EarthCraft™ is a program of the Greater Atlanta Home Builders Association and Southface Energy Institute

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EarthCraft Multifamily Program Summary

The EarthCraft Multifamily Program is for developer certification of new construction, gut-rehabilitation, adaptive reuse, and renovation of low, mid and high-rise multifamily projects. The program is designed to accommodate both "affordable" and "market rate" project types.

The program is point based and includes three tiers of certification: CERTIFIED, GOLD, and PLATINUM. ENERGY STAR certification (New Homes or Multifamily High Rise) is required at the GOLD and PLATINUM levels depending on the building type. Appropriate ventilation based on ASHRAE guidelines is a requirement of the program implemented at either the unit or building level. Outside of these areas, the program is very flexible and can be customized by individual developers to suit their individual projects within the scoring system.

Typical approaches to reach EarthCraft energy efficiency requirements:

- Improve insulation levels and installation quality
- Better than "typical" low-e windows
- Integrated ballast and compact fluorescent lighting
- Installation of ENERGY STAR rated appliances

Certified projects are more energy efficient and less costly to operate. There is less communication of air between units allowing for the isolation of odors and sounds between units, and EarthCraft Multifamily projects are more durable. These projects have a smaller environmental footprint both during construction process and operation/occupancy.

Developers receive quality assurance and confirmation of program standards for the project through the work of the EarthCraft Technical Advisor and the benefits that come with that process.

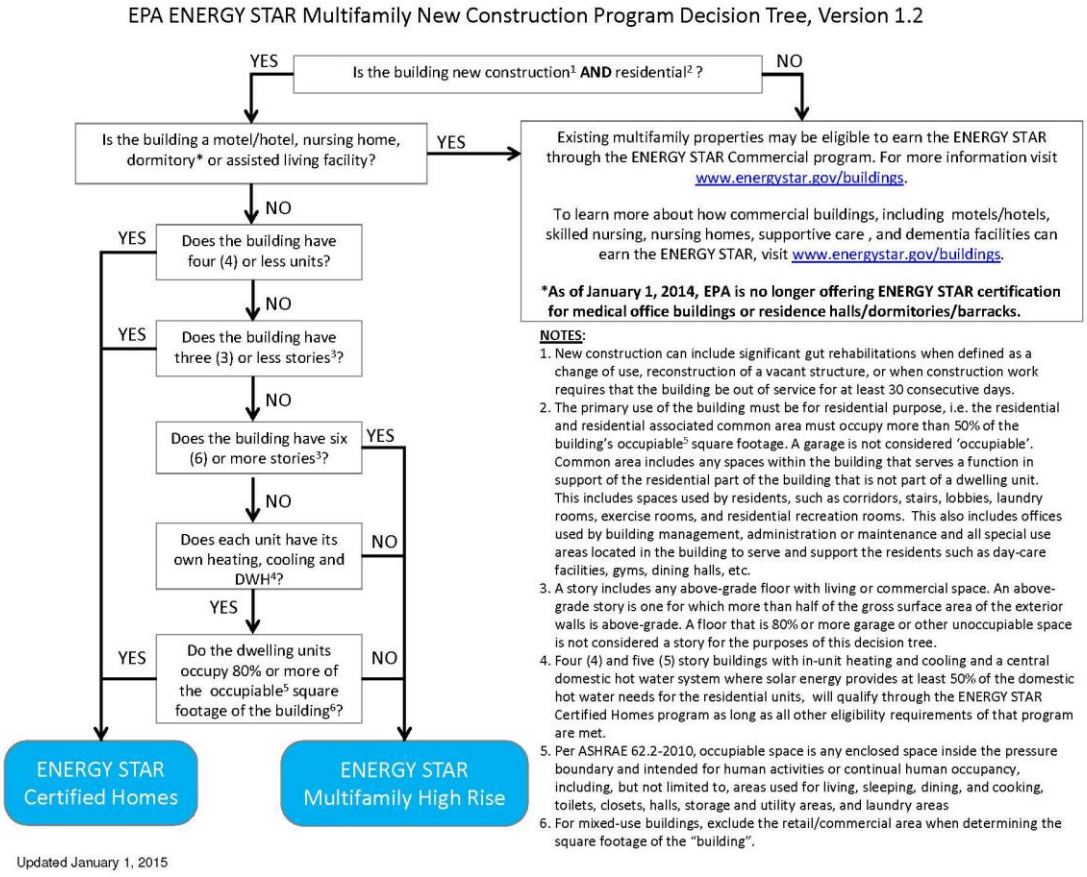
Training

Effective January 1, 2015, all site supervisors are required to attend the EarthCraft Multifamily training. Trainings are held at Southface and please visit http://www.southface.org/learning-center/trainings/ to sign up for trainings.

Project Eligibility

A project will be eligible for EarthCraft Multifamily if either of the following criteria is achieved:

A. All projects with stacked units sharing a floor or ceiling with another unit are eligible for participation in the EarthCraft Multifamily program. This includes both apartments intended for rental and condos intended for ownership. We use the ENERGY STAR flowchart to determine what type of program the project will follow:



Any projects that fall under ENERGY STAR Certified homes path, means they will qualify as low-rise. All others of course will qualify as mid-rise.

B. Duplex, row-home, and townhome projects are eligible for participation in the EarthCraft Multifamily program under the following criteria:

- ❑ The project is built for rental purposes and will be operated as such by the developer for a minimum of 5 years
- ❑ The entire project is completed by the same project team including but not limited to:
  - Architects
  - Engineers
  - General Contractors
  - Subcontractors/Trades
- ❑ The project is completed within a period of 18 months from the beginning of construction
- ❑ The project has consistent specifications and construction practices throughout

Note: It is the project team's responsibility to submit information supporting compliance with the multifamily criteria listed above. EarthCraft will review each request and will make the final determination based on the information provided.

C. Adaptive Reuse:

- ❑ Any project transforming a building from a previously non-residential use. This may include warehouses, hotels, gyms, school buildings, or other similar types. The adaptive reuse may be historic in nature.

ENERGY COMPLIANCE for Low Rise Residential, Mid/High-Rise Residential, Adaptive Reuse:

Reference the **High Performance Building Envelope** section of the EarthCraft Multifamily Guidelines for full details of required **Energy Compliance** at the CERTIFIED, GOLD, and PLATINUM certification levels. Please note that energy compliance requirements will vary between low-rise residential, mid/high-rise residential, and adaptive reuse projects.

Note: Enrollment in and participation in the EarthCraft Multifamily program does not ensure compliance or imply certification under an EPA ENERGY STAR program.

HVAC COMPLIANCE

Reference the **ENERGY EFFICIENT SYSTEMS** section of the EarthCraft Multifamily Guidelines for full details of current requirements for high performance HVAC design standards**.**

EarthCraft Multifamily Project Process

Process Overview

All EarthCraft Multifamily Developers and Technical Advisors must follow a specific project process in order to certify EarthCraft Multifamily projects. All steps of the process must be completed, including individual unit and building-level inspections, in order for a project to be eligible for certification. Each step in the EarthCraft project process is defined in detail on the following pages.

Pre-Construction	
1	Project Registration
2	Project Information Submittal
3	Preliminary Energy Model(s) or Analysis of Prescriptive Compliance
4	Preliminary Energy Model(s) Report Submittal(s) or Specifications reaching Prescriptive Compliance
5	EarthCraft Design Review
6	EarthCraft Design Review Report Submittal

Pre-Drywall	
7	Kick-Off Meeting
8	Kick-Off Meeting Report Submittal
9	Air Sealing Inspection(s)
10	HVAC Initial Diagnostics/Inspection(s)
11	Insulation Inspection(s)
12	Pre-drywall Inspection Submittal

Project Closeout	
13	Final Inspection(s)
14	Confirmed Energy Model(s)
15	Final Inspection Submittal
16	Certification Submittal
17	Certification

Step 1: Project Registration

To officially begin an EarthCraft Multifamily project, each project must be registered with EarthCraft prior to the Design Review. Online project registration is available at http://www.earthcraft.org/resources-for-earthcraft-professionals. The registration fee is non-refundable and does not guarantee the project will be certified. Fees paid online are dependent on the scope of work (i.e. renovation vs new construction). Please visit the registration page to familiarize yourself with current costs. This fee covers the costs of project/program administration, technical assistance from EarthCraft staff throughout design and construction, one on-site quality assurance visit for each project during construction (this may occur at pre-drywall or final inspection phase), final review of project compliance, and the printing of certificates upon successful completion of the program (upon request from the developer/builder group).

EarthCraft Technical Advisor Responsibilities

Confirm project registration with EarthCraft

EarthCraft Technical Advisors are responsible for ensuring that each project they provide services for is registered with EarthCraft.

Multifamily Developer Responsibilities

Register each project with EarthCraft

Participate in an information call with an EarthCraft representative prior to the design review and include any necessary project team members on that call. Once the project is registered, an EarthCraft representative will contact the Multifamily Developer to schedule the call. The call will last 45-75 minutes.

Multifamily Developers are responsible for registering each project and paying the applicable EarthCraft registration fee. This Project Registration Fee is additive of the confirmation/inspection fees charged by the EarthCraft Technical Advisor to the Multifamily Developer. This step may also be completed by the Owner or the Owner's Representative of the project, if applicable.

Note that the project will be tied to the version of the program active the day of registration. If the project does not begin design within 12 months of the registration date the project will be required to update to the current version of the program as applicable.

General Contractor Responsibilities

No responsibilities at this step in the process unless serving as the Owner's representative in charge of project registration.

Step 2: Project Information Submittal

Each EarthCraft Multifamily project must be inspected by an EarthCraft Technical Advisor throughout the construction project. The Multifamily Developer or Owner must contract with an EarthCraft Technical Advisor. The project information submittal step provides the information necessary for subsequent steps in the process.

EarthCraft Technical Advisor Responsibilities

Follow-up with Multifamily Developer

- Review Project Information Submittal and ask questions about any items of concern
- Confirm preliminary EarthCraft Worksheet meets minimum program requirements
- Identify any appropriate points of clarification for the plans and specifications to support program compliance during construction
- Request Project Information Submittal from EarthCraft Multifamily Developer if not received two weeks prior to Design Review

Multifamily Developer Responsibilities

Submit Project Information to EarthCraft Technical Advisor

The following information must be submitted to the EarthCraft Technical Advisor at least two weeks prior to the Design Review:

- Project Plans including:
  - Cover page
  - Site plan
  - Building plans
  - Unit floor plans
  - Unit schedule
  - Elevation(s)
  - Window/door schedule
  - For whole building simulations (eQUEST, TRACE, or other approved by EarthCraft) the project team will need to furnish a full set of plans in both PDF and CAD (.dwg) format (Architectural and MEP).
- Construction Specification Sheet
- Load calculation (ACCA Manual J Version 8 or later or equivalent) and acknowledgement
- Preliminary EarthCraft Worksheet
- Fresh Air Ventilation strategy and acknowledgement to achieve ASHRAE 62.2 and EarthCraft Multifamily requirements
- Additional confirmation documentation as required by EarthCraft Technical Advisor based on items identified by the Multifamily Developer on the EarthCraft Worksheet (e.g. Manual D duct design).

Note: The team may choose to hold the design review at the conceptual design phase to engage the EarthCraft program, process, and procedures early on. If this occurs then the information above must be submitted at the appropriate time (when available) but must be submitted prior to the commencement of any construction and/or EarthCraft site inspections.

General Contractor Responsibilities

No responsibilities at this step in the process unless acting as the Owners Representative.

Step 3: Preliminary Energy Model(s) or Analysis of Prescriptive Compliance

After receiving a complete Project Information Submittal package from the Multifamily Developer, the EarthCraft Technical Advisor and project team will follow the steps below to show energy compliance with EarthCraft Multifamily program standards.

For unit level energy models the EarthCraft Technical Advisor will also serve as the HERS Rater. For whole building simulations the energy modeler must be a qualified professional and may be the EarthCraft Technical Advisor, Southface Energy Institute, a member of the design team, or an outside consultant.

Note: EarthCraft Multifamily Renovation projects following the Renovation Worksheet must complete and submit existing condition models based on the pre-assessment and improved models based on the renovation construction specifications.

EarthCraft Technical Advisor Responsibilities

Guide the project team in the development of preliminary unit level energy model(s), building simulation (eQUEST or equivalent program), or show compliance with the appropriate prescriptive path.

Low-Rise projects:

For *CERTIFIED* level projects not seeking ENERGY STAR for Homes Version 3 certification, show **Energy Compliance** for low-rise developments through unit level models of all qualifying worst case unit types in the project.

In order to identify the worst case unit:

A model will be created for each distinct floor plan on each distinct floor level type (bottom, middle & upper floors). Interior and exterior configurations should be included in this analysis as well. Mid-level, interior configurations can be excluded from the analysis. The "worst case" (highest HERS Index) model for each unit type should be selected to represent all units belonging to that unit type in the project.

Unit types that are within 10% conditioned floor area and have equal number of bedrooms and bathrooms can be considered the same unit-type. Worst-case analysis must consider worst-case orientation, all known option packages, and applicable site location(s).

For *GOLD* and *PLATINUM* level projects seeking ENERGY STAR for Homes Version 3 certification, all unit types in the building must be modeled (following current ESTAR V3 policy).

Mid-Rise projects and above:

Show **Energy Compliance** for mid/high-rise developments through a building level simulation using eQUEST software following ENERGY STAR Multifamily High-Rise policies and procedures and achieving ESTAR MFHR energy compliance targets.

Based on the results of the model/simulation, determine the project's ability to meet program requirements. If not reaching program requirements, develop an energy improvement analysis to reach EarthCraft Multifamily program requirements identifying effective trade-offs for improving building performance within the model/simulation.

> *Note: For mid/high rise project using a building level simulation, EarthCraft will require the completion of an EarthCraft Quality Assurance Review. There will be a standard fee applied for the completion of this review. Contact EarthCraft for further details.*

OR

Analysis of **Prescriptive Energy Compliance** based on desired certification tier and appropriate building type.

CERTIFIED level projects will follow the **EarthCraft Multifamily prescriptive path** while *GOLD and PLATINUM* projects must comply with the appropriate **ENERGY STAR prescriptive path** (ENERGY STAR for Homes V3 or ENERGY STAR Multifamily High-Rise).

Note: Enrollment in and participation in the EarthCraft Multifamily program does not ensure compliance or imply certification under an ENERGY STAR program.

Energy Modeler Responsibilities

The Energy Modeler will follow all EarthCraft requirements related to unit level or whole building simulation energy models. The responsibilities of the Energy Modeler will include each of the following elements as applicable to the low-rise or mid-rise EarthCraft Multifamily program.

1. The Energy Modeler will review and sign required EarthCraft MF affidavits related to energy modeling requirements. This will inform the Energy Modeler of the current EarthCraft Multifamily requirements and will detail all responsibilities of the consultant. The affidavits will be posted online at www.earthcraft.org/multifamily within the resources page.
2. Develop an energy model in accordance with all EarthCraft Multifamily standards at the time of project registration. EarthCraft staff can provide appropriate details related to such standards relative to the date the project registered. The modeler may also review the **Project Eligibility** section of the **EarthCraft Multifamily Manual** and the **High Performance Building section** of the **EarthCraft Multifamily Technical Guidelines** for full details of the required modeling process.

   A. For low-rise projects:

   - If tracking the *CERTIFIED* level, create a unit level model for the qualifying worst case unit(s) in the project.
   - If tracking *GOLD* or *PLATINUM*, create a unit level model for all unit type(s) within the project and follow all ENERGY STAR for Homes V3 rating requirements.

   OR

   B. For mid-rise projects and above:

   - Create a building simulation model using eQUEST software in accordance with the current version of the *ENERGY STAR Multifamily High Rise Program Simulation Guidelines*.

3. Develop an energy model report that fully details all components of the model/simulation.

   At minimum, the report should include the following:

   A. For low-rise projects include:

   - The EarthCraft Low-Rise specification sheet specifying the energy model inputs to be verified in the field.

   OR

   B. For mid-rise projects and above:

   - Complete the EarthCraft Mid-Rise specification sheet specifying the building simulation inputs to be verified in the field.
   - Complete the full ENERGY STAR Performance Path Calculator excel workbook must be submitted. If the project is pursuing the GOLD and PLATINUM tier full compliance with the ENERGY STAR Multifamily High Rise program is required.

     AND

   - Develop the model:
     - You will be need to submit the preliminary eQUEST files (the two .pd2 and the two .inp files for the baseline and the proposed building).

For all projects:

If the outcome of the energy model passes EarthCraft efficiency standards the report should detail all building components which the EarthCraft Technical Advisor must verify in the field.

If the energy model does not reach EarthCraft efficiency standards the report should identify potential energy efficiency upgrades to achieve the required efficiency goals.

4. When there is a change in the building components at any point during the project's design or construction, the Energy Modeler is required to make the following updates:

   A. Update all energy models/simulations to reflect the changed or proposed specification changes.

   AND

   B. Update all reports to reflect the changes in the model and detail the changes to the efficiency of the unit/building design.

   AND

   C. When there are proposed change(s) to the building specifications, the Energy Modeler will report any simulation results that have either a positive or negative impact on the performance of the building related to the efficiency goals of the EarthCraft program. At minimum, the design team, EarthCraft, and the EarthCraft Technical Advisor must be notified of such changes.

   AND

   D. Using information gathered by the EarthCraft Technical Advisor, update the simulation and/or verify compliance with As Built construction.

      Verification must include:

      - Efficiency ratings of HVAC
      - Efficiency of major appliances (any included in the simulation report)
      - Efficiency of service water heating/DHW systems
      - Verification of all building envelope components
      - Verification of ventilation design

5. Upon completion of the project the energy modeler must turn in the following items to EarthCraft for the Quality Assurance Review:

   A. For low-rise projects include:
      - The field verified REM Rate file(s) and/or REM Reports detailing the field verified model for each modeled dwelling unit.

   OR

   B. For mid-rise projects include:

      - The EarthCraft Mid-Rise specification sheet specifying the building simulation inputs to be verified in the field.
      - The full ENERGY STAR Performance Path Calculator excel workbook must be submitted. If the project is pursuing the GOLD and PLATINUM tier full compliance with the ENERGY STAR Multifamily High Rise program is required.

        AND

      - Provide files for:
        - The preliminary eQUEST files (the two .pd2 and the two .inp files for the baseline and the proposed building).

Multifamily Developer Responsibilities

Provide EarthCraft Technical Advisor with any updates to the design information that was provided for the design review so that those updates may be accurately represented in the energy model as appropriate.

General Contractor Responsibilities

No responsibilities at this step in the process.

Step 4: Preliminary Energy Model(s) Report Submittal(s) or Specifications Reaching Prescriptive Energy Compliance

Upon completion of the preliminary energy modeling, EarthCraft Technical Advisors are required to provide model reports and associated documents to EarthCraft. At this phase, the EarthCraft Technical Advisor should begin to create building and unit type records in salesforce, which will be required to be completed prior to the pre-drywall inspections.

EarthCraft Technical Advisor Responsibilities

Submit documents to EarthCraft, the Multifamily Developer, and the General Contractor

Submit the following documents to EarthCraft, the Multifamily Developer, and the General Contractor at least 5 business days prior to the Design Review. (If the Design Review was conducted at the conceptual design phase, these documents will be due prior to the Kick-Off meeting with sufficient time for EarthCraft to review and for the project to update any necessary construction specifications such as the fresh air ventilation strategy.):

- Project Plans including:
  - Cover page
  - Site plan
  - Building plans
  - Unit floor plans
  - Unit schedule
  - Elevation(s)
  - Window/door schedule
- Load calculation (ACCA Manual J Version 8 or later or equivalent)
- Compliant fresh air ventilation strategy
- Preliminary EarthCraft Worksheet
- Preliminary Energy Model Results

Projects meeting Energy Compliance through model simulation

Low-Rise Projects

- ENERGY STAR for Homes Version 3 Verification Summary Report (draft watermark OK if print permission not enabled).
- If ENERGY STAR for Homes Version 3 certification is also being pursued, the project must comply with all additional model requirements of that program.

Mid-Rise Projects

Provide to EarthCraft:

- The full ENERGY STAR Multifamily High Rise Performance Path calculator excel workbook, completed in accordance with the ENERGY STAR MF High Rise Modeling Guidelines. If the project is pursuing the GOLD and PLATINUM tier full compliance with the ENERGY STAR Multifamily High Rise program is required.
- The preliminary eQUEST files (the two .pd2 and the two .inp files for the baseline and the proposed building).
- The EarthCraft Mid-Rise specification sheet.

There is access on the EarthCraft website resources page for the Energy Star Highrise Modeling Manual for your convenience.

Projects meeting Energy Compliance through prescriptive measures

- List of building specifications and energy components showing compliance with the appropriate prescriptive path (based on desired certification tier and building type).
- Verify compliance with the appropriate prescriptive path documents (EarthCraft Certified, ENERGY STAR for Homes Version 3, ENERGY STAR Multifamily High Rise).

Note: Enrollment in and participation in the EarthCraft Multifamily program does not ensure compliance or imply certification under an ENERGY STAR program.

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Review model report and discuss any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received 5 business days ahead of the Design Review meeting

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Review model report and discuss are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received 5 business days ahead of the Design Review meeting

Step 5: EarthCraft Design Review

The EarthCraft Design Review is an opportunity to identify project goals and look carefully at the building and site plans to determine how the EarthCraft program can be best applied to meet the project goals. The EarthCraft worksheet and energy modeling results will be used to guide the discussion. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Design. An EarthCraft Design Review must be conducted on each multifamily project.

Scope

During the EarthCraft Design Review, the EarthCraft Multifamily Developer, General Contractor and EarthCraft Technical Advisor should discuss the program requirements for construction specifications, documentation and submittal timelines, inspection visits and testing, fees and payment timelines, and communication strategies. The EarthCraft Multifamily Developer, General Contractor and EarthCraft Technical Advisor will review the building plans for project goals and EarthCraft criteria incorporation. If available, the Multifamily Developer, General Contractor and EarthCraft Technical Advisor should also utilize the energy model to identify optimum building strategies and systems for maximizing energy performance while minimizing construction costs. EarthCraft encourages the Multifamily Developer and General Contractor to invite other project team members to participate in the EarthCraft Design Review for maximum coordination and project communication of project goals, program requirements, and roles and responsibilities.

Note: The team may hold the design review at the conceptual design phase prior to full plan development.

Objectives

Successful EarthCraft Design Reviews will accomplish the following objectives:

- Establish rapport building between EarthCraft Multifamily Developer, General Contractor and EarthCraft Technical advisor, and other team members
- Define a communication strategy
- Develop EarthCraft compliance strategies as well as roles and expectations

Agenda

Every EarthCraft Design Review should include the following agenda items and additional items as identified by the Multifamily Developer, General Contractor, EarthCraft Technical Advisor and project team members:

- EarthCraft Program Introduction/Summary
  - Review of technical guidelines and design review packet
  - Confirmation that the project can meet mandatory items and minimum point requirements in every program category
- Review EarthCraft documentation requirements, including EarthCraft forms
- Thermal Bypass Checklist
- Requirements:
  - Kick-Off meeting
  - Air sealing inspections
    - Discussion on air sealing requirements
  - HVAC rough in tests
    - Discussion on duct sealing requirements
  - Insulation inspections
    - Discussion on insulation requirements
  - Final inspections
- Sampling procedures (if applicable)
  - Review of builder sampling application
- Review of load calculation (Manual J) and most current fresh air requirements
  - Confirmation that the HVAC load calculation is appropriate and accurate
  - Confirmation that the fresh air ventilation strategy is appropriate
- Review of preliminary energy model
  - HERS report and summary
  - Construction Specification Sheet

- Review of selected items on the EarthCraft Multifamily worksheet
- Questions

EarthCraft Technical Advisor Responsibilities

Preparation

In preparation for the EarthCraft Design Review, the EarthCraft Technical Advisor must:

- Confirm Multifamily Developer has completed Step 1: Project Registration
- Complete Step 2: Project Information Submittal
- Complete Step 3: Preliminary Energy Model(s)
- Complete Step 4: Preliminary Energy Model Report Submittal

Facilitate meeting

Review and explain each item in the agenda (see above)

Collect documentation

- Fresh air Ventilation Acknowledgement (available online)
- Load Calculation Acknowledgement (available online)
- Sign In sheet

Documentation to hand out to all design review participants

- Manual (including sponsor list)
- Copies of all reports (worksheets, fact sheets)
- Directions on how to download or view on ftp, if applicable
- Directions on Quality Assurance Plan for Sampling, if applicable (available online)

Discuss Preliminary Energy Model results, unless the Design Review is taking place at the conceptual stage.

Notification of the project's:

- Eligibility to meet program requirements
  - Projects meeting program requirements and seeking to advance their construction practices may work on additional variations in construction techniques to further improve the energy efficiency, comfort and durability of the project
- Effective cost trade-offs for improving building performance
- Options developed to meet program requirements if a project is ineligible

Multifamily Developer Responsibilities

Preparation

In preparation for the Design Review, the Multifamily Developer must:

- Complete Step 1: Project Registration
- Complete Step 2: Project Information Submittal
- Complete Step 3: Preliminary Energy Model or Analysis of Prescriptive Compliance*
  *Design review may be held before Step 3 is completed
- Determine project goals and probable strategies for EarthCraft compliance
- Generate a copy of the site plan and unit plans for use during the Design Review
- Generate a copy of Erosion Control Workshop Certificate
- Complete Fresh Air and Load Calculation Acknowledgment Forms (available online)

Schedule the EarthCraft Design Review

The Multifamily Developer is responsible for scheduling the EarthCraft Design Review with the EarthCraft Technical Advisor and other project team members prior to construction starting on the project. EarthCraft Design Reviews typically take three to five hours depending on project size, Multifamily Developer's and General Contractor's prior experience working with energy efficiency or green building programs, and Multifamily Developer's and General Contractor's knowledge and familiarity with EarthCraft Multifamily.

Arrange for all relevant stakeholders to attend the meeting:

- Required

    - EarthCraft Technical Advisor
    - Multifamily Developer (and Owner's Representative, if applicable)
    - General Contractor
        - Project Manager
        - Site Supervisor
        - Quality Assurance Designee
    - Architect
    - Mechanical Engineer
- Optional but strongly recommend
    - Trade representatives
        - Air Sealing
        - Insulation
        - Framing
        - HVAC
        - Weather Barrier/Window flashing
    - Civil Engineer
    - Landscape architect
    - Other consultants involved in the development process

Attendance

Attend meeting

General Contractor Responsibilities

Attendance

Attend meeting

Step 6: EarthCraft Design Review Report Submittal

Upon completion of the Design Review Meeting, the EarthCraft Technical Advisor provides meeting minutes to the Multifamily Developer, General Contractor and EarthCraft. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Design Review as reported and discussed by the EarthCraft Technical Advisor.

Technical Advisor Responsibilities

Submit documents to EarthCraft, the Multifamily Developer, and the General Contractor

Submit the following documents to EarthCraft, the Multifamily Developer, and the General Contractor within ten business days of the Design Review that include:

- Meeting minutes
  - Summary of suggested modifications that should be incorporated to reach certification and hold meeting with stakeholders for any needed clarification.
  - Updated summary of information on construction specifications that affect the energy model or prescriptive energy compliance
  - General information about the Kick-Off Meeting and inspection scheduling
  - Additional clarification on load calculation and ventilation requirements including fresh air intake strategy(when applicable)
- Updated EarthCraft Multifamily Worksheet
- Sign In Sheet

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 10 business days of the meeting

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 10 business days of the meeting

Step 7: Kick-Off Meeting

All EarthCraft Multifamily projects must have a Kick-Off meeting, led by an EarthCraft Technical Advisor, during the framing stage of the projects construction and prior to the mechanical, electrical and plumbing rough in. During this on-site meeting, EarthCraft requirements and guidelines are reviewed with the general contractor's project manager and site supervisor, and all subcontractors whose work will be impacted by EarthCraft standards. This meeting provides an on-site review of EarthCraft details, techniques, expectations and specification requirements at the commencement of construction. Mock up units are highly recommended to confirm during the kick-off meeting that all program details have been effectively addressed and trades are able to efficiently implement design specifications.

Design Team Responsibilities

Prior to the EarthCraft Multifamily Kick-Off Meeting, the design team must submit the heating and cooling system design along with the air handler/ductwork design and ventilation strategy to the EarthCraft Technical Advisor for review. The EarthCraft Technical Advisor will review the strategy for compliance with EarthCraft Program standards and the approved designs. The Design Team must include the approved design in the mechanical drawings of the construction set.

EarthCraft Technical Advisor Responsibilities

Prior to the EarthCraft Multifamily Kick-Off Meeting,

Determine design strategy compliance with all elements of the Energy Efficient Systems.

- Heating and Cooling
- Ductwork/Air Handler
- Ventilation

Note: This includes identifying issues which may reduce efficiency of air flow including (but not limited to) any unnecessarily long runs in ductwork (supply/return/exhaust/intake), improper duct take off spacing at the supply plenum/trunk line and potential obstructions for proper spacing, and potential to limit or eliminate right angles in ductwork (supply/return/exhaust/intake).

Send written approval to Design Team upon determination of ventilation strategy compliance.

At the EarthCraft Multifamily Kick-Off Meeting, review project on-site with General Contractor and the following subcontractors during early stages of construction

All participants

- Identify possible building envelope issues not noted at the plan review stage and work with General Contractor and appropriate subcontractor to suggest appropriate modifications or corrections.
- Review design expectations and specifications with HVAC, insulation, air sealing, framing, and weather barrier subcontractors prior to commencement of their work to ensure compliance with all applicable program standards.
- Meet with all appropriate contractors to outline expectations and answer questions.

General Contractor, Site Supervisor and General Contractor Quality Assurance Designee

- Review inspection forms and Quality Assurance responsibilities
- Review required inspections at each phase and determine scheduling

Framing Contractor

- At commencement of framing confirm implementation of appropriate and specified framing details and techniques to ensure compliance with all applicable program standards.
- Confirm utilization of appropriate and specified framing details and techniques

Air Sealing and Insulation Contractor

- Review design expectations and specifications at commencement of their work to ensure compliance with all applicable program standards.
- If necessary, identify building envelope issues not noted at the plan review stage and work with the General Contractor to suggest appropriate modifications or corrections.

HVAC Contractor

- Review design expectations and specifications at commencement of their work to ensure compliance with all applicable program standards.

Distribute and collect documentation from each trade

- Sign in sheet
- Trade sign-off

Multifamily Developer Responsibilities

Prior to the EarthCraft Multifamily Kick-Off Meeting, follow-up with the EarthCraft Technical Advisor.

Review any changes in the ventilation design strategy and ask questions if there are any items of concern or confusion

Follow-up with General Contractor

Contact General Contractor if Kick-Off meeting has not been scheduled and held prior to the beginning of mechanical rough-in on the first unit in the first building

General Contractor Responsibilities

Prior to the EarthCraft Multifamily Kick-Off Meeting, follow-up with the EarthCraft Technical Advisor.

Review any changes in the ventilation design strategy and ask questions if there are any items of concern or confusion

Schedule and ensure attendance

Arrange for all relevant stakeholders to attend the meeting:

- All trades listed below
  - Framing
  - Weather Barrier/Window flashing
  - Insulation
  - Air Sealing
  - HVAC
  - Plumbing
  - Electrician
- EarthCraft Technical Advisor

Notify Multifamily Developer

Notify Multifamily Developer of date and time of meeting

Ensure project is ready for meeting

Coincide with the project pre-construction meeting; if no project meeting is scheduled, this meeting should occur after all trades are under contract, but prior to the beginning of mechanical rough-in on the first unit in the first building.

Attendance

Attend meeting

Step 8: Kick-Off Meeting Report Submittal

Upon completion of the Kick-Off Meeting, the EarthCraft Technical Advisor provides meeting minutes reporting to the Multifamily Developer, General Contractor and all meeting attendees, and EarthCraft. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Kick-Off Meeting as reported by the EarthCraft Technical Advisor.

Technical Advisor Responsibilities

Submit documents to EarthCraft, the Multifamily Developer, and the General Contractor

Submit the following documents to EarthCraft, the Multifamily Developer, and the General Contractor within ten business days of the Kick-Off Meeting that include:

- Meeting minutes
  - General information about the inspection scheduling
- Trade forms
- Fresh Air and Load Calculation Acknowledgment forms (to be submitted to EarthCraft only)

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 10 business days of the meeting

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read meeting minutes and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 10 business days of the meeting

Step 9: Air Sealing Inspections

All EarthCraft Multifamily projects must pass an Air Sealing Inspection(s) conducted by an EarthCraft Technical Advisor on each individual unit. The Air Sealing Inspection provides an on-site evaluation of the unit in terms of the EarthCraft Multifamily guidelines, including a visual inspection of the air sealing. This inspection occurs before insulation is installed to inspect for required air sealing measures including plumbing and electrical penetrations, window and door rough openings, chases, band area and exterior sheathing penetrations, etc. The Air Sealing Inspection provides opportunities to identify additional construction considerations that may impact the performance of the building. The EarthCraft Multifamily Worksheet and Inspection Records provide a full list of the required air sealing items.

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the Air Sealing Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. Prior to Air-Sealing inspections, the EarthCraft Technical Advisor must complete all building and unit type records in salesforce. At the Air Sealing Inspection, EarthCraft Technical Advisors must:

- Visually inspect each unit prior to insulation application to identify potential air sealing issues.
- Review identified issues on site with General Contractor, and appropriate subcontractor if available.
- Confirm that plans represent project as constructed.
- Confirm that the energy model Building Report represents project as constructed.
- Confirm that the Construction Specification Sheet represents project as constructed.
- Confirm that items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer at the inspection).
- While in the field, create an Air Sealing Inspection Record for the building and or building section inspected. The building and units inspected must be identified in the "General Information" section at the top of the record, and a new Air-Sealing inspection record should be created for each subsequent building section until all units have passed inspection.
- The Erosion and Sediment Control as well as the Building Durability inspection records must also be created prior to final inspections.

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule Air Sealing Inspections

The General Contractor is responsible for scheduling the inspection.

- General Contractor notifies EarthCraft Technical Advisor that project will be ready for inspection at least 1 week in advance.

Ensure project is ready for inspection

- Using the Builder Quality Assurance document as a guide, check to ensure all air sealing is complete on all building envelope penetrations at the unit and building level
- All required confirmation documentation is ready for the EarthCraft Technical Advisor to review onsite as specified on the EarthCraft Worksheet and in the EarthCraft Multifamily Guidelines

Step 10: HVAC Initial Diagnostics/Inspection

All EarthCraft Multifamily projects must pass a HVAC Initial Diagnostics/Inspection conducted by an EarthCraft Technical Advisor. The HVAC Initial Diagnostics/Inspection provides an on-site evaluation of the unit in terms of the EarthCraft Multifamily guidelines, including a visual inspection of duct sealing as well as Duct Blaster diagnostic testing of each unit type in that section of the building. The HVAC Initial Diagnostics/Inspection provides opportunities for identifying additional construction considerations that may impact the performance of the home. When the first floor or section of the first building is roughed-in, the project is ready for an EarthCraft Technical Advisor to visit the site, pressure test the duct systems, and inspect for mastic sealing.

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the HVAC Initial Diagnostics/ Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. At the HVAC Initial Diagnostics/ Inspection, EarthCraft Technical Advisors must inspect and confirm:

- Every unit
  - Every unit's HVAC equipment and duct systems at rough-in for sizing compliance (based on load calculation), Energy Code compliance, and installation design recommendations. A minimum of one connection in each system must be visually inspected for proper mastic sealing details.
  - Plans, Construction Specification Sheet, and Building report represent home as constructed.
  - While in the field, create a Multifamily HVAC Inspection Initial inspection record for the building and or building section inspected. The building and units inspected must be identified in the "General Information" section at the top of the inspection record and a new inspection record should be created for all subsequent building section until all units have passed inspection.
  - Items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer at the Inspection).
  - The Erosion and Sediment Control as well as the Building Durability inspection records must also be completed prior to final inspections.
- Selected units
  - A minimum of 10% of total units to include one of each unit type per section/floor shall be tested. Minor variations in unit layout or square footage will not be considered as additional unit types.
  - Total leakage duct pressure tests on a portion of systems. Quantify total duct loss, identify leaks and note any possible "weak points" in the sampled systems.
  - Review the identified issues with the General Contractor and HVAC subcontractor on site.

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule HVAC Initial Diagnostics/Inspections

The General Contractor is responsible for scheduling the HVAC Initial Diagnostics/Inspection to occur after HVAC, ductwork and system are installed, but before drywall is installed, providing adequate notification to the EarthCraft Technical Advisor to prevent construction delays.

- General Contractor notifies EarthCraft Technical Advisor that project will be ready for inspection at least 1 week in advance, and schedules a specific timeframe for the Pre-Drywall Inspection.

Ensure project is ready for inspection

The General Contractor is responsible for ensuring their projects are ready for inspections. Failure to be prepared for an inspection may result in a re-inspection with additional fees. Common phases of construction that must be completed in preparation for a HVAC Initial Diagnostics/Inspection Inspection include:

- HVAC Rough-ins complete
- General Contractor QA designee has ensured there are no major deficiencies in the HVAC bypass checklist items
- All required confirmation documentation is ready for the EarthCraft Technical Advisor to review onsite as specified on the EarthCraft Worksheet and in the EarthCraft Multifamily Developer Guidelines

General Contractors are encouraged to work with EarthCraft Technical Advisors to ensure the project is ready for inspection prior to the inspection date.

Ensure relevant contractors are on the job-site and available for inspection:

- HVAC contractor must be present for the first visit and may be required at subsequent inspections based on the discretion of both the EarthCraft Technical Advisor and General Contractor QA designee.

Step 11: Insulation Inspections

All EarthCraft Multifamily projects must pass an Insulation Inspection conducted by an EarthCraft Technical Advisor on every individual unit. The Insulation Inspections provide an on-site evaluation of the unit in terms of the EarthCraft Multifamily guidelines, including a visual inspection of insulation. The Insulation Inspections provides opportunities to identify additional construction considerations that may impact the performance of the building. After insulation is installed the EarthCraft Technical Advisor will visit the site to grade the installation of the insulation (this may affect the energy model results).

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the Insulation Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. At the Insulation Inspection, EarthCraft Technical Advisors must:

- Visually inspect and grade each unit at insulation application to identify possible insulation coverage and envelope issues
- Review identified issues on site with General Contractor and appropriate contractor if available
- Confirm that plans represent unit as constructed
- Confirm that energy model Building Report represents unit as constructed
- Confirm that the Construction Specification Sheet represents home as constructed
- Confirm that items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer or General Contractor at the inspection)
- While in the field, create a Multifamily Insulation inspection record for the building and or building section inspected. The building and units inspected must be identified in the "General Information" section at the top of the inspection record and a new inspection record should be created for all subsequent building section until all units have passed inspection.
- The Erosion and Sediment Control as well as the Building Durability inspection records must also be completed prior to final inspections.

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule HVAC Initial Diagnostics/Inspections

The General Contractor is responsible for scheduling the inspection.

- General Contractor notifies EarthCraft Technical Advisor that project will be ready for inspection at least 1 week in advance.

Ensure project is ready for inspection

- Insulation is complete
- All required confirmation documentation is ready for the EarthCraft Technical Advisor to review onsite as specified on the EarthCraft Worksheet and in the EarthCraft Multifamily Guidelines

Step 12: Pre-drywall Inspection Submittal

Upon completion of a building or section of building, the Air Sealing Inspection, HVAC Initial Diagnostics/Inspection, and Insulation Inspection reports will be submitted. EarthCraft Technical Advisors are required to provide the above described inspection reports to the Developer, General Contractor, and EarthCraft. The Developer and General Contractor are responsible for following-up on any program compliance issues identified by the EarthCraft Technical Advisor.

EarthCraft Technical Advisor Responsibilities

Submit the following documents to EarthCraft within five business days* of the first insulation inspection.

- Pre-Drywall Inspection Records (Durability, Erosion, Air Sealing, Initial HVAC, and Insulation records)

Inform Multifamily Developer and General Contractor of inspection Results

- Inform the General Contractor of the inspection results verbally, immediately following the inspection.
- Provide Multifamily Developer and General Contractor a copy (either electronic or paper) of all reports submitted to EarthCraft.

EarthCraft will charge a $75 fee for each inaccurate and/or incomplete project submission that is received from a TA. EarthCraft will waive the $75 fee for the first submission an EarthCraft Technical Advisor submits to EarthCraft that is inaccurate or incomplete per program (i.e. EarthCraft House, Multifamily, or Renovation), but this fee will be charged on all subsequent inaccurate or incomplete submissions. If you submit multiple projects at once, we will charge this fee on each inaccurate or incomplete submission unless these submissions have identical inaccuracies or areas of incompleteness and EarthCraft has not responded to any of the submissions. For example, if you submit 3 projects with the same error and EarthCraft then notifies you of the error in these 3, you will be required to pay only one $75 fee. You will, however, be charged $75 for any projects submitted after EarthCraft responds to the first 3, even if they have the same error as the original 3 projects.

Common errors and omissions include, but are not limited to:

- Design temperatures in load calculation do not comply with program standards
- Load calculation does not factor in the ventilation requirement of the program
- Load calculation is not calculated in software compliant with ACCA 8th Edition
- Inspection dates on the "Cover Sheet" tab in the worksheet file are not filled in
- Basic address info on "Cover Sheet" tab is not filled in
- The "Status Column" on the "Worksheet" tab is not filled in correctly
- All required items must be marked with Y, N, VF (if applicable at PDWI), NA, or AD (if applicable at PDWI)
- All point items must be marked with Y, N, VF (if applicable at PDWI), AD (if applicable at PDWI)
- Projects are submitted before they have been registered with the program
- Required information for diagnostic testing is not recorded (e.g. SFBE, Volume, Area Served)
- Leakage to Outside test results are not recorded (we need this even if the ducts are in conditioned space)
- Insulation grades are missing
- A required document is missing (e.g. AHRI matching certificate, load calculation, verification of energy compliance, verification of ventilation design compliance)

As always EarthCraft Administrators are available to answer questions prior to submission. Utilizing this resource will help avoid the enforcement of this fee.

Notes:

*EarthCraft Technical Advisors: See Document Naming Conventions page for specific information on how to submit project documentation to EarthCraft.
**Pre-Drywall Inspection Submittals received more than ten business days after the first insulation inspection will result in a $25 late submittal fee charged to the EarthCraft Technical Advisor. Incomplete documents or documents not meeting EarthCraft program standards will not be processed and the EarthCraft Technical Advisor will receive an Incomplete Documentation Notice with fee information.

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with EarthCraft (as necessary)

- Please contact EarthCraft directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical Advisor may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with EarthCraft (as necessary)

- Please contact EarthCraft directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical Advisor may result in the project becoming ineligible to certify.

Step 13: Final Inspections

All EarthCraft Multifamily projects must pass a Final Inspection on each unit conducted by an EarthCraft Technical Advisor. During the Final Inspection, an EarthCraft Technical Advisor confirms all program criteria through visual inspection, documentation review and diagnostic testing of the building. The Multifamily Developer and General Contractor provide project documentation to support the final inspection. When an entire floor or section is ready, an EarthCraft Technical Advisor will visit the site and conduct final testing. The Multifamily Developer and General Contractor are responsible for following-up on any program compliance issues identified during the Final Inspection as reported by the EarthCraft Technical Advisor as the project cannot be certified until all issues are remedied.

EarthCraft Technical Advisor Responsibilities

Perform Field Inspection

EarthCraft Technical Advisors are responsible for performing the Final Inspection at the time agreed upon by the EarthCraft Technical Advisor and General Contractor. At the Final Inspection, EarthCraft Technical Advisors must inspect and confirm:

All units

- Plans represent the project as constructed
- Building Report continues to represent project as constructed
- Requirements on the Multifamily Final Inspection records are fulfilled and that no items confirmed as compliant during pre-drywall have changed
- Items identified by the Multifamily Developer on the EarthCraft Multifamily Worksheet are in program compliance (some items may require additional documentation to be provided by the Multifamily Developer at the final inspection)
- Visual inspection and confirmation of fixtures and appliances consistent with efficiencies specified for the project for EarthCraft Multifamily certification in units tested
- Inspect site and structure for Erosion and Sediment Control as well as items under the Building Durability section of the Inspection Checklist to ensure that all requirements have been met.

Sampled units

- Building envelope and duct system meet program criteria for performance:
  - Pressure testing of a sampling of units must be conducted in compliance with Chapter 8 of the RESNET Standards and include one of each unit type in the various configurations within the building not to total fewer than 15% of the total number of units. These tests are used to confirm that units meet or surpass established infiltration goals and duct leakage requirements. For projects with units that have duct work located outside of conditioned space 50% of the total number of sampled units must be units with duct work located outside of conditioned space and the other 50% of sample units must be evenly distributed throughout the building. State code requirements may require additional testing for compliance. For example, in Georgia all ducts located outside of conditioned space must be pressure tested, which may increase the number of duct leakage test required for an EarthCraft Multifamily certification.
  - If each dwelling unit within the building meets the diagnostic testing goals, then no further diagnostic testing will be necessary.
  - Should a unit within a building or section of a building fail pressure testing, then all of the units of that same type with in that building or section of the building will be required to be tested.
    - This additional pressure testing is not included in the standard scope and will add additional cost per unit tested.
    - If any failures occur in the additional units tested, then all dwelling units within the building will be subjected to diagnostic testing and the General Contractor will be directed to correct all the dwelling units within the building. This additional pressure testing is not included in the standard scope and will add additional cost per unit tested.

EarthCraft Technical Advisors are encouraged to call the General Contractor 24-48 hours ahead to ensure the project is ready for inspection on the day of the scheduled inspection.

Inform EarthCraft and General Contractor of inspection results

- The EarthCraft Technical Advisor should inform the General Contractor of the inspection results verbally, immediately following the final inspection
  - Diagnostic results
  - Documentation review of worksheet line items
- The EarthCraft Technical Advisor must submit the first final inspection record to EarthCraft (see Step 15)

Review EarthCraft Project Documentation

Upon receipt from the General Contractor, review all required documentation for credit specific confirmation. Notify General Contractor of items outstanding or not in compliance with program requirements.

Multifamily Developer Responsibilities

Follow-up with General Contractor (as necessary)

Contact the General Contractor if inspection has not been scheduled and held prior to the next step in the process.

General Contractor Responsibilities

Schedule Final Inspection

The General Contractor is responsible for scheduling the final inspection once the home is ready for occupancy and all EarthCraft measures have been completed. The General Contractor should then:

- Notify the EarthCraft Technical Advisor that project will be ready for final inspection at least one week in advance.
- Request that a Multifamily Developer representative will be available onsite
- Make sure that no conflicting trades are working onsite, e.g. floor finishers, touch-up painters, carpet installers, etc.

Notes:
Occupied Final Inspections – NO EXCEPTIONS
In the event that an occupied final inspection must be performed, the following rules apply:

- General Contractor must be onsite the entire time
- All pets crated or removed from the home
- All ducts must be accessible; EarthCraft Technical Advisors may not move homeowners' personal belongings
- Conversations are between the EarthCraft Technical Advisor, Multifamily Developer and the General Contractor; the General Contractor is responsible for all conversations with homeowners; and EarthCraft Technical Advisors should avoid talking to the homeowner about the home certification, and should never discuss the home's performance with the homeowner.

Ensure project is ready for inspection

Units ready to receive a Certificate of Occupancy are typically ready for a final inspection. The General Contractor identifies a building, section, or floor in which all of the units have the following items complete prior to the final inspection:

- All windows and doors installed
- All exterior doors weather-stripped
- Thresholds installed on all exterior doors and entrance doors
- All ceiling penetrations in mechanical closet sealed including plenum penetration through ceiling
- All plumbing penetrations are air sealed at drywall
- All light fixtures and additional ceiling penetrations sealed where insulation is in contact with dwelling unit
- All HVAC boots penetrations are sealed at interior finish
- All bath fans are sealed to drywall at rough opening through walls or ceilings.

Complete EarthCraft Project Documentation

Specific line items in the EarthCraft Multifamily program require documentation to confirm the credit intent has been met. Prior to the first Final Inspection, submit all required documentation to the EarthCraft Technical Advisor for review.

At the completion of the final inspections, the Multifamily Developer is required to:

- Sign the final version of the EarthCraft Worksheet for the project acknowledging compliance with EarthCraft program guidelines and requirements

Step 14: Confirmed Energy Model(s) or Prescriptive Path Compliance

After the final inspection, EarthCraft Technical Advisors develop a confirmed energy model for each project.

EarthCraft Technical Advisor Responsibilities

A. Finalize unit level energy model

The EarthCraft Technical Advisor must:

- Revise the energy model at project completion to reflect as-built conditions
- Record the final HERS index
- Determine project's ability to meet program requirements
  Develop options to meet program requirements if a project is ineligible
- ENERGY STAR for Homes Version 3 Verification Summary Report
- If ENERGY STAR for Homes Version 3 certification is also being pursued, the project must comply with all additional model requirements of that program

OR

B. Mid-Rise Projects

Provide eQUEST files that reflect the as built conditions. Communicate with energy modeler to confirm whether any items listed on the MidRise Building Component Spec Sheet have changed based on field verification. These are to be submitted for EarthCraft Quality Assurance Review.

- The field verified eQUEST model, updated Multifamily High Rise Calculator and EarthCraft Mid-Rise specification sheet.
- Field verified:
  - The full ENERGY STAR Performance Path calculator form.

OR

C. Provide documentation of specifications reaching Energy Compliance through the appropriate prescriptive path (EarthCraft Certified, ENERGY STAR for Homes Version 3, ENERGY STAR Multifamily High Rise).

Multifamily Developer Responsibilities

No responsibilities at this step in the process.

General Contractor Responsibilities

No responsibilities at this step in the process.

Step 15: Final Inspection Report Submittal

EarthCraft Technical Advisors are required to submit the first final inspection reports EarthCraft for review.

EarthCraft Technical Advisor Responsibilities

The EarthCraft Technical Advisor must notify EarthCraft, through salesforce, once the first Multifamily Final Inspection records have been completed. Notification to EarthCraft should occur within 5 business days of the first final inspection visit and after a Multifamily Final Inspection record has been completed.

Multifamily Developer Responsibilities

No responsibilities at this step in the process.

General Contractor Responsibilities

No responsibilities at this step in the process.

Step 16: Certification Submittal

EarthCraft Technical Advisors are required to submit final project documents to the Multifamily Developer, General Contractor and EarthCraft.

EarthCraft Technical Advisor Responsibilities

The EarthCraft Technical Advisor must submit the following documents to EarthCraft within 30 business days* of the last final inspection of the project:

- Final EarthCraft Worksheet
- EarthCraft Worksheet Cover signed by Multifamily Developer, General Contractor, and EarthCraft Technical Advisor
- AHRI Certificate or Manufacturer equivalent
- All completed inspection records for the project (Durability, Erosion, Air Sealing, Insulation, HVAC Initial, and Final Inspection records for all units and buildings)
- Energy Performance Reports
    - For projects using REM/Rate or EnergyGauge:
        - REM/Rate Fuel Summary Report located within the IECC 2009 reports
        - REM/Rate Emissions Report or EnergyGauge Pollution Analysis (from confirmed Energy Model)
        - REM/Rate ENERGY STAR Compliance: ENERGY STAR v3 Verification Summary Report (draft watermark OK if print permission not enabled) or EnergyGauge ENERGY STAR Verification Summary (from confirmed Energy Model)
    - For mid-rise projects using energy modeling
        - As-built energy model files, updated Multifamily High Rise Calculator and a Mid Rise Construction Spec sheet signed by the EarthCraft Technical Advisor.
    - For projects taking the prescriptive energy path
        - Documentation of specifications meeting the EarthCraft Prescriptive path (or just select "Yes" next to all of the worksheet items under the Prescriptive path section.

Projects seeking ENERGY STAR certification (in addition to list above)

- Thermal Enclosure System Rater Checklist
- HVAC System Quality Installation Contractor Checklist
- HVAC System Quality Installation Rater Checklist
- Water Management System Builder Checklist (or Indoor airPLUS Verification Checklist
- ENERGY STAR Compliance: ENERGY STAR Version 3 County-level reference design checklist Inform Multifamily Developer and General Contractor of Final Inspection Results
- Provide Multifamily Developer and General Contractor a copy (either electronic or paper) of all reports submitted to EarthCraft.

EarthCraft will charge a $75 fee for each inaccurate and/or incomplete project submission that is received from a TA. EarthCraft will waive the $75 fee for the first file an EarthCraft Technical Advisor submits to EarthCraft that is inaccurate or incomplete per program (i.e. EarthCraft House, Multifamily, or Renovation), but this fee will be charged on all subsequent inaccurate or incomplete submissions. If you submit multiple projects at once, we will charge this fee on each inaccurate or incomplete submission unless these submissions have identical inaccuracies or areas of incompleteness and EarthCraft has not responded to any of the submissions. For example, if you submit 3 projects with the same error and EarthCraft then notifies you of the error in these 3, you will be required to pay only one $75 fee. You will, however, be charged $75 for any projects submitted after EarthCraft responds to the first 3, even if they have the same error as the original 3 projects.

Common errors and omissions include, but are not limited to:

- Design temperatures in load calculation do not comply with program standards
- Load calculation does not factor in the ventilation requirement of the program
- Load calculation is not calculated in software compliant with ACCA 8th Edition
- Inspection dates on the "Cover Sheet" tab in the worksheet file are not filled in

- Basic address info on "Cover Sheet" tab is not filled in
- The "Status Column" on the "Worksheet" tab is not filled in correctly
- All required items must be marked with Y, N, VF (if applicable at PDWI), NA, or AD (if applicable at PDWI)
- All point items must be marked with Y, N, VF (if applicable at PDWI), AD (if applicable at PDWI)
- Projects are submitted before they have been registered with the program
- Required information for diagnostic testing is not recorded (e.g. SFBE, Volume, Area Served)
- Leakage to Outside test results are not recorded (we need this even if the ducts are in conditioned space)
- Insulation grades are missing
- A required document is missing (e.g. AHRI matching certificate, load calculation, verification of energy compliance, verification of ventilation design compliance)

As always EarthCraft Administrators are available to answer questions prior to submission. Utilizing this resource will help avoid the enforcement of this fee.

Notes:

*EarthCraft Technical Advisors: See Document Naming Conventions page for specific information on how to submit project documentation to EarthCraft.
**Pre-Drywall Inspection Reports received more than ten business days after the Pre-Drywall Inspection will result in a $25 late submittal fee charged to the EarthCraft Technical Advisor. Incomplete documents or documents not meeting EarthCraft program standards will not be processed and the EarthCraft Technical Advisor will receive an Incomplete Documentation Notice with fee information.

Multifamily Developer Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with EarthCraft (as necessary)

- Please contact EarthCraft directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

General Contractor Responsibilities

Follow-up with EarthCraft Technical Advisor

- Read inspection report results and ask questions if there are any items of concern or confusion
- Request written report from EarthCraft Technical Advisor if not received within 2 business days of the inspection
- Mitigate all issues outlined in the inspection report. Failure to mitigate issues as outlined by the EarthCraft Technical may result in the project becoming ineligible to certify.
- Any units failing an inspection must be re-inspected prior to the next step outlined in the process. There is typically additional cost for re-inspections. Failure to re-inspect units may result in the project becoming ineligible to certify. Scheduling of the re-inspection is the responsibility of the General Contractor, in consultation with the Multifamily Developer.

Follow-up with EarthCraft (as necessary)

- Please contact EarthCraft directly if attempts in writing have not resulted in timely inspection reporting by the EarthCraft Technical Advisor.

Step 17: Certification

Final certification is approved by the EarthCraft Technical Advisor working with the EarthCraft Program staff. Once approved, it is up to the Multifamily Developer to officially certify the units in the project as meeting EarthCraft Multifamily program requirements and guidelines.

EarthCraft Technical Advisor Responsibilities

Direct EarthCraft Multifamily Developer to the EarthCraft Certificate Request Form

EarthCraft Technical Advisors are responsible for directing the Multifamily Developer to the EarthCraft Certificate Request Form found on the EarthCraft website. Once the certificate request is received and all project verification requirements are confirmed (including a signed cover page from the verified EarthCraft Multifamily worksheet), the certificate will be generated by EarthCraft program staff within 10 business day(s).

Multifamily Developer Responsibilities

Once the EarthCraft Technical Advisor has confirmed that all required documents are verified, the Multifamily Developer is responsible for submitting a request form for an EarthCraft certificate. Alternatively, the Multifamily Developer may request that the EarthCraft Technical Advisor completes this request. The form can be found at the EarthCraft website:
http://form.jotformpro.com/form/31005717597961

Follow-up with EarthCraft Technical Advisor or EarthCraft Program Staff

If the report is not received within 30 business days of final inspection, the Multifamily Developer should follow up with the EarthCraft Technical Advisor or EarthCraft program staff.

General Contractor Responsibilities

No responsibilities at this step in the process

Additional Steps

The process outlined above illustrates a project that is a repeat project between a Multifamily Developer, General Contractor and an EarthCraft Technical Advisor that does not run into any major problems. As every project is unique, there are additional steps that may be required in order for a project to become EarthCraft Certified.

Re-Inspection

If a project does not meet the criteria for the EarthCraft program at the time of the inspection, the Multifamily Developer has the option of making improvements to the project in order to meet the guidelines. In order to certify the unit at this point, the Multifamily Developer must contact their EarthCraft Technical Advisor for a re-inspection. There is typically additional cost for re-inspections.

Note:

The EarthCraft Technical Advisor will determine whether the issues identified within the project may realistically be improved and therefore whether a re-inspection is appropriate for the project. Some projects may be ineligible for re-inspections due to the inability to meet program criteria.

Cancellation

If a project is not ready for inspection at the time of the scheduled inspection, the EarthCraft Technical Advisor may charge a cancellation fee to their client requiring the General Contractor to reschedule the inspection for a time when the project will be ready for the inspection. To prevent cancellations, EarthCraft Technical Advisors and Multifamily Developers are encouraged to stay in touch in the days and hours leading up to an inspection to confirm the project is still on track and will be ready for the inspection. To avoid cancellation fees, it is the General Contractor's responsibility to cancel an inspection according to the cancellation policy of each EarthCraft Technical Advisor.

Project Close-Out

Multifamily Developers are responsible for ensuring that all projects seeking EarthCraft Multifamily certification comply with project certification requirements. However, not all projects that were registered with EarthCraft will meet these requirements. Both EarthCraft and EarthCraft Technical Advisors have the authority to determine that projects cannot meet requirements of the program.

Registered projects that have no activity for a period of nine months will be automatically closed-out by EarthCraft staff. In order to re-open closed projects, a fee of $125 will be charged to the party that registered the project.

Projects that do not ultimately become certified are not refunded any fees (including registration fees). All projects closed by EarthCraft staff will receive an email notification to the Multifamily Developer and EarthCraft Technical Advisor.

Scopes of Work

All EarthCraft Multifamily projects must be contracted for all of the scopes of work described below under All Projects. Renovation projects, defined as those that do not expose framing during the construction process, require additional steps as listed in the Renovation projects section; Gut-rehab projects do not qualify to utilize the Multifamily Renovation worksheet.

All Projects

Design Review

- ☐ Review plans prior to submittal for incorporation of recommended EarthCraft Multifamily concepts and consistency with sustainability objectives.
- ☐ Meet with stakeholders to discuss comments and clarify any detail questions. Establish existing benchmarks and energy goals for the project.
- ☐ Produce report summarizing suggested modifications that should be incorporated to reach certification and hold meeting with stakeholders for any needed clarification.

Kick-Off Meeting

- ☐ During preconstruction kickoff meeting review EarthCraft measures with general contractors project manager and site supervisor, and any subcontractors whose work are impacted by EarthCraft standards:
  - Confirm utilization of appropriate and specified framing details and techniques
  - Identify possible building envelope issues not noted at the plan review stage and work with General Contractor and appropriate subcontractor to suggest appropriate modifications or corrections.
  - Review design expectations and specifications with HVAC, electrical, insulation, and air sealing subcontractors prior to commencement of their work to ensure compliance with all applicable program standards.
  - Meet with all appropriate contractors to outline expectations and answer questions.
- ☐ During early stages of construction review project on site with appropriate stakeholders and subcontractors
  - At commencement of framing confirm implementation of appropriate and specified framing details and techniques with the framing contractor to ensure compliance with all applicable program standards.
  - Review design expectations and specifications with the air sealing and insulation subcontractors at commencement of their work to ensure compliance with all applicable program standards, and if necessary to identify building envelope issues not noted at the plan review stage and work with the General Contractor to suggest appropriate modifications or corrections.
  - Review design expectations and specifications with HVAC subcontractor at commencement of their work to ensure compliance with all applicable program standards.

- ☐ Produce written reports noting deficiencies and recommended corrective measures for each site visit and provide copies of report for Developer, General Contractor and the appropriate sub contractors.

Air Sealing Inspections

- ☐ Visual inspection of each unit prior to insulation application to identify potential air sealing issues. Review identified issues on site with General Contractor, and appropriate subcontractor if available.
- ☐ Produce a written report noting any specific deficiencies, identifying problem areas, and suggesting corrective measures as well as review this report with General Contractor, developer and appropriate contractors.

HVAC Initial Diagnostics/Inspections

- ☐ Visually inspect each unit's HVAC equipment and duct systems at rough-in for sizing compliance, Energy Code compliance, and installation design recommendations. A minimum of one connection in each system will be visually inspected for proper mastic sealing details.
- ☐ Perform total leakage duct pressure tests on a sampling of systems. Quantify total duct loss, identify leaks and note any possible "weak points" in the sampled systems. Review the identified issues with the HVAC subcontractor on site.
- ☐ Produce written reports noting deficiencies and recommended corrective measures for each site visit and provide copies of report for Developer, General Contractor and the appropriate sub contractors.

Insulation Inspections

- ☐ Visual inspection of each unit at insulation application to identify possible insulation coverage and envelope issues. Review identified issues on site with General Contractor and appropriate contractor if available.
- ☐ Produce a written report noting any specific deficiencies, identifying problem areas, and suggesting corrective measures as well as review this report with General Contractor, developer and appropriate contractors.

Final Inspections

- ☐ Pressure testing of all units in the project unless approved for sampling. If approved for sampling, pressure testing of a sampling of units (one of each unit type in the various configurations within the building not to total fewer than 15% of total number of units) to confirm units meet or surpass established infiltration goals and duct leakage requirements. Identification of problem areas, if necessary. Communication with General Contractor and Developer to address issues. Produce a written report of results to be provided to the General Contractor and Owner.
  - If a unit within a building or section of a building fails pressure testing, then all of the units of that same type with in that building or section of the building will be required to be tested by EarthCraft Multifamily protocols. This pressure testing is not included in the above scope and will add additional cost per unit tested.
- ☐ Visual inspection and confirmation of fixtures and appliances consistent with efficiencies specified for the project for EarthCraft Multifamily certification in all units.
- ☐ Where code requires a larger sample rate provide additional tests. For instance, GA Energy Code requires testing of all ductwork located outside of conditioned space.

New Construction and Gut Rehab

Energy Compliance and Energy Modeling

- ☐ Assess energy performance compliance through the appropriate performance or prescriptive measures. Reference the **High Performance Building Envelope** section of the EarthCraft Multifamily Guidelines for full details of required **Energy Compliance** at the CERTIFIED, GOLD, and PLATINUM certification levels.

- ☐ Provide additional recommendations to further optimize the energy performance of the buildings to reach Energy Compliance.
- ☐ Produce improvement report of further steps that could enhance energy performance and, if not already meeting this goal, recommend steps to reach benchmark. Review necessary and suggested components with appropriate stakeholders in pre-construction meeting not to exceed two (2) hours in length.

Renovation Projects (Gut-Rehab not included)

Wall cavity assessment

- ☐ During the capital needs assessment being conducted by the Developer wall cavities must be inspected for poly or other material with a perm rating ≤0.1. One cavity in each wall type must be inspected (e.g. above grade exterior wall, above grade interior wall, attic kneewall, bathroom wall, foundation wall between interior and exterior, foundation wall between interior and basement/crawlspace, etc.). Prior inspections performed at the time of building acquisition may be accepted, but must be submitted to EarthCraft for pre-approval in order to obtain a waiver for the wall cavity assessment.
- ☐ If low-perm materials are identified during the wall cavity assessment, a scope of work must be provided to address these materials in accordance with the EarthCraft Worksheet.

Pre-Renovation Assessment

- ☐ Confirm wall cavity assessment was completed in accordance with the above scope and that appropriate scopes of work are included to provide remediation during the renovation. If the developer, or general contractor, is not able to provide this documentation, the EarthCraft Technical Advisor is to ensure this step is completed by the developer or general contractor prior to the Kick-Off meeting.
- ☐ Determine current energy performance of various existing unit level envelopes to assess current energy performance and measure units against current energy code compliance.
    - Access to a sampling of units prior to any demolition to conduct an inspection for purposes of establishing the performance benchmarks of the building envelope, lighting and plumbing fixtures as well as all appliances. These inspections will include one of each unit type in its worst case condition within the building.
    - Duct blaster and Blower Door measurements will be performed on the sampling for an establishment of baseline measurements required for the energy model.
    - Review existing conditions and note any areas of concern related to building condition or improvement strategy. Identify other opportunities for energy and/or durability improvements.
- ☐ All common areas will be included in the assessment. Common areas will include: breezeways, corridors, stairwells, offices, resident support spaces and community spaces such as the resident lounge or computer labs, bathrooms, kitchens, exterior lighting- wall mounted/parking area/overhead/pedestrian, laundry rooms, and elevator lobbies. For each of these spaces complete a survey on the conditions of the envelope, lighting fixtures, water fixtures, appliances, and mechanical systems. Provide recommendations to optimize the energy performance of the building for common areas and units. Produce a report on envelope and systems improvement identifying further steps that could enhance energy performance and prioritize measures in terms of impact with an overall goal of achieving an EarthCraft certification.
- ☐ Produce a copy of the EarthCraft worksheet that prioritizes recommended improvements and provides template for meeting EarthCraft House certification. Any items gaining credit within units are expected to also be applied to the common areas of the building.

Energy Compliance and Energy Modeling

- ☐ Assess current energy performance by completing energy model(s) based on the information collected during the Pre-Renovation Assessment. Using the established existing baseline and

renovation up-grade specifications, complete energy model(s) for each unit type reflecting improvements to existing conditions.

- ☐ Provide recommendations to further optimize the energy performance of the buildings to reach Energy Compliance.
- ☐ Produce improvement report of further steps that could enhance energy performance and, if not already meeting the 15% energy improvement goal, recommend steps to reach benchmark. Review necessary and suggested components with appropriate stakeholders in pre-construction meeting not to exceed two (2) hours in length.

EarthCraft Multifamily Project Quality Assurance

Overview

Each EarthCraft Multifamily project is subject to a Quality Assurance review; This review will be conducted by EarthCraft staff trained in the multifamily inspection process and may include an onsite visit, at the discretion of EarthCraft. Scheduling of this visit is the responsibility of the EarthCraft Technical Advisors and must allow for units to be inspected at both pre-drywall and final inspection phases; Any exceptions to this policy must be approved, in advance, by EarthCraft. The cost of one quality assurance visit is covered by the project registration fee paid by each project.

EarthCraft Project Tracking

All EarthCraft Multifamily projects will have an associated EarthCraft team member that is responsible for tracking the project throughout the full life of the project. The project tracker will ensure that each project receives personal attention from EarthCraft.

The project tracker will check-in monthly with the associated EarthCraft Technical Advisor to ensure that the required linear process of the EarthCraft Multifamily project submittal is being met.

All new EarthCraft Multifamily projects will also receive a call from the project tracker to the Developer. The call is required to take place prior to the design review and will cover key program updates and criteria.

What to expect in EarthCraft Multifamily

For all projects

Site Planning

The Site Planning section will be very different from single family. The EarthCraft Technical Advisor will need to confirm all site planning points being tracked. Additionally, certain items on the worksheet can only be confirmed in the earliest stages of construction. These items such as slab insulation or drainage planes which are installed prior to inspections can be confirmed through other means (pictures, details on architectural/civil plans, product receipts).

Fresh Air Intake Strategy

Fresh air intake implementation in multifamily differs as there is typically no return plenum to connect the fresh air intake to. Therefore, EarthCraft Multifamily requires that all fresh air intake ducts terminate within 1 foot of the open return inside the mechanical closet. The ventilation strategy must comply with the current EarthCraft Multifamily program guidelines. See the **ENERGY EFFICIENT SYSTEMS: VENTILATION** section for full details of current program requirements.

Air Sealing and Insulation

Multifamily protocol will require a separate air sealing and insulation inspection for each building section. Each unit within a predefined building section/floor must be inspected and any deficiency should be clearly identified on the inspection report.

While working on EarthCraft projects the EarthCraft Technical Advisor will fill out inspection documents developed by EarthCraft specific to EarthCraft Multifamily.

HVAC Initial Diagnostics/Inspection

Multifamily inspections will require a visual inspection of appropriate duct sealing in all units of the building. The inspection process also requires a sampling of pre-drywall HVAC tests to ensure duct sealing is being completed in accordance with EarthCraft duct testing requirements. During HVAC Initial Diagnostic tests, the EarthCraft Technical Advisor will test a minimum of 10% of systems at rough in. At this time each unit tested should be achieving 10% total duct leakage or less to provide confidence the unit will pass all final duct testing requirements. When total duct leakage is above this percentage the EarthCraft Technical Advisor should identify potential issues and provide feedback to the site supervisor to ensure the HVAC sealing requirements are reached.

Final Testing Requirements

Current requirements for final diagnostic testing are different between single family and multifamily projects. For EarthCraft multifamily a sample of all units (subject to RESNET sampling protocol requirements) must be tested for duct leakage and air infiltration compliance.

Blower Door requirement:

- All units must meet the required infiltration rate
- Bonus points may be awarded when 80% or more of all units tested achieve the level of infiltration designated on the worksheet
- All dwelling units must be completely compartmentalized from one another to ensure infiltration goals are achieved at final tests. Available strategies will be influenced by the type of fire separation system utilized for the project. Please consult with the project design team to understand the planned fire system and contact EarthCraft for further advice on achieving appropriate compartmentalization under specific scenarios. Common options may include draft blocking between units and between the unit and corridors/breezeways or air tight drywall approach employed at each unit when draft stopping is not part of the fire separation requirement.

Duct Blaster requirements:

- When testing open returns it is often possible to pressurize directly into the open return in the mechanical closet. If the return is blocked by a low-boy water heater it will be necessary to tape off the return and pressurize through a supply.

Common Areas including Community Centers

Common areas must comply with all thermal bypass requirements for air sealing, insulation, and HVAC, and EarthCraft Multifamily worksheet items, excluding diagnostic testing requirements.

Confirming the Worksheet

The EarthCraft Technical Advisor has the same responsibilities at this step as in the EarthCraft House project process.

Multifamily Photo-documentation Standards

Instructions

Photo-documentation may be used to document certain strategies used to reach EarthCraft certification. Photo-documentation is very helpful for strategies that will not be visible after project completion (i.e., installed behind drywall, buried underground). Photographs submitted to EarthCraft for verification of points and required items must follow the standards below.

Photographs must be:

- Clear and sharp
- Properly oriented
- Taken with a frame of reference
- Taken with varying proximity to the strategy used when appropriate
- Taken to include both the general location and specifics of strategy used

A narrative explaining what is being portrayed must also accompany each photograph. Pictures should be taken in such a way that the viewer will immediately understand what is being portrayed. Photos of the whole building (or project site) should also be included as part of each set of pictures taken.

For example, photographs submitted with the intent of verifying the ventilation strategy used in a residence would include pictures of the air intake and exhaust ducts' location. These pictures should also demonstrate that all seams are properly sealed with mastic, with a brief narrative accompanying each picture.

Conventions

Photos submitted to EarthCraft should be uploaded to salesforce, using the naming convention below. All submittals must include the date of the photos taken. If the photo documentation is associated with a submittal phase, add the submittal number before the project name.

Document	File Name Convention
Photo-documentation	Submittal#_ProjectName_PhotoName_DateTaken.jpg

Multifamily Document Naming Conventions

Instructions

Documents submitted to EarthCraft must be named according to the Conventions below

- All submittal packages must be uploaded to salesforce using the document specific naming conventions below
- For information on each submittal package, review the EarthCraft Multifamily Project Process section of the EarthCraft Manual
- If documents are too large to upload to salesforce, the TA is responsible for reducing the file sizes. Removing unnecessary pages of a file or saving as a smaller resolution file would be acceptable solutions as long as the files are legible and contain the minimum items outlined in the manual. Please contact the EarthCraft Administrator for assistance as needed.

Conventions

1-Preliminary Energy Model Report Submittal

Submit at least 5 business days prior to the Design Review

❑ Project Plans	1-ProjectName_Project Plans.zip
❑ Load Calculation (Manual J)	1-ProjectName_Load Calc.pdf
❑ EarthCraft Preliminary Worksheet	1-ProjectName_Preliminary Worksheet.xls
❑ Ventilation Strategy	1-ProjectName_VentilationStrategy.pdf(or other file extension)
❑ Low Rise: Preliminary Energy Model Summary Report	1-ProjectName_Preliminary Energy Model Summary Report.xls (or .doc/.pdf)
❑ Low Rise: Projected Rating HERS Report	1-ProjectName_Projected HERS.pdf (or .doc)
❑ Low Rise: ENERGY STAR v3 Summary	1-ProjectName_Projected ENERGYSTARv3.pdf
❑ Mid Rise: Construction Spec Sheet	1-ProjectName_MidriseConstructionSpec.pdf (or .doc)
❑ Mid Rise: ENERGYSTAR MFHR Calculator	1-ProjectName_ESMFHR Calc.xls
❑ Mid Rise: Building Files (see Step 4)	1-ProjectName_Projected Building Files.idp

2-EarthCraft Design Review Report Submittal

Submit within ten business days of the Design Review

❑ Meeting minutes	2-ProjectName_Meeting Minutes.pdf
❑ Updated EarthCraft Preliminary Worksheet	2-ProjectName_Worksheet.xls
❑ Sign In Sheet	2-ProjectName_SignIn.pdf

3-Kick-Off Meeting Report Submittal

Submit within ten business days of the Kick-Off Meeting

❑ Meeting minutes	3-ProjectName_ Meeting Minutes.pdf
❑ Updated EarthCraft Preliminary Worksheet	3-ProjectName_Worksheet.xls
❑ Trade forms	3-ProjectName_TradeForms.pdf
❑ Sign In Sheet	3-ProjectName_ SignIn.pdf
❑ Acknowledgment Forms	3-ProjectName_FreshAir(or ManJ)Acknowledgment.pdf

4-Pre-Drywall Inspection Report Submittal

Submit within one business day of first insulation inspection; the files should be inspection records attached directly to the project record, but if you have supplemental documentation you would like to include in this submittal, please use the following structure

❑	Pre-Drywall Documentation	4-ProjectName_FileDescription.pdf

5-Final Inspection Report Submittal

Submit within one business day of first final inspection; the files should be inspection records attached directly to the project record, but if you have supplemental documentation you would like to include in this submittal, please use the following structure

❑	Final Inspection Documentation	5-ProjectName_FileDescription.pdf

6-Certification Submittal

Submit to EarthCraft within 30 business days of the last final inspection of the project

❑	Final EarthCraft Worksheet	6-ProjectName_Final Worksheet.pdf
❑	EarthCraft Worksheet Cover	6-ProjectName_Final Cover.pdf
❑	AHRI Matching Certificate	6-ProjectName_AHRI.pdf
❑	Low Rise: Fuel Summary Report	6-ProjectName_Fuel Summary Report.xls (or .doc/.pdf)
❑	Low Rise: Verified Rating HERS Report	6-ProjectName_Verified HERS.pdf (or .doc)
❑	Low Rise: ENERGY STAR v3 Summary	6-ProjectName_Verified ENERGYSTARv3.pdf
❑	Mid Rise: Signed Construction Spec Sheet	6-ProjectName_Verified Construction Spec.pdf (or .doc)
❑	Mid Rise: ESMFHR Calculator	6-ProjectName_Verified ESMFHR Calc.xls
❑	Mid Rise: Building Files (see Step 16)	6-ProjectName_Verified Building Files.idp

Notes:

Report submittals received after the deadline outlined in each step will result in a $25 late submittal fee charged to the EarthCraft Technical Advisor.

Incomplete documents or documents not meeting EarthCraft program standards will not be processed and the EarthCraft Technical Advisor will receive an Incomplete Documentation Notice. If complete packages are not resubmitted within 10 days, a $25 late submittal fee will be charged to the EarthCraft Technical Advisor.

Common Multifamily Obstacles

Fresh air ventilation

To ensure compliance with EarthCraft Multifamily standards review the current ventilation requirement for the EarthCraft Multifamily program. See the **ENERGY EFFICIENT SYSTEMS: VENTILATION** section for full details of current program requirements.

This duct run must be horizontal in order to prevent stack effect and the duct must draw from a clean point source a minimum of 10 feet from any pollutant sources including dryer and bath exhaust, roof tops, breezeways facing parking garages, and vehicle idling zones.

Fresh air extended through soffit

All fresh air intakes must be permanently affixed to the exterior when run to the soffit vent in the attic.

Exhaust fans and fresh air extended through soffit

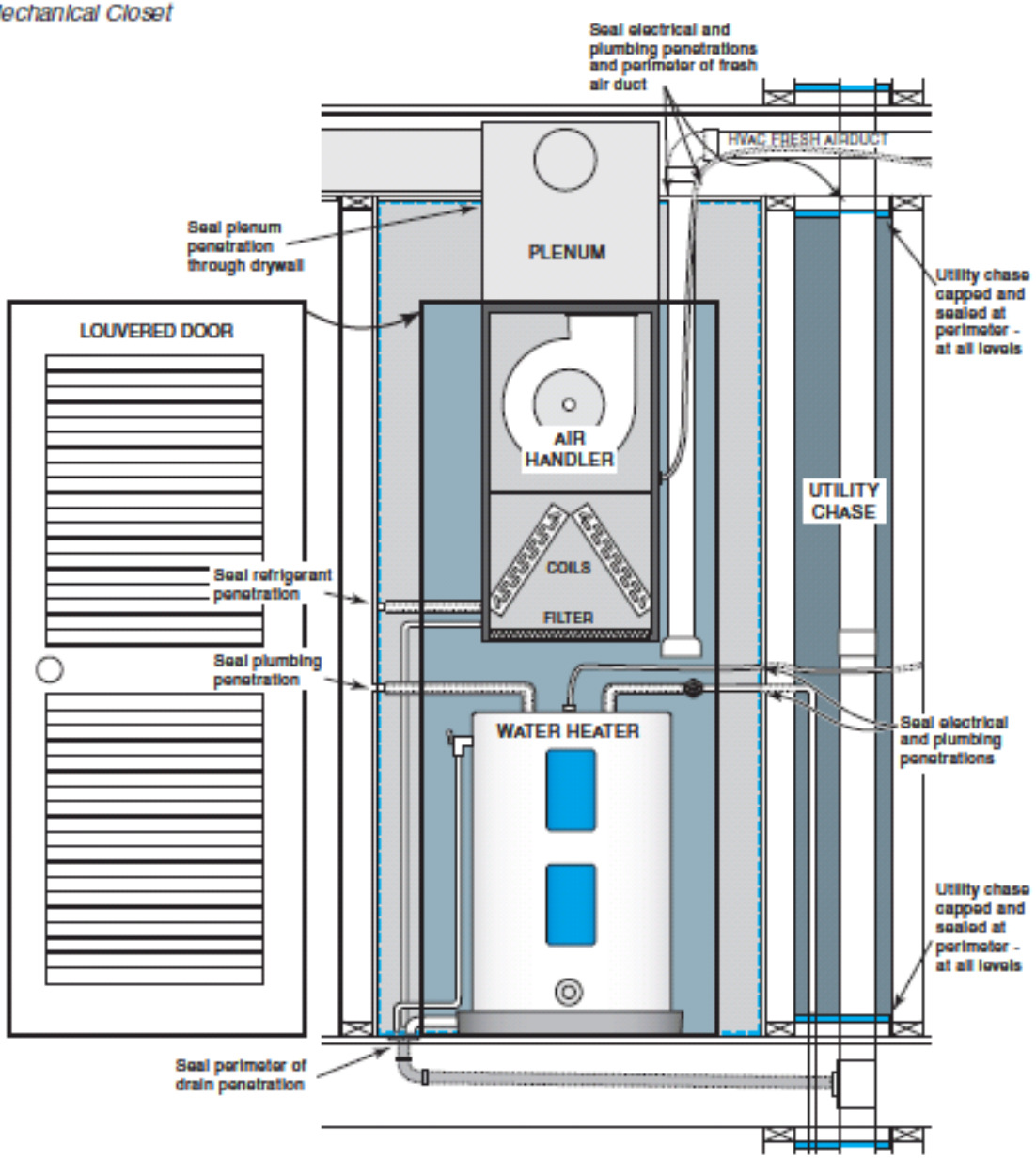
All exhaust fans including bath fans, dryers, range hoods, must be extended to the exterior of the building on all levels. If run to the soffit in the attic, these exhaust fans must be permanently affixed to the exterior of the soffit.

The vent is extended to the soffit but not extended and permanently affixed through the soffit.

Sealing penetrations in mechanical closet

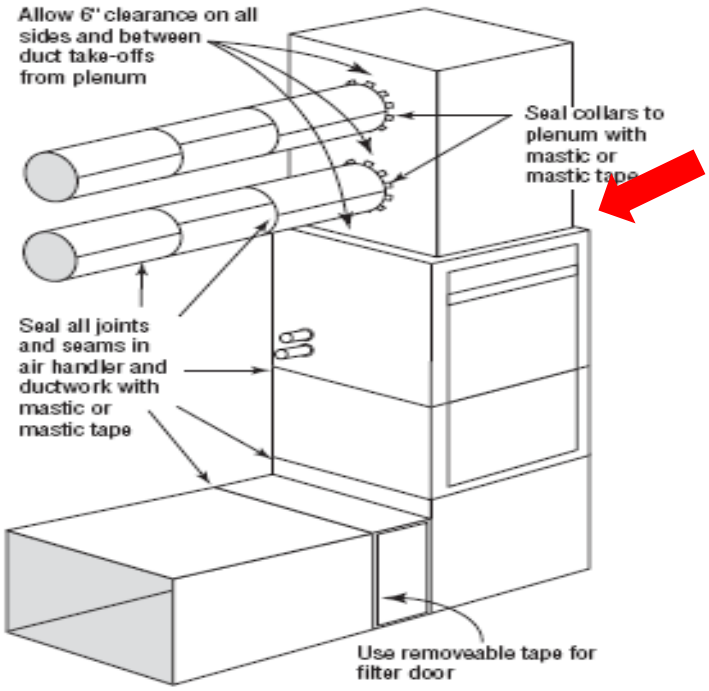
Mechanical closets can represent areas of high air infiltration and/or duct loss. Paying special attention to sealing all penetrations in the mechanical closet is an essential component in reducing air infiltration rates.

Mechanical Closet



Sealing heat pump to plenum

In multifamily settings, a common area causing high duct leakage and failure on duct leakage tests is the plenum connection to the air handler on the back side of the plenum. This area is hard to reach and it is common for a ¼ to ½ inch gap to be left open, leading to failures in test results at final diagnostic testing. Special attention should be given to sealing this area during installation, and if necessary, space planning should consider adding room to properly seal and maintain hard to reach areas within the mechanical closet.

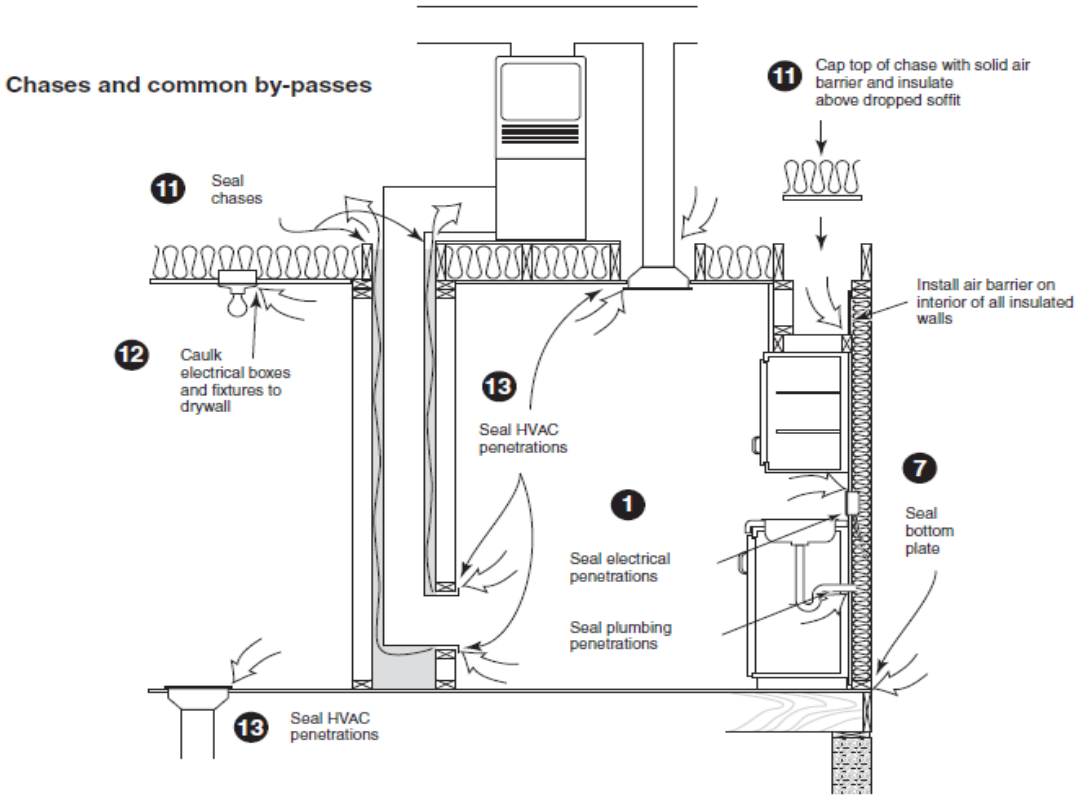


Air sealing at bath fans

Bath fans must be sealed to drywall for penetrations in ceilings and/or walls on each level of the building. Bath fans must be sealed in all common area restrooms.

Ceiling penetrations air sealed

Gaps around ceiling fans and light fixtures must be sealed at any level in contact with attic space. If the attic space is conditioned it is best practice to seal these areas to reduce air infiltration rates during final testing, resulting from pulling large quantities of air from the attic space. HVAC boots must be sealed at all levels in both units and common areas to prevent air infiltration and reduce duct leakage caused by substantial quantities of air "bouncing" off the back of the register back into the floor cavity or attic.



Air sealing wall penetrations

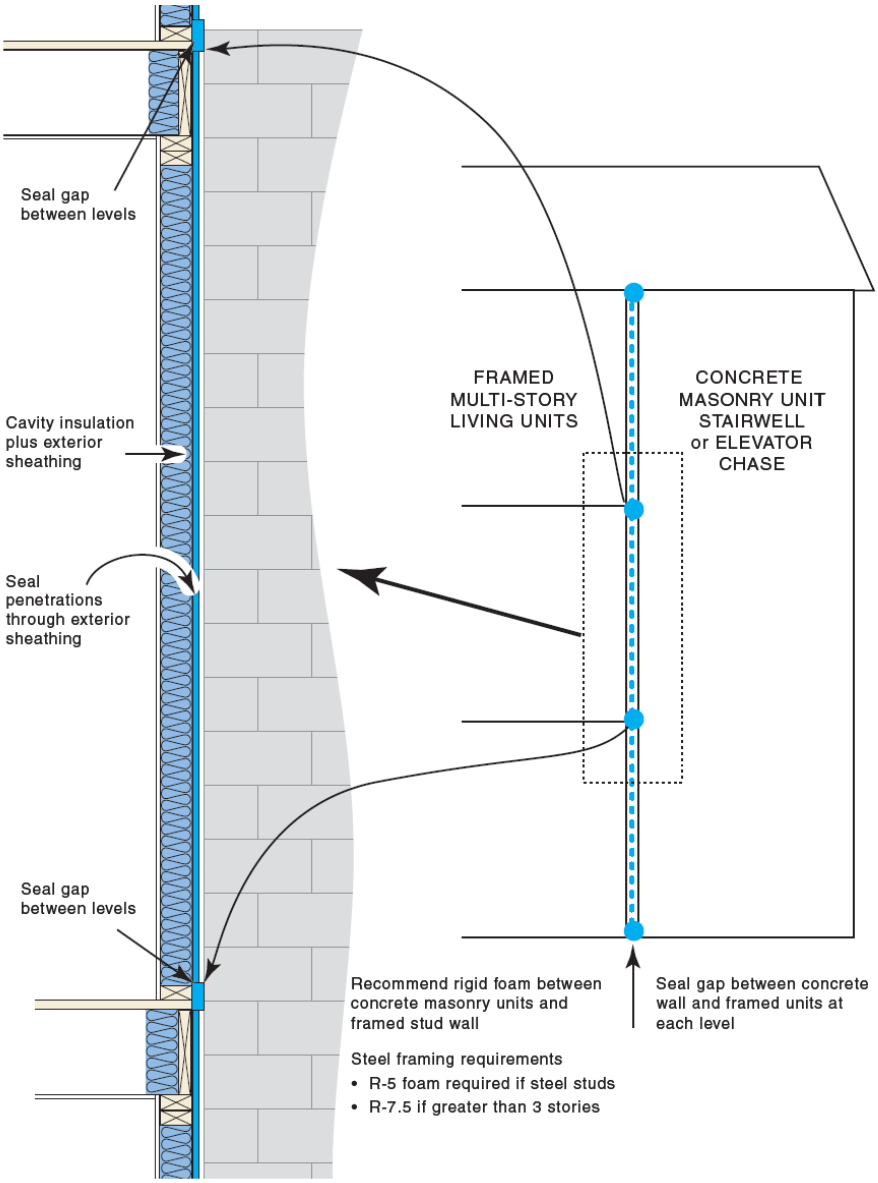
To completely air seal wall penetrations a putty pack must be applied to the back of the junction box and a bead of caulk must seal the junction box to the drywall.

Scheduling inspections

While EarthCraft Technical Advisors make all efforts to accommodate any site visit, it is important to provide as much lead time as possible while scheduling inspections. Busy work schedules may cause delays if scheduling is not provided in advance of necessary inspections. Please provide a week advance notice for inspection needs. Best practices in scheduling would include placing EarthCraft inspections on a master schedule at the beginning of construction and updating the EarthCraft Technical Advisor as inspection needs change. Other best practices include informing the EarthCraft Technical Advisor when air sealing, HVAC, or insulation is scheduled to be completed on site and setting up an appropriate day for inspections of the given section/level.

Air leakage at stairwells, firewalls, elevator shafts, foundation walls

Areas of high air infiltration can be found adjacent to stairwells, firewalls, poured foundations, and elevator shafts. These conditions for air loss can be even greater at top floor units adjacent to stairwells, firewalls, and elevator shafts. Special attention should be given to air sealing corners, top plates, and bottom plates at these areas. Best practice at these areas would be using an air tight drywall approach for the unit. EarthCraft can provide further details on using air tight drywall systems.



Sealing air barrier at chases

Although blocking of chases is a common practice, builders commonly miss critical air sealing details around the air barrier material. To properly seal the chase at the ceiling height, air sealant should be applied to the perimeter of the air barrier material. This is most important where chases are located at attic spaces.

Protecting Indoor coils during construction

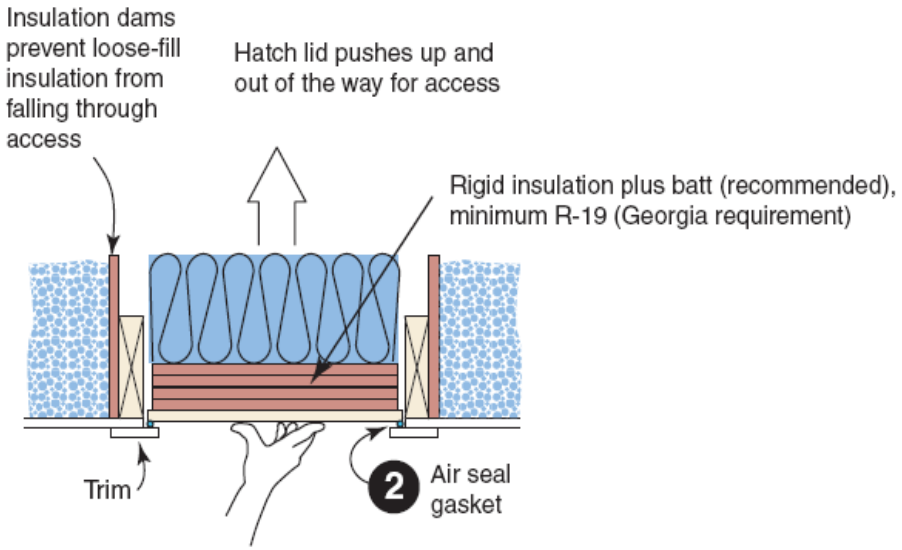
EarthCraft require all HVAC boots in subfloors to be protected during construction. EarthCraft requires all indoor coils to be protected until the finished floor of the unit is in place. This will prevent large amounts of construction debris from collecting on the coil, which can cause poor equipment performance and lead to poor indoor air quality for tenants.

Block exterior wall at cantilevered floors

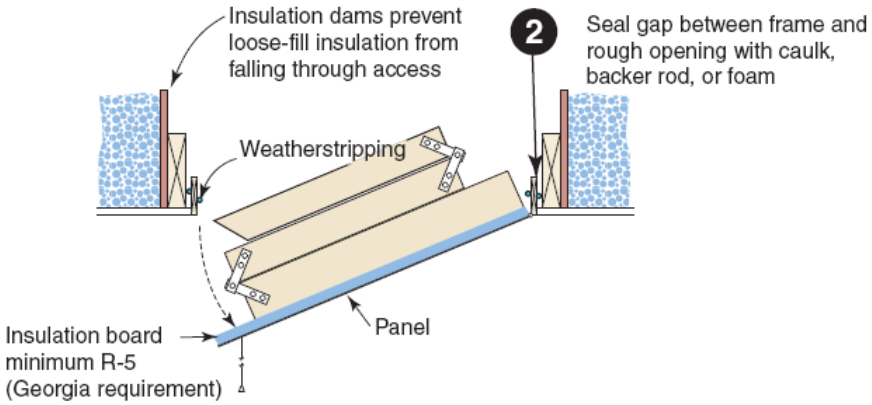
Blocking above cantilevers will improve ability to insulate band area, reduces air flow from expansion gaps that can cause air infiltration issues within the unit, and isolates unit from exterior conditions which would otherwise be connected through the cantilevered floor. Currently a code required blocking item in Georgia.

Sealing and insulating attic access within units

It is important to pay close attention to required air sealing elements and insulation requirements for attic access stairs and attic access scuttle hole doors. These areas can lead to higher air infiltration rates and comfort issues if not appropriately covered. Air sealing considerations include weather-stripping and air sealing at rough opening of at scuttle holes/pull down stairs. Insulation considerations include R-5 for attic pull down stairs and R-19 for attic scuttle holes. Compressed batts are not acceptable for this application.



Attic pull-down stairs



Keeping construction waste separated from recycling

EarthCraft Technical Advisors will be inspecting for recycling compliance while on site. It is important to develop a plan for waste management and clearly identify recycling requirements through posted signs on site and within contracts with all trades.

Contracting EarthCraft Multifamily items with Sub-Contractors

It is important to ensure all EarthCraft Multifamily requirements are clearly identified in contracts with sub-contractors. Some of the biggest hold ups are created when certain air sealing, insulation, or HVAC elements are not clearly identified within the sub-contractors scope of work. Use the EarthCraft Multifamily program worksheet as a guide to ensure the appropriate elements are transferred to the contract with each sub-contractor.

Sampling Quality Management Guidelines

Relationship between Quality Management and Sampling Protocol

Many general contractors have existing and well-developed quality management plans. Other general contractors do not have one. Sampling is a process whereby the responsibility for quality management is shared between the general contractor and the HERS Rater. The general contractor's quality management plan is the general contractor's commitment to their share of the quality management process. The sampling protocol is the HERS Raters commitment to their share of the quality management process - which is highly dependent on the general contractor's ability and commitment.

A general contractor that chooses to use this sampling protocol should have a quality management plan. If the general contractor does not have one, the first step is to create one. Basic elements of a quality management plan include:

1. Designate and train general contractor's in-field supervisors on their specific oversight and sign-off responsibilities
2. Develop detailed scopes of work for each trade that are focused on quality-critical tasks;
3. Include scopes of work, and compliance requirements in all trade contracts
4. Plan and conduct kick-off meetings for each project (e.g., subdivision) where performance goals and consequences of missing performance goals are clearly specified
5. Provide appropriate training on green home building, inspections, and performance testing requirements to all trades before starting work on the project
6. Require trade and general contractor supervisor approval and sign-off on all quality-critical measures
7. Schedule the HERS Rater to be on-site during the completion of each measure (that requires testing or inspection) in the first home in sample set

Field Confirmation

EarthCraft Multifamily requires includes field inspecting and testing each individual unit, or using the RESNET Sampling Protocol.

Pressure testing of a sampling of units must be conducted in compliance with Chapter 8 of the RESNET Standards and include one of each unit type in the various configurations within the building not to total fewer than 15% of the total number of units. These tests are used to confirm that units meet or surpass established infiltration goals and duct leakage requirements. For projects with units that have duct work located outside of conditioned space 50% of the total number of sampled units must be units with duct work located outside of conditioned space and the other 50% of sample units must be evenly distributed throughout the building. State code requirements may require additional testing for compliance. For example, in Georgia all ducts located outside of conditioned space must be pressure tested, which may increase the number of duct leakage test required for an EarthCraft Multifamily certification.

Guide to Multifamily REM Rate Modeling

Process

- ☐ Select Housing type as:
  a. Apartment, end unit
  b. Apartment, inside unit
- ☐ Select Level type as:
  a. Lowest level for all bottom floor units
  b. Mid-level
  c. Top floor for all units with attic space above
- ☐ Select Foundation type as:
  a. Typical lowest level unit will have slab on grade for new construction buildings
     - You may see a crawl or basement in renovation scenarios
  b. Mid-level and top floor units you select apartment above conditioned space
  c. For terrace level units, add foundation walls when necessary and exclude this area from the above grade wall properties input screen
  d. For units above commercial space select apartment above conditioned space
- ☐ Defining the complete building envelope:
  a. Lowest level and mid-level units will include the band area in the SFBE calculation
  b. Calculated SFBE should incorporate all six sides of the unit on each level but REM Rate will not automatically calculate for absent ceiling/floor areas explained in items a,b,c above.
- ☐ For slabs, exposed perimeter will only be considered on exterior walls and not to adjoining units or conditioned corridors. Unconditioned breezeways will also be considered in the exposed perimeter calculation.
- ☐ All walls and band areas which are adjacent to conditioned areas (adjoining units, common areas, or conditioned corridors) should be qualified as adiabatic. Identify wall areas and band areas adjoining semi-conditioned spaces (sometimes storage rooms, garbage rooms, or unconditioned stairwells). These can be modeled as garage or exterior walls. You may want to ask the design team how these spaces will be conditioned.
- ☐ The primary unit entrance will be considered the front facing wall of the unit level model regardless of the whole building orientation.
- ☐ Selecting ductwork locations:
  - Typical MF scenarios will utilize an air source heat pump with an open return. This means the return values for ductwork percentage area, R-value, as well as duct surface area square footage should be zeroed out.
  - For bottom floor and mid-level units any ductwork in rim/band areas will be considered conditioned space.

Tips for Simple Unit Level Conversions

For mid-level model (converting from lowest level)

- ☐ Change the level type to mid-level
- ☐ Change the foundation type to apartment above conditioned space
- ☐ Band area will remain the same
- ☐ The SFBE and volume should remain the same
- ☐ Remove slab and replace with framed floor area

- ☐ Location of ducts will remain the same (conditioned space)
- ☐ Air infiltration rate remain the same

For top floor model (converting from mid-level)

- ☐ Change the level type to top-floor
- ☐ Foundation type remains as apartment above conditioned space
- ☐ Remove the band area
- ☐ Update the SFBE and volume to reflect the loss of the band area
- ☐ Add ceiling area and insulation
- ☐ Location of ducts will typically be changed to unconditioned space. Unless noted that the roofline is insulated or ducts located in fur down below ceiling height of unit.
- ☐ Change the air infiltration rate to reflect the new volume/SFBE