REGREEN – HOME AND INTERIORS ASSESSMENT

The goal of every home is to have comprehensive and continuous management of:

- Bulk water
- Air leakage
- Heat flow
- Vapor (and soil gases)
- Pests (insects, rodents, etc.)
- Wildfire (location-dependent)
- Indoor Air Quality

When we improve the energy efficiency of a home, we need to evaluate moisture management with the same degree of care. This worksheet systematically lists the items you need to check to understand how and how well a home is performing in terms of energy, durability, and human health and safety.

The final section—Explanations/Resources—can help you with each item below.

RENOVATOR:_____ INTERIOR DESIGNER:_____

HOMEOWNER:_____ ARCHITECT:_____

HOUSE ADDRESS:_____ TRADES:_____

_____ DATE OF ASSESSMENT:_____

EXISTING HOME # Stories: _____ Foundation Type _____
Orientation:_____ Exterior Siding _____
☐ Garage (attached/detached)

Year House built _____ # Years in house _____

History

_____
_____
_____
_____

Complaints and Problems Noted

_____
_____
_____

Comfort Issues

_____
_____
_____

Summary of Scope of Work

_____
_____
_____
_____

The home assessment aspects are based on the EarthCraft House Renovation Assessment form; it is used/modified with EarthCraft House permission. The interiors assessment created for workshop.

SITE ASSESSMENT

Prevailing slope(s):

Irrigation system check: -

Water table depth:

Landscape details:

Pervious/impervious surface details:

Notes on drainage issues:

INSULATION/AIR SEALING

COMPONENT/ASSEMBLY	ORIGINAL HOUSE	EXISTING ADDITION	NOTES

WINDOWS

TYPE	U VALUE	SHGC	NOTES

MOISTURE MANAGEMENT

Flashing – windows:

Flashing – doors:

Flashing – valleys:

Flashing – drip edge:

Gutters/downspouts:

Capillary breaks:

Roof ventilation:

Vapor Profile – Foundation:

Vapor Profile – Above Grade Walls:

Vapor Profile – Roof:

MECHANICAL SYSTEMS

SYSTEM	LOCATION	MODEL#/ BRAND	FUEL, EFFICIENCY, CAPACITY	CONDITION/AGE/NOTES

DUCT SYSTEMS

AREA SERVED	LOCATION	TYPE	INSULATION	SUPPLY AGAINST WALLS?	RETURNS: #/LOCATIONS	OBSERVED LEAKAGE/NOTES

EXHAUST VENTING

	VENTED TO OUTSIDE? THROUGH WHERE?	NOTES
Dryer		
Oven		
Bath Fans		
Kitchen range hood		

RADON

Radon test performed? _____ Test kit left with owner _____

Radon Mitigation? _____

OTHER:

Fireplace (damper?)_____

Attic Access (sealed?)_____

Whole house fan?

_____

HAZARDOUS MATERIALS

Lead paint

_____

Asbestos

_____

Pest Management Details:

_____

Wildfire Management Details:

_____

_____

Building Performance/Conditions Metrics:

Whole building air tightness (blower door) -

_____

HVAC duct tightness (Duct blaster) -

_____

HVAC flow (air velocity) measurements -

_____

Room-to-room pressure measurements -

_____

Worst-case depressurization test:

_____

Low-e window testing -

_____

Infra-red imaging -

_____

Humidity (air moisture) readings -

_____

Moisture content (material moisture) readings –

_____

REGREEN – INTERIOR ASSESSMENT & DESIGN PROCESS

The interiors assessment requires a comprehensive evaluation of the interior and exterior living spaces to ensure that the home is fully utilized, meets sustainability goals and assesses interior components on a detailed level. This systematic, process oriented assessment will help to appraise and understand how the interior of the home functions, and how the home performs and integrates with the infra-structure/systems of the home.

OPTIMIZING INTERIOR SPACE

As part of the design process consider current and future needs for the following:

1) Function and Layout of Rooms:
   a) What rooms work, are enjoyed and fully utilized?
   _____
   _____
   b) What rooms don't work, are under-utilized and out-dated?
   _____
   _____
   c) Key adjacencies and space relationships:
   _____
   _____
   d) Reconfigure, linkage and efficient use of space:
   _____
   _____
   e) Flexibility and adaptability for future needs:
   _____
   _____
   f) Closet and storage needs; daily and seasonal:
   _____
   _____
   g) Balance family needs with market trends:
   _____
   _____

2) Life Style Patterns and Activities:
   a) Living_____
   b) Playing_____
   c) Working_____
   d) Children_____
   e) Pets_____
   f) Views_____
   g) Connecting with family and friends_____
   h) Connection with nature_____
   i) Outdoor living_____

OPTIMIZING INTERIOR SPACE (cont)

3) Aging in Place / Universal Design:
   a) Accessibility_____
   b) Future users_____
   c) Multi-use space_____

4) Health, Safety and Welfare:
   a) Indoor air quality_____
   b) Ergonomics_____
   c) Security_____
   d) Egress_____
   e) Privacy_____
   f) Comfort_____

ADDRESS SUSTAINABILITY METRICS

As part of the design process establish goals/metrics for the following:

1) Water Efficiency and Reduction:
   a) Plumbing fixtures and fittings _____
   b) Appliances_____
   c) Filtration_____

2) Energy Efficiency and Reduction:
   a) Appliances_____
   b) Decorative lighting_____
   c) Office/Entertainment equipment _____

3) Materials and Resource Efficiency:
   a) Reduce, reuse, recycle, repurpose_____
   b) Building reuse
      Reuse of existing floors, walls, doors, windows, etc.
      _____
      Deconstruction options vs. demolition _____
   c) Construction waste management plan _____
      _____
   d) Materials reuse - reuse of existing finishes, cabinetry, trim, millwork
      _____
   e) Regional materials_____
   f) Reclaimed materials_____
   g) Recycled content materials_____
   h) Rapidly renewable materials_____
   i) FSC Certified wood_____

ADDRESS SUSTAINABILITY METRICS (cont)

4) Indoor Environmental Quality:
   a) Environmental tobacco smoke_____
   b) Low-emitting finishes; paint, wood finishes, caulks, construction adhesives
   _____
   c) Hazardous materials; formaldehyde, lead, asbestos, radon, etc...
   _____
   d) Chemical and pollutant source control
   Tracking in contaminants_____
   Asbestos (vinyl flooring, patch compounds, textured paints, ceilings, insulation)
   _____
   Dust (carpet, uph. furniture, pets, fireplaces, heating ducts)
   _____
   Lead (old paint, ceramic, pottery) _____
   Carbon monoxide _____
   Pesticides (herbicide, insecticide, fungicide) _____
   _____
   Vinyl Chloride (flooring, adhesives, upholstery, wall coverings, window coverings, countertops) _____
   _____
   Mold (basement, kitchen, bathrooms, carpets and rugs on cold floors, wall cavities, closets, plumbing leaks) _____
   _____

5) Controllability of Systems:
   a) Lighting
   _____
   b) Acoustics
   _____
   c) Thermal comfort
      i) Ventilation
      _____
      ii) Drafty rooms
      _____
      iii) Comfort levels
      _____
   d) Day lighting
   _____

6) Durability and Longevity:
   a) Product performance, low maintenance, durability _____
   _____
   b) Timeless design, longevity
   _____
   c) Quality vs. quantity
   _____

APPLYING SUSTAINABILITY TO INTERIOR COMPONENTS

Research, specify and install environmentally preferable products for the following:

1) Interior Fixtures and Finishes:
   a) Wood /Composite Trim and Millwork

   _____

   b) Interior Doors, Door Hardware and Windows

   _____

   c) Finishes (Consider reflectance values to support passive solar and day lighting strategies)

      Floors

      Material

      _____

      Substrates

      _____

      Install methods

      _____

      Adhesives, sealers

      _____

      Walls

      Interior sheathing

      _____

      Wall covering materials, adhesives, finishes

      _____

      _____

      Paints, finishes, coatings,

      _____

      _____

      Tile

      _____

      _____

      Ceiling

      _____

      _____

   d) Specialties

      Fireplace(s)

      _____

      Shower enclosure(s)

      _____

APPLYING SUSTAINABILITY TO INTERIOR COMPONENTS (cont)

1) Interior Fixtures and Finishes: (cont)

e) Appliances and Equipment
   Kitchen
   _____
   Laundry
   _____
   Office/Entertainmnent_____

f) Plumbing Fixtures and Fittings
   Toilets
   _____
   Tubs
   _____
   Showerheads
   _____
   Faucets – kitchen and bath
   _____

g) Electrical
   Lamping
   _____
   Fixtures
   _____
   Systems and Controls
   _____
   Foot candle levels
   _____

2) Interior Furnishings:
   a) Cabinetry Built-ins/Closets/Storage
   _____
   b) Countertops
   _____
   c) Textiles/Fabrics/Leathers
   _____
   d) Case Pieces
   _____
   e) Upholstery
   _____
   f) Bedroom/Bath Linens
   _____
   g) Area Rugs
   _____
   h) Window Treatments
   _____
   i) Art, Framing, Accessories & Artifacts
   _____

APPLYING SUSTAINABILITY TO INTERIOR COMPONENTS (cont)

3) Outdoor Living and Landscaping:
   a) Patios, porches, decks, gazebos, etc...

   b) Plantings - resource efficient, regional, non-invasive and drought tolerant Perennial species

   Shade trees

   Compost/mulch beds

   Turf

   c) Irrigation system

   d) Lighting

   e) Rainwater collection

4) Operation and Maintenance:
   a) Client education

   b) Recycling and composting center

   c) Maintenance/cleaning preference

   d) Indoor air quality testing

   e) Monthly, quarterly, annual systems maintenance

   f) Automated systems

Explanations/Resources

Site Details:

- Prevailing slope: Does the site drain, in general, towards or away from the structure?
- Irrigation system check: if the home has an irrigation system, check to make sure that all heads or dispersers are turned away from the structure.
- Water Table Depth: The homeowner or a local county extension agent or planning/building department may have information on water table depth. The importance of this is determining how it relates to the foundation's depth and whether the foundation ever sees hydrostatic pressure.
- Landscape details: Does the landscape help manage soil and water or encourage run-off and soil erosion?
- Pervious/impervious surface details: Are soils and paved or driveways areas pervious; do they promote infiltration or ponding of water?
- Notes on drainage issues: The soil just around the building foundation is often fill that may be very different than the rest of the site. Check to see what this soil is like—sandy, clayey, silty, loose and well-draining or dense and poorly draining. The ability of the site to handle its water load is based in part on the drainage characteristics of site soil. For the 1st ten feet or so around the structure, is the grade away from the building or towards, or flat? A 5% grade (6 inches in 10 feet) is recommended around the structure. Are there neighboring site features that affect the performance of the home: shading trees, sloped sites onto property, etc.?

Insulation/Air sealing:

- You can check framed walls for insulation by drilling a small hole and inserting a coat hanger "hook" to gauge the depth of insulation and pull out a small sample.
- Carefully removing a window jamb casing can give you a great portal into how water, air and heat are being managed at the most common of wall penetrations, windows. Pick the least sheltered window if possible, in terms of overhangs, and most likely windward side of the home.

Windows:

- Glazing properties: The 4 major properties of glazing are U-value, Solar Heat Gain Coefficient (SHGC), Visual Transmittance (VT) and Air Leakage (AL). The single best source of information on window and glazing properties is the Efficient Windows Collaborative: http://efficientwindows.org/.
- Glazing area: as a percent of floor area, this can be an important aspect of excessive heat loss or gain; passive solar homes can have as little as 7% glazing with typical homes having around 14% glazing (aspect of course is important too).

Moisture Management:

- Flashing: All of the protection systems—drainage plane (WRB), air barrier, and thermal barriers can be challenged here, at the transition from the top of the foundation wall to the start of the framed assemblies. Inspect from both the exterior and the interior to see if this transition area is continuously protected, including how penetrations are flashed and/or sealed.

  Decks are another very common problem area—how they attach and are (or are not) properly flashed.
- Guters/downspouts: how is the roof load managed? Guttters and downspouts? Are there surface-level French drains handling water off the eaves? Are gutter system leaders connected to perimeter drainage; do splashblocks and run-outs move the roof load 2 or more feet away from the building?

- Capillary breaks: a free-draining air space or any non-porous material breaks the capillarity of water and stops wicking of water up and into building assemblies. The most common capillary breaks are between masonry and wood and between wood and soil. Inspect any ground contact of claddings and inspect mudsill contact with concrete foundations.

  A capillary break between the soil and the concrete floor could be any non-porous or free-draining material such as polyethylene sheeting, rigid insulation, or gravel (no fines). One indication of these, since you may not be able to inspect, is to use the ASTM 4263 Polyethylene Sheet Test (http://www.nrmca.org/aboutconcrete/cips/28p.pdf). Check the basement or crawlspace floor for penetrations, both as potential problem areas but also as inspection spots.
- Vapor Profile: This is a layer by layer accounting for relative vapor permeability of building assemblies to determine how they are specified to keep the assembly from getting wet AND to account for how the assembly can dry should (or more likely when) it gets wet. For detailed information on this topic, see this Building Science Corp. web resource: http://www.buildingscience.com/documents/digests/bsd-106-understanding-vapor-barriers/?topic=/resources/vapor_barrier_code_changes.

Mechanical System Details

- Combustion sources: wood stoves, gas cooktops, fireplaces, unvented space heaters are all open combustion devices, as are atmospherically-vented boilers, furnaces and gas water heaters. They should be evaluated for back-drafting potential. See the worst-case depressurization test below.
- Heating and Cooling details: Check maintenance schedule; confirm when each system was last inspected, maintained.
- Dehumidifier/humidifier: Hygrometers or relative humidity (RH)sensors for most dehumidifiers and humidifiers are notoriously inaccurate. Each should be supported by more accurate RH assessment (electronic hygrometer) or spot-checked against a sling psychrometer. The need for either or both dehumidification or humidification should be evaluated based on whole-house performance and overall moisture management. Both treat the symptoms and not the cause of moisture levels.
- Ventilation system: Is there a whole-house ventilation system (any home with air tightness of .35 NACH ("natural air changes per hour) or less should have a fresh-air whole-house mechanical ventilation system: exhaust, supply, or balanced heat recovery system.
- Water heating: Check gas water heaters for evidence of roll-out back drafting; check water heater for evidence of leaks.

Ducting Details

- Ducting details: Are all ducts in conditioned space? Are ducts and the air handler cabinet, return and supply trunks all sealed?

Exhaust Venting

- Spot exhaust: Every room with a moisture load (bathrooms, kitchen, laundry) should have a functioning spot exhaust system, ducted to the outdoors. You can qualitatively check the "draw" of bath and laundry room exhaust fans by holding up two-ply toilet tissue—if the tissue "sticks" to the exhaust grille when the fan is operating, it has sufficient draw; if not, check the ducting or considering replacing the fan.

Radon/Hazardous Materials

- Hazardous materials assessment: Lead paint test sticks are carried by local hardware stores (EPA lead guide: http://www.epa.gov/lead/pubs/leadtest.pdf), radon test kits are

available on-line or from many state/local agencies (http://www.epa.gov/radon/pubs/citguide.html), and asbestos testing requires a lab, although a list of common materials containing friable asbestos can be found here: http://www.inspect-ny.com/sickhouse/asbestoslook9.htm.

Pest Management

- Pest management details: Insects—mainly termites and carpenter ants—can be big problems; their management is well-covered by fact sheets from Dr. Mike Potter of the University of Kentucky extension office: http://www.ca.uky.edu/entomology/dept/entfacts.asp. Check around the building for branches that make contact with the structure and then around the perimeter at grade looking for woody debris or other woody materials (firewood, for example) that is stored close to or actually against the building. Squirrels seem to be a big problem for some homes: management advice can be found here: http://extension.missouri.edu/publications/DisplayPub.aspx?P=G9455.

Wildfire Management: In areas where wildfire is a threat, use these resources to check hazards and counter measures: http://firecenter.berkeley.edu/housedemo/.

Building performance metrics:

- For a good explanation of how blower doors work - http://www.homeenergy.org/archive/hem.dis.anl.gov/eehem/94/940110.html.
- For an explanation of house pressure measurements, including room-to-room measurements (doors closed) - www.energyoutwest.org/eow_2008.../Cox_Performance1.pdf.
- For an explanation of the worst-case depressurization test - www.affordablecomfort.org/.../LEAR_5_Cox_Worst_Case_Depressurization.pdf.
- Examples of low-e window testing equipment - http://www.edtm.com/1_LowE_Detection.htm?_kk=test%20low%20e&_kt=c31d5dda-d79a-4b90-9775-27a0508683e8&gclid=CLzjmbTqr5wCFdZM5QodsHn9kQ?1.
- For information on electronic hygrometers, go here: http://www.greenbuildingadvisor.com/blogs/dept/building-science/moisture-sources-relative-humidity-and-mold.
- For more information on moisture meters, go here: http://www.greenbuildingadvisor.com/blogs/dept/building-science/tools-trade-moisture-meters.