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Introduction

Austin Energy Green Building (AEGB) promotes buildings that are efficient, healthy and well-constructed. AEGB’s Multifamily Program provides resources to residential and mixed-use developments up to six stories above grade in the Austin Energy service area. Whether the rating is voluntary or required we promote an integrated team approach that involves AEGB staff, project architects, engineers and general contractors. The Online Tool, Guidebook, calculation tools and various other resources have been developed to facilitate the rating process and assist design teams in meeting their green building goals.

Achieving an Austin Energy Green Building Rating will confirm that your building will have:
- Lower utility bills and reduced energy and water use
- Improved indoor air quality and occupant health
- Reduced operation and maintenance costs
- Increased durability
- Lasting value and benefits for our community and planet

WHO SHOULD USE THE AEGB MULTIFAMILY RATING?

The Multifamily Rating is applicable for multifamily and mixed-use developments six stories or less in height above grade. Multifamily and mixed-use developments taller than six stories shall use the Commercial Rating. Townhouses (that meet the definition of the IRC) must use the Single-Family Home Rating. If there are multiple buildings in a development, each building must individually meet AEGB requirements and credits.

ABOUT THE ONLINE TOOL

The AEGB Multifamily Online Tool will allow you to track your progress in meeting your sustainability goals. Performance goals for multifamily and mixed-use developments are laid out according to a set of Basic Requirements required for all rated projects and additional green building measures that can be achieved to attain points for a higher rating. Points are available in the following categories: site, energy, water, indoor environmental quality, materials and resources, and innovation. We highly encourage design teams to select measures in all categories so that the project encompasses all attributes of a green building.

The Online Tool is used to help assess a building and award it a “star” level determined by total points achieved. One star is the entry level rating and five stars is the highest rating. All of the Basic Requirements must be met in order for a building to qualify for a rating. By fulfilling all the Basic Requirements, a project will receive a one star Rating. Additional star levels can be gained by earning points for additional green building
measures as outlined in this guide. Following are the point requirements for the star levels:

<table>
<thead>
<tr>
<th>Star</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic Requirements</td>
</tr>
<tr>
<td>2</td>
<td>29-35 points*</td>
</tr>
<tr>
<td>3</td>
<td>36-42 points</td>
</tr>
<tr>
<td>4</td>
<td>43-56 points</td>
</tr>
<tr>
<td>5</td>
<td>57 points or more</td>
</tr>
</tbody>
</table>

*Note: For developments working toward an AEGB Rating as part of a Planned Unit Development (PUD) that requires two (2) or more Stars, certain measures need to be included and accomplished in addition to the basic requirements and the accumulated points. These measures are purple-highlighted in this Guidebook.

Rebates may be available where you see the $ sign.

Residential Uses and Non-Residential Uses
The Rating contains measures for Residential Uses, Non-Residential Uses, or if not indicated, both. “Residential” criteria are for buildings containing multifamily dwellings and their common spaces, such as hallways, leasing office, gym, or media room. “Non-residential” criteria are for mixed-use buildings, where part of the building is dedicated to non-residential uses, such as retail businesses or offices, and for those accessory buildings that do not contain multifamily dwellings such as a separate clubhouse or leasing office. For a mixed-use multifamily building with non-residential spaces, both requirements must be met. For a building serving only residential needs, then only the Residential Uses criteria should be used.

Calculators and Forms
Calculators and forms are used to help design teams demonstrate and track how some measures are being achieved. These calculators and forms are included in the Online Tool and must be completed and submitted to AEGB in order to achieve the proposed points. Calculators and forms that are included are:

- Building Water Use Reduction
- Construction Waste
- Irrigation Water Use Reduction
- Rainwater and Condensate Collection
- Building Reuse
- Building Materials (salvaged, recycled content, Texas sourced)
- Low Emitting Materials
- Certified Wood

Performance Option and Prescriptive Option Points
Some of the points in the Rating give you the option to choose between a Performance or Prescriptive path for accomplishing credits. With the Prescriptive Option you are told exactly what is required to meet that point. With the Performance Option, you choose other ways to meet the required performance measure but will need to demonstrate savings, for example using the calculators listed above, or building energy modeling. For point categories that offer Prescriptive or Performance Options, the project must meet either Prescriptive or Performance criteria, not both.
Required Verification
In each Required Verification section of the Guidebook, use the following key to
determine what documentation or action is required for Conditional Approval or Final
Approval:

- Needed for Conditional Approval
- Needed for Final Approval

In many cases required documentation for each measure can be uploaded and tracked
within the Online Tool.

Tenant Improvement Agreements
In mixed-use developments including leased non-residential spaces that are finished-out
by the tenants, a tenant lease agreement must be implemented to assure that non-
residential tenants will also adhere to green building requirements. The lease should
clearly identify the Star Rating to be achieved and, to the greatest extent possible, spell
out all rating criteria that shall be met. For instance, if tenants install their own water
fixtures, the tenant lease agreement shall list the flow rate limits they must follow in order
to accomplish the desired percentage of water conserved.

A draft of the tenant lease agreement shall be submitted with the documentation for
Conditional Approval. A copy of the final tenant lease agreement must be submitted as
verification to Austin Energy Green Building for Final Approval. The agreement shall
include the process for completing the Austin Energy Green Building Rating for each
tenant space, including plan review and construction verification. AEGB Multifamily
program staff can assist you in developing tenant agreement language that will meet our
requirements.

ABOUT THE PROCESS AND REQUIRED SUBMITTALS
Contact AEGB as soon as you know that an Austin Energy Green Building Rating is
either required or desired for your project. Early communication is essential to learn
about all available options for your development so you and your team can make
informed choices about design decisions. Integrated design team meetings increase the
likelihood that all project team members understand the green building goals of the
project.

Fee Schedule
Fees for multifamily projects will be assessed as follows:

<table>
<thead>
<tr>
<th>Size</th>
<th>Registration Fee</th>
<th>Service Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 50,000sf</td>
<td>$250</td>
<td>$750</td>
</tr>
<tr>
<td>50,000-500,000sf</td>
<td>$500</td>
<td>$3,500</td>
</tr>
<tr>
<td>Over 500,000sf</td>
<td>$500</td>
<td>$7,000</td>
</tr>
</tbody>
</table>

SMART Housing Projects: All fees will be waived.

Site Visits
AEGB staff will conduct site visits throughout construction. At a minimum, AEGB staff will
conduct an introductory site visit early in construction; to verify the integrity of all return air
plenums; and/or the installation of ductwork; and a final site visit at or near project completion.

Plenum/ductwork site visits should occur immediately before the mechanical inspection has been completed for each floor or building. The project superintendent, or designee, is responsible for contacting their AEGB representative to schedule a quality control site visit immediately prior to both rough and final inspections on each building.

At Your Earliest Opportunity:
- Complete the online registration process and assign team members using the Online Tool. If you have not yet identified all of the members of your team feel free to complete it later as your team is finalized. If applicable, an initial registration fee will be invoiced at this time. All current information, including any outstanding issues that need attention, can be posted in real time using the Online Tool. The project team and AEGB staff should be notified when updates are made to the project worksheet or calculators.

- When zoning or other City of Austin criteria requires an AEGB Rating, please execute and attach the AEGB Letter of Intent (LOI) using the Online Tool. Once the project has been registered and team members assigned, we will sign and return the LOI. You will need to include the executed LOI in the project’s application to Land Use Review in order to receive a Site Development Permit.

- Throughout the project, keep AEGB up to date with the project schedule, including major deadlines, so that AEGB staff can work with the project team to assure that the green building goals are met. The project schedule can be edited using the Online Tool.

PLANNING PHASE
Early in Pre-schematic Design we request a meeting with the entire design team. This will provide an opportunity to introduce features of the AEGB Rating and Rating Process and provide an opportunity to answer any questions you may have about how it relates to your development. This meeting is a great way to set the tone for a successful project.

To complete the planning phase, provide AEGB with:
- Update the online Rating Worksheet. Acknowledge all required measures and indicate which points the team plans to pursue. Place any questions or comments in the message queue for each measure. Ensure project and team information is up to date, as well as project schedule. This will provide an opportunity to see how ideas from the planning meeting are developing.
- Sign the Letter of Intent and return it for our signature. You will need to attach the executed LOI to the project’s application for a site permit, if required.
- Ensure registration fees have been paid.
- Allow at least two weeks for the team to review and approve this phase once all of the above have been completed.
**DESIGN PHASE**

*This review is crucial to ensure green building systems, materials and goals are integrated into bid documents, providing for more accurate cost estimates and project assessment.*

Upon satisfactory review that the documentation provided demonstrates how each Rating item will be achieved, AEGB will issue Conditional Approval. All documents necessary for Conditional Approval should be submitted at least four weeks prior to the planned date for receiving Conditional Approval. When zoning or other City of Austin criteria require an AEGB Rating, the **AEGB Conditional Approval letter must be attached to the front of the building permit set at the time of intake** with Planning and Development Review Department.

To complete the Design phase, provide to AEGB:
- Electronic set of permit drawings that demonstrate compliance w/each measure. Please attach the relevant drawing to the credit you are trying to pursue.
- ½ size hard-copy set of the drawings that demonstrate compliance with the Basic Requirements and other measures to be achieved.
- Project Specifications that demonstrate compliance with the Basic Requirements and other measures to be achieved, including Testing/Commissioning (Cx) specs
- Updated Online Tool Worksheet with the applicable calculators complete
- Design phase energy model if applicable
- Manual J calculations performed according to AEGB guidelines (included in this document) and according to specified parameters in construction documents
- Non-residential Uses that will be completed separately: draft tenant agreement
- Non-residential Commissioning: Owners Project Requirements
- Allow at least four weeks for the team to review and approve this phase once all of the above have been completed.

**CONSTRUCTION PHASE**

*Pre-Construction:* As you prepare for construction, update Online Tool with:
- Construction Waste Management Plan
- Testing / Commissioning (Cx) Plan
- Non-residential Commissioning: Basis of Design
- Updated project, team and schedule

The Testing/Commissioning Plan and the Construction Waste Management Plan are two imperative components of participation in the AEGB Multifamily program, therefore we require these plans are in place before construction begins. Now is the time to ensure contract documents, submittal forms, and team meetings include information that will lead to a successful green building development. Ask for Energy Star labels, recycled content, or volatile organic compounds (VOC) content, etc., as required.

*During construction:*
- Site visits throughout construction to verify measures selected are met.
- Rough mechanical site visit (call a day or two before city MEP rough inspection).
- Final mechanical site visit (call a day or two before city MEP final inspection).
- Continue to update Online Tool Worksheet
- Attach submittals and cut sheets to Online Tool Worksheet measures
- Monthly update of Demolition and Construction Waste Management calculator
• Updated project, team and schedule

IMPORTANT: AEGB staff will need to perform regular site visits for mechanical rough and other necessary verification. Please call us to schedule visits. The first introductory site visit should occur early in construction.

**Substantial Completion:** Update AEGB Online Tool project file:
- Final Online Tool Worksheet update, including all the finalized calculators and updated project and team information.
- Testing / Commissioning (Cx) Report draft including pre-functional test results (use standard testing forms available from AEGB for duct leakage testing and balancing)
- To-date Construction Waste Management report and back-up (attach pdfs to Online Tool)
- Submittals and cut sheets demonstrating each measure has been achieved attached to Online Tool.
- Ensure service fees have been paid.
- Final site visit

One or more final site visits are required. These are often done in stages as different areas of the building are completed. The first final site visit should be scheduled prior to the planned move-in date of first occupants. In order to perform the final site visit(s) and verification, service fees must be paid. An invoice is generated once the building permit set is approved.

Upon completion of site visits and satisfactory review of documentation, AEGB will issue a Final Approval. **When zoning or other City of Austin criteria require an AEGB Rating, this Final Approval is necessary to acquire a Certificate of Occupancy.**

**CLOSEOUT PHASE**
**At Post Construction:** Upload to AEGB Online Tool project file:
- Final Construction Waste Management report
- Final Commissioning (Cx) Report
- Any additional cut sheets and product specifications needed to document compliance

*This will enable our team to generate your project’s final Rating, and issue Rating Certificates.

**COMPLETE PHASE**
Once the project is complete the team will no longer be able to make any changes or add points.

If you have any questions regarding any of these deliverables, please feel free to contact your AEGB representative. We are here to help you through every step in the process.

With the exception of the ½ size set of plans, electronic submittals are preferred attached to the online tool. Any hard copy documents or CDs should be delivered to:
Katherine Murray  
Austin Energy Green Building  
Physical Address: 811 Barton Springs Road, 3rd Floor  
Mailing Address: 721 Barton Springs Road  
Austin, TX 78704  
(512) 482-5351  
fax (512) 482-5441  
E-mail: katherine.murray@austinenergy.com
Disclaimer

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BASIC REQUIREMENTS

1. Current Regulations

Intent
A green building rated project must comply, at a minimum, with all current codes and laws associated with the built environment. Of specific interest to a green building rating is compliance with regulations regarding water quality, energy efficiency, and urban head island. These codes are in place to assure energy efficient quality buildings and protect the health and safety of building occupants, our community and the natural environment.

Requirements (Residential and Non-Residential Uses)
Meet current City of Austin Codes with local amendments (including energy, building, mechanical, plumbing, electrical, and current drainage and water quality standards applicable for the project site watershed).

Required Verification
- Schedule of applicable codes in Construction documents

Strategies
- Review references for possible strategies.

Resources
For Run-off: Environmental Criteria Manual – Section 1.9.0
For Water Quality: Environmental Criteria Manual – Land Development Code [LDC 25-8-211]

Land Development Code - City of Austin:
www.amlegal.com/austin_nxt/gateway.dll/?f=templates$fn=altmain-nf.htm$vid=amlegal%3Aaustin_tx$3.0
Watershed Ordinance Summary Map - City of Austin:
www.ci.austin.tx.us/watershed/ordinance_map.htm
Edwards Aquifer Recharge Zone Map:
www.tceq.state.tx.us/compliance/field_ops/eapp/mapdisclaimer.html
Drainage Criteria Manual - City of Austin:
www.amlegal.com/austin_nxt2/gateway.dll?f=templates&fn=default.htm&vid=amlegal:austin_drainage
Environmental Criteria Manual - City of Austin:
Watershed Ordinances Regulations Summary Table - City of Austin:
www.ci.austin.tx.us/watershed/ordinance_table.htm

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
2. Transportation Alternatives - Bicycle Use

Intent
Reduce pollution and development impact from automobile use and improve public health by encouraging bicycle use. Ensure safety of tenants and their property.

Requirements (Residential and Non-Residential Uses)
Provide covered bicycle parking for 15% of residents and permanent building occupants and provide a safe path from property entrance to bike parking. Bicycle spaces shall be racks or lockers anchored so that they cannot be easily removed. Each space allocated for this kind of parking shall be a minimum of two (2) feet wide and six (6) feet long.

To Calculate Occupant Count:
* Use the method below to get a preliminary count of projected occupant totals on your projects. As the project progresses and speculative uses [ie: retailers] are known, the occupant totals can be adjusted according to the retailers actual historical or projected data. Permanent occupants = “Full Time Equivalent [FTE]”. Visitors and temporary occupants = “Transient”.

** Note, this occupant total is distinct from the occupant total calculated per IBC means of egress requirements [Table 1004.1.2 – IBC 2003]

For Residential Uses: [Condos or Apartments]
The number of occupants [FTE] is based on the parking counts [before reductions. i.e. Austin local CURE reductions etc]. Add up the counts based on:
LDC, Sec. 25-6-474 [www.ci.austin.tx.us/development/downloads/park_require.doc]
* Efficiency = 1 parking space
* One-Bedroom = 1.5 parking spaces
* Two-Bedroom = 2 parking spaces
* Three-Bedroom = 2.5 parking spaces
* Each additional bedroom = 0.5 spaces per bedroom per unit

For Commercial uses other than dwellings:
Estimate number of FTEs based on square footage and use.
Office: 250 sf per employee
Retail:  550 sf per employee
Medical:  225 sf per employee

To Calculate Bicycle Parking Spaces:
Total occupant number [FTE] x 15% = Bicycle Spaces Required

Exemptions:
➢ Residential units that have their own garage or are assigned a private, locked storage area are exempt.

➢ Projects that meet the requirements of Site Credit 11, Bicycle Storage meet this Basic Requirement.

➢ Senior or special needs housing projects are not exempt from this requirement, but can meet it by demonstrating how they meet the intent of this credit for
residential uses (through a proposed combination of bicycle parking, tenant transportation services for activities such as shopping, preferred Vanpool parking, Car2Go onsite, electric vehicle use such as golf carts transportation on property, and through programs to improve public health and help tenants lead a more active lifestyle, etc).

### Required Verification

- Calculations demonstrating total building occupancy and required quantity of securing areas (include in parking count schedule).
- Building and/or site plans indicating bicycle rack locations (include the capacity of each) cover device, and safe bicycle/pedestrian routes.
- Specifications of bicycle securing systems.
- Verification of installed path and bicycle securing device.

### Strategies

- Estimate the number of occupants based on the number of dwelling units and number of bedrooms in each unit, as well as permanent occupants of non-residential uses in building. See calculations above.
- Place bicycle racks in locations with high foot traffic and good visibility, such as near a building entrance or gathering place.
- If the development has multiple buildings or entrances, consider placing separate racks at each location to increase convenience.

### Resources

- City of Austin Bicycle and Pedestrian Program including Bicycle Route Map: [www.ci.austin.tx.us/bicycle/](http://www.ci.austin.tx.us/bicycle/)
- Bicycle Austin discusses bicycle transportation issues in Austin: [bicycleaustin.info/](http://bicycleaustin.info/)
- Custom Mobility Devices for Special Needs Individuals [www.freedomconcepts.com/](http://www.freedomconcepts.com/)

### 3. Building Energy Performance

#### Intent

The Energy Code establishes minimum regulations for energy-efficient buildings. Exceeding these standards further reduces building energy consumption and load and contributes to the reduction of conventional power plant construction, green house gas emissions, and utility costs.
Requirements (Residential and Non-residential Uses)
Select ONE of the following options (Note: buildings with greater than 25% glazing must comply with Option B):

Option A: Meet the following prescriptive requirements:
- **Glazing:** Maximum U value = 0.51, maximum SHGC = 0.3
- **Exterior Wall R-Value:** R-15 +2 (wood frame) R-15+5 (steel frame)
- **Lighting:** 90% of indoor lamps in dwelling units, multifamily common spaces, and commercial or tenant finish out spaces must be Energy Star-compliant, high-efficacy lamps*. Outdoor luminaries that are permanently attached to a structure must be high efficacy and controlled by an integral photocell or an astronomical time clock (Exception: Lighting for covered vehicle entrances or exits from buildings or parking structures when required for safety, security, or eye adaptation.) Energy Star lamps can be fitted into conventional light fixtures.
- **Mechanical Systems:** where split mechanical systems are installed to serve dwelling units, common spaces, and non-residential spaces, these systems must be 14 SEER or inverter (e.g. mini splits) or Variable Refrigerant Volume (VRV) technology
- **Appliances:** Energy Star refrigerator and dishwasher (installing dishwasher not mandatory).

*Lamps in closets and lighting required for safety, security or eye adaptation are excluded from the calculation.

Option B: Use a building performance model to demonstrate that the building exceeds the applicable Austin Energy Code with Amendments. Buildings under the commercial code must save 10% of energy (kWh) compared to an ASHRAE 90.1-2007 standard reference design (SRD) building (with Austin Amendments incorporated into the SRD) using a Building Energy Hourly Simulation such as Energy Plus1, Carrier HAP1, Trane Trace1, EnergyGauge Summit1, Energy10, or eQUEST. Buildings under the residential energy code must exceed this code (with Austin Amendments incorporated into the SRD) by 7% of energy by using Building Energy Hourly Simulation such as Energy Gauge or other software capable of modeling low-rise multifamily buildings. Buildings choosing Option B must also meet the prescriptive code minimums for the building envelope, i.e. lighting and equipment efficiency cannot be traded with envelope efficiency. Buildings under the commercial code should perform modeling per the Performance Rating Method in ASHRAE 90.1-2007 Appendix G. Buildings under the residential code should perform modeling as per 2009 IECC Chapter 4 Table 405.5.2(1). Projects doing modeling shall also complete AEGBs Summary Data Table documenting building components incorporated into the standard reference and proposed designs. Mixed-use buildings three stories and less with portions of the building under the residential energy code, may use either the Performance Rating Method as per Appendix G for the entire building, or use the Performance Rating Method for the commercial portions and a residential software capable of modeling multifamily buildings for the residential portions of the building. These cases must submit both the residential and commercial AEGB Summary Data Table.

Option C: Meet Energy Star 2011 National Program Requirements V2.5 or V3 Prescriptive Path. This option is only available to multifamily buildings that meet the criteria for Qualifying Units in Multiple Family Buildings and are permitted after January
1, 2011. AEGB staff shall be notified of project advancements and shall accompany RESNET raters on site visits.

### Required Verification

Indicate which option is chosen in the online tool Worksheet

**Option A**
- Narrative describing the building envelope, systems, and energy savings measures incorporated into the building
- Plans and specifications documenting all prescriptive measures
  - Cut sheets documenting prescriptive measures were incorporated into the building

**Option B**
- Narrative describing the building envelope, systems, and energy saving measures incorporated into building.
- Submit design energy model inputs and results recorded in the AEGB Energy Analysis Summary Form as well as modeling reports showing inputs and results for Baseline and SRD buildings. AEGB may further request the modeling files.
- Buildings under the residential energy code may perform modeling using Energy Gauge USA.
- Construction documents verifying modeling inputs
  - Product specifications, cut sheets, or other documentation (e.g. NFRC stickers) documenting installed envelope materials, mechanical and lighting systems.
  - Submit final energy model inputs and results recorded in the AEGB Energy Analysis Summary Form as well as modeling reports showing inputs and results for Baseline and SRD buildings. AEGB may further request the modeling files.

**Option C**
- Narrative describing the building envelope, systems and energy saving measures incorporated into building
- Plans and specifications documenting that Energy Star criteria are being met
- Notify AEGB staff for project meetings and site visits
  - Final Energy Star rating

### Strategies

- Consider modeling early in the design phase to: assess how different design options will impact the building’s energy use; estimate the cost-effectiveness of energy saving measures; maximize the benefit of producing the energy model.

- We encourage projects following Option C to take advantage of AEGB staff in the design and construction process by inviting AEGB staff to design meetings and site visits in addition to required site visits with RESNET raters.

### References

Energy Code Ordinance and Amendments - City of Austin:
[www.cityofaustin.org/edims/document.cfm?id=135892](http://www.cityofaustin.org/edims/document.cfm?id=135892)

Energy Star Qualified Multifamily Buildings
RESNET Accredited Rating Software Programs (for HERS (Energy Star) rating)
www.resnet.us/programs/energy_rating_software

Green Roof Directory:
www.greenroofs.org

Lawrence Berkley National Laboratory:
eetd.lbl.gov/HeatIsland/CoolRoofs/
National Fenestration Rating Council
www.nfrc.org/

Efficient Windows Collaborative Window Selection Tool
http://www.efficientwindows.org/selection.cfm

ASHRAE Article on VRV Systems
http://www.ashrae.org/doclib/20070327_goetzler.pdf

4. Residential Mechanical Systems PUD

Intent
An efficient and right-sized air conditioner is an important part of an energy-efficient residence. Air conditioners must be sized carefully to match the cooling needs of the dwelling unit for tenant comfort, improved indoor air quality and energy savings.

Requirements (Residential Uses)
Systems meet ALL of the following requirements:

1. Dwellings served by split or individual systems are sized according to the Air Conditioning Contractors Association (ACCA) Manual J Residential Load Calculation Procedure and installed according to code.
2. Air conditioning system components are matched according to AHRI (Air-Conditioning, Heating and Refrigeration Institute).

Required Verification
- A complete and accurate Manual J for each unit type (see description below)
- Mechanical schedule demonstrating that installed systems will be sized per Manual J
- AHRI reference numbers or other documentation for equipment match
  - Final system cut sheets, AHRI reference numbers
  - Final mechanical schedule, if applicable.
  - Verification by site visit

Strategies
- Perform load calculations using the Air Conditioning Contractors of America (ACCA) approved Manual J software
- Perform load calculations according to AEGB guidelines.
- A complete set of Manual J calculations, as well as unit plans and elevations, should be submitted at least four weeks prior to the date the project plans to receive Conditional Approval in order to accommodate edits and re-submittals.
Manual J:
Manual J is the accepted industry standard, approved by ANSI, for the proper sizing and selection of HVAC equipment in residential homes. Green Building will accept any of the tools approved by ACCA that meet Manual J standards.

AHRI:
Air conditioning equipment must be matched according to AHRI Directory of Certified Product Performance (Ahridirectory.org). The directory offers a convenient source for showing certified efficiencies and capacity ratings for the listed products. By comparing product performance ratings, the appropriate product for a particular job can be selected with the assurance that the product will perform as indicated in the directory.

The following language is from Manual J regarding right-sizing of systems:
Air Conditioning Contractors of America, Manual J, 8th ed., Introduction pp. i – iii

On undersizing heating and cooling equipment:
“The obvious problem with significantly undersized equipment is that it will not maintain the desired set-point temperature when a passing weather system imposes a design load on the heating and cooling equipment. However, slightly undersized cooling equipment – by a margin of 10% or less – may actually provide more comfort at a lower cost…”

On oversizing heating and cooling equipment:
“Excessively oversized equipment causes short-cycles, marginalizes part-load temperature control, creates pockets of stagnate air (unless the blower operates continuously), degrades humidity control during the cooling season…, requires larger duct runs, increases the installed cost, increases the operating cost, increases the installed load on the utility system and causes unnecessary stress on the machinery.”

On humidity control during the cooling season:
“Sensible and latent cooling loads are imposed on dwellings located in climates that have a substantial amount of moisture in the air during the cooling season. When the summer design condition occurs, properly sized equipment will operate continuously or almost continuously, both loads will be completely neutralized, and the occupants will be comfortable.”

“The total capacity (sensible plus latent) of the cooling equipment should not exceed the total load (sensible plus latent) by more than 15 percent for cooling-only applications and warm-climate heat pump applications…”

On safety factors:
“Manual J calculations should be aggressive, which means that the designer should take full advantage of legitimate opportunities to minimize the size of the estimated loads. In this regard, the practice of manipulating the outdoor design temperature, not taking full credit for efficient construction features, ignoring internal and external window shading devices and then applying an arbitrary “safety factor” is indefensible.

Research studies and the experience of knowledgeable system designers indicate that aggressive use of Manual J procedures provides an adequate factor of safety. No
additional safety factors are required when load estimates are based on accurate information pertaining to envelope construction and duct system efficiency."
Manual J Inputs:
City of Austin Energy Code requires calculations based on actual design, specifications and orientation and according to the Air Conditioning Contractors of America (ACCA) Manual J or equivalent computer analysis. AEGB will only accept Manual J calculations performed using tools approved by ACCA (see ACCA website www.acca.org/software). Buildings between four and six stories above grade may use a commercial load calculation program; however the inputs must meet AEGB guidelines. AEGB requires separate calculations for each unit type. Printouts showing all input and output values are required with submittals for review.

Manual J calculations must be done according to the AEGB guidelines below. Most requirements are based on ACCA's Manual J or ASHRAE Handbook of Fundamentals.

AEGB Multifamily Guidelines for Residential System Sizing Calculations:
- When multiple units of different orientations are present, the Manual J calculation only needs to be done for the unit with the highest gain. Typical “worst case” characteristics include: on the top floor; with the most west-facing glazing; on the southwest corner; with the most exterior walls; adjacent to unconditioned spaces like stairwells, elevators, garages, etc.).
- The exact unit that each Manual J calculation represents must be identified either on the Manual J printouts or as a separate list.
- Air infiltration rates of 0.20-0.36 air changes per hour (ACH) for summer; 0.20 to 0.46 ACH for winter must be used.
- Ventilation is defined as outdoor air that is mechanically introduced into the conditioned space through the heating and cooling equipment. Exhaust fans are not considered mechanical ventilation, and the effect of these devices on the cooling/heating loads is accounted for in the infiltration above.
- Ductwork located in furdowns or interstitial space should not have heat gain/loss in the load calculations. Only ductwork located outside the thermal envelope, such as a vented, unconditioned attic, should have a heat gain/loss associated with the ductwork.
- Indoor and outdoor design temperatures should be per Austin Amendments to the 2009 IECC (302.1 Exterior design conditions) and Manual J standards.
- Occupancy estimates should be based on ASHRAE recommendations, however up to two people per bedroom is acceptable.
- Manual J people load values must be used, i.e. 230 BTUH sensible, 200 BTUH latent per person.
- Walls separating conditioned space from interior unconditioned space, such as a garage, are specified as partition walls. Unlike exterior walls, partition walls do not have a solar load. Walls adjacent to breezeways or otherwise shaded must be input as partitions.
- Internal loads for all appliances and lighting shall not exceed 2,400 BTUH total. This load is less than the installed load in a typical apartment, but is an ASHRAE estimate of the load due to appliances which are actually operating at peak time.
- The total cooling load must be based on no less than 75% Sensible Capacity.
- The installed capacity of the cooling equipment (as specified in the mechanical schedule) must meet the sensible and latent load as calculated by the Manual J procedure AND shall not exceed the total load calculated by more than a half ton (5,999 BTUH).
- HVAC systems must be sized based on Manual J calculations and split systems must be matched per AHRI.
Manual J Submittals:
In order to review Manual J calculations, reports which show all inputs and outputs must be submitted. In order to expedite the review process, the specific reports required for the two primary Manual J softwares in use are listed below.

Elite RHVAC
The figure below shows the report selection screen in RHVAC with the required reports indicated with checks in the check boxes.

<table>
<thead>
<tr>
<th>General</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title Page</td>
<td>Detailed Loads</td>
</tr>
<tr>
<td>Project</td>
<td>Load Summary</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Bar Graph</td>
</tr>
<tr>
<td>Load Preview</td>
<td>Radiant Floor</td>
</tr>
<tr>
<td>Custom Report</td>
<td></td>
</tr>
<tr>
<td>AED Report</td>
<td></td>
</tr>
<tr>
<td>Psych. Chart</td>
<td></td>
</tr>
</tbody>
</table>

The RHVAC printouts will have the report titles listed below.
- Project Report
- Miscellaneous Report
- Adequate Exposure Diversity Test
- Detailed Room Loads
- System Summary Loads

Wrightsoft Right-J
The figure below shows the report selection screen in Right-J with the required reports shaded on the list.

<table>
<thead>
<tr>
<th>Choose Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost: Equipment Performance Elns</td>
</tr>
<tr>
<td>Cost: Equipment Summary</td>
</tr>
<tr>
<td>Cost: Investment Comparison Report</td>
</tr>
<tr>
<td>Cost: Operating Cost Summary</td>
</tr>
<tr>
<td>Cost: Sales Report</td>
</tr>
<tr>
<td>Duct: System Summary</td>
</tr>
<tr>
<td>Loads: AED Assessment</td>
</tr>
<tr>
<td>Loads: Building Analysis</td>
</tr>
<tr>
<td>Loads: Component Constructions</td>
</tr>
<tr>
<td>Loads: Project Summary</td>
</tr>
<tr>
<td>Loads: Short Room Summary</td>
</tr>
<tr>
<td>Loads: Worksheet</td>
</tr>
<tr>
<td>Loop: Circulating Pump</td>
</tr>
<tr>
<td>Loop: Details</td>
</tr>
<tr>
<td>Loop: Field Installation</td>
</tr>
<tr>
<td>Loop: Summary</td>
</tr>
<tr>
<td>Quote: Parts Order</td>
</tr>
<tr>
<td>Quote: Parts Pull Order</td>
</tr>
<tr>
<td>Quote: Quotation</td>
</tr>
<tr>
<td>Radiant Heating: Design Summary</td>
</tr>
</tbody>
</table>

The Right-J printouts will have the report titles listed below.
- AED Assessment
- Building Analysis
- Component Constructions
- Project Summary
- Right-J8 Worksheet

Resources:
Air Conditioning Contractors or America
www.Acca.org
ACCA Approved Manual J Software
www.acca.org/software/
Air-Conditioning, Heating and Refrigeration Institute
www.ahrinet.org/

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
5. Tenant Education

Intent
Increase awareness of building’s green features and encourage conservation by building occupants through education to extend the life of the landfill, save energy, water and other resources.

Requirements
Notify and continually educate building tenants on recycling and green practices through a formal and ongoing educational program, including information on the building’s website. A tenant guide to educate tenants shall include at minimum information on the building’s green features, recycling program, alternative transportation options, pest management, pet etiquette (if pets allowed), hazardous waste disposal and green tips for conservation must be included in move-in packet information. Use double-sided print option to conserve paper or provide in electronic form (preferred).

Recycling information should provide at a minimum guidelines on what materials are and are not accepted, location of recycling, and contact information for additional questions. Permanent signage must be posted indicating the location of the recycling area.

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Draft description of tenant educational program and draft copy of guidebook.</td>
</tr>
<tr>
<td>• Final draft of tenant educational program and guidebook.</td>
</tr>
<tr>
<td>• Copy of any educational materials to be distributed to tenants.</td>
</tr>
<tr>
<td>• Visual verification of signage for recycling area/s.</td>
</tr>
</tbody>
</table>

Strategies
✓ The City of Austin Solid Waste Services Department may have free recycling and waste reduction educational materials to help property owners and building managers educate their tenants.

Resources
Review the Sample Tenant Guidebook Template on the Online Tool
City of Austin Recycling Ordinance:
www.ci.austin.tx.us/sws/commercial_recycling_ordinance.htm

6. Testing/Building Systems Commissioning (Cx) PUD

Intent
The intent of the Testing/Building Systems Commissioning Basic Requirement is to ensure a comfortable and healthy environment for building occupants and minimize energy use; to reduce building operating costs by keeping mechanical and electrical building systems compliant with warranties and operating as designed; and to reduce potential for mold or other damage that can be caused by poor indoor air quality.

For the purposes of our rating, a testing requirement is applied to projects that are only using residential split systems and a commissioning requirement is applied to buildings...
using more complex mechanical systems (e.g. water source heat pumps or chillers). Buildings that are permitted under Chapter 5 (commercial chapter) of the energy code are required to undergo commissioning as per code and must also meet the AEGB testing or commissioning requirements. Projects that are undergoing the Commissioning compliance path for the AEGB Multifamily rating must also do airside testing of HVAC systems as per the testing requirement. Variable refrigerant volume and inverter systems will be treated on a case by case basis as these systems work their way into the multifamily market in Austin.

Building Commissioning is a systematic approach to improving system performance, operation & maintenance, indoor air quality & thermal comfort, and energy efficiency, resulting in improved occupant comfort, health & welfare, and productivity. Commissioning activities are not part of the typical design and construction process or part of standard operation & maintenance service contracts. Commissioning goes beyond testing, adjusting and balancing (TAB) and traditional inspections. Commissioning involves functional testing to determine how well the building systems work, and how well they work together. Commissioning is also used to determine whether the installed building equipment meets the facility’s goals or whether equipment needs to be adjusted to improve the efficiency and overall performance, consistent with the Owner’s Project Requirements (also known as the Design Intent).

Requirements (Residential Systems)
For residential spaces using split systems and non-residential spaces using residential split systems (i.e. air conditioners and air-source heat pumps 60,000 btuh or less), assure that mechanical systems are operating properly, efficiently, and according to their design intent through verification and testing that will ensure proper airflow and minimal duct leakage by meeting the AEGB Testing Requirements.

Spaces that are using mechanical systems other than residential split mechanical systems shall assure that mechanical and electrical systems are operating properly, efficiently, and according to the Owner Project Requirements (OPR) by undergoing commissioning and meeting the AEGB Commissioning Requirements.

An independent testing company hired by the General Contractor (not the Mechanical Contractor) will prepare the Testing Plan and verify that mechanical systems are installed and tested to meet their design intent via the required testing below.

Split mechanical systems (ductless, VRF or inverter systems are treated on a case by case basis):
Required testing:

1. AEGB Site Visits: 100% of dwellings
2. Duct leakage testing: 25% of dwellings
3. Air balancing: 25% of dwellings
4. Static pressure: 25% of dwellings

See Installation Guidelines, AEGB Site Visit Procedures, and Testing Protocol below. Though only 25% of units must be initially tested, any recurring problems must be addressed in all other systems likely to have the same issues.
Required Submittals:

**Specification:** The project specifications should include required testing. The testing requirements may also be included on the mechanical plans. Be sure to involve the testing company early and work with them to integrate testing appropriately into the construction schedule.

**Testing Plan:** Prior to construction, a testing plan must be submitted that narrates what testing is to be done, the criteria for acceptable performance, and the management protocols for follow-up, particularly in the event that testing demonstrates that there may be problems across all or a subset of systems. Review the Sample Testing Plan in the Online Tool.

**Final Testing Report:** The Final Testing Report must include testing method, common problems encountered, solutions used to meet performance criteria, problems that were not solved, and lessons learned. Field and summary data must be submitted with the Final Report. Contact your AEGB representative for template forms for reporting testing data.

Note: Projects installing ductless, inverter driven or VRF systems should work with AEGB staff to develop testing/commissioning requirements pertinent to these systems. This may include a requirement that a manufacturer’s representative is onsite during installation and initial commissioning. Any systems that include an air distribution system must also comply with residential air-side testing requirements.

**Requirements (Non-Residential Systems)**

Commission Mechanical and Electrical systems:

The following documentation must be provided:

1. Cx specification included in construction documents, **including air-side testing required for residential systems (above)**
2. Owner’s Project Requirements and Basis of Design documents
3. Cx Plan
4. Installation verification
5. Preliminary Cx Report including testing data

**Note:** Commercial building types or tenant finish outs installing split systems with 60,000 Btuh capacity or less, i.e. residential mechanical systems, may follow the AEGB site visit and testing requirements for residential systems in lieu of commissioning to meet AEGB requirements. Projects that are required to conduct commissioning as per the energy code may include the AEGB testing requirements with code commissioning.

*An independent Commissioning Authority (CxA) that meets the code definition of a CxA (Austin Amendments to IECC Section 503.2.9.2.1) AND has documented commissioning experience on at least two other building projects will verify and ensure that mechanical and electrical systems are installed and calibrated to operate according to the Owner Project Requirements (OPR) and Basis of Design (BOD).*

Refer to the following flow chart if unsure what requirements the project must meet:
GUIDELINES FOR AEGB TESTING REQUIREMENTS

INSTALLATION GUIDELINES FOR RESIDENTIAL SYSTEMS:
New HVAC installations will be installed as follows in addition to compliance with all applicable codes and specifications:

a) All gaps, joints, seams, etc. between the supply buckets and wallboard MUST BE SEALED with approved materials.

b) Provide return air opening of 1 square foot of net free area per ton of air conditioning. The return air system must provide enough air to maintain proper Freon pressures and supply adequate airflow to meet manufacturer’s specifications.

c) Seal all furdown penetrations with mastic, or silicone caulking.

d) If return air plenums are located in a ceiling furdown, the following guidelines apply:

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval

v2010_01  22
1. The preferred method is to construct the furtdown at least 16” deep, or such that the sidewalls of the furtdown extend at least 1-1/2” below the bottom 2" x 4" nailer.

2. Or, you may construct the sidewalls to the typical depth (14”) and install the 2" x 4" nailer flush with the bottom of the sidewalls; however, the joint between the nailer and the bottom of the wall board must be caulked along the entire perimeter of furtdown.

3. All gaps, joints, seams, etc. between wood framing and wallboard must have an air tight seal using caulk, mastic etc. This includes “knock-outs” between two sections of the return plenum and the return grill opening if located in the sidewall of the furdown plenum.
   
   e) If the air handler is in a closet, the door must be weather-stripped, with door sweep and threshold.
   
   f) All seams between the air handler/furnace, the return plenum and the supply plenum must be sealed with either hard cast tape or mastic.
   
   g) Using pure silicone caulk, seal the perimeter of the air handler to the platform.

AEGGB SITE VISIT PROCEDURES
1. Visual Check of Mechanical Rough-ins: 100% of Dwellings
   a) AEGGB will conduct regular quality control site visits. At a minimum, AEGGB staff will conduct an introductory visit early in construction, site visits to verify the integrity of all return air plenums, and final site visits at or near project completion. The project may hire a third party inspector to conduct visual verification of plenums if they choose.
   
   b) Plenum verifications should occur immediately before the mechanical inspection has been obtained on each building. The project superintendent, or designee, is responsible for contacting their AE Green Building Representative to schedule a visual verification immediately prior to both rough and final inspections with the city inspector on each building.
   
   c) The superintendent, or designee, must walk through the units with the Green Building representative so that any problems can be addressed on the spot. The construction representative should carry necessary materials (caulk, mastic, etc.) to repair any unsealed areas of the air duct system (i.e. ducts, fan coil unit, and return air plenum).

AIR-SIDE TESTING PROTOCOL
Testing shall be done in accordance with the following local amendments to the energy code: Austin Amendments to the 2009 IECC Sections 403.2.2, 403.2.4, 403.2.6
   
   a) A minimum of 25% of the dwelling units in each building of a multifamily project must be tested. The dwellings selected for testing should be apportioned among unit types. If all systems in the 25% batch meet Energy Code requirements, then all of the dwelling units are considered to meet AEGGB requirements. Though only 25% of units must be initially tested, any recurring problems must be addressed in all systems.
GUIDELINES FOR AEGB COMMISSIONING REQUIREMENTS

I. Owner’s Project Requirements
The Owner’s Project Requirements (also known as the Design Intent) should be prepared by the Owner with assistance from the Commissioning Agent. This document should provide a narrative on what features the building will have and what needs the building needs to fill. The California Commissioning Collaborative (www.cacx.org) has a good template for the Owners Project Requirements (OPR) and Basis of Design.

II. Commissioning Specification
The specification should include the specific commissioning tasks and tests that will be conducted and who will conduct them. This could be a separate specification or the commissioning and testing specifications can be included in the mechanical and electrical specifications. The Building Commissioning Association (www.bcxa.org) has a Master Commissioning Specification provides a good model for what to include in a Commissioning Specification.

III. Basis of Design (BOD)
The Basis of Design should be prepared by design team with assistance from the commissioning agent and should include:

- Narrative on how the proper functioning of the mechanical and electrical systems relate to the OPR
- What calculations, standards, protocols, programs, etc. are used to design electrical and mechanical systems? (ex. Manual J, Manual D, Manual S, CHVAC, Trace, etc.)

IV. Commissioning Plan
The Commissioning Plan should be prepared by the Commissioning Agent and design team. This plan shall include the Commissioning Form described in the Austin Amendments to the 2009 IECC Section 503.2.9.2.2. In addition the Commissioning Plan shall include:

- Team members
- Tasks for team members
- Periodic reviews and a schedule of planned reviews
- What will be included in the Final Report

Systems to be Commissioned
- List of systems to be commissioned
- Forms that will be used to collect data
- Forms that will be used to track deficiencies
- Percent of HVAC units will be commissioned
- The functional tests that will be performed for mechanical or electrical systems including AEGB Residential Air-Side Site Visit and Testing Requirements for systems with air distribution and Functional Performance Testing per Austin Amendments to the IECC Section 503.2.9.2.4.1 and 503.2.9.2.4.2 9 (for HVAC and lighting controls)
- Criteria for determining satisfactory performance

Key to Required Verification
- o Needed for Conditional Approval
- • Needed for Final Approval
• Contingency plan for addressing deficiencies
• The protocols, standards and calculations that will be used for testing and data analysis (references from BOD in addition to functional testing, duct leakage, TAB, etc.)
• Plan for training equipment contractors and installers to assure good installation and operation of HVAC and electrical equipment

Training
• How training will be implemented
• Who will be trained
• Materials that will be provided for O and M and training purposes

Appendices
• Task Matrix or Task List (including who will lead and who will be involved in each task)
• Blank Pre-functional and Functional Testing Forms
• Commissioning Checklist
• Blank Deficiency/Corrective Action Report

V. Preliminary Commissioning Report

For projects meeting the Commissioning Requirement, the Preliminary Commissioning Report shall be prepared by the Commissioning Agent with input and documentation provided by the design team and contractors. This report shall include required documentation as per Austin Amendments to the 2009 IECC Section 503.2.9.2.5. In addition, the Preliminary Commissioning Report shall include:

• Completed testing checklists and data forms
• Issues Log (produced by the CxA)
• Corrective Action Reports
• Project Schedule showing when reviews and tests were performed
• Narrative on what was done as part of the commissioning process
• Narrative on deficiencies and how they were addressed
• Narrative describing why any testing or other procedures called forth in the Cx Plan were not carried out and how this may impact meeting the Owners Project Requirements
• System Balancing Report as per Austin Amendments to the 2009 IECC Section 503.2.9.2.7.3
• Data summary tables (ex. showing exhaust fan design cfm next to measured cfm)
• System Manual per Austin Amendments to the IECC Section 503.2.9.2.7.2

Key to Required Verification

- Needed for Conditional Approval
- Needed for Final Approval
Austin Energy Green Building Multifamily Program: Basic Requirements

Required Verification

**Residential Systems:**
- Testing Specification in construction documents
- Pre-construction Submittal: Testing Plan (Testing Plan should not be prepared by Mechanical Contractor)
- Site visits by AEGB staff or third party
- Final Testing Report including testing data

**Non-Residential Systems:**
- Owner’s Project Requirements
- Commissioning Specification
- Preconstruction Submittal: Basis of Design and Commissioning Plan
- Site visits by AEGB or third party
- Preliminary Commissioning Report including testing data and System Manual

Strategies

- Projects meeting the Testing compliance path should be sure to review the GUIDELINES FOR AEGB TESTING REQUIREMENTS included above for details on required site visits, air-side testing, and test reporting requirements. It is highly suggested that duct test leaking be performed after ductwork is installed and before the gypsum board is installed. It is also recommended to do a mock-up unit of the HVAC installation and involve all trades. Your AEGB representative can do a site visit for the mock-up unit to help trades to understand what the representative will be looking for during site visits.

- Projects meeting the Commissioning compliance path should be sure to review both the GUIDELINES FOR AEGB TESTING REQUIREMENTS and the GUIDELINES FOR AEGB COMMISSIONING REQUIREMENTS included above for details on required site visits, air-side testing and additional functional testing, and commissioning documentation requirements.

References

ACG Commissioning Guideline (focuses on HVAC commissioning)

www.commissioning.org/commissioningguideline/

Building Commissioning Association

www.bcxa.org

California Commissioning Collaborative Tools and Templates

www.cacx.org/resources/cxtools/

Commissioning Site and Functional Testing and Design Guides - Portland Energy Conservation, Inc.:

www.peci.org/ftguide/

Commissioning guidance and procurement - Energy Design Resources:

www.energydesignresources.com/category/commissioning/

Association of Certified Commissioning Authorities AABC Commissioning Group (ACG):

www.commissioning.org


Key to Required Verification

- Needed for Conditional Approval
- Needed for Final Approval
7. Building Water Use Reduction – Metering

Intent
Give residents the ability to monitor their own consumption of utilities and be rewarded for conserving behaviors on an individual basis.

Benefits
Sub-metering and charging residents for water instead of including it in rental rates results in an 18 to 39 percent drop in water use. (Source: Sub-metering, RUBS, and Water Conservation, Industrial Economics, Inc., June 1999).

Requirements (Residential Uses)
All dwellings are individually metered (or sub-metered) for water and are billed individually for water usage.

- **Required Verification**
  - Plumbing plans showing meter locations
  - On-site verification by AEGB staff

Strategies
✓ It is becoming more common for multifamily residential units to have individual water meters. New, relatively inexpensive in-line metering devices are now available.

Resources
City of Austin Water Conservation Department:
www.ci.austin.tx.us/watercon/

8. Building Water Use Reduction

Intent
High efficiency plumbing fixtures reduce consumption of water for indoor use thus lessening the impact on the water supply and treatment facilities as well as reducing building operating costs by saving water and associated energy use.

Requirements (Residential Uses)
Each dwelling includes ALL of the following:
1. Lavatory fixtures (max. 1.0 gpm)
2. Showerheads (max. 2.0 gpm) (no more than one showerhead installed per shower)
3. Kitchen fixtures (max. 2.2 gpm)
4. Toilets (max. 1.28 gpf)
5. Energy Star Dishwasher

- **Key to Required Verification**
  - Needed for Conditional Approval
  - Needed for Final Approval
6. Either no clothes washer is installed in each unit OR washer uses fewer than 28 gallons / regular cycle.
7. Complete the Water Use Reduction Calculator

**Requirements (Non-Residential Uses)**
Meet ALL of the following:
1. Public Lavatories (max. 0.5 gpm)
2. Public Showers (max. 2.0 gpm)
3. Public Kitchen fixtures (max 2.2 gpm)
4. Toilets (max. 1.28 gpf)
5. Urinals (max. 0.5 gpf)
6. Complete the Water Use Reduction Calculator

To calculate Occupant Count for the Water Use Reduction Calculator, follow the instructions in Basic Requirement #2 on page 10.

Toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume of a dual flush toilet is defined as the composite, average flush volume of two reduced flushes and one full flush.

### Required Verification
- Plumbing fixture specifications and water-using appliance schedule
- Calculations from the AEGB Building Water Use Reduction Calculator
  - Installed fixture and water-using appliance submittals including water use
  - Updated Water Use Reduction Calculator, if applicable

### Strategies
✓ All developments can reduce indoor water usage by either installing the specified water fixtures (lavatory, showerheads and kitchen fixtures) and by installing low-water using Energy Star clothes washers.

✓ Low-flow plumbing fixtures including toilets, faucet aerators and showerheads as well as residential water-using appliances have been developed that save substantial amounts of water compared with conventional fixtures and appliances while providing the same utility.

### References
City of Austin Water Conservation Department:
[www.ci.austin.tx.us/watercon/](http://www.ci.austin.tx.us/watercon/)
EPA **WaterSense** labeled High Efficiency Toilets and faucets:
[www.epa.gov/watersense](http://www.epa.gov/watersense)

### 9. Irrigation Water Reduction

#### Intent
Minimize potable water use for landscape irrigation by designing water-wise landscapes to reduce the treatment and energy used by municipal water systems, saving water and energy and lowering building operating costs.

### Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
Requirements (Residential and Non-Residential Uses)
Site meets ALL of the following requirements:
1. 90% of new plants on COA Grow Green list (Native and Adapted Landscape Plants).
2. Plant-based mulch covers non-turf planting beds to a minimum 4-inch depth.
3. Install a minimum of 6 inches of soil below all turf areas.

Required Verification
- Landscape design drawings, plant list and planting details
- Drawings and narrative describing the captured rainwater system or the recycled site water system with the capacity of the system highlighted (if applicable)
- On-site verification by AEGB staff

Strategies
Potable water used for irrigation can be reduced through a number of methods.
- Retain existing established plant material on a site to drastically reduce the amount of irrigation required to get new plant material healthily established in the site.
- Minimize use of manicured grass.
- Landscape design and plant material choices that are appropriate to the climate will reduce the amount of water required by depending more on the natural rain systems than the irrigation system.
- High-efficiency irrigation systems that include moisture sensors, clock times and weather database controllers are widely available. These technologies ensure that plant material is being watered only when required and eliminate the waste associated with over-watering.
- Stormwater, rainwater, and condensate collection systems can also be of use in reducing the amount of potable water used for irrigation. This water will not be potable but can be used with no or minimal further treatment for irrigation purposes.

Note: Grow Green recognizes that there are many other plants well deserving of selection and they welcome your comments and suggestions regarding any new additions and changes you think would be useful. The list is periodically updated. Please call 512-974-2446 or email them through www.growgreen.org.

Resources
Water Conservation Program provides information and assistance – City of Austin: www.ci.austin.tx.us/watercon/
Landscaping for water quality protection - Grow Green City of Austin: www.ci.austin.tx.us/growgreen/
The Irrigation Association: www.irrigation.org/
Rainwater Harvesting (including calculator) - Texas A & M: rainwaterharvesting.tamu.edu/
10. **Low VOC Interior Paints and Coatings**

**Intent**
Low VOC (volatile organic compound) interior paints and coatings reduce toxic pollution and contribute to good indoor air quality for the benefit of the health and productivity of building occupants and those applying the paints and coatings.

**Requirements (Residential and Non-Residential Uses)**
All paints, primers, and anti-corrosive coatings applied on-site to the building interior must not exceed the VOC limit of Green Seal Environmental Standard GS-11 as shown below. All coatings applied on-site to the building interior must not exceed the current VOC limit of SCAQMD Rule 1113. *If a specialty product does not have a low VOC option, contact your AEGB representative for approval prior to application.*

I. All paints, primers, and anti-corrosive coatings applied on-site to the building interior must not exceed the VOC limit of Green Seal Environmental Standard GS-11 Section 4.4.

<table>
<thead>
<tr>
<th>Paint Type</th>
<th>VOC Limit (g/L)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-flat Topcoat</td>
<td>100</td>
</tr>
<tr>
<td>Flat Topcoat</td>
<td>50</td>
</tr>
<tr>
<td>Primer</td>
<td>100</td>
</tr>
<tr>
<td>Anti-Corrosive Coating</td>
<td>250</td>
</tr>
</tbody>
</table>

* The calculation of VOC shall exclude water and colorants added at the point-of-sale.

II. Coatings applied on-site to the building interior must not exceed the current VOC limit of SCAQMD Rule 1113 for clear wood finishes, floor coatings, stains, sealers and shellacs, and all other applicable coatings.

**Required Verification**
- Product specifications
- Tabulation using the AEGB Low Emitting Materials Form
- Product submittals with VOC content highlighted

**Strategies**
- ✔ If a specialty product does not have a low VOC option, contact your AEGB representative for approval prior to application.

**References**
11. Filtration for Indoor Air Quality

Intent
Proper air filtration plays an important role in keeping the coils and heat exchangers clean, which helps the HVAC system to work most efficiently, as well as prolong the life of the system. Air filters also help maintain good indoor air quality resulting in improved occupant health.

Requirements (Residential and Non-Residential Uses)
Filters installed in ventilation systems shall have a minimum efficiency reporting value (MERV*) rating of 7 or greater.

*MERV is the industry standard rating for air filters that measures their ability to trap particles. The higher the rating, the more efficient the air filter is at trapping particles. A MERV rating of 7 will capture particles as small as 3 microns.

**Required Verification**
- Product specifications
- On-site verification by AEGB staff

Strategies
- Review Resources for possible strategies.

Resources
EPA’s Indoor Air Quality:
www.epa.gov/iaq/index.html

12. Moisture Prevention

Intent
Protect against building moisture infiltration through direct rainwater intrusion, water vapor transmission, and negative pressurization. Avoid potentially damaging results of condensation that may occur within an exterior wall system. Proper moisture prevention affects the health of the occupants, air conditioning costs, and building integrity and durability.

Requirements (Residential and Non-Residential Uses)
The site must meet ALL of the following requirements:

1. No vinyl wall coverings or other vapor barriers, such as fiber reinforced plastic or vinyl (FRP or FRV) may be installed as the finish material on the interior of exterior wall.
2. Tenant agreements state that no vinyl wall coverings or other vapor barriers may be installed as the finish material on the interior of any exterior wall.

**Key to Required Verification**
- Needed for Conditional Approval
- Needed for Final Approval
3. Install building envelope drainage plane systems, including flashing and overhang systems.
4. For buildings with mechanical ventilation systems that bring in outside air, document building will be pressurized.

**Required Verification**
- Finish schedule indicating no vinyl wall covering on any exterior walls.
- Plans showing typical building details of building envelope drainage systems, including flashing and overhang systems, and wall sections for each exterior wall type indicating all materials.
- Mechanical schedule showing building is pressurized, if applicable.
  - Photos of installed drainage plane and flashing details with location and date notes.
  - Copy of tenant agreement, if applicable.
  - On-site verification by AEGB staff

**Strategies**
- Review references for possible strategies.

**References:**
ASHRAE’s Handbook – Fundamentals
www.ashrae.org

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13. **Storage and Collection of Recyclables**

**Intent**
The collection of recyclables reduces waste generated by building occupants and building operations that is directed to the landfill, extending the life of the landfill and saving energy and resources through the recycling process.

**Requirements (Both Residential and Non-Residential Uses)**
Provide an easily accessible, well-marked area(s) that serves the entire facility, dedicated to the separation, collection, and storage of materials for recycling. A minimum of the top four identified recyclable waste stream materials must be recycled. Building loading dock or pick-up location(s) must be sized appropriately to handle the recycling material volumes generated by the building occupants. Recycling carts/containers must be labeled with the materials accepted. Permanent signage must be posted marking the recycling center/s. Tenants must be educated about the recycling program (location, materials accepted, etc).

**Required Verification**
- Site plan indicating location of recycling collection center(s)
- On-site verification by AEGB staff of labeled recycling containers, and labeled recycling center/s.
Austin Energy Green Building Multifamily Program: Basic Requirements

Strategies
✓ Check with City of Austin Solid Waste Services for a current list of garbage and recycling providers.
✓ The City of Austin Solid Waste Services Department may have free educational materials to help apartment managers educate their tenants.
✓ Include information about the recycling program (location, materials accepted, contact information for questions, etc.) in the move-in packet.

References
City of Austin Recycling Ordinance: www.ci.austin.tx.us/sws/recyclerules.htm

14. Construction Waste Management

Intent
Construction waste management includes recycling or salvaging construction, demolition/deconstruction, and land clearing waste to reduce the amount of waste destined for the landfill or incineration. Construction Waste Management programs extend the life of the landfill, and save energy, resources, and material costs in their reuse.

Requirement (Residential and Non-Residential Uses)
Recycle and/or salvage at least 50% (by weight) of non-hazardous construction and demolition waste, excluding excavated soil and stone.

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Specifications for Construction Waste Management</td>
</tr>
<tr>
<td>• Demolition Waste Management Plan submitted prior to demolition, if applicable</td>
</tr>
<tr>
<td>• Construction Waste Management Plan submitted prior to beginning construction</td>
</tr>
<tr>
<td>• Monthly CWM updates during demolition and construction using summary matrix</td>
</tr>
<tr>
<td>• Calculations from AEGB Construction Waste Calculator</td>
</tr>
<tr>
<td>• Digital copies (preferred) of weight tickets for recycling, salvage and landfill</td>
</tr>
</tbody>
</table>

Strategies
✓ Employ building materials that are highly recyclable and a construction sequence conducive to maximizing recycling. If the building site has an existing structure, design for reuse of the building or the materials on site.
✓ If you are considering utilizing a co-mingled construction waste recycling service provider, collect and compare the facility’s diversion rates and techniques. Be aware your project’s waste may be combined with that of other projects and/or a historic diversion rate for the facility may be used, which may not be your actual diversion rate. On-site separation may be preferable.

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
To ensure you have the inputs required for the AEGB Construction Waste Calculator, weight tickets or recycling reports should list:

1. Date
2. Hauler or subcontract hauler
3. Destination (landfill or recycler)
4. Amount of each material recycled, salvaged or reused (sheetrock, wood, concrete, cardboard, plastics, etc.)
5. Amount of materials not recycled, such as rejected loads of contaminated recycling and dumpsters of garbage

To convert pounds to tons, one ton equals 2,000 pounds.

The AEGB Construction Waste Calculator contains a volume to weight calculator for converting cubic yards of various materials to pounds. This is especially useful for converting land clearing vegetation mulched on site to pounds, since this material is not weighed.

Rejected loads due to contamination must be counted as landfill waste instead of recycling even though the intention was to recycle.

Do not include hazardous materials, i.e. lead and asbestos, or soil and stone removed from site in either total materials removed from site or recycled/landfilled total.

References
Construction Industry Compliance Assistance Center www.cicacenter.org
1. Site Selection

Intent
As the population of Central Texas increases two-fold in the next two to three decades, effectively manage the impact of growth through site selection for new developments and buildings that utilizes the existing municipal infrastructure and preserves our natural resources.

1.1 Environmental Sensitivity

Requirements (Residential and Non-residential Uses)
Project site is not in the Drinking Water Protected Zone which includes the Barton Springs Zone, Barton Creek Watershed, Edwards Aquifer Recharge and Contributing Zone, and Balcones Canyon Land. Also, project site is not a Greenfield defined as a parcel of land not previously developed beyond that of agriculture or forestry use.

Required Verification
- Print-out of the GEO Profile identifying site location and Watershed Classification from the City of Austin Development GIS Viewer. Include site address.
- Pre-construction description of site as a non-Greenfield site.

Strategies
- Avoid building on undeveloped lands and in environmentally sensitive areas.

References
Watershed Development Map GIS Viewer - City of Austin: coagis1.ci.austin.tx.us/website/COAViewer_dev/viewer.htm
Watershed Classification Report using the GIS Viewer. First, select Address from the Viewer Tools menu on the left menu bar. Enter the address or street name and intersection. The Development GIS will bring up the map. To see on the map the Watershed Regulation Area, select Austin Watershed Regulation Areas from the Layers Menu on the right, then refresh map. Select the LEGEND tab on the right to see if the address is located in the Suburban or Urban (Site 1b) Watershed Regulation Area. To get a report of the Watershed Classification, set browser to allow pop-ups, Select Geo Profile from the left menu bar and point and click to the location on the map and a GeoProfile Search Results page will open. Scroll down to page 2 to see Watershed Classification. If the SDE Waterreg. Watername is Suburban or Urban, this address qualifies for Site1a. Urban also qualifies for Site1b. BSZ, Water Rural and Water Supply Suburban do not qualify for Site1a or Site1b.
Watershed Ordinance Map - City of Austin: www.ci.austin.tx.us/watershed/ordinance_map.htm
1.2 Desired Development Area  
4 points

Requirements (Residential and Non-residential Uses)
Project site is located within the Urban Watershed Desired Development Zone.

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Print out of the GEO Profile identifying site location and Watershed Classification from the City of Austin Development GIS Viewer. Include site address.</td>
</tr>
</tbody>
</table>

Strategies
✓ Select a site within the Urban Watershed Desired Development zone.

References
City of Austin Development Map Viewer: coagis1.ci.austin.tx.us/website/COAViewer_dev/viewer.htm
City of Austin Watershed Ordinance Summary Map: www.ci.austin.tx.us/watershed/ordinance_map.htm

2. Brownfield Redevelopment  
1 point

Intent
Rehabilitate sites where development is complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant as defined by CERCLA §104(k) the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 to revitalize communities, utilize existing infrastructures taking development pressures off of undeveloped, open land, and improve and protect the environment.

Requirements (Residential and Non-residential Uses)
Project demonstrates effective remediation of site contamination (using established technologies that have minimal disruption on the site’s natural features above and below ground).

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Documentation of the Brownfield classification and verification of remediation efforts</td>
</tr>
</tbody>
</table>

Strategies
✓ Rehabilitate and build on Brownfield sites.

References
EPA Preliminary Remediation Goals: www.epa.gov/region09/waste/sfund/prg/index.html
EPA Sustainable Redevelopment of Brownfields Program, legal definition, grants and loans: www.epa.gov/brownfields/
Brownfields Redevelopment Office Services – City of Austin:
3. Site Characteristics Study 1 point

Intent
Reduce the impact of the structures on the environment and optimize building placement on a site.

Requirements (Residential and Non-residential Uses)
Map the proposed site’s environmental characteristics (include all that are applicable):
- Existing water elements
- Soil conditions
- Ecosystems and natural habitats
- Slope
- Trees and other vegetation
- Seasonal wind and daylight availability
- Traffic and other pollution sources

Create a plan to minimize disturbance and maintain or restore existing site features. Develop recommendations for building placement on site to minimize impact on the environment and to take advantage of site characteristics.

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Site characteristics map should be completed prior to design development documenting all applicable elements listed in Requirements</td>
</tr>
<tr>
<td>o Narrative including recommendations for maintaining or restoring existing site features as well as for building placement to minimize environmental impact</td>
</tr>
</tbody>
</table>

Strategies
✓ Use existing site characteristics research to select the best possible building site to take advantage of features and minimize development impacts.

References
Sun Path Chart useful in passive design considerations:
solardat.uoregon.edu/SunChartProgram.html

4. Transportation Alternatives

Intent
Reduce pollution and development impact from automobile use and encourage use of alternative forms of transportation that minimize emissions and land use.
4.1 Public Transportation  

Requirements (Residential and Non-residential Uses) 
Main building entrance is located within 1/4 mile of the stops for at least two Capital Metro bus lines or within 1/2 mile of a rail stop (or future rail stop with proposed completion within 5 years).

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Area site plan highlighting the public transportation stops. Indicate walking distance from the building’s main entry to each indicated.</td>
</tr>
</tbody>
</table>

Strategies
✓ Select a site near public transportation options.

References
 Austin Capital Metro Transit identifies services near a given location:  
www.capmetro.org/riding/trip_info.asp  
Transit Oriented Development Districts – objectives and locations:  
www.ci.austin.tx.us/planning/tod/default.htm  
Envision Central Texas:  
www.envisioncentraltexas.org  
Gmaps Pedometer  
www.gmap-pedometer.com

4.2 Parking Capacity  

Requirements (Residential and Non-residential Uses) 
Parking does not exceed minimum local zoning requirements.

TABLE OF OFF-STREET PARKING REQUIREMENT

<table>
<thead>
<tr>
<th>Use Classification</th>
<th>Minimum Off-Street Parking Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Uses</td>
<td>Efficiency dwelling unit: 1 space</td>
</tr>
<tr>
<td>Condominium and Multifamily</td>
<td>1 bedroom dwelling unit: 1.5 spaces</td>
</tr>
<tr>
<td></td>
<td>Dwelling unit larger than 1 bedroom: 1.5 spaces plus 0.5 space for each additional bedroom</td>
</tr>
</tbody>
</table>

City of Austin Land Development Code Ch 25-6, Appendix A: Tables of Off-street Parking and Loading Requirements (partial listing). For non-residential and additional residential uses see Appendix A in References below. Note: Off-street parking may be subject to multipliers based on project location (central business district, for example).

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Schedule associated with the site plan showing the number of parking spaces required and number provided.</td>
</tr>
<tr>
<td>• Confirm number of parking spaces installed.</td>
</tr>
</tbody>
</table>

Key to Required Verification
| o Needed for Conditional Approval |
| • Needed for Final Approval |

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Strategies
✓ Be sure to check if any parking multipliers apply to your project based on location or investigate other opportunities available (i.e. car sharing programs, etc).

References
City of Austin Land Development Code Ch 25-6-471, Off-street parking and loading:
City of Austin Land Development Code Ch 25-6, Appendix A: Tables of Off-street Parking and Loading Requirements:
www.amlegal.com/austin_nxt/gateway.dll?f=id&id=Austin%20City%20Code%3Ar%3A7670$cid=texas$t=altmain-nf.htm$an=JD_APPENDIXA.TABLESOFOFF-STREETPARKINGANDLOADINGREQUIREMENTS.$3.0#JD_APPENDIXA.TABLESOFOFF-STREETPARKINGANDLOADINGREQUIREMENTS

4.3 Electric Vehicle Charging Station 1 point

Intent
Prepare to meet future needs by designing an electrical infrastructure necessary to support the additional load of plug-in electric vehicles (PEV). PEV compared to gasoline fueled vehicles reduce air pollution and greenhouse gas emissions that affect human health and global warming.

Requirements
Install Level 2 electric vehicle (EV) charging station(s). The EV charging station may be accessible to the general public, building occupants, and/or company fleet vehicles. Signage shall be provided.

Required Verification
- Location of the EV charging station, service panel, and conduit plan included in the plan set.
- EV Charging station specifications in construction documents.
- Narrative of scope of use.

Resources
City of Austin Design Criteria Manual – Section 4
Online Code Library - City of Austin:
austintech.amlegal.com/nxt/gateway.dll/?f=templates$fn=default.htm$3.0$vid=amlegal:austin_all_mc$anc=
Definitions:
Level 1 Electric Vehicle Charging. Electric vehicle charging systems using 120 volt AC 15-20 AMP electric circuits. Typical equipment configuration is standard 3 prong NEMA 5-15R/20R outlet.
Level 2 Electric Vehicle Charging. Electric vehicle charging systems using 208 to 240 volt single phase 40-70 AMP electric circuits. Equipment configuration is compliant with the SAE J1772™ standard.
5. **Site Disturbance**  

**Intent**  
Limit site disturbance or restore damaged open areas to provide habitat and promote biodiversity.

**Requirements (Residential and Non-residential Uses)**  
**Greenfield sites:** *Site not previously developed or graded and remains in a natural state.*  
Plan to limit disturbance to 40 ft beyond the building perimeter; 10 ft beyond walkways, patios, and surface parking; 15 ft beyond roadways and utility trenches; and 25 ft beyond any pervious areas that require additional staging.

**Previously developed sites:** *Site previously contained buildings, roadways, parking lots, or was graded.*  
At least 50% of the post-development open area (site area minus building footprint) is vegetated using native/adapted plants. Vegetated roof areas may be included in the open area calculations, if the plants meet the definition of native/adapted.

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Greenfield sites:</strong></td>
</tr>
<tr>
<td>o Site plan clearly indicating limits of construction (site disturbance boundaries) as indicated above and locations of planned development within those constraints.</td>
</tr>
<tr>
<td>• On-site verification by AEGB staff</td>
</tr>
<tr>
<td><strong>Previously developed sites:</strong></td>
</tr>
<tr>
<td>o Landscaping plan including plant list and open area calculations demonstrating that at least 50% is vegetated.</td>
</tr>
<tr>
<td>• On-site verification by AEGB staff</td>
</tr>
</tbody>
</table>

**Strategies**  
✓ Choosing native plants will also help reduce outdoor water consumption.

✓ Clearly define limits of construction visually on site during construction.

✓ Consider including limits of construction in individual sub-contracts and regular site meetings. Some developments have placed a penalty for working outside the agreed upon limits.

**References**  
City of Austin Grow Green Guide:  
www.ci.austin.tx.us/growgreen/plants.htm

6. **Heat Island Reduction**  

**Intent**  
Urban Heat Islands are characterized by increased temperatures which affect the formation of ground-level ozone or smog, local weather patterns and the performance of air conditioning and refrigeration equipment. Heat island effects can be reduced by
minimizing site impervious surfaces, including vegetated open-grid pavement systems, maximizing vegetative shading, and installing high albedo roofing and other impervious surfaces. The resulting reduction in the heat island effect for the microclimate surrounding the building contributes to improved air quality and building cooling energy savings.

Requirements* (Residential and Non-residential Uses)
Site meets ONE of the following measures:

- Vegetated open-grid pavement system (at least 50% pervious) for 50% of the non-structured parking area.
- Locate 50% of parking underground or in structured parking.
- High-albedo paving materials [Solar Reflective Index (SRI) of 29 or above] on at least 30% of non-roof impervious surfaces.
- Vegetative shading of at least 30% of non-roof impervious surfaces within five years.

*NOTE: Required credit for two-star PUDs

**TABLE S6:** Solar Reflectance Index (SRI) for Standard Paving Materials

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>Emissivity</th>
<th>Reflectance</th>
<th>SRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical New Gray Concrete</td>
<td>0.9</td>
<td>0.35</td>
<td>35</td>
</tr>
<tr>
<td>Typical Weathered* Gray Concrete</td>
<td>0.9</td>
<td>0.20</td>
<td>19</td>
</tr>
<tr>
<td>Typical New White Concrete</td>
<td>0.9</td>
<td>0.7</td>
<td>86</td>
</tr>
<tr>
<td>Typical Weathered* White Concrete</td>
<td>0.9</td>
<td>0.4</td>
<td>45</td>
</tr>
<tr>
<td>New Asphalt</td>
<td>0.9</td>
<td>0.05</td>
<td>0</td>
</tr>
<tr>
<td>Weathered Asphalt</td>
<td>0.9</td>
<td>0.10</td>
<td>6</td>
</tr>
</tbody>
</table>

*Reflectance of surfaces can be maintained with cleaning. Typical pressure washing of cementious materials can restore reflectance to close to original value. Weathered values are based on no cleaning.

Source: LEED for New Construction Version 2.2, pg. 91
Required Verification

- Copy of site plan indicating method utilized at various locations and their associated areas.
- Area calculations for the entire site demonstrating that the minimum requirements are met.
- Product specifications.
- On-site verification by AEGB staff

Strategies

- Choose high-albedo paving materials that have a Solar Reflective Index (SRI) of 29 or above.
- A subsurface portion of a parking structure with ground cover may be counted as pervious cover if it meets requirements of City of Austin Land Development Code 23-1-23[b].
- Fire lanes constructed of pervious pavement are not counted as impervious cover if: the lanes are gated for fire access only and are accessible by pedestrians as a walkway, AFD approves of the structure of the driving surface, and the pervious paving detail is in the construction notes.

References

Design strategies and benefits to mitigating Heat Island affect:
- eetd.lbl.gov/HeatIsland/
- Environmental Protection Agency:
  - www.epa.gov/heatisland/index.html
- Grow Green Guide native and adapted plant listings – City of Austin:
  - www.ci.austin.tx.us/growgreen/plants.htm
- "Albedo: A Measure of Pavement Surface Reflectance”, American Concrete Pavement Association:
  - www.pavement.com/Downloads/RT/RT3.05.pdf

7. Light Pollution Reduction 1 point

Intent

Design efficient outdoor lighting systems to reduce light pollution and adverse effects of artificial light including sky glow, glare, light trespass, and light clutter to preserve nocturnal environments.

Requirements (Residential and Non-residential Uses)

Development site achieves BOTH:

- Exterior lighting meets the standards of the City of Austin Code – Subchapter E of Chapter 25-2: Design Standards and Mixed Use, Article 2.5 Exterior Lighting with the exception of Section 2.5.2.C.2.
- Exterior lighting meets the maximum initial illuminance values at the site boundary and beyond and the fixtures meet the percentage of lumens emitted above full cut-off requirements as outlined in Table 1 below for the appropriate zone as defined in IESNA RP-33. Check census data for population per square
mile for the property address by census tract to determine which Lighting Zone to use.

**Table 1: Light Trespass Criteria per Lighting Zone**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Initial Illuminance (fc)</th>
<th>Calculated at Location relative to site boundary</th>
<th>Initial Lumens Emitted above Full Cutoff¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>LZ1 – &lt;200 people per square mile</td>
<td>0.01 horizontal &amp; vertical</td>
<td>Site boundary</td>
<td>0%</td>
</tr>
<tr>
<td>LZ2 – 200-3,000 people per square mile</td>
<td>0.10 horizontal &amp; vertical 0.01 horizontal</td>
<td>Site boundary 10 ft beyond site boundary</td>
<td>2%</td>
</tr>
<tr>
<td>LZ3 – 3001-100,000 people per square mile</td>
<td>0.20 horizontal &amp; vertical 0.01 horizontal</td>
<td>Site boundary 15 ft beyond site boundary</td>
<td>5%</td>
</tr>
<tr>
<td>LZ4 – &gt;100,000 people per square mile</td>
<td>0.60 horizontal &amp; vertical 0.01 horizontal</td>
<td>Site boundary 15 ft beyond site boundary</td>
<td>10%</td>
</tr>
</tbody>
</table>

¹Full Cutoff is defined as an angle of 90 degrees from nadir (straight down).

Exterior lighting levels of illuminance meet the horizontal foot candles for the facilities listed in Table 2 as defined in the City of Alpine, TX Outdoor Lighting Ordinance adopted May 23, 2000. Minimum levels shall be consistent with safety and security.

**Table 2: Levels of Illuminance at Specific Facilities**

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Average 2.0 fc; minimum 0.5 fc</th>
<th>Maximum 5.0 fc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Lots and areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entry areas near buildings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Definitions**

LZ 1: Dark: For population densities less than 200 people per square mile according to the last US Census, also for development areas in state and national parks, areas near astronomical observatories, zoos, and ANY area where residents have expressed a desire to maintain a natural nighttime environment.

LZ 2: Low: For population densities of 200-3,000 people per square mile according to the last US Census, this would include most areas zoned “residential”, and is the default zone for residential areas.

LZ 3: Medium: For population densities greater than 3,000 people per square mile according to the last US Census, this lighting density is intended for high urban density neighborhoods, shopping and commercial districts and industrial parks. This is the default zone for commercial and industrial areas.

LZ 4: High: This is for major city centers (with population densities greater than 100,000 per square mile according to the last US Census), thematic attractions, entertainment districts, and major auto sale districts.
Required Verification
- Exterior lighting plan and schedule
- A narrative including specific information regarding the light trespass analysis, including census data on population per square mile
- Photometric plan showing illuminance levels at intervals no greater than 10 feet between each point across the entire site
- Product specifications
  - Product submittals
  - As-built exterior lighting plan, if applicable

Strategies
- Select full cut-off exterior fixtures.
- Look for opportunities to place lights under overhangs and vegetation.

References
City of Austin Code – Subchapter E of Chapter 25-2: Design Standards and Mixed Use, Article 2.5 Exterior Lighting:
Census Data. From this site, enter the zip code, hit the “go” button, and then click on “map” in the Total Population line to get a population map by census tract.
http://factfinder.census.gov/servlet/
International Dark-Sky Association:
www.darksky.org
"Lighting for Exterior Environments" - IESNA RP-33-99, Illuminating Engineering Society of North America:
www.iesna.org
Texas Light Ordinance as demonstrated in ‘An Ordinance to improve outdoor lighting in the City of Alpine, Texas:
www.iessanjacinto.org/Ordinances/Alpine_5-23-05.pdf

8. Accessibility  

Intent
Accessibility is an integral part of designing and constructing better buildings that serve occupants’ needs over the life of the building without requiring future costly and resource-intensive renovations. Accessibility allows persons with temporary or permanent disabilities a wide range of housing options, as well as the ability to visit and mingle with neighbors, and to allow visitors easy access to the building. Accessibility reduces the need and cost for disabled persons to make requests for reasonable modifications and allows residents to “age in place” – that is, to be able to stay in their home as they grow older or as their mobility abilities change. Improved accessibility also results in improved accommodations for residents and guests who are temporarily disabled due to illness or injury.
Requirements (Residential Uses Only)
Site meets BOTH of the following:
- 100% of units have blocking in at least one bath wall.
- Door handle levers installed on 100% of units.
- Faucet controls at all sinks and lavatories in 100% of all units shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist.

The blocking for conventional bathtubs should be placed 32”-38” above the floor on the longest tub wall and should be 6” high by 24” wide. For location of blocking for conventional bathtubs and other shower/tub types, follow the Fair Housing Act design manual. Scrap pieces of wood can be used for blocking and projects are encouraged to put blocking in additional walls.

Blocking in the walls must be verified before sheetrock is installed. Grab bars do not have to be installed until resident or future resident requests installation.

Lever door handles should be installed on the interior and exterior of main entrances, as well as all bedrooms, offices, bathrooms, closets, garages and rear/patio doors (sliding doors excluded).

Lever-operated, push-type, and electronically controlled mechanisms are examples of acceptable designs.

<table>
<thead>
<tr>
<th>Required Verification</th>
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<tbody>
<tr>
<td>o Plan notes include location of blocking.</td>
</tr>
<tr>
<td>• On-site verification of blocking and lever handles by AEGB staff.</td>
</tr>
</tbody>
</table>

Strategies

✓ Use scrap lumber for blocking in the bathroom walls if building is stick frame.

✓ Specify low-pile carpeting or non-slip flooring.

References
City of Austin S.M.A.R.T. Multi-Family Accessibility Standards
Americans with Disabilities Act
www.ada.gov
Fair Housing Act (FHA) design manual –
Federal Disability Information Resource
www.disabilityinfo.gov
Disability Law Resource
www.dlrp.org
United States Access Board
www.access-board.gov
Institute for Human Centered Design
www.adaptiveenvironments.org/index.php?option=content&Itemid=3
9. **Outdoor Environmental Quality** 1 point

**Intent**
Provide community-oriented, outdoor places on site to enable building occupants and visitors to connect to and enjoy the natural environment.

**Requirements (Residential and Non-residential Uses)**
Provide shaded, outdoor seating that is accessible to all building occupants for 10% or more of the building's occupants.

<table>
<thead>
<tr>
<th>Required Verification</th>
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</thead>
<tbody>
<tr>
<td>o Site plan and details indicating location of outdoor areas, seating capacities, and types of shading provided.</td>
</tr>
<tr>
<td>• On-site verification by AEGB staff</td>
</tr>
</tbody>
</table>

**Strategies**
✓ Review references for possible strategies.

**References**
Sun Path Chart useful in shading design:
http://solardat.uoregon.edu/SunChartProgram.html

10. **Integrated Pest Management** 1 point, PUD

**Intent**
Integrated pest management (IPM) is an environmentally-sound method that focuses on long-term prevention of pests in and around buildings using a least-toxic approach. The use of native and adapted plants that are naturally resistant to pests and diseases, as well as physical barriers to prevent termite infestation are a few examples of ways to control pests over the life of the building and landscape. IPM preserves the site's ecological integrity, enhances biological diversity, and protects wildlife and worker/public health and safety, and may reduce maintenance costs.

**Requirements* (Residential and Non-residential Uses)**
Develop and implement an Integrated Pest Management Plan and practices appropriate for both site and building use. Plan should include two sections as outlined in memo IPM Plan Requirements 9-4-06 , www.ci.austin.tx.us/growgreen/downloads/ipm-plan-requirements-9-4-06.pdf. The memo gives guidance on the content and format of the overall IPM plan. Part A should include a description of the project and Part B should include anticipated pest problems, pest-specific IPM Plans, and a public education program. The plan should include a system of controlling pests (weeds, diseases, insects or others) in which:
- Pests are identified
- Action thresholds are considered

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<tr>
<th>Key to Required Verification</th>
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<tr>
<td>o Needed for Conditional Approval</td>
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<td>• Needed for Final Approval</td>
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</table>
• All possible control options are evaluated
• Selected control(s) are implemented
• Control options--which include biological, cultural, manual, mechanical and chemical methods--are used to prevent or remedy unacceptable pest activity or damage
• Choice of control option(s) is based on effectiveness, environmental impact, site characteristics, public health and safety, and economics

*NOTE: Required credit for two-star PUDs

<table>
<thead>
<tr>
<th>Required Verification</th>
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<tbody>
<tr>
<td>o Draft of the Integrated Pest Management Plan for indoor and outdoor pests</td>
</tr>
<tr>
<td>• Verify IPM plan in Operation &amp; Maintenance (O&amp;M) documents</td>
</tr>
<tr>
<td>• If applicable, verification of installed systems (either product submittals or site visit).</td>
</tr>
<tr>
<td>• Final copy of Integrated Pest Management Plan</td>
</tr>
</tbody>
</table>

Strategies
✓ IPM takes advantage of all appropriate pest management options.
✓ For a good example of handouts for tenants, staff and contractors, see the link below for the Massachusetts IPM Kit for Building Managers.

References
Integrated Pest Management Reference Plan, City of Austin: [www.ci.austin.tx.us/watershed/ipm.htm](http://www.ci.austin.tx.us/watershed/ipm.htm)
Pest Fact Sheets for IPM of Outdoor and Indoor Pests [http://www.ci.austin.tx.us/growgreen/landscape_problems.htm](http://www.ci.austin.tx.us/growgreen/landscape_problems.htm)

11. Diverse, Walkable Communities 1 point

Intent
Promote livable, walkable, and bikeable communities that encourage efficient transportation and a mix of community-oriented businesses. Promote safe pedestrian access between proposed building(s) and connections to nearby destinations.

Requirements (Residential and Non-residential Uses)
Building(s) connects with neighboring properties with pedestrian and/or bicycle only paths (shading is preferred) that are separate from vehicular traffic.

Project includes or is located within ½ mile walking distance of at least 10 Basic Services:
Basic Services include, but are not limited to:

Basic services must be accessible via a safe route explicitly intended for use by the pedestrian that does not require crossing a road more than 5 lanes wide or 35 miles per hour.

Required Documentation
- Vicinity plan with Basic Services highlighted and pedestrian path distance measured between project and each location.
- Narrative describing how a pedestrian makes the connection between the proposed building(s) and the Basic Services. Include suggested route to cross vehicular traffic and photographs of difficult to describe connections.

References
To identify basic services and distances for a given address - Walk Score™ Maps:
http://www.walkscore.com
Oregon Bicycle and Pedestrian Planning and Design Manual:
www.oregon.gov/ODOT/HWY/BIKEPED/planproc.shtml
City of Austin Design Standards and Mixed-Use Subchapter, Section 2.3 Connectivity:

12. Bicycle Storage 1 point

Intent
Reduce pollution and development impact from automobile use and improve public health by encouraging bicycle use. Reduce the reliance on automobiles. Ensure high-security bicycle storage for tenants and their property.

Requirements (Both Residential and Non-Residential Uses)
Provide Class 1 high-security bicycle parking for 15% of residents and permanent building occupants and provide a safe path from property entrance to bike parking. Provide Class 3 bicycle parking for visitors at a rate of one parking space per 20 dwelling units, but no fewer than 4 spaces. Projects meeting this credit also meet Basic Requirement #2.

Bicycle spaces shall be racks or lockers anchored so that they cannot be easily removed. Each space allocated for this kind of parking shall be a minimum of two (2) feet wide and six (6) feet long. Bicycle parking lots shall provide 48” of clearance between rows.

As defined in the Transportation Criteria Manual:

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<td>• Needed for Final Approval</td>
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</table>
Class I - highest security - a completely enclosed parking space which protects the bicycle from inclement weather and designed so that an unauthorized person cannot remove a bicycle from it. Examples of Class I parking include bike lockers for one or two bikes, or locked storage rooms, bike check-in systems under control of an attendant, and bike storage facilities in a parking garage under constant personal or electronic surveillance.

### Required Verification

- Calculations demonstrating total building occupancy and required quantity of securing areas (include in parking count schedule).
- Building and/or site plans indicating bicycle parking locations (include the capacity of each) and safe bicycle/pedestrian routes.
- Specifications of bicycle securing systems.
- Verification of installed path and bicycle securing device.

### Strategies

- Refer to Basic Requirement #2 for occupant calculations.
- Unused space in parking garages can often be used for storage rooms.
- Providing high-security bicycle parking can reduce the need for vehicle parking spaces and the need to own a vehicle.
- Constant personal or electronic surveillance must be within 100 feet of parking/storage area.

### References

- Link to Transportation Criteria Manual
  [www.amlegal.com/austin%5Ftechmanuals/](http://www.amlegal.com/austin%5Ftechmanuals/)
- City of Austin Bicycle and Pedestrian Program including Bicycle Route Map:
  [www.ci.austin.tx.us/bicycle/](http://www.ci.austin.tx.us/bicycle/)
- Bicycle Austin discusses bicycle transportation issues in Austin:
  [bicycleaustin.info/](http://bicycleaustin.info/)
- Oregon Bicycle and Pedestrian Planning and Design Manual:
- Bicycle Info.org
  [www.bicyclinginfo.org/engineering/parking.cfm](http://www.bicyclinginfo.org/engineering/parking.cfm)
E N E R G Y  
Save Energy, Use Clean Energy

1. Energy Efficient Building  
1 - 12 points, $, PUD

Intent
The energy code establishes minimum regulations for energy-efficient buildings using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and innovative techniques that conserve energy. Utilizing an energy modeling program as a design tool enables effective analysis of design strategies to maximize the cost effectiveness of efficiency strategies, lower operating costs, increase occupancy comfort and lower carbon dioxide emissions.

1.1 Energy Efficient Building Performance Option

Requirements (Residential and Non-residential Uses)

Buildings under the commercial code must exceed the ASHRAE 90.1-2007 Appendix G Performance Rating Method (PRM) code building by 10% or more of building energy (kWh) use. One point is earned for using a model during the design phase to meet the Basic Requirement for Energy Performance (10%). One additional point is earned for each additional 2.5% savings.

<table>
<thead>
<tr>
<th>Percent Savings</th>
<th>10</th>
<th>12.5*</th>
<th>15</th>
<th>17.5</th>
<th>20</th>
<th>22.5</th>
<th>25</th>
<th>27.5</th>
<th>30</th>
<th>32.5</th>
<th>35</th>
<th>37.5</th>
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<tbody>
<tr>
<td>Points</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
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*NOTE: Required credit for two-star PUDs

Buildings under the residential code may use Energy Gauge USA to demonstrate above code savings. The design building must use at least 7.0% less energy than the Standard Reference Design. One point is earned for using a model during the design phase to meet the Basic Requirement for Energy Performance (7%). One additional point is earned for each additional 2.5% savings.

<table>
<thead>
<tr>
<th>Percent Savings</th>
<th>7</th>
<th>9.5*</th>
<th>12</th>
<th>14.5</th>
<th>17</th>
<th>19.5</th>
<th>22</th>
<th>24.5</th>
<th>27</th>
<th>29.5</th>
<th>32</th>
<th>34.5</th>
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<tbody>
<tr>
<td>Points</td>
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<td>2</td>
<td>3</td>
<td>4</td>
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<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
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</table>

*NOTE: Required credit for two-star PUDs

Mixed-use buildings three stories and less with portions of the building under the residential energy code, may either use a commercial modeling program to model the entire building using an appropriate baseline, or use a commercial modeling program and the Appendix G Performance Rating Method for the commercial portions and a residential software capable of modeling multifamily buildings for the residential portions of the building. These cases must submit both the residential and commercial AEGB Summary Data Table. The awarding of points for mixed-use buildings will be done considering modeled performance and square footage of residential and commercial space.

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
Required Verification

- Narrative describing the building envelope, systems, and energy saving measures incorporated into building.
- Submit design energy model inputs and results recorded in the AEGB Energy Analysis Summary Form as well as modeling reports showing inputs and results for Baseline and SRD buildings. AEGB may further request the modeling files.
- Buildings under the residential energy code may perform modeling using Energy Gauge USA.
- Construction documents verifying modeling inputs
  - Product specifications, cut sheets, or other documentation (e.g. NFRC stickers) documenting installed envelope materials, mechanical and lighting systems.
  - Submit final energy model inputs and results recorded in the AEGB Energy Analysis Summary Form as well as modeling reports showing inputs and results for Baseline and SRD buildings. AEGB may further request the modeling files.

Strategies

- Modeler should have a copy of ASHRAE Standard 90.1-2007 Appendix G Performance Rating Method (PRM) and become familiar with it. In addition, the User’s Manual for the ASHRAE Standard 90.1-2007 is very helpful.
- Modeler should complete the AEGB Energy Analysis Summary Form and Sample Summary Form, and a Sample Energy Analysis Narrative before beginning modeling. These must be included with the modeling submittal and will help to direct model inputs.
- Begin a base model as early as design allows and update it as needed.
- Use the model to determine energy and cost saving envelope, mechanical, and lighting system measures (particularly during the value engineering process).

References

Energy Code Ordinance and Amendments - City of Austin:  
www.cityofaustin.org/edims/document.cfm?id=135892

1.2. Energy Efficient Building Prescriptive Options a-f

1.2a. Envelope and Mechanical Systems  
( Energy Efficient Building – Prescriptive Option)  

1-3 points

Requirements (Residential and Non-residential Uses)
Select one of the following options using the Roofing, Mechanical Systems and Envelope lists below:
Option A: Implement 1 item from Roofing, 2 items from Mechanical Systems and 1 item from Envelope; installed cooling systems must meet a minimum of 600 square feet per ton. (1 point)

Option B: Implement 1 item from Roofing, 3 items from Mechanical Systems and 2 items from Envelope; installed cooling systems must meet a minimum of 650 square feet per ton. (2 points)

Option C: Implement 2 items from Roofing, 4 items from Mechanical Systems and 3 items from Envelope; installed cooling systems must meet a minimum of 700 square feet per ton. (3 points)

Roofing List
Flat or low-slope (2:12 or less):

- Total fill insulation to a minimum of R32
- Advanced framing
- Green/vegetated roof 50% minimum

Steep Slope (greater than 2:12):

- Raised heel roof truss allows for a minimum of 8” insulation at the exterior wall face OR sealed attic.
- Total fill insulation to a minimum of R32
- Advanced framing

Mechanical Systems List

- Located within the thermal envelope
- Ducts are cut to exact length, original diameter maintained, no change in direction in any single duct greater than 180 degrees and no single turn greater than 90 degrees.
- Duct systems are sized according to Manual D.
- Ductless systems are installed.
- Supply and return ductwork insulation outside the thermal envelope > R-10.
- Outdoor condensing units are 100% shaded at 10 AM and 3 PM on September 21
- Bedrooms have dedicated return air duct OR pressure relief for all bedrooms is provided by means of jump ducts, transfer grills, or ducted returns.
- Maximum length of any flex duct take-off is 10 feet.
- Cooling equipment uses inverter or variable refrigerant volume

Envelope List

- Advanced framing techniques are used
- “Total fill” insulation in exterior walls
- East and west glazing is less than 10% of façade.
- Use airtight building systems such as structural insulated panels (SIPs) or insulating concrete form (ICF).
• All south windows are shaded with overhangs – must demonstrate glazing is 100% shaded at 10 AM and 3 PM on September 21.

**Required Verification**
- Construction documents clearly indicate measures to be achieved
- Manual Js demonstrating square feet per ton of air conditioning
- Narrative describing energy saving measures incorporated into building
  - Product submittals
  - On-site verification by AEGB staff

**Strategies**

- ✓ Examples of total-fill insulation are: wet-blown cellulose, BIBS, open-cell foam, cementitious foam, etc.

**References**
Energy Code Ordinance and Amendments - City of Austin:
www.cityofaustin.org/edims/document.cfm?id=135892
Ladybird Johnson Wildflower Center Native Green Roof research:
www.wildflower.org/greenroof/

**1.2b. Cooling Equipment Efficiency**

1 point, $

**Energy Efficient Building – Prescriptive Option**

**Requirements (Residential and Non-residential Uses)**

Select one of the following options:

**Option A:** Dwellings served by split or individual systems: 15 SEER
**Option B:** Water-source heat pumps: 10% better than Code
**Option C:** Inverter or Variable Refrigerant Volume systems

**Required Verification**
- Specifications
  - HVAC submittals indicating installed system in each unit type

**1.2c. Water Heaters**

1 point, $

**Energy Efficient Building – Prescriptive Option**

**Requirements (Residential and Non-residential Uses)**

Water heater meets at least ONE of the following:

- Residential gas – minimum Energy Factor (EF): 0.63 (<50 gallon tank), 0.60 (>50 gallon tank)
- Central hot water using commercial water heaters with TE of 0.9 or greater
- Gas tankless
- Solar thermal
- Gas boilers are Energy Star labeled
- Heat pump water heater Energy Star labeled

**Key to Required Verification**
- Needed for Conditional Approval
- Needed for Final Approval
1.2d. Gas Furnaces 1 point, $
(Energy Efficient Building – Prescriptive Option)
Requirements (Residential and Non-residential Uses)
Gas furnaces are Energy Star labeled. If gas is not available, heat pump is Energy Star labeled.

1.2e. Ceiling Fans 1 point
(Energy Efficient Building – Prescriptive Option)
Requirements (Residential and Non-residential Uses)
Ceiling fans installed in all main rooms and bedrooms (not required in walled dining rooms/kitchens) AND are Energy Star listed.

1.2f. Lighting 1 points
(Energy Efficient Building – Prescriptive Option)
Requirements (Residential and Non-residential Uses)
100% of all indoor lamps are Energy Star-compliant high efficacy lamps (1 points).

Strategies
✓ Review references for possible strategies.
2. Green Energy 1 point

Intent
Green Power, electricity generated from clean, renewable sources such as wind, solar, and biomass, lowers fossil fuel burning emissions which cause global warming and pollution. Purchasing green power supports the development of renewable power in Texas. Additionally, the Austin Energy GreenChoice® fixed rate rider may result in lower operating costs as fossil fuel prices fluctuate throughout the term.

Renewable Energy Certificates (RECs) support the development of the renewable power industry in Texas or nationwide.

Requirements (Residential* and Non-residential Uses)
Subscribe to Austin Energy GreenChoice® for 100% of building's electricity use (*dwelling units excluded).

If GreenChoice® subscriptions are not available choose one of the following RECs options:

OPTION 1: Obtain a 2-year contract for Texas RECs for 100% of the building’s annual electricity use.

OPTION 2: Obtain a 2-year contract for Green-e certified National RECs for 100% of the building’s annual electricity use.

The building’s electricity use shall be estimated using a Building Energy Hourly Simulation and Load program OR using the electricity intensity factors per building type from the DOE Commercial Buildings Energy Consumption Survey 2003 in the table below.

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Median Electricity Intensity (kWh/sf-yr)</th>
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<tbody>
<tr>
<td>Food Sales</td>
<td>48.0</td>
</tr>
<tr>
<td>Food Service</td>
<td>37.4</td>
</tr>
<tr>
<td>Lodging</td>
<td>11.9</td>
</tr>
<tr>
<td>Retail (other than mall)</td>
<td>9.4</td>
</tr>
<tr>
<td>Office</td>
<td>11.5</td>
</tr>
<tr>
<td>Corridors of residential buildings</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
Austin Energy Green Building Multifamily Program: Energy

### Required Verification
- Copy of the agreement with Austin Energy GreenChoice®.
- Copy of the RECs contract including name of REC vendor and value of RECs purchased (kWh) and total annual electricity consumption projection (kWh).

### Strategies
- Austin Energy GreenChoice® subscriptions may sell out during the year. Contact your AEGB representative to see if subscriptions are available.

### References

General guide to purchasing green power and RECs – EPA & Green Power Partnership: [epa.gov/greenpower/buygp/guide.htm](http://epa.gov/greenpower/buygp/guide.htm)

Companies selling Green-e certified RECs in Texas: [www.green-e.org/](http://www.green-e.org/)

### 3. On-Site Renewable Energy

#### Intent
On-site generation of energy through the use of renewable energy technologies such as solar photovoltaic (PV) panels and wind turbines for electricity production or solar thermal for hot water heating will lower operating costs and fossil fuel emissions.

#### Requirements *(Residential* and Non-residential Uses)*
On-site renewable energy system installed for:

- **Option A:** 10 kW min. OR generate 25% of annual kWh usage (1 point).
- **Option B:** 15 kW min. OR generate 50% of annual kWh usage (2 points).
- **Option C:** 20 kW min. OR generate 75% of annual kWh usage (3 points).
- **Option D:** >20 kW min. OR generate 90% of annual kWh usage (4 points).

*Note: Residential dwelling units excluded.

The building’s electricity use shall be estimated using a Building Energy Hourly Simulation and Load program OR using the electricity intensity factors per building type from the DOE Commercial Buildings Energy Consumption Survey 2003 in the table shown above in Energy Credit 2.

PV and Solar Thermal systems must meet the performance requirements of the Austin Energy PV Solar Rebate and Solar Water Heater Programs in order to receive rebates from Austin Energy.
Required Verification

- Indicate which option is chosen in the Strategies/Comments column of the Worksheet tab in Rating Packet.
- Construction documents and specifications of renewable energy system(s) to be installed
- Calculations indicating the annual electricity requirements and amount of energy to be generated by on-site renewable energy technology
  - Product submittals
  - Documentation renewable energy system(s) have been commissioned

Strategies

- Coordinate early with Austin Energy staff to assure that your project meets these requirements.
- Most participating installers (link below) will have information on federal incentives for renewable energy technologies.

References

Learn about renewable energy - National Renewable Energy Laboratory: www.nrel.gov/

4. Additional Commissioning (Cx) 1 point

Intent

The intent of Additional Commissioning is to expand the basic testing/commissioning requirement to include design review, mechanical, electrical, building structure and envelope commissioning in order to demonstrate that systems are performing to meet the Owner’s Project Requirements.

Requirements (Residential and Non-residential Uses)

If the building only uses split systems for mechanical systems then the testing performed as part of the Basic Requirement is sufficient to meet the mechanical systems’ functional testing requirements for commissioning those split systems. A Commissioning Authority (CxA) with documented commissioning experience on at least two other building projects will verify and ensure that mechanical, electrical, structural, and envelope systems are installed and calibrated to operate according to the Owner Project Requirements (OPR) and Basis of Design (BOD).
In order to accomplish this, all of the following are completed:

- Commissioning agent provides design review prior to 50% completion of Construction Documents
- Commissioning specifications included throughout construction documents
- Provide Owners Project Requirements, Basis of Design, and Commissioning Plan
- Demonstrate that the mechanical and electrical systems operate in accordance with the Owner’s Project Requirements.
- Demonstrate building structure & envelope performance in accordance with Owner’s Project Requirements.
- Provide seasonal re-commissioning throughout the warranty period.
- Submit a final commissioning report.

**Required Verification**

- Submit Cx design review prior to 50% CDs
- Commissioning specifications including seasonal re-commissioning
- Owner’s Project Requirements
- Basis of Design
- Commissioning Plan
- Commissioning report demonstrating that the energy systems, building structure and envelope all operate according to Owner’s Project Requirements
- Signed letter of certification by the commissioning authority confirming that the commissioning plan has been successfully executed and the Owner’s Project Requirements have been achieved

**Strategies**

- Refer to the Commissioning Checklist included under the Testing/Commissioning Basic Requirement for details on what to include in the Commissioning submittals.

- The Commissioning Agent (CxA) should be brought into the design team as early as possible. The Additional Commissioning point cannot be achieved if the CxA does not perform a design review prior to 50% CDs.

**References**

- Building Commissioning Association
  [www.bcxia.org](http://www.bcxia.org)
- California Commissioning Collaborative Tools and Templates
  [www.cacx.org/resources/cxtools/](http://www.cacx.org/resources/cxtools/)
- Commissioning Site and Functional Testing and Design Guides - Portland Energy Conservation, Inc.:
  [www.peci.org/ftguide/](http://www.peci.org/ftguide/)
- Commissioning guidance and procurement - Energy Design Resources:
  [www.energydesignresources.com/category/commissioning/](http://www.energydesignresources.com/category/commissioning/)
- “The Commissioning Process” ASHRAE Guideline 0-2005: ISSN 1049-894X.
- National Institute of Building Sciences - Whole Building Design Guide:
- Envelope Commissioning
  [www.closerlookinspection.com/envelope.htm](http://www.closerlookinspection.com/envelope.htm)

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**Key to Required Verification**

- Needed for Conditional Approval
- Needed for Final Approval
5. **District Cooling**  

**Intent**  
A district cooling plant distributes chilled water from a central plant to individual buildings through a network of underground pipes. A single district cooling plant can satisfy the cooling needs of several buildings and customers.

Austin Energy chilled water plants may use a combination of thermal storage, heat recovery driven absorption chillers, and high efficiency electric chillers to reduce electric consumption and peak demand. District cooling contributes to the reduction of conventional power plant construction, associated greenhouse emissions, and building operating costs.

**Requirements (Residential and Non-residential Uses)**  
Tie into an Austin Energy district cooling loop.

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<th>Required Verification</th>
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</tr>
</thead>
<tbody>
<tr>
<td>o Drawings demonstrating the tie from the building into an Austin Energy district cooling loop</td>
<td></td>
</tr>
<tr>
<td>• Copy of signed contract with Austin Energy District Cooling</td>
<td></td>
</tr>
<tr>
<td>• On-site verification by AEGB staff</td>
<td></td>
</tr>
</tbody>
</table>

**Strategies**  
✓ Contact Austin Energy District Cooling early (email below) for assistance in determining how district cooling can meet your chilled water needs.

✓ Any building within a few blocks of an existing chilled water plant should consider district cooling.

**Benefits**  
Operational benefits of district cooling are proven reliability, convenience, simplicity and risk mitigation. Building costs are reduced initially by substantially reducing the capital investment for cooling systems. Throughout the life of the building the use of district cooling offers lower operational and energy expenses for the entire facility and stable, predictable cooling costs over the long term which will increase the net operating income. In addition, the use of district cooling will conserve space by eliminating the need for a chiller plant, reduce noise and potential environmental hazards, and improve facility comfort.

**References**  
Austin Energy District Energy Services, On-Site Energy Resources:  
E-mail: Sue.Arthur@austinenergy.com
6. **High Efficiency Clothes Washers**  

**Intent**  
Energy Star appliances use less energy, save money and help protect the environment. Energy efficient choices can save families about a third on their energy bills, with similar savings of greenhouse gas emissions, without sacrificing features, style or comfort.

**Requirements (Residential and Non-residential Uses)**  
Choose ONE of the following options:  

**Option A: Energy Star Labeled Clothes Washers**  
Install clothes washers in every dwelling unit that are Energy Star labeled and included on the City of Austin Water Conservation WashWise list (see links in References section below).

**Option B: Central Laundry**  
Central laundry equipment is Energy Star labeled and listed on the City of Austin’s Water Conservation Multifamily Rebate program for coin-operated equipment.

**Required Verification**
- Product specifications documenting that clothes washers are to be Energy Star labeled and included on the City of Austin Water Conservation WashWise list for single-family or multifamily clothes washer rebates.
- Plans showing location of central laundry facility, for Option B.
- Product submittals with Energy Star label highlighted
- WashWise list with installed model highlighted
- Onsite verification washers are installed.

**Strategies**
- The Washwise list is updated on a regular basis. Old versions of the list are not available to staff, so print and save the list when you have made your selection.

**References**
- Energy Star  
  [www.energystar.gov](http://www.energystar.gov)
- Single-family Clothes Washer Rebates  
  [www.cityofaustin.org/watercon/sfwasher.htm](http://www.cityofaustin.org/watercon/sfwasher.htm)
- Multifamily Clothes Washer Rebates  
  [www.cityofaustin.org/watercon/mfwasher.htm](http://www.cityofaustin.org/watercon/mfwasher.htm)
1. **Irrigation Water Minimization** 1 - 3 points, PUD

**Intent**
Minimize potable water use for landscape irrigation by designing WaterWise landscapes, using drip irrigation and "smart" technology irrigation systems, and utilizing rainwater catchment systems will reduce the load on municipal water systems saving water, energy, and lower building operating costs.

**Requirements (Residential and Non-residential Uses)**
Do not include plants listed on the City of Austin Grow Green “Invasive Plants to Avoid” list AND

Option A*: Reduce irrigation potable water consumption by at least 50% of total water required for irrigation over baseline (1 point).

*NOTE: Option A is a required credit for two-star PUDs

Option B: Reduce outdoor potable water consumption by at least 75% of total water required for irrigation over baseline (2 points).

Option C: Reduce outdoor potable water consumption by 100% of total water required for irrigation over baseline (3 points).

**Required Verification**
- Indicate which option is chosen in the Strategies/Comments column of the Worksheet tab in Rating Packet.
- Drawings indicating plant selection and location and irrigation system
- Drawings and narrative describing the rainwater harvesting system or recycled site water system with the capacity of the system highlighted, if applicable
- Draft calculations from the AEGB Irrigation Calculator.
  - Updated AEGB Irrigation Calculator
  - On-site verification of installed plants, irrigation, and catchment systems by AEGB staff
- For Option C, design narrative of the landscape design and describe why a permanent landscape irrigation system is not necessary.

**Strategies**
- Potable water use reductions may be based on landscaped area, vegetation species factor water usage (low, medium, high), density factor (low, medium, high), and/or irrigation technology (drip, sprinkler, other) efficiency. Use the Irrigation Water Calculator to determine % reduction.
Retaining existing established plant material on a site will drastically reduce the amount of irrigation required to get new plant material healthily established in the site.

Minimizing use of manicured grass.

Landscape design and plant material choices that are appropriate to the climate will reduce the amount of water required by depending more on the natural rain cycles than the irrigation system.

High-efficiency irrigation systems that include moisture sensors, clock timers and weather data-base controllers are widely available. These “smart” technologies ensure that plant material is being watered only when required and eliminate the waste associated with over-watering.

Rainwater and greywater systems can be used to recover stormwater from roof and impervious site surfaces as well as water from building waste water. This water will not be potable but can be used with no or minimal further treatment for irrigation purposes.

References
Water Conservation Program provides information and assistance – City of Austin: www.ci.austin.tx.us/watercon/
Landscaping for water quality protection – Grow Green City of Austin: www.ci.austin.tx.us/growgreen/
The Irrigation Association: www.irrigation.org/
Rainwater Harvesting (including calculator) - Texas A & M: rainwaterharvesting.tamu.edu/
Texas Evapotranspiration: texaset.tamu.edu/

2. Indoor Potable Water Use Reduction 1-4 points, PUD

Intent
High efficiency plumbing fixtures reduce consumption of water for indoor use thus lessening the impact on the water supply and treatment facilities and reducing building operating costs by saving water and associated energy use.
Requirements *(Residential and Non-Residential Uses)*

**Option A**: Reduce planned indoor potable water consumption below the baseline by 20% (1 point).

**NOTE**: Option A is required credit for two-star PUDs

**Option B**: Reduce planned indoor potable water consumption below the baseline by 25% (2 points).

**Option C**: Reduce planned indoor potable water consumption below the baseline by 30% (3 points).

**Option D**: Reduce planned indoor potable water consumption below the baseline by 35% (4 points).

The volume and flow rates for standard plumbing fixtures used to establish the baseline are set by the current ASME/ANSI Standards and City of Austin Ordinance No. 20071018-086 Section 411.3.1 and City of Austin Ordinance No. 20051215-108.

To calculate Occupant Count for the Water Use Reduction Calculator, follow the instructions in Basic Requirement #2 on page 10.

Toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume of a dual flush toilet is defined as the composite, average flush volume of two reduced flushes and one full flush.

### Required Verification

- Draft of AEGB Building Water Use Reduction Calculator
- Plumbing fixtures schedule specifying flush and flow rates or specifications or flow limits in specifications
  - Updated AEGB Building Water Use Reduction Calculator
  - Plumbing fixture submittals with flush and flow rates highlighted for all water-using fixtures and appliances installed onsite
  - On-site verification by AEGB staff

### Strategies

- Faucet aerators or flow restrictors can be used to further decrease water consumption.
- Rainwater and condensate collection systems can also be of use in reducing the amount of potable water used.
Types of Water Saving Fixtures

<table>
<thead>
<tr>
<th>TOILETS</th>
<th>URINALS</th>
<th>SINKS AND LAVATORIES</th>
<th>SHOWERS</th>
<th>APPLIANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power-Assisted Low Flush</td>
<td>Waterless</td>
<td>Low-Flow Faucets</td>
<td>Low-Flow Showerheads</td>
<td>Clothes Washers</td>
</tr>
<tr>
<td>Dual Flush</td>
<td>Pint Flush</td>
<td>Electronic Sensor Faucets</td>
<td></td>
<td>Dishwashers</td>
</tr>
<tr>
<td>Power-Assisted Dual Flush</td>
<td>Low Flush</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composting Toilets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References

Toilet listings and rainwater harvesting - City of Austin Water Conservation: www.ci.austin.tx.us/watercon/

Energy Star Appliances: www.energystar.gov/index.cfm?c=appliances.pr_appliances

EPA WaterSense labeled High Efficiency Toilets and Faucets: www.epa.gov/watersense


3. Central Laundry 2 point, $

Intent

Decrease demand for water and electricity or gas by providing centralized laundry facilities. Residents with in-unit washers do many more, smaller and less-efficient loads of laundry than residents utilizing a common-area laundry facility. In-unit laundry washers use 3.3 times more water while electricity usage of in-unit applications is close to 5 times higher compared to common-area laundry rooms and gas usage is 5.2 times higher. (Source: 2002 Study: A National Study of Water and Energy Consumption in Multifamily Housing).

Requirements (Residential and Non-residential Uses)

The development does not include clothes washer hook-ups in dwellings.

Required Verification

- Plans showing dwellings without laundry hook-ups and, if applicable, location of centralized laundry facility
- On-site verification by AEGB staff

Strategies

- If central laundry facilities are planned, check to see which washers are available for a rebate from the City of Austin.
- Reference credit Energy 6.
References
Multifamily Clothes Washer Rebates
www.cityofaustin.org/watercon/mfwasher.htm
Laundrywise Website
www.laundrywise.com/

Key to Required Verification
○ Needed for Conditional Approval
• Needed for Final Approval
INDOOR ENVIRONMENTAL QUALITY
Better indoor environmental quality, humidity control, comfort

1. Indoor Air Quality Monitoring 1 point

**Intent**
Monitor indoor air quality to maintain adequate volume of fresh air within a building by measuring the carbon dioxide concentrations for the health and productivity of the occupants.

**Requirements (Non-residential Uses)**
Install permanent carbon dioxide monitoring system interlocked with the ventilation system that provides feedback in a useable form to make adjustments for ventilation system.

Commission all systems to the preferred set point parameters and optimal performance for all operating conditions.

**Required Verification**
- Drawings and narratives describing the preferred set point parameters and optimal performance requirements of the monitoring and control system.
- Monitoring and control system specifications
  - Cut sheets
  - Documentation of the commissioning efforts associated with the monitoring and control system

**Strategies**
- Review references for possible strategies.

**References**
Indoor Air Quality guidance tools - EPA:
www.epa.gov/iaq/index.html

2. Indoor Chemical & Pollutant Sources 1 point

**Intent**
Minimize indoor pollutants generated by certain types of equipment and chemical use inside a building that affect the health, comfort, and performance of occupants.

**Requirements (Residential* and Non-residential Uses)**
Identify and isolate pollution point sources which may include: copy rooms, print shops, janitorial closets/rooms, laboratories, chemical storage, etc. *Dwelling units are excluded. (Complete all below)

- Provide ventilation directly to the outside of the building.
Austin Energy Green Building Multifamily Program: Indoor Environmental Quality

- Between these areas and occupied spaces construct a full height deck to deck partition or construct a hard lid ceiling enclosure.
- Operate at a negative pressure relative to surrounding areas under all operating conditions.

**Required Verification**
- Plans locating copy rooms, print shops, laboratories, and janitorial chemical storage rooms.
- Details and partition schedule indicating types of full height partitions used.
- Mechanical and plumbing construction documents demonstrating ventilation, drainage and pressure requirements.
- On-site verification of installed partitions and ventilation / drainage systems.

**Strategies**
- ✓ Review references for possible strategies.

**References**
Indoor Air Quality in Large Buildings guidance tool - EPA: [www.epa.gov/iaq/largebldgs/i-beam/index.html](http://www.epa.gov/iaq/largebldgs/i-beam/index.html)

### 3. Daylighting  
**1 point**

**Intent**
Integrate effective daylighting systems, electric lighting systems and controls to optimize daylighting strategies and minimize energy consumption and heat generation.

**Requirements (Residential* and Non-residential Uses)**
Provide adequate daylighting which minimize glare and integrate daylighting systems with electric lighting systems and controls. *Dwelling units are excluded.

**Required Verification**
- Lighting plan and sections showing daylighting penetration and electrical controls and photoelectric sensors.
- A narrative highlighting the methods used to provide sufficient daylighting for the task, shading strategies, depth of daylight, quality and quantity of daylight, surface colors, and contrast ratio < 4:1, percentage of building day lit, and orientation.
- Include in the specifications the requirement for calibration of controls and calibration logs to be submitted by the contractor and verified by the Commissioning Authority.
- Documentation that the daylighting systems, lighting and controls, have been commissioned.

---

**Key to Required Verification**
- Needed for Conditional Approval
- Needed for Final Approval
Strategies

- Involve a commissioning agent early in planning.
- Include in the specifications the requirement for calibration of controls and calibration logs to be submitted by the contractor.
- Include daylighting systems in the commissioning plan.
- Consider wiring light fixtures (along the building perimeter) independently of the others in a space so they can be switched off when daylight is adequate.

References

Daylighting design guide - U.S. Department of Energy EERE:
www1.eere.energy.gov/buildings/commercial/lighting.html
Daylighting - Whole Building Design Guide:
www.wbdg.org/resources/daylighting.php
Electric Lighting Controls - Whole Building Design Guide:
www.wbdg.org/resources/electriclighting.php

4. Views to Outside 1 point

Intent
Create a connection between the indoor and outdoor environments by providing visual access to windows from regularly occupied spaces.

Requirements (Residential and Non-residential Uses)
Glazing systems and interior partitions allow for a minimum of 75% of regularly occupied spaces a view of vision glazing (between 2'-6" and 7'-6" from finished floor height) and a view of the outdoors.

Required Verification
- Window schedule and building elevations
- Plans and sections demonstrating the lines of site from within the building to the vision glazing.
- Submit a view calculation indicating that areas with uninterrupted views to the outside encompass 75% of regularly occupied space (not including copy rooms, storage areas, mechanical, laundry, bathrooms and other support areas).

Strategies

- Review references for possible strategies.

References

US Green Building Council, LEED-NC v2.2 Reference Guide, Environmental Quality Credit 8.1, Daylight and Views

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
5. **Thermal Comfort** 1 point

**Intent**
Provide an environment that controls temperature, humidity and air movement for the comfort and performance of the occupants.

**Requirements (Residential and Non-residential Uses)**
Install mechanical systems (thermal, ventilation, and dehumidification) and controls to provide thermal comfort for all operating conditions according to ASHRAE 55-2004.

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Documentation from the mechanical engineer addressing the Owner Project Requirements for thermal comfort including components described in ASHRAE 55-2004 Section 6.1.1 in the Basis of Design and supporting documentation.</td>
</tr>
<tr>
<td>• Documentation of commissioning efforts for components of thermal, ventilation, dehumidification and monitoring systems.</td>
</tr>
</tbody>
</table>

**Strategies**
- Review references for possible strategies.

**References**
ASHRAE 55-2004 *Thermal Environmental Conditions for Human Occupancy*:
[www.ashrae.org/](http://www.ashrae.org/)

6. **Low-Emitting Materials**

**Intent**
Low–emitting building materials reduce toxic pollution and waste thus conserving natural resources and habitats and minimizing global warming and ozone depletion. In addition, they contribute to good indoor air quality, benefiting the health and productivity of building occupants.

6.1 **Sealants and Adhesives** 1 point

**Requirements (Residential and Non-residential Uses)**
All sealants and adhesives applied on-site to building interior meet South Coast Air Quality Management District (SCAQMD) standards Rule 1168. For spray adhesives, meet the Green Seal standard for Commercial Adhesives GS-36. *If a specialty product does not have a low VOC option, contact your AEGB representative for approval prior to application.*

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Specifications for all sealants and adhesives, including volatile organic compound (VOC) limits</td>
</tr>
<tr>
<td>• Cut sheet and MSDS sheet for each sealant and adhesive with VOC content highlighted</td>
</tr>
<tr>
<td>• Tabulation using the AEGB Low Emitting Materials Form</td>
</tr>
</tbody>
</table>

**Key to Required Verification**
- *Needed for Conditional Approval*
- *Needed for Final Approval*
Strategies
- Clearly identify VOC limits for specific sealants and adhesives in each applicable specification section.
- Specifications and General Contractor should require VOC content to be highlighted on submittals for all sealants and adhesives

References
South Coast Air Quality Management District Rule #1168
Green Seal Standard for Commercial Adhesives GS-36
http://www.greenseal.org/certification/standards/commercial_adhesives_GS_36.cfm

6.2 Flooring System

Requirements (Residential and Non-residential Uses)
All flooring systems meet the requirements of IEQ 6a above and BR 10 AND at least ONE of the following:

- All carpets must be Carpet & Rug Institute's (CRI) Green Label Plus certified and carpet adhesives must have a VOC content of 50 g/l or less.
- All carpet cushions must be CRI Green Label certified.
- All of the hard surface flooring must be FloorScore certified. Flooring products covered by FloorScore include vinyl, linoleum, laminate flooring, and rubber flooring.
- All finish flooring is concrete and all finishes, sealers and stains must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1113 (see Basic Requirement 10).

Required Verification
- Specifications
  - Cut sheets for carpets and pads with the VOC limits highlighted
  - Cut sheets for non-carpet flooring with listed FloorScore certification
  - Tabulation using the AEGB Low Emitting Materials Form

Strategies
- Clearly identify Label or Certification criteria required in flooring systems specifications.
- Specifications and General Contractor should require Label or Certification to be highlighted on submittals for all flooring systems.

References
Green Label Plus approved products - Carpet & Rug Institute:
www.carpet-rug.org/drill_down_2.cfm?page=8&sub=17&requesttimeout=350
Certified hard flooring – Floor Score:
www.scscertified.com/iaq/floorscore_1.html
6.3 Composite Wood and Agrifiber Products

Requirements *(Residential and Non-residential Uses)*
All installed composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system) shall contain no added urea-formaldehyde resins.

Composite wood and agrifiber products are defined as: particle board, medium density fiberboard (MDF), wheatboard, strawboard, panel substrates, door cores, and plywood. Movable furniture and equipment are not considered base building elements and are not included.

**Required Verification**
- Specifications
  - Cut sheets and MSDS for composite wood and agrifiber products with urea-formaldehyde levels highlighted.
  - Tabulation using the AEGB Low Emitting Materials Form

**Strategies**
- Clearly identify composite wood and agrifiber products in specifications that do not contain added urea-formaldehyde. Ensure, if the specification allows for “or equal”, that “no added urea-formaldehyde” is included in product specifications.
- Specifications and General Contractor should require composite wood and agrifiber product submittals and/or MSDS with urea-formaldehyde quantity highlighted.

**References**

6.4 Insulation

Requirements *(Residential and Non-residential Uses)*
All installed insulation (excluding piping) contains no added urea-formaldehyde.

**Required Verification**
- Specifications
  - Cut sheets and MSDS for insulation with urea-formaldehyde levels highlighted.
  - Tabulation using the AEGB Low Emitting Materials Form

**Key to Required Verification**
- Needed for Conditional Approval
- Needed for Final Approval
Strategies

- Clearly identify insulation products in specifications that do not contain added urea-formaldehyde. Ensure, if the specification allows for “or equal”, that “no added urea-formaldehyde” is included in product specifications.

- Specifications and General Contractor should require insulation submittals and/or MSDS with urea-formaldehyde quantity highlighted.

References

Greenguard IAQ Certified Products® - Greenguard: www.greenguard.org/
Products meeting CHPS Low-Emitting Materials criteria - Collaborative for High Performance Schools (CHPS): www.chps.net/dev/Drupal/node/287

7. Humidity Control  

1 point

Intent
Regulate indoor humidity at the source to help prevent mold and mildew growth and improve thermal comfort.

Requirements (Residential Uses)
Humidity is controlled by BOTH the following measures:

1. Exhaust fans are vented to the outside for 100% of dwellings in the following locations:
   - above cooktop/stove
   - any room with a tub or shower

2. Bathroom (with shower or tub) fan connected to a timer or humidistat.

Note: It is not sufficient to rely on natural ventilation for this credit.

Required Verification

- Plans showing locations of exhaust fans to the outside
- Exhaust fan specifications
- Documentation of commissioning efforts for components dehumidification systems
- On-site verification by AEGB staff on final inspection
8. Acoustic Quality 1 point

Intent
To provide a building environment free from disturbing mechanical equipment noise and vibration and excessive sound reverberation that is designed with sufficient acoustical privacy and adequate sound isolation. To minimize tonal noise and intermittent noise sources in occupied spaces, as these noise sources are particularly troublesome.

Requirements (Residential and Non-residential Uses)
Achieve all of the following measures:

- Define appropriate background sound levels, reverberation decay times, speech intelligibility, and sound isolation for the building use. Identify spaces where impact noises are likely and address the potential problem.
- Provide mechanical and duct systems designed to meet guideline Room Criteria (RC), Noise Criteria (NC) or Balanced Noise Criteria (NCB) provided by current copy of ASHRAE Applications Design Guidelines for HVAC Sound and Vibration Control Chapter.
- Provide appropriate vibration isolation for mounted equipment.
- Select equipment that could not be characterized as "tonal".
- Specify surface finishes and/or masking systems to provide appropriate sound intelligibility and privacy.
- Specify partitions, ceilings, floor/ceiling assemblies, building layouts, and vestibules to provide adequate sound isolation between spaces.
- Mitigate intermittent noise sources such as footfall and loading dock noise.

<table>
<thead>
<tr>
<th>Required Verification</th>
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</thead>
<tbody>
<tr>
<td>- Narrative of the acoustical Owner's Project Requirements and Basis of Design</td>
</tr>
<tr>
<td>- One-third octave band sound data submittals for the following:</td>
</tr>
<tr>
<td>- air handling equipment inlets, discharges, and casing radiation</td>
</tr>
<tr>
<td>- exhaust fan bare fan sound levels</td>
</tr>
<tr>
<td>- generators</td>
</tr>
<tr>
<td>- pumps</td>
</tr>
<tr>
<td>- chillers</td>
</tr>
<tr>
<td>- Vibration isolation schedule.</td>
</tr>
<tr>
<td>- Surface finish schedules including Noise Reduction Coefficient (NRC) and Ceiling Attenuation Class (CAC) Ratings, as applicable</td>
</tr>
<tr>
<td>- Schedule of partition and floor/ceiling assembly cross sections. Indicate Sound Transmission Class (STC), CAC and Impact Insulation Class (IIC) ratings of partitions, ceilings and floor/ceilings on plans</td>
</tr>
<tr>
<td>- On-site verification by AEGB staff of assemblies and isolation devices</td>
</tr>
</tbody>
</table>

Strategies
✓ Clearly define all items from the first bullet in “Requirements” section in the Owners Project Requirements and Basis of Design
9. Outdoor Pollutant Sources 1 point

Intent
Avoid exposure of building occupants to hazardous particulates and chemical pollutants (vehicle exhaust, pollens/allergens, etc.) that can enter the building through air intakes and entryways.

Requirements (Residential and Non-residential Uses)
Minimize and control outdoor pollutant sources by ALL of the following measures:
1. Entrances, operable windows and fresh air intakes shall be located a minimum 30 feet away from designated smoking areas.
2. Install appropriate signage to clearly designate where smoking is permitted and not permitted.
3. Install permanent entryway systems to the main building (grills, grates, mats), a minimum 6 feet long (10 feet recommended), in the primary direction of travel to capture dirt from entryways directly connected to the outdoors.
4. Specify effective filters for intake, return and re-circulation air.

Required Verification
- Plans indicating the location of the smoking sections, the 30 foot radius around the areas and all entrances, operable windows and air intakes.
- Signage plans denoting smoking and no smoking areas.
- Entrance plans, details and cut sheets describing the entryway system
- Narrative including: 1) identified contaminants that may be of concern if allowed to enter the building, as observed during a 24 hr survey of the building site and its immediate surroundings, and 2) design strategies that can be used to mitigate identified air borne contaminants from the outdoors
- Specifications of filters from intake, return and recirculation (or filter matrix).
- On-site verification by AEGB staff of filters, entryway systems and designated smoking areas.

Strategies
- Design entryway systems to include permanently installed grates, grilles, or slotted systems that allow for cleaning underneath. Roll-out mats are only acceptable when maintained on a weekly basis by a contracted service organization.
- Site survey should include:
  - Description of nearby facilities
  - Observation of odors or irritants
10. Construction Indoor Air Quality 1 point

Intent
Prevent indoor air quality problems that result from the construction process.

Requirements (Residential and Non-residential Uses)
Develop and implement a Construction Indoor Air Quality Management Plan that meets or exceeds the recommended control measures of the Sheet Metal and Air Conditioning National Contractor's Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction. The plan should include each of these key areas of IAQ protection: Scheduling, Source Control, HVAC Protection, Pathway Interruption, and Housekeeping.

Protect stored on-site or installed absorptive materials from moisture damage.

If permanently installed air handlers are used during construction, filtration media with a minimum MERV of 8 shall be used at each return grille. Replace all media filters immediately prior to occupancy.

Required Verification
- Copy of the Construction IAQ Management Plan, highlighting the five requirements of the SMACNA IAQ Guidelines for Occupied Buildings Under Construction
  - Photographs of on-site construction IAQ measures, such as duct protection and on-site storage of absorptive materials
  - Cut sheets of filtration media used during construction with MERV values highlighted.
  - On-site verification by AEGB staff, as schedule permits

Strategies
- Review references for possible strategies.
References
IAQ Guidelines for Occupied Buildings Under Construction - Sheet Metal and Air Conditioning National Contractor’s Association:
www.smacna.org/bookstore/
Indoor Pollution Prevention Fact Sheet – Austin Energy Green Building
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Resources/Fact%20Sheets/indoorPollution.pdf
1. Additional Construction Waste Management 1 point

**Intent**
Divert construction, demolition, and land clearing debris from landfill disposal and incineration. Redirect reusable and recyclable material back to the manufacturing process.

**Requirements (Residential and Non-residential Uses)**
Recycle and/or salvage at least 75% of non-hazardous construction waste (by weight) of construction, demolition, and land clearing waste excluding excavated soil and stone.

The following table shall be used to calculate percentage of construction waste diverted when weight tickets are not available:

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>DENSITY, (lbs/CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Waste</td>
<td>350</td>
</tr>
<tr>
<td>Wood</td>
<td>300</td>
</tr>
<tr>
<td>Cardboard</td>
<td>100</td>
</tr>
<tr>
<td>Gypsum Wallboard</td>
<td>500</td>
</tr>
<tr>
<td>Rubble</td>
<td>1400</td>
</tr>
<tr>
<td>Steel</td>
<td>1000</td>
</tr>
</tbody>
</table>

**Required Verification**
- Specifications for Construction Waste Management.
- Construction Waste Management Plan submitted before construction begins (if applicable, submit Demolition Waste Management Plan before demolition begins).
- Monthly updates to AEGB Construction Waste Management Calculator.
- Copies of weight tickets for recycling, salvage and landfill (electronic copies preferred).
- Completed AEGB Construction Waste Management Calculator.

**Strategies**
- Employ building materials that are highly recyclable and a construction sequence conducive to maximizing recycling. If the building site has an existing structure, design for reuse of the building or the materials on site.
- If you are considering utilizing a co-mingled construction waste recycling service provider, collect and compare the facility’s diversion rates and...
techniques. Be aware your project’s waste may be combined with that of other projects and/or a historic diversion rate for the facility may be used, which may not be your actual diversion rate. On-site separation may be preferable.

To ensure you have the inputs required for the AEGB Construction Waste Calculator, weight tickets or recycling reports should list:
1. Date
2. Hauler or subcontract hauler
3. Destination (landfill or recycler)
4. Amount of each material recycled, salvaged or reused (sheetrock, wood, concrete, cardboard, plastics, etc.)
5. Amount of materials not recycled, such as rejected loads of contaminated recycling and dump

To convert pounds to tons, one ton equals 2,000 pounds.

The AEGB Construction Waste Calculator contains a volume to weight calculator for converting cubic yards of various materials to pounds. This is especially useful for converting land clearing vegetation mulched on site to pounds, since this material is not weighed.

Rejected loads due to contamination must be counted as landfill waste instead of recycling even though the intention was to recycle.

Do not include hazardous materials, i.e. lead and asbestos, or soil and stone removed from site in either total materials removed from site or recycled/landfilled total.

References
The Waste Reduction Assistance Program is available to assist with all aspects of solid and hazardous waste management through the on-site waste reduction assessment service, materials exchange, and business information-clearing house. Have a waste reduction assessment conducted for facility operation; contact City of Austin Solid Waste Services Waste Reduction Assistance Program at 974-WRAP.
www.ci.austin.tx.us/sws/commercial_wrap.htm

2. Building Reuse

Intent
Extend the life cycle of the existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials, manufacturing, and transport.
2.1 Envelope and Structure  

Requirements (Residential and Non-residential Uses) 
Option A: Incorporate at least 40% (surface area) of existing non-hazardous building envelope (including exterior skin and framing, excluding window assemblies and non-structural roofing material) and structure (including structural floor and roof decking) in the new building. (1 point) 

Option B: Incorporate at least 80% (surface area) of existing non-hazardous building envelope (including exterior skin and framing, excluding window assemblies and non-structural roofing material) and structure (including structural floor and roof decking) in the new building. (2 points) 

Required Verification 
- Indicate which option is chosen in the Strategies/Comments column of the Worksheet tab in Rating Packet. 
- Plans and elevations indicating pre-construction existing building shell and structure and intended area to be preserved. 
  - Calculations from the AEGB Building Reuse Calculator. 

Strategies 
- For clarification, this credit includes: 
  - All portions of the exterior skin and framing except for window assemblies and non-structural roofing material. 
  - All structural members including structural floor and roof decking. 

References 
Building Reuse Case Studies - Smart Growth Network: 
www.smartgrowth.org/library/bytype.asp?typ=2 

2.2 Interior Non-Structural Elements  

Requirements (Residential and Non-residential Uses) 
Incorporate at least 50% (surface area) of existing non-hazardous interior non-structural elements (walls, doors, floor coverings and ceiling surfaces) in the new building. 

Required Verification 
- Plans and elevations indicating pre-construction existing building interior elements and intended areas to be reused. 
- Calculations from the AEGB Building Reuse Calculator. 

Strategies 
- Review references for possible strategies. 

Key to Required Verification 
- Needed for Conditional Approval 
- Needed for Final Approval
3. Exterior Wall Materials

Intent
Use long-lasting alternatives to wood in exterior walls to decrease dependence on forest products to ensure that insulation systems are continuous, minimize opportunities for thermal transfer, and reduce air infiltration through the exterior wall.

Requirements (Residential and Non-residential Uses)
Exterior walls (minimum of 50% of surface area) are constructed of material other than stick frame construction (e.g. Structural Insulated Panels (SIP), Insulated Concrete Forms (ICF), Autoclaved Aerated Concrete (AAC), etc.)

Required Verification
- Plans and specifications including insulating value (R-value) of materials
- On-site verification by AEGB staff

Strategies
- Review references for possible strategies.

References
- Structural Insulated Panel Association
  www.sips.org/
- Insulating Concrete Form Association
  www.forms.org/
- Autoclaved Aerated Concrete Products Association
  www.aaccpa.org

4. Durable Floor Materials

Intent
Floors constructed of durable, long-lasting materials, will not need replacement as often as non-durable products, thus reducing landfilled materials and future costs and time associated with flooring repair and removal between residents. Durable floors also help maintain good indoor air quality.

Requirements (Residential and Non-residential Uses)
Floor is durable material (e.g. concrete, stone, brick, and ceramic tile) for a minimum of 75% of all flooring.
5. **Low VOC Paints, Coatings, Adhesives and Sealants** 1 point

**Intent**
Reduce the quantity of air contaminants that are odorous or potentially irritating to installer and occupant health and comfort.

**Requirements (Residential and Non-Residential Uses)**
All paints, primers, and anti-corrosive coatings applied on-site to the building exterior must not exceed the volatile organic compound (VOC) limit of Green Seal standard GS-11 as shown below. All coatings, adhesives, and sealants applied on-site to the building exterior must not exceed the current VOC limits set by South Coast Air Quality Management District (SCAQMD) Rules 1113 and 1168. For spray adhesives, meet the Green Seal standard for Commercial Adhesives GS-36. *If a specialty product does not have a low VOC option, contact your AEGB representative for approval prior to application.*

**Example: Topcoat Paints, Primers, and Anti-Corrosive Coatings**

<table>
<thead>
<tr>
<th>Paint Type</th>
<th>VOC Limit (g/L)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-flat Topcoat</td>
<td>100</td>
</tr>
<tr>
<td>Flat Topcoat</td>
<td>50</td>
</tr>
<tr>
<td>Primer</td>
<td>100</td>
</tr>
<tr>
<td>Anti-Corrosive Coating</td>
<td>250</td>
</tr>
</tbody>
</table>

* The calculation of VOC shall exclude water and colorants added at the point-of-sale.

**Required Verification**
- Specifications
  - Tabulation using the AEGB Low Emitting Materials Form
  - Product submittals and MSDS with VOC content highlighted

**Strategies**
- Include contract language for contractors to provide low-emitting exterior paint information in submittals.
6. Interior and Exterior Materials

6.1 Performance Options a-d

6.1a. Salvaged Materials  

1 - 2 points  

(Interior and Exterior Materials – Performance Options)

Intent
Extend the life cycle of targeted building materials and reduce the environmental impacts related to materials manufacturing and transport.

Requirements (Residential and Non-residential Uses)
Option A: Salvaged or refurbished materials account for 5% (dollar value) of total project building materials cost. (1 point)

Option B: Salvaged or refurbished materials account for 10% (dollar value) of total project building materials cost. (2 points)

Mechanical, electrical and plumbing components as well as specialty items should not be included in the calculations. Only include materials permanently installed in the project.

Required Verification
- Specifications include 1) Submittals to include salvaged content and 2) Individual material sections include salvaged content requirement (as necessary)
- Calculations from the AEGB Building Materials Calculator.

Strategies
✓ Include contract language for contractors to provide salvaged material information in submittals.

References
Re-Store Salvaged Building Materials Outlet – Austin Habitat for Humanity: www.re-store.com/
6.1b. Recycled Content (Interior and Exterior Materials – Performance Options) 1 - 2 points

Intent
Increase demand for building products that have incorporated recycled content materials, thereby reducing the environmental impacts resulting from the extraction of new materials.

Requirements (Residential and Non-residential Uses)
Option A: Building materials contain recycled content (the sum of post-consumer recycled content plus one-half of the post-industrial content) of at least 10% (by dollar value) of total project building materials cost. (1 point)

Option B: Building materials contain recycled content (the sum of post-consumer recycled content plus one-half of the post-industrial content) of at least 20% (by dollar value) of total project building materials cost. (2 points)

Mechanical, electrical and plumbing components as well as specialty items should not be included in the calculations. Only include materials permanently installed in the project.

Required Verification
- Specifications include 1) Submittals to include recycled content and 2) Individual material sections include recycled content requirement (as necessary)
- Calculations from the AEGB Building Materials Calculator.

Strategies
✓ Include contract language for contractors to provide recycled content information in submittals.

References
- EPA Comprehensive Procurement Guidelines: www.epa.gov/cpg/
- Recycled Content Product Database: www.ciwmb.ca.gov/rcp/
- Recycled Content Product Database from Texas Manufacturers - Clean Texas: www.tceq.state.tx.us/assistance/P2Recycle/TXrecy/resources.html

6.1c. Texas Sourced Materials (Interior and Exterior Materials – Performance Options) 1 - 2 points, PUD

Intent
Increase demand for materials that are manufactured in Texas, thereby reducing the environmental impacts resulting from their transportation and supporting the State economy.

References
- Key to Required Verification
  - Needed for Conditional Approval
  - Needed for Final Approval

v2010_01 83
Requirements *(Residential and Non-residential Uses)*

**Option A:** Building materials and products are extracted and/or manufactured (final assembly) regionally within Texas for at least 30% (dollar value) of the project materials cost (1 point).

**NOTE:** Option A is required credit for two-star PUDs.

**Option B:** Building materials and products are extracted and/or manufactured (final assembly) regionally within Texas for at least 50% (dollar value) of the project materials cost (2 points).

Mechanical, electrical and plumbing components as well as specialty items should not be included in the calculations. Only include materials permanently installed in the project.

**Required Verification**
- Specifications include 1) Submittals to include Texas-sourced content, and 2) Individual material sections include Texas-sourced requirement (as necessary)
- Calculations from the AEGB Building Materials Calculator.

**Strategies**
- Include contract language for contractors to provide Texas-sourced materials information in submittals.

**References**
Resources for Recycled Content Products- TCEQ: www.tceq.state.tx.us/assistance/P2Recycle/TXrecy/resources.html

### 6.1d. Certified Wood

1 point

(Interior and Exterior Materials – Performance Options)

**Intent**
Encourage environmentally responsible forest management.

**Requirements *(Residential and Non-residential Uses)*
At least 50% (by dollar value) of new wood-based materials are certified in accordance with the Forest Stewardship Council (FSC) guidelines for wood building components.

**Required Verification**
- Specifications include 1) Submittals to include certified wood content and 2) Individual material sections include certified wood requirement (as appropriate)
- Submittals with FSC chain of custody information and quantity highlighted
- Calculations from the AEGB Certified Wood Calculator

**Strategies**
- Include contract language for contractors to provide FSC chain of custody information in submittals.

---

**Key to Required Verification**
- Needed for Conditional Approval
- Needed for Final Approval
6.2. Interior and Exterior Materials – Prescriptive Options  1-3 points

Intent
Use products in construction that have environmentally preferable attributes.

Requirements (Residential and Non-residential Uses)
Achieve at least one attribute per material listed below:

<table>
<thead>
<tr>
<th>Material</th>
<th>Recycled Content</th>
<th>Rapidly Renewable</th>
<th>Texas-Sourced</th>
<th>FSC Certified</th>
<th>Low-emitting / Formaldehyde-Free</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cabinetry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>All interior doors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>All trim / molding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>All studs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Metal studs</td>
<td>0.5</td>
</tr>
<tr>
<td>All flooring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>All insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
</tbody>
</table>

Note: Only whole points will be awarded.

**Required Verification**
- Specifications
  - Submittal with selected attribute highlighted

**Strategies**
- Select materials that contain either or both post-consumer recycled content (PCRC) and post-industrial recycled content (PIRC).
- Select materials that have a planting – harvesting cycle of less than 10 years
- Select materials that are extracted and/or manufactured in the state of Texas
- Select materials that are Forest Stewardship Council chain-of-custody certified
- Select materials that meet standards in this Guidebook for low-emitting materials, (i.e., for materials that contain no added urea-formaldehyde reference IEQ 6c. Composite Wood and Agrifiber Products and IEQ 6d. Insulation)
7. **PVCs and Phthalates**  

**Intent**
To reduce the manufacturing, use and disposal of materials containing polyvinyl chloride (PVC) and phthalates, and the toxic manufacturing byproducts dioxin, ethylene dichloride, and vinyl chloride. These chemicals contribute to the environmental burden of endocrine disrupting chemicals (EDCs) and are associated with a variety of health problems.

**Requirements** *(Residential and Non-residential Uses)*
The following installed materials must not contain PVC:

- Flooring and interiors (e.g., vinyl composition tile, carpet, floor covers, blinds, shower enclosures, tub surrounds)
- Roofing systems (e.g., roof membranes, waterproofing membranes and flashing)
- Wall systems (e.g., siding, waterproofing membranes, wall coverings, windows, doors, wallpaper, partitions, fiber reinforced plastics in any janitorial or food service areas)
- Outdoor equipment (e.g., playground equipment, outdoor furniture)

In addition, one of the following two materials must not contain PVC (1 point)
OR
both of the following materials must not contain PVC (2 points):

- Potable and wastewater plumbing systems (e.g., piping)
- Electrical systems (e.g., insulation, sheathing, conduit and electrical boxes)
Required Verification
- Specifications stating materials will not be made with PVC
- Cut sheet submittal or manufacturer documentation demonstrating no PVC
- Final site visit verifying that non-PVC materials are installed

Strategies
- Review Perkins and Will Precautionary List for product alternatives.
- Obtain documentation from manufacturer in design phase assuring that products do not contain PVC

References
EQUITY
Affordability and Access to Information

These credits can be applied for as Innovations in the Online Rating Tool

1. Housing Affordability 1-3 points

Intent
Assure that housing for people with lower incomes is achieving the energy and water efficiency, improved indoor air quality, reduced utility bills, and other benefits of green building. The provision of housing that is affordable to own or rent and affordable to operate is imperative to a sustainable community. Projects that include dwelling units that are affordable to households with incomes at or below 80% MFI (home ownership, i.e., condominiums) or 60% MFI (apartment homes) may be able to receive points for housing affordability under this credit. Projects that include dwelling units that are affordable to households with incomes at or below 30% MFI may be able to receive additional credit.

Requirements
Prior to Conditional Approval, projects must submit the Housing and Transportation Affordability Data Sheet that includes a narrative describing the population expected to reside in the development, the transportation options most amenable to this population, housing and transportation data for both the project and the census block in which the project is located, and a narrative that describes project implications from this brief analysis. Census block data can be found at htaindex.cnt.org/ by zooming in on the project location.

The City of Austin’s SMART Housing program promotes mixed-income housing by allowing fee waivers for projects that provide varying levels of affordable housing for a five-year timeframe for multifamily buildings. SMART Housing then monitors rental and mortgage rates for applicable units to assure that the affordability levels are being met. In addition to SMART housing, other funding mechanisms through banks and state and local funding agreements require that certain levels of affordability are provided over a specified number of years and can provide an assurance that housing costs will meet affordability criteria.

Provide affordable dwelling units as part of a SMART Housing or financing agreement through which affordability will be verified over the specified time period.

- Document that at least 20% of dwelling units will be affordable to homeowners living at or below 80% MFI for a period of at least 5 years; OR 20% of dwelling units will be affordable to renting households living at or below 60% MFI for a period of at least 5 years (1 point); OR
- Document that at least 20% of dwelling units will be affordable to homeowners living at or below 80% MFI for a period of at least 15 years; OR 20% of dwelling units will be affordable to renting households living at or below 60% MFI for a period of at least 15 years (2 points);
- Document that at least 20% of apartment (rental) dwelling units will be affordable to people living at or below 30% MFI for a period of at least 15 years (The 2009
Austin Comprehensive Market Study has shown that the most substantial housing need in Austin is for rental properties that are available to households at 30% MFI or less) (3 points)

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o This credit should be applied for as an Innovation in the online rating tool.</td>
</tr>
<tr>
<td>o Completed Housing and Transportation Affordability Data Sheet</td>
</tr>
<tr>
<td>o Signed SMART Housing letter or financing agreement verifying the MFI levels and that these affordability criteria will be verified through a financing or other agency for the required time period (at least 5 or 15 years)</td>
</tr>
<tr>
<td>• A pro-forma from the developer showing the projected rents/sales price</td>
</tr>
</tbody>
</table>

Strategies:

✓ The H + T Affordability Data Sheet is intended to provide a snapshot of affordability levels for both housing and transportation in the community immediately surrounding the project. Similar to the Site Characteristics Study required for Site credit 3, the data sheet should be completed as early in the project as possible in case findings could impact decision making regarding housing and transportation affordability.

References
LEED for Neighborhood Developments Pilot, June 2007, NPD Credit 4: Affordable rental housing
Austin Comprehensive Market Study including affordability analysis
http://www.ci.austin.tx.us/housing/apr08chms.htm
2. **Access to Information**  

**Intent**  
To improve access to the internet to all residents in multifamily buildings. Access to information via the internet is an integral part of assuring an equitable living environment. Today the internet is used to gain employment, search for housing, pay bills, and can potentially be used to manage our home energy use. In addition, internet service can be a substantial expenditure for people with low disposable incomes. Providing internet access to residents in multifamily buildings as internet lounges on site can improve quality of life for residents. In addition, as we move to smart grid capabilities, people may have opportunities to manage and reduce their energy use, and energy bill, via the internet.

**Requirements**  
Meet the following criteria:
- Provide a 24-hour computer lounge with free internet access for all residents. The lounge shall have 1 computer with high speed internet access for every 15 residents (1 point)

**Required Verification**
- This credit should be applied for as an Innovation in the online rating tool
- Show lounge and computer stations on plans
- Submit internet account agreement/contract
- Verification on final inspection

3. **Transportation Options**  

**Intent**  
Housing and transportation together account for 40-70% of the average household income. Having a variety of transportation options can increase affordability by allowing reduced auto dependence and improve environmental quality by reducing the number of single-occupancy vehicles. Access to public transportation sufficient enough to allow for car-free living, i.e. public transportation to jobs, schools, stores and services, can substantially reduce a household’s transportation cost burden.

**Requirements**  
Prior to Conditional Approval, projects must submit the Housing and Transportation Affordability Data Sheet that includes a narrative describing the population expected to reside in the development, the transportation options most amenable to this population, housing and transportation data for both the project and the census block in which the project is located, and a narrative that describes project implications from this brief analysis. Census block data can be found at [htaindex.cnt.org](http://htaindex.cnt.org/) by zooming in on the project location.

Demonstrate that residents have access to public transportation that is sufficient to allow for car-free living:
Development must be within ¼ mile of one or more bus or rail stops that together offer high frequency service (averaging at least 3 buses per hour weekdays and 2 buses per hour weekends; rail stops can be counted as equivalent to bus stops); AND

At least one of the buses must stop within ¼ mile of a public transportation activity center such as:
- Transit Center (e.g. North Lamar TC, South Congress TC, etc.)
- State Capital
- 2nd and Congress
- Barton Creek Mall
- Capital Plaza
- I-35 and East 32nd
- University of Texas (28th and Guadalupe)

An activity center is defined as an area served by at least 5 bus routes. (1 point)

In addition to meeting the above criteria for bus and/or rail, the development offers additional public transportation options such as Car 2 Go, or a van pool that offers rides at least twice per week to a supermarket, shopping center, or other popular destination. (2 points)

**Required Verification**
- This credit should be applied for as an Innovation in the online rating tool.
- Completed Housing and Transportation Affordability Data Sheet
- Submit a map outlining the project site with locations and marks for public transportation options (i.e. mark bus stops with the bus lines that come to that stop, mark which lines connect to activity centers, mark van pool pick up locations, etc.). A Google map or other online map with hand marks will suffice.
- Submit calculations demonstrating high frequency service
- If a transportation or car sharing service (car share, van pool, etc.) will be used, submit a copy of the contract demonstrating the transportation option will be available to tenants.

**Strategies:**
- Projects receiving credit for Transportation Affordability may also achieve the Public Transportation credit under Site

The H + T Affordability Data Sheet is intended to provide a snapshot of affordability levels for both housing and transportation in the community immediately surrounding the project. Similar to the Site Characteristics Study required for Site credit 3, the data sheet should be completed as early in the project as possible in case findings could impact decision making regarding housing and transportation affordability.

**References**
Center for Neighborhood Transportation Housing + Transportation Index
http://www.cnt.org/repository/AffordabilityIndexBrief.pdf
Capital Metro System Map:
http://www.capmetro.org/riding/current_schedules/maps/system_map.pdf
Austin Energy Green Building Multifamily Program: Innovation

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
Intent
Develop sustainable solutions that demonstrate a comprehensive approach and quantifiable sustainability benefits beyond the requirements of measures defined in this program.

Requirements *(Residential and/or Non-residential Uses)*
Submit a proposal of the innovation measure to Austin Energy Green Building for approval. The proposal must include:
- the intent of the measure
- requirements for compliance
- submittals to demonstrate compliance, and
- the design approach (strategies) that might be used to meet the requirements.

<table>
<thead>
<tr>
<th>Required Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Proposal of innovative measure</td>
</tr>
<tr>
<td>o Submit required documentation to demonstrate compliance.</td>
</tr>
</tbody>
</table>

Strategies
- Early in the design process, for example as part of a charette or integrated team meeting, encourage discussion of potential sustainability measures, i.e. measures that could improve the environmental or equity impacts from the project
- Talk to your AEGB representative about any and every sustainability idea your team comes up with to see what could qualify as innovation credits
- For new technologies, talk to product manufacturers about getting cost reductions for bulk purchases or inclusion in case studies
- Look for design and technologies that are emerging in the building industry or otherwise not yet covered in the AEGB Multifamily rating tool:
  - e.g. designing for physical activity, composting

Example Innovation Credits:
1. A current credit is exceeded to the next increment or level:
   Ex. Construction Waste Management: Recycle and/or salvage at least 90% (by weight) of non-hazardous construction and demolition waste, excluding excavated soil and stone. 1 point.
   Ex. Heat Island Reduction: High-albedo paving materials [Solar Reflective Index (SRI) of 29 or above] on at least 60% of non-roof impervious surfaces or instead of meeting one requirement, meets two of the Heat Island Reduction choices. 1 point
   Ex. On-Site Renewable Energy: Solar panels provided for each residential unit. 1-4 points.

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval
Ex. Green Energy: Residential units signed up for Green Choice. 1 point.

3. Propose your own innovative measure that is not covered by existing measures within the Online worksheet to meet the requirements above. Some example Innovation measures are provided on the Online Tool.
APPENDIX - General Green Building Resources

IRS publications:
  www.nrel.gov/docs/fy07osti/40467.pdf
- Notice 2006-52: Deduction for Energy Efficient Commercial Buildings:

Energy Improvement and Extension Act of 2008 Summary including energy efficiency tax incentives for: commercial buildings, combined heat and power systems (CHP) and for plug-in hybrid purchases:

Austin Energy, Commercial and Multifamily Programs and Rebates $:
www.austinenergy.com/Commercial/index.htm
www.austinenergy.com/Energy%20Efficiency/Programs/Rebates/Commercial/

Austin Energy Green Building:
www.austinenergy.com/go/greenbuilding

Austin Environmental Directory, 2006 edition:
A sourcebook for environmental issues, products, services, and organizations in the Austin area
www.environmentaldirectory.info

Austin Water Utility, Multifamily and Commercial Programs, Rebates $, and Water Efficient Equipment and Design:
www.ci.austin.tx.us/watercon/default.htm

BuildingGreen, LLC:
www.buildinggreen.com
BuildingGreen publishes accurate, unbiased, and timely green design information through many publications, including Environmental Building News, the GreenSpec directory of green products, and the Building Green Suite of online tools.

Business Energy Advisor, Austin Energy and ESource:

Center for Maximum Potential Building Systems:
www.cmpbs.org/

Energy Design Resources:
www.energydesignresources.com
Energy Design Resources offers a valuable palette of energy design tools and resources that help make it easier to design and build energy-efficient commercial and industrial buildings in California. The goal of this effort is to educate architects, engineers, lighting

Key to Required Verification
- Needed for Conditional Approval
• Needed for Final Approval
designers, and developers about techniques and technologies that contribute to energy efficient nonresidential new construction.

Environmental Building News and GreenSpec® Guide:  
www.buildinggreen.com/  
https://www.buildinggreen.com/ecommerce/gbp.cfm?

Green Building Pages – building materials database and design tool:  
www.greenbuildingpages.com

Green Building Resource Guide:  
www.greenguide.com

Healthy Building Network:  
www.healthybuilding.net/

Lawrence Berkeley National Laboratory The Cost-Effectiveness of Commercial-Buildings Commissioning:  
eetd.lbl.gov/emills/PUBS/Cx-Costs-Benefits.html

New Buildings Institute:  
www.newbuildings.org/

Rocky Mountain Institute:  
www.rmi.org/

Smart Growth Network:  
www.smartgrowth.org

Sustainable Design Resource Guide of Colorado:  
http://www.aiasdrg.org/

U.S. Department of Energy, Building Technologies Program Building Database:  Case studies of various building types around the world with information on green building features, financial analysis, and lessons learned:  
eere.buildinggreen.com/

U.S. Green Building Council:  
www.usgbc.org/

Texas Organizations

Design-Build-Live (aka Austin Sustainable Building Coalition):  
www.designbuildlive.org

Infinite Power of TX – technology/concept fact sheets:  
www.infinitepower.org

Key to Required Verification

○ Needed for Conditional Approval
• Needed for Final Approval
Solar Austin – advocacy group:
www.solaraustin.org/

TREIA (TX Renewable Energy Industries Assoc.):
www.treia.org

TXSES (TX Solar Energy Society):
www.txses.org

U.S. Green Building Council – Central Texas Chapter:
www.usgbc-centraltexas.org

Key to Required Verification
- Needed for Conditional Approval
- Needed for Final Approval