4" VENT 1-1/4" H&DW 1/2"
WC1	WATER CLOSET SEAT SUPPLY CONNECTION SIZES	ZURN ZURN ZURN	Z2650 Z56655-EL Z48824-CR-LK	HIGH PERFORMANCE, TWO PIECE SET, VITREOUS CHINA - 1.28 GPF ELONGATED, WHITE, CLOSED FRONT TOILET SEAT W/ COVER & STAINLESS STEEL CHECK HINGE ANGLE SUPPLY W/ CHROME HANDED STOP WASTE 3" VENT 2" CW 1/2"
WC2 ADA	WATER CLOSET SEAT SUPPLY CONNECTION SIZES	ZURN ZURN ZURN	Z2651 Z56655-EL Z48824-CR-LK	HIGH PERFORMANCE, TWO PIECE SET, VITREOUS CHINA - 1.28 GPF ELONGATED, WHITE, CLOSED FRONT TOILET SEAT W/ COVER & STAINLESS STEEL CHECK HINGE ANGLE SUPPLY W/ CHROME HANDED STOP WASTE 3" VENT 2" CW 1/2"
EHI	HOSE BIBB	WOODFORD	MODEL 68	"UNDERCOVER" WALL HYDRANT, ENCASED, NON-FREEZE, ANTI-SIPHON, AUTOMATIC DRAINING, BRONZE CASING, ALL BRONZE INTERIOR PARTS - 3/4" FEMALE FITTING
WB	WASHER BOX TRAP CONNECTION SIZES	SYMMONS	W-602-X	LAUNDRY WASTE SUPPLY & DRAIN 2" P-TRAP, PROVIDE VACUUM BREAKERS & HOSE CONNECTION WASTE 2", VENT 1-1/2", H & DW 1/2"
WSP	WASHER BOX TRAP CONNECTION SIZES	DATEY	38470	1 HOUR RATED WASHER BOX SUPPLY & DRAIN 2" P-TRAP, PROVIDE VACUUM BREAKERS & HOSE CONNECTION WASTE 2", VENT 1-1/2", H & DW 1/2"
IB	ICE MAKER BOX CONNECTION SIZE	DATEY	38570	HIGH DENSITY POLYETHYLENE, 8"X10" ICE MAKER BOX WITH BRAIDED STAINLESS STEEL HOSE CW 1/2"
BF	ICE MAKER BOX CONNECTION SIZE	DATEY	38486	HIGH DENSITY POLYETHYLENE, 8"X10" ICE MAKER BOX WITH BRAIDED STAINLESS STEEL HOSE - FIRE RATED CW 1/2"
T1	BATH TUB VALVE CONNECTION SIZES	AQUA BATH SYMMONS	A86031TS 25-221	60" X 30" WHITE ACRYLIC TUB SHOWER ENCLOSURE TEMP/CTRL 2000 PRESSURE BALANCING MIXING VALVE WITH BUILT-IN CHOKE AND ADJUSTABLE STOP SCREW TO LIMIT HANDLE TURN, DIVERTER TUB SPOUT, WATER SAVER SHOWER HEAD 1.5 GPM WASTE 2", VENT 1-1/2", H & DW 1/2"
T2 ADA	BATH TUB VALVE CONNECTION SIZES	AQUA BATH SYMMONS	C86022TS C-86-600-830-V-X	ADA COMPLIANT - 60" X 30" WHITE ACRYLIC TUB SHOWER ENCLOSURE W/ GRAB BARS TEMP/CTRL SHOWER SHOWER SYSTEM W/ INTEGRAL SERVICE STOPS - CHROME - 30" SLIDE BAR SEPARATE DUAL OUTLET DIVERTER VALVE, WATER SAVER SHOWER HEAD 1.5 GPM WASTE 2", VENT 1-1/2", H & DW 1/2"
SH1	SHOWER VALVE CONNECTION SIZES	AQUA BATH ZURN	A84385SH Z7301-SSC-MT-S9	48"X36" WHITE ACRYLIC SHOWER ENCLOSURE W/ GRID DRAIN TEMP GUARD W/ SHOWER UNIT, CHROME PLATED, W/ PRESSURE COMPENSATING WATER SAVER SHOWER HEAD, 1.5 GPM PROVIDE W/ FULL SIZE P-TRAP WASTE 2", VENT 1-1/2", H&DW 1/2"

PLUMBING LEGEND	
	COLD WATER LINE
	HOT WATER SUPPLY
	HOT WATER RETURN
	140°F HOT WATER RETURN
	SANITARY SEWER LINE
	GREASE WASTE
	NATURAL GAS
	LIQUID PROPANE
	VENT LINE
	CONDENSATE
	RAIN WATER PIPING
	STORM WATER PIPING
	NITROGEN OXIDE
	OXYGEN
	VACUUM
	AIR
	POINT OF CONNECTION TO EXISTING PLUMBING
	FLOOR DRAIN
	FLOOR SINK
	ROOF DRAIN
	WATER CLOSET CONNECTION
	FLOORGRADE CLEANOUT
	WALL CLEANOUT
	FIXTURE CONNECTION
	HOSE BIBB
	WATER HAMMER ARRESTOR

PIPING SYMBOLS	
	THREE WAY VALVE
	BALL VALVE
	BUTTERFLY VALVE
	GATE VALVE
	CHECK VALVE
	GAS COOK/PLUG VALVE
	GLOBE VALVE
	UNION
	ORCLUT SETTER
	PRESSURE REGULATING VALVE
	PRESSURE RELIEF VALVE
	PIPE TURN DOWN
	PIPE TURN UP
	PIPE TEE DOWN
	PIPE TEE UP
	PIPE TRANSITION
	STRAINER

ABBREVIATIONS	
BV	BALL VALVE
CI	CAST IRON
CO	CLEAN OUT
CON	CONDENSATE
CW	COLD WATER
CHK	V CHECK VALVE
EX	EXISTING
FD	FLOOR DRAIN
FS	FLOOR SINK
GW	GREASE WASTE
HB	HOSE BR/WALL HYDRANT
HW	HOT WATER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
PI	FIXTURE NUMBER (SEE SCHEDULE)
SS	SANITARY SEWER
VS	VENT STACK
VT	VENT LINE
VTR	VENT THRU ROOF
VB	VACUUM BREAKER
WH	WATER HEATER
WS	WASTE STACK

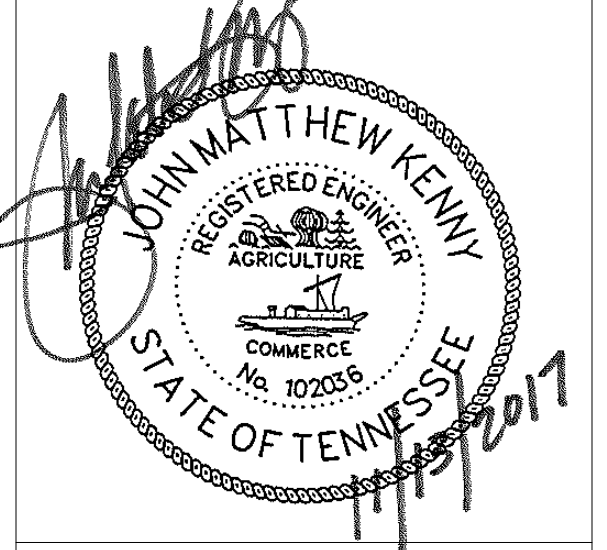
- PLUMBING NOTES:**
- SANITARY WASTE AND VENT PIPING BOTH ABOVE AND BELOW GRADE SHALL BE SCHEDULE 40 PVC/DWV PLASTIC PIPE AND FITTINGS WITH SOLVENT WELD JOINTS. PLASTIC PIPING AND PIPING COMPONENTS SHALL BE LISTED AS CONFORMING WITH ANSIS/ASTM D-3045 AND ASTM D-3045. CAST IRON WHERE INDICATED.
  - UNLESS INDICATED OTHERWISE ON DRAWINGS, INTERNAL WATER PIPING IS TO BE ROUTED IN CEILING SPACES, ATTICS, CRAWL SPACES AND IN AND BETWEEN WALL STUDS, ETC. (AS AND WHERE APPLICABLE) AND ON INSIDE OF INSULATED BUILDING ENVELOPE. THIS PIPING SHALL BE TYPE "L" COPPER AND INSTALLED IN ACCORDANCE WITH 2006 INTERNATIONAL PLUMBING CODE.
  - ALL VENT PIPING TO PENETRATE ROOF A MINIMUM OF 12" ABOVE ROOF. FLASH AND SEAL TO ROOF WEATHERTIGHT. PAINT VENT PIPING ABOVE ROOF AND WITH 2 COATS EPOXY BASED PAINT. COLOR TO MATCH ROOF.
  - CONTRACTOR SHALL INSPECT SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS WHICH MAY AFFECT WORK, INCLUDING VERIFICATION OF LOCATIONS AND RELATIONSHIP BETWEEN FIXTURES AND CONNECTIONS.
  - PIPING PLACED IN TRENCHES SHALL BE EMBEDDED IN 6" OF LOOSE AGGREGATE FILL. TAMP FILL MATERIAL ON EACH SIDE IN 6" LAYERS. ALL PIPING UNDER SLAB SHALL HAVE A MINIMUM 1" COVER FROM BOTTOM OF SLAB TO TOP OF PIPE AT HIGH POINT. PROTECT PIPING FROM BEING CRUSHED OR OTHERWISE CONSTRUCTED.
  - EACH SINK, WATER CLOSET, ETC. SHALL HAVE SHUT-OFF VALVES LOCATED AT THE FIXTURE.
  - THE PLUMBING SYSTEM IN ITS ENTIRETY SHALL NOT BE COVERED UNTIL IT HAS BEEN INSPECTED, TESTED, AND APPROVED BY THE OWNER.
  - PRIOR TO COVERING THE WATER SUPPLY SYSTEM, IT SHALL BE PRESSURE TESTED AND PROVED TIGHT UNDER A WATER PRESSURE NOT LESS THAN 25 P.S.I. ABOVE THE WORKING PRESSURE UNDER WHICH IT IS TO BE OPERATED. THIS TEST SHALL BE COMPLETED AND APPROVED IN THE PRESENCE OF THE OWNER.
  - ALL SOLDERED JOINTS SHALL BE CLEANED BRIGHT AND ALL BURRS SHALL BE REMOVED AND THE TUBING SHALL BE RETURNED TO FULL BORE.
  - ALL SOLDER AND FLUX USED IN THE INSTALLATION OR REPAIR OF THE WATER SUPPLY OR DISTRIBUTION SYSTEM SHALL BE LEAD FREE.
  - ALL SOLDERED JOINT MATERIAL SUCH AS FITTINGS, SOLDER, TUBING SHALL BE APPROVED BY THE OWNER PRIOR TO INSTALLATION.
  - ALL MATERIALS, METHODS AND PRACTICES SHALL BE IN ACCORDANCE WITH THE 2006 INTERNATIONAL PLUMBING CODE.
  - CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED FITTINGS TO CREATE A COMPLETE AND FUNCTIONAL PLUMBING SYSTEM. CONTRACTOR SHALL DETERMINE ANY FITTINGS REQUIRED FOR CONNECTION TO FIXTURES SPECIFIED.
  - PROVIDE REMOVABLE PVC COVERS ON ALL EXPOSED SUPPLY AND WASTE FITTINGS TO COMPLY WITH ANSIS STD. A117.1 REQUIREMENTS.
  - CLEANOUTS:
    - INTERIOR FINISHED FLOOR AREAS (FOO) - LAQUERED CAST IRON BODY WITH ANCHOR FLANGE, REVERSIBLE CLAMPING COLLAR, THREADED TOP ASSEMBLY AND ROUND GASKETTED DEPRESSION COVER TO ACCEPT FLOOR FINISH.
    - INTERIOR FINISHED WALL AREAS (WCO) - LINE TYPE WITH LAQUERED CAST IRON BODY AND ROUND EPOXY COATED GASKET COVER, AND ROUND STAINLESS STEEL ACCESS COVER SECURED WITH MACHINE SCREW.
    - EXTERIOR SURFACED AREAS - ROUND CAST NICKEL BRONZE ACCESS FRAME AND NON-SKID COVER.
    - EXTERIOR UN-SURFACED AREAS - LINE TYPE WITH LAQUERED CAST IRON BODY AND ROUND EPOXY COATED GASKET COVER.
  - ALL HOT WATER PIPE ABOVE GRADE SHALL BE INSULATED WITH 1" FIBERGLASS, LOW PRESSURE INSULATION WITH WHITE UNIVERSAL JACKET. ALL COLD WATER PIPE ABOVE GRADE SHALL BE INSULATED WITH 1/2" FIBERGLASS, LOW PRESSURE INSULATION WITH WHITE UNIVERSAL JACKET. ALL INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
  - ALL CONDENSATE PIPING SHALL BE INSULATED WITH 1" THICK ARMAFLEX INSULATION WITH GLEUED JOINTS, OR 1" FIBERGLASS, LOW PRESSURE INSULATION WITH VAPOR BARRIER MASTIC WRAP.
  - PROVIDE VACUUM BREAKERS WHERE ANY THREADED CONNECTIONS ARE PRESENT ON WATER SUPPLY LINE.
  - WATER HAMMER ARRESTORS TO BE INSTALLED ON EQUIPMENT PER MANUFACTURER RECOMMENDATIONS.
  - GAS PIPING SHALL BE BLACK PIPE AND INSTALLED IN ACCORDANCE WITH GAS CODE.

ELECTRIC WATER HEATER SCHEDULE		
MARK	WH1	WH2
DESIGN MANUFACTURER	AMERICAN	AMERICAN
MODEL NUMBER	ES10N-50H	ES10N-40H
GALLON CAPACITY	50	40
RECOVERY @ 100 DEG. F. RISE	18 GPH	18 GPH
HEATING CAP. (KW)	4.5 KW	4.5 KW
ELECTRICAL (VOLT/3PH)	120	120

NOTES:  
1. ALTERNATIVE MANUFACTURERS: BRADFORD WHITE, A.O. SMITH, STATE IND.



505 Market St Suite 300 Knoxville, TN 37902  
1 865.934.1915 F 865.546.0242  
bmg1915.com



PROJECT NUMBER  
166200

PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE'S COMMUNITY DEVELOPMENT CORPORATION

PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915

PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	SGP
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS		
1	Addendum 1	11/13/17

**P001**  
PLUMBING SCHEDULES AND NOTES

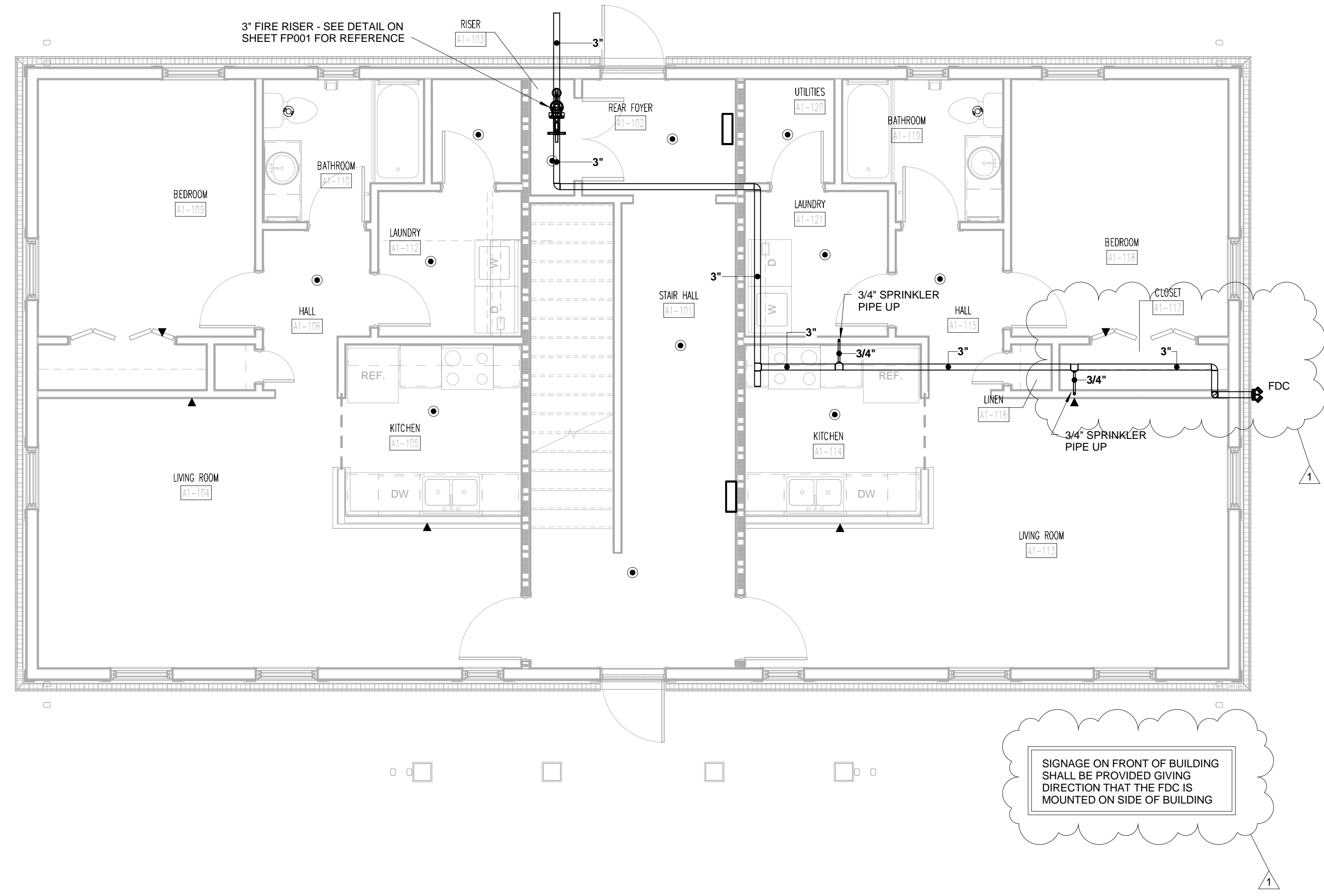


PROJECT NUMBER  
166200

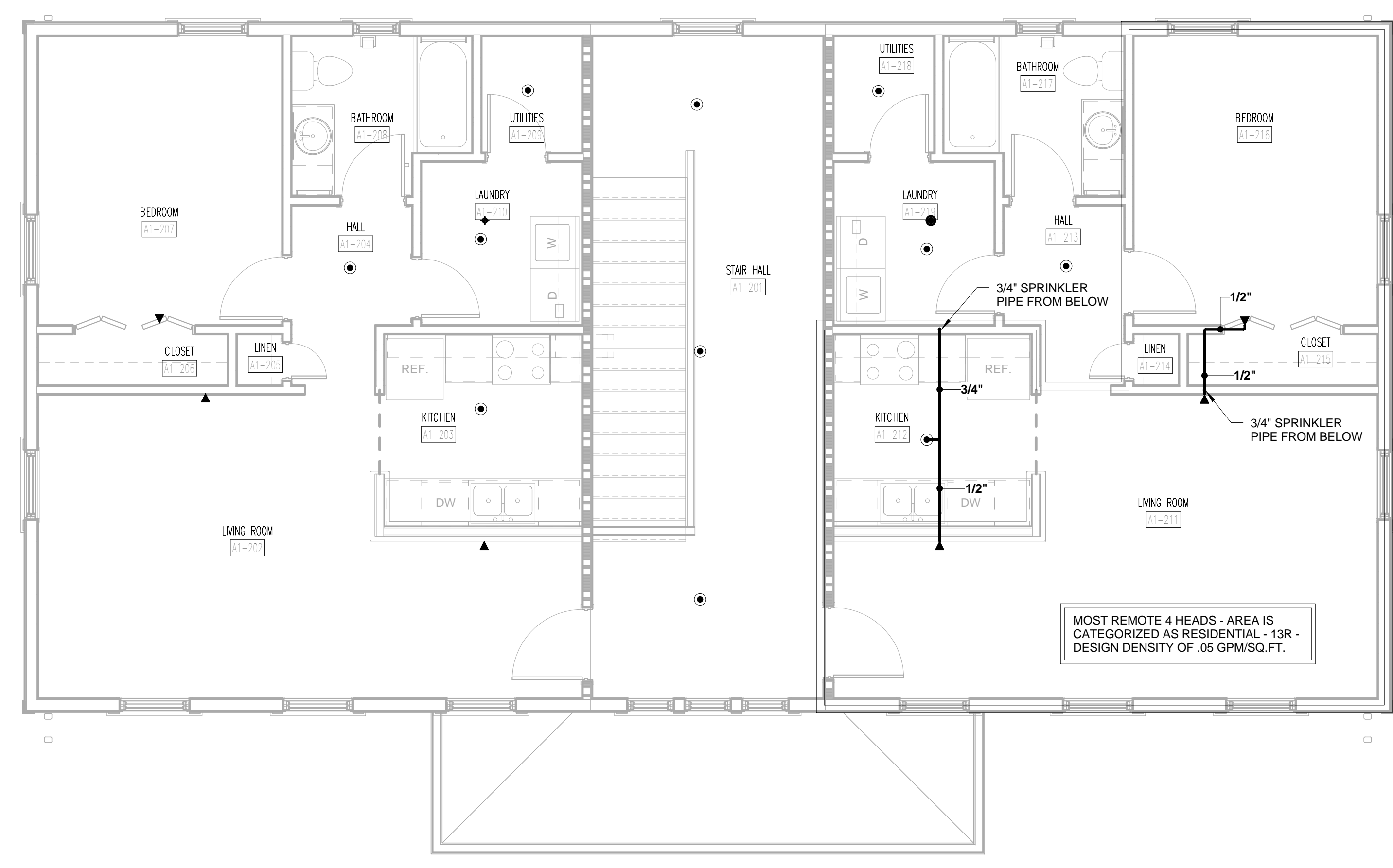
PROJECT NAME  
FIVE POINTS - PHASE 3

OWNER  
KNOXVILLE'S COMMUNITY  
DEVELOPMENT  
CORPORATION

PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915



TYPE A1 FIRST FLOOR FIRE PROTECTION PLAN  
① 1/4" = 1'-0"



TYPE A1 SECOND FLOOR FIRE PROTECTION PLAN  
② 1/4" = 1'-0"

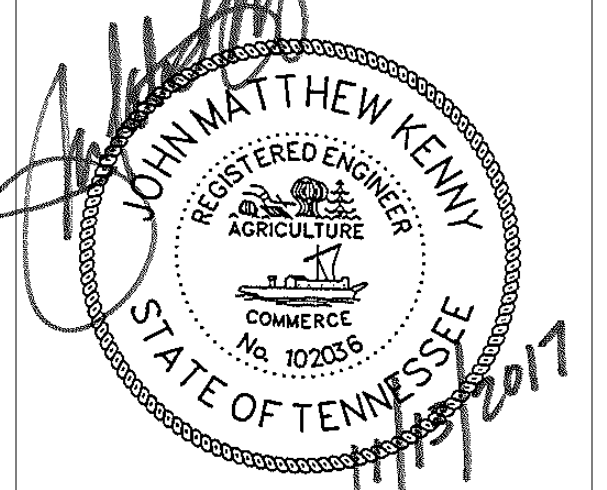
**WALL LEGEND**

	UNRATED PARTITION
	1 HOUR RATED PARTITION

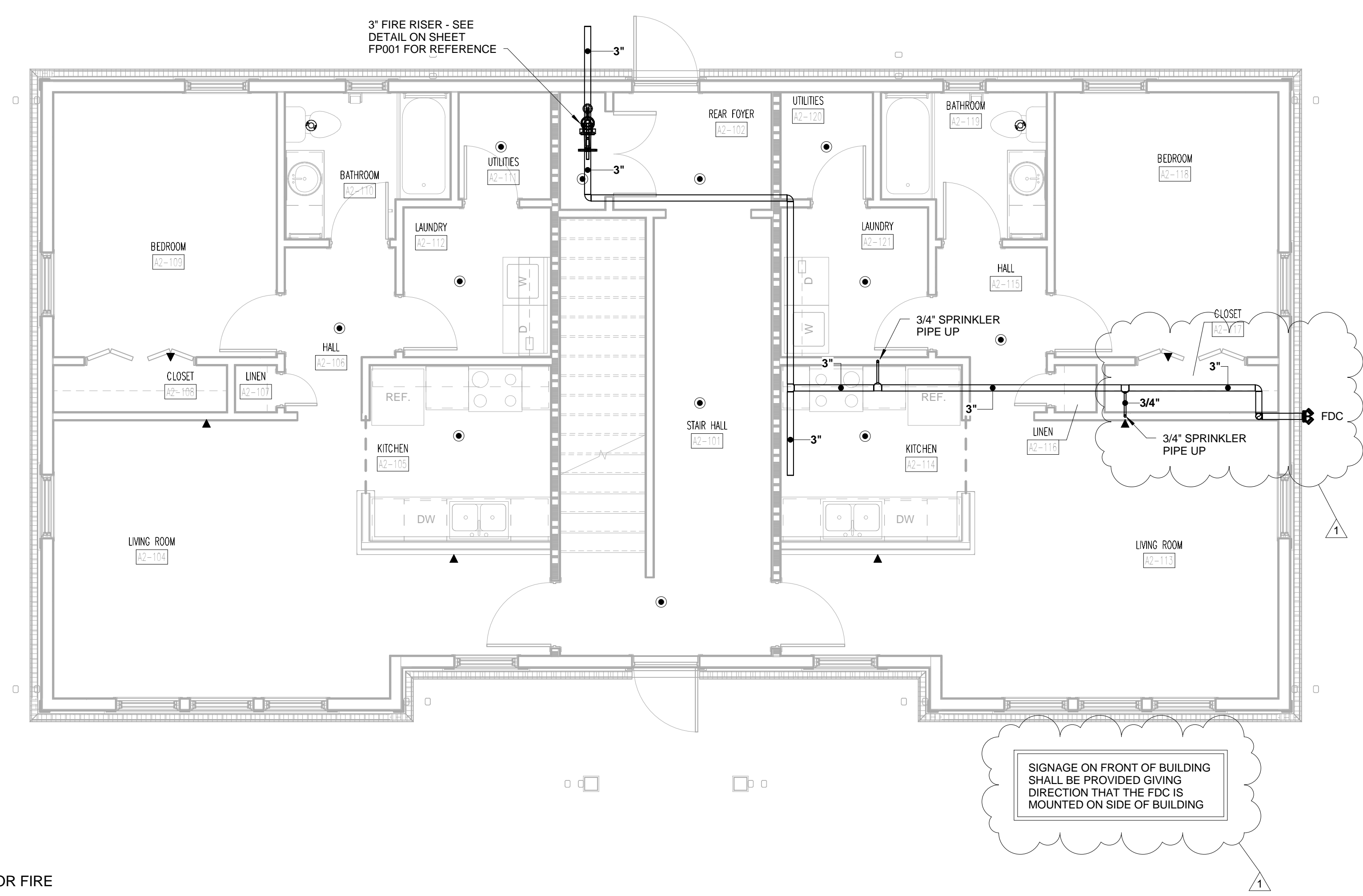
PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	SGP
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS

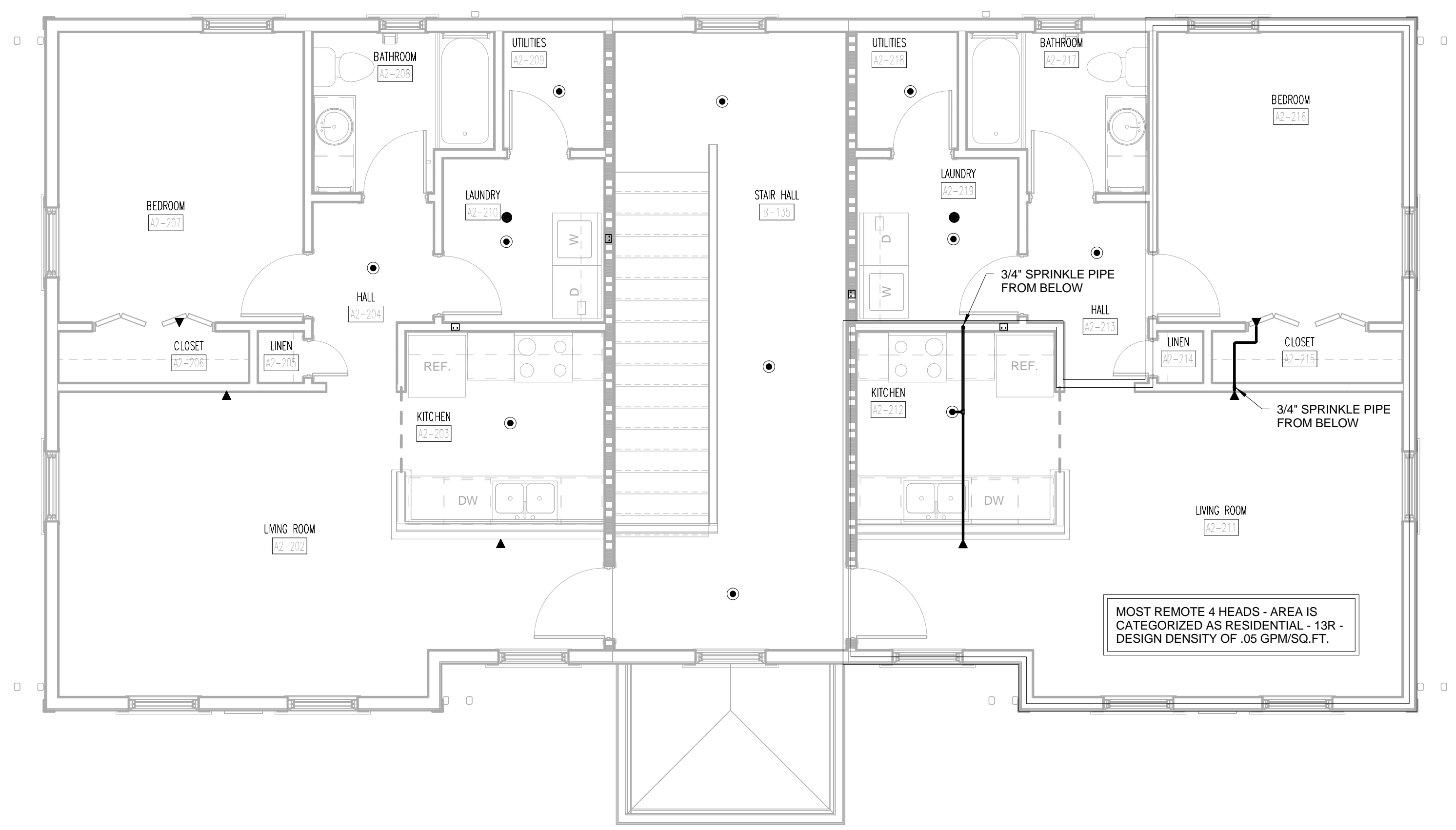
1	Addendum 1	11/13/17
---	------------	----------



PROJECT NUMBER  
 166200  
 PROJECT NAME  
 FIVE POINTS - PHASE 3  
 OWNER  
 KNOXVILLE'S COMMUNITY  
 DEVELOPMENT  
 CORPORATION  
 PROJECT ADDRESS  
 304 S. KYLE STREET  
 KNOXVILLE, TN 37915



TYPE A2 FIRST FLOOR FIRE PROTECTION PLAN  
 1/4" = 1'-0"



TYPE A2 SECOND FLOOR FIRE PROTECTION PLAN  
 1/4" = 1'-0"

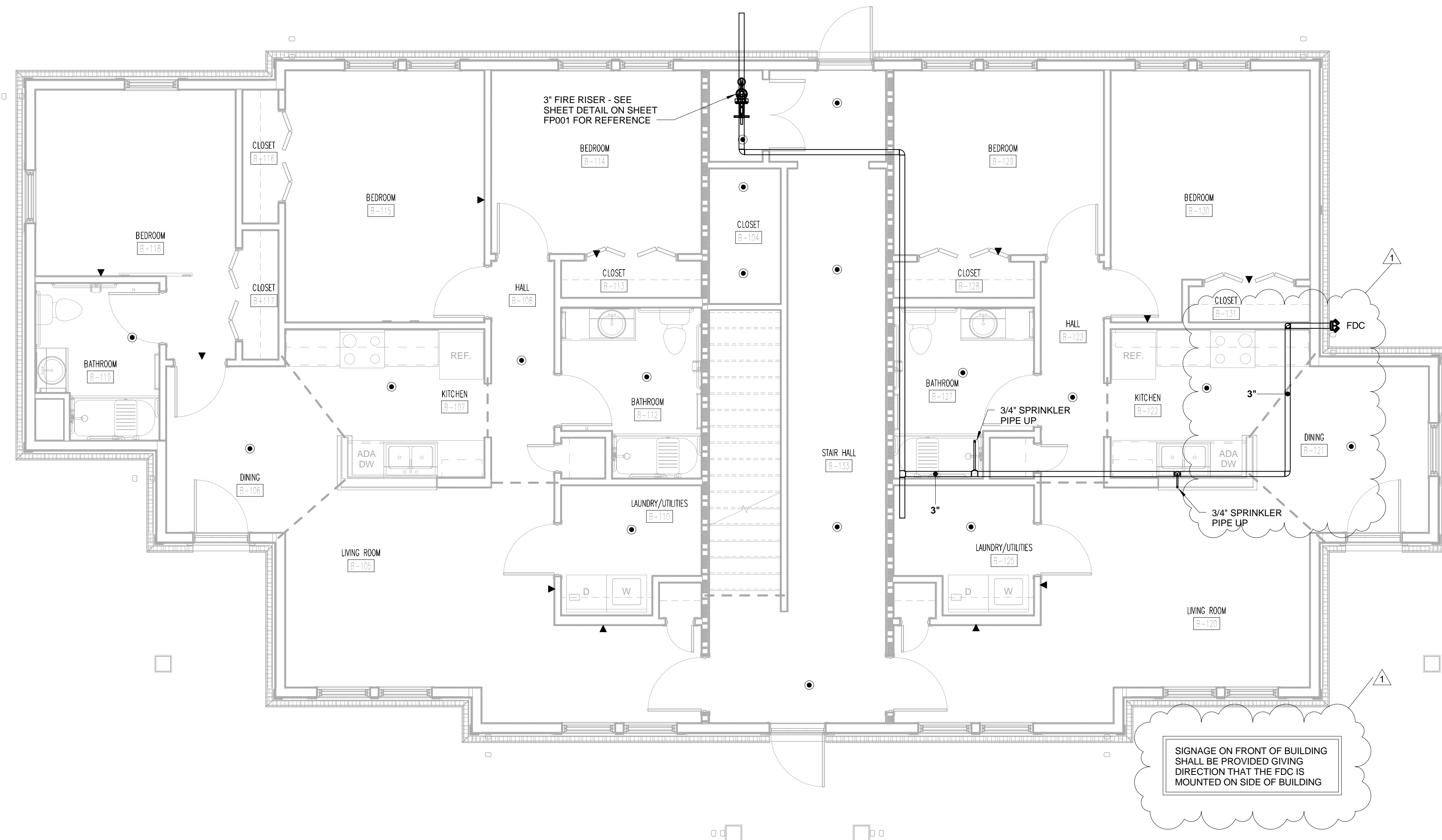
**WALL LEGEND**

	UNRATED PARTITION
	1 HOUR RATED PARTITION

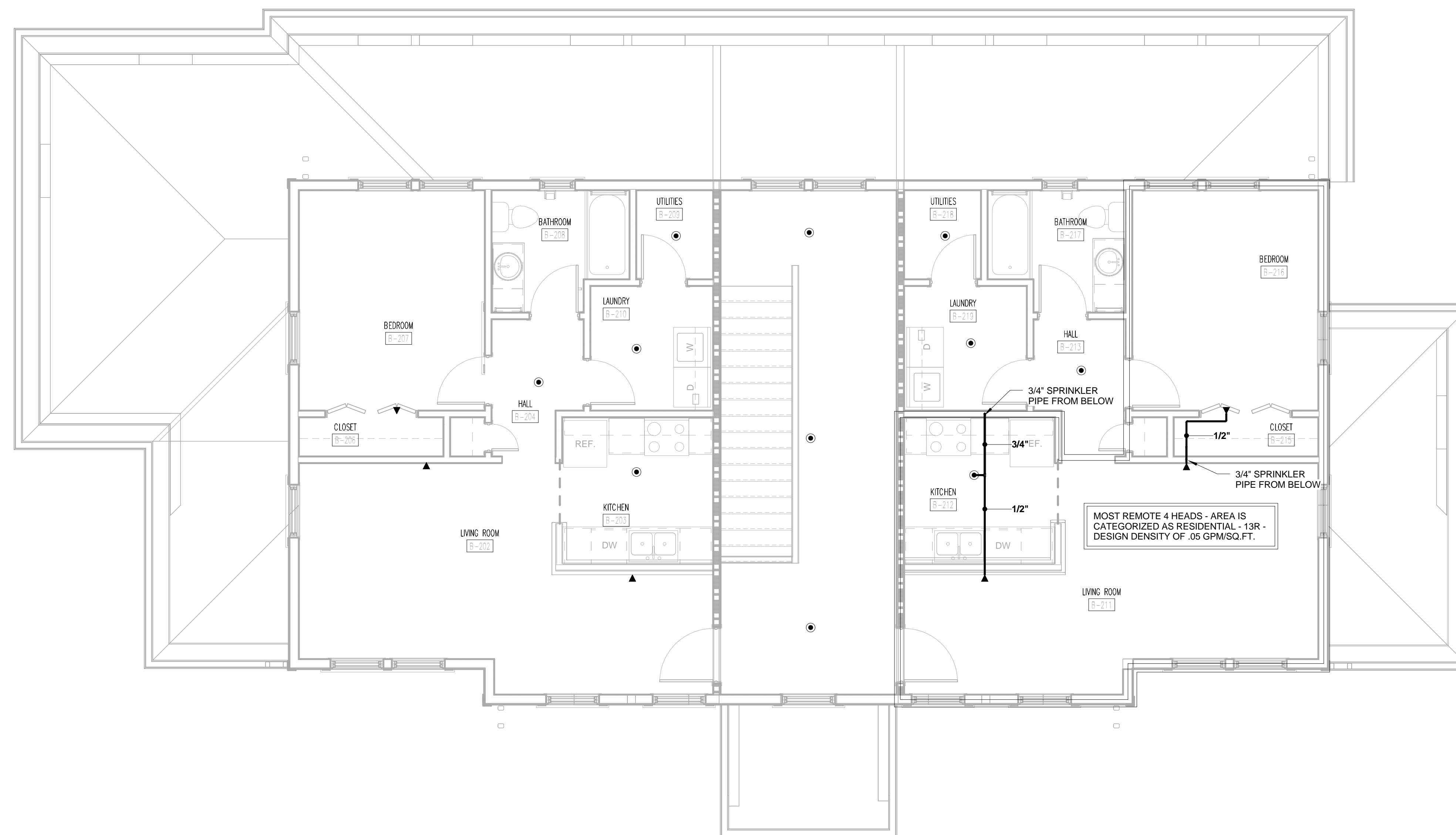
PARTNER-IN-CHARGE	MTD
PROJECT MANAGER	ELD
DRAWN BY	SGP
REVIEWED BY	JMK
ISSUE DATE	10-27-2017

REVISIONS

1	Addendum 1	11/13/17
---	------------	----------



① TYPE B FIRST FLOOR FIRE PROTECTION PLAN  
1/4" = 1'-0"

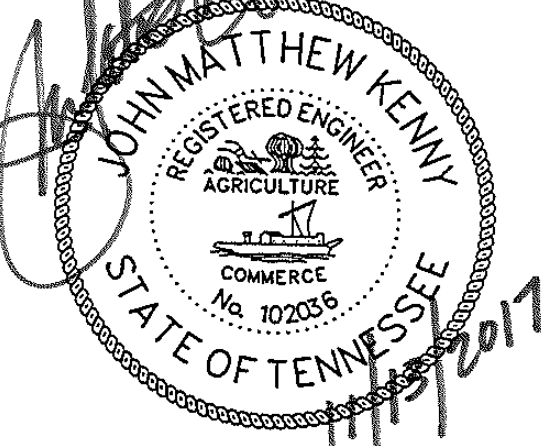


② TYPE B SECOND FLOOR FIRE PROTECTION PLAN  
1/4" = 1'-0"

oma

BARBERMcMURRY  
architects since 1915

505 Market St Suite 300 Knoxville, TN 37902  
1 865.934.1915 F 865.546.0242  
bma1915.com



PROJECT NUMBER  
166200  
PROJECT NAME  
FIVE POINTS - PHASE 3  
OWNER  
KNOXVILLE'S COMMUNITY  
DEVELOPMENT  
CORPORATION  
PROJECT ADDRESS  
304 S. KYLE STREET  
KNOXVILLE, TN 37915

**WALL LEGEND**  
 UNRATED PARTITION  
 1 HOUR RATED PARTITION

PARTNER-IN-CHARGE MTD  
 PROJECT MANAGER ELD  
 DRAWN BY SGP  
 REVIEWED BY JMK  
 ISSUE DATE 10-27-2017

REVISIONS  
 1 Addendum 1 11/13/17

**B-FP101**  
 TYPE B - FIRST AND SECOND FLOOR  
 FIRE PROTECTION PLANS