City of Lewisville - Green Built Texas – Guidelines

PROPOSED	BUILDER VERIFIED	CATEGORY	PROTOCOL ELEMENT	WHEN VERIFIED	HOW VERIFIED
WATER EFFICIENCY					
☐	☐	Water Efficiency	Obtain EPA WaterSense Certification	At Final Inspection	Confirms presence by visual inspection.
OR Implement the following strategies:					
☐	☐	Water Efficiency	Irrigation systems shall be equipped with technology that inhibits or interrupts operation of the irrigation system during periods of rainfall, sufficient moisture, and freezing (e.g., rain sensors, soil moisture sensors) or a weather- forecast based (ET) irrigation controller. WS 4.2.6.	At Final Inspection.	Confirms presence by visual inspection.
☐	☐	Water Efficiency	Limit landscape & turf plantings to drought-tolerant varieties (must survive stage 3 drought restrictions).	At Final Inspection.	Consult Texas A&M Horticulture list
☐	☐	Water Efficiency	Install 2" deep mulch in landscape beds.	At Final Inspection.	Confirms mulch of at least 2-inches in depth.
☐	☐	Water Efficiency	Select water efficient toilets (1.3 gpf) that work with first flush (min. 350 grams).	At Final Inspection.	Confirms that toilet model(s) purchased meets performance requirement, using MaP testing protocol reference sheet, or plumber attests that the toilets provided meets program requirements.
☐	☐	Water Efficiency	Reduce hot water usage by implementing one of the following: (NAHB 801.1.1) • Hot water plumbing running to kitchen and all bathrooms is 30 feet or less in length from the water heater and is sized in accordance with the code for the specified application. • One of the following piping system designs is implemented: o Structured-type plumbing with demand-controlled hot water loops o Engineered parallel piping system (i.e. manifold system) in which the hot water line distance from the water heater to the parallel plumbing system is less than 15 feet. o Central core plumbing system with all plumbing fixture fittings (e.g. faucets and showerheads) is located such that the volume of water between the water heater and fixture fittings is a maximum of 6 cups. • Pipe runs exceeding 30 feet from the water heater to fixture locations are aided by one of the following: o Tankless hot water heater installed at point of use and served only by cold water An on-demand hot water recirculation system is installed. o Pipes are insulated to minimum of R3. Circulating hot water piping is insulated to minimum R2.	At Pre-Drywall Inspection.	Confirms that piping is run at a distance of no more than 30 feet (Vertical plus Horizontal with Margin of error 5 feet) to fixtures **OR** presence of hot water on demand system.

☐	☐	Water Efficiency	Install an ENERGY STAR dishwasher.	At Final Inspection.	Visually confirms that model carries ENERGY STAR label OR Builder with appliance provider confirms that dishwasher carries ENERGY STAR label.
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Select any two (2) of the following water conservation strategies or install rainwater catchment system to provide for a minimum of 50% of landscape irrigation needs (presence of rainwater catchment system confirmed by verifier and performance attested to by builder and/or landscaping professional):					
☐	☐	Water Efficiency	Strategy #1: Select high performance fixtures. Choose any two (2) of the following: • All lavatory faucet flows rates equal to or less than 1.5 gpm. • All kitchen & utility faucet flow rates equal to or less than 2.2 gpm. • All showerhead flow rates equal to or less than 2.0 gpm Lavatory faucets operated with infrared sensors	At Final Inspection.	Builder with plumber and/or fixture provider confirms flow rate with Verifier. Confirmation of fixture performance must be sent to Verifier at least twice annually.
☐	☐	Water Efficiency	Strategy #2: Zone irrigation system separately for turf and slab/bedding areas.	At Final Inspection.	Builder or landscaping professional must clearly denote separate zoning on irrigation control box. Verifier confirms separate zoning indicated on control box.
☐	☐	Water Efficiency	Strategy #3: Install a low-volume, non-spray irrigation system. Choose any one (1) of the following: • Drip irrigation • Bubblers • Drip emitters • Soaker hose • Subsurface irrigation Use no irrigation system	At Final Inspection.	Presence of system used can be attested to by builder. Installed system must not have spray zones.
INDOOR AIR QUALITY					
☐	☐	Indoor Air Quality	Obtain EPA Indoor Air Plus Certification	At Final Inspection.	Can be attested to by builder providing copy of certification.
OR Implement the following strategies:					
☐	☐	Indoor Air Quality	Comply with ENERGY STAR Version 3.0 HVAC Quality Installation requirements	At Final Inspection.	HVAC Quality Installation Checklist is to be completed per EPA guidelines **OR**
☐	☐	Indoor Air Quality	a. **Heating and cooling design loads shall be determined for each room according to ACCA Man J, ASHRAE Handbooks, or equivalent software.** Heating and cooling equipment shall be properly sized and selected to meet the design loads. This requirement shall be met by an ENERGY STAR HVAC QI Certificate (where available) OR verification of all the following: • Documentation of design load calculations (i.e., load calculation worksheet or software report), **AND** • System design documentation (i.e., sizing calculations and equipment performance information), **AND** Verification that outdoor and indoor coils match in accordance with the AHRI Directory of Certified Product Performance. For more information, see www.ahridirectory.org	When completed by HVAC contractor.	Load calculations can be conducted by contractor with proper credentials (Engineer, Texas A/C license, or under the supervision of a license holder). HVAC contractor attests to the sizing/commissioning being completed and will be required to maintain documentation throughout the warranty term. Upon request of verifier, homeowner, or builder the HVAC contractor must submit the *Manual J sizing calculation according to equipment manufacturer's specifications and airflow design according to calculations performed; within five (5) business days of request.*

☐	☐	Indoor Air Quality	b. Sealed **Duct system(s) shall be designed according to ACCA Man D, ASHRAE Handbooks, or equivalent software AND installed to be substantially airtight, properly balanced, and protected from construction debris.** This requirement shall be met by an ENERGY STAR HVAC QI Certificate (where available) **OR** verification of all the following prescriptive requirements, **OR** the Performance Test Alternative below: ☐ Design verified by appropriate documentation (i.e., duct-sizing worksheet or annotated layout), **AND** ☐ Duct system verified to meet the following additional requirements: o Seams in the HVAC cabinet, plenum, and adjacent ductwork shall be sealed with mastic systems, tape that meets the applicable requirements of UL 181A or UL 181B, or gasket systems. o Building cavities shall not be used as part of the forced air supply or return systems. o Duct openings shall either be covered during construction or vacuumed out thoroughly prior to installing registers, grilles, and diffusers **Performance Test Alternative:** ☐ Room-by-room airflows balanced and measured by the HVAC contractor within +/-20% of calculated room airflows to meet design loads, except for baths, closets, and pantries, AND ☐ Duct system TOTAL leakage test no greater than 6 cfm per 100 s.f. of floor area (or 9% design fan flow), measured at 25 Pa, with duct boots and air handler in place, according to ASTM E1554, ASHRAE 152, or other RESNET-approved method.	At Pre-Insulation. At Final Inspection. At Final Inspection. At Pre-drywall Inspection	Confirms duct design according to ACCA Man D, ASHRAE Handbooks, or equivalent software. Confirms presence by visual inspection. Confirms room-by-room balance airflows according to ACCA 5 QI-2015 standard. Confirms duct system TOTAL leakage requirements through duct testing outline in ASTM E1554, ASHRAE 152, or other RESNET-approved method.
☐	☐	Indoor Air Quality	c. **Provide mechanical whole-house ventilation meeting all ASHRAE 62.2 requirements.** The following requirements shall be visually verified: • Whole house mechanical ventilation system & controls shall be installed to deliver the prescribed outdoor air ventilation rate (ASHRAE 62.2 section 4), including ventilation restrictions in ASHRAE 62.2 section 4.5 (e.g., not greater than 6.0 cfm/100 s.f. in "Warm-Humid" climates as defined by IECC Figure 301.1); **AND** ☐ Transfer air (i.e., air from adjacent dwelling units or other spaces such as garages, crawlspaces, or attics) shall not be used to meet ventilation requirements (ASHRAE 62.2 section 6.1); **AND** ☐ Outdoor air inlets shall be located a minimum of 10 ft. from contaminant sources (ASHRAE 62.2 section 6.8); **AND** ☐ Airflow shall be tested to meet rated fan airflow (at 0.25 in. w.c.) **OR** verify duct(s) sized according to the requirements of ASHRAE 62.2 Table 7.1 and the manufacturer's design criteria (ASHRAE 62.2 section 7.3)	At Pre-drywall Inspection At Pre-drywall Inspection At Pre-drywall Inspection At Final Inspection	Confirms presence by visual inspection.

☐	☐	Indoor Air Quality	d. **Room pressure differentials shall be minimized by installing transfer grilles or jump ducts for any closed room that does not have a dedicated return, except for baths, kitchens, closets, pantries, and laundry rooms.** The opening size shall be 1 square in. capacity (grille area) per cfm of supply (including free area undercut below door as part of the area). **Performance Test Alternative:** Measured pressure differential no greater than 3 Pa (0.012 in. w.c.) between closed rooms and adjacent spaces that have a return. Pressure difference of 5 Pa shall be acceptable for rooms with designed airflow of greater than or equal to 150 cfm. **Note:** Outdoor air ducts connected to the return side of an air handler shall be permitted as supply ventilation only if the manufacturers' requirements for return air temperature are met (e.g., most manufacturers recommend a minimum of 60 degrees F air flow across furnace heat exchangers)	At Pre-drywall Inspection.	Confirms presence by visual inspection.
☐	☐	Indoor Air Quality	If gas furnaces and/or water heaters are located within conditioned space they must be sealed combustion or vented to the outside	At Pre-Drywall Inspection.	Confirms that gas furnaces and/or water heaters located within thermal envelope are sealed combustion or vented to outside.
☐	☐	Indoor Air Quality	**No air-handling equipment or ductwork shall be located in garages.** **Note:** Ducts and equipment may be located in framing spaces or building cavities adjacent to garage walls or ceilings if they are separated from the garage space with a continuous air barrier (see ENERGY STAR Thermal Enclosure Rater Checklist).	At Pre-Drywall Inspection.	Confirms that NO air-handling equipment or ductwork is located in garages by visual inspection.
☐	☐	Indoor Air Quality	Provide local mechanical exhaust ventilation to the outdoors in each bathroom and kitchen, meeting ASHRAE 62.2 section 5 requirements	At Final Inspection	Confirms presence of mechanical exhaust ventilation to the outdoors in each bathroom and kitchen compliant to ASHRAE 62.2 section 5 requirements.
☐	☐	Indoor Air Quality	Avoid attached garage or isolate garage from the living space by providing a tightly sealed, gasketed door between the garage and conditioned space and provide a continuous air barrier between walls and ceilings separating the garage from the conditioned living space.	Initially at Pre-Drywall and confirmed at Final Inspection	Checks for poly seal at base plate during Pre-Drywall Inspection and confirms sheetrock, tape, bed, and other sealing techniques at Final Inspection.
☐	☐	Indoor Air Quality	Install equipment to maintain Relative Humidity at or below 60% using one of the following: a. Additional dehumidification system(s) Central HVAC system equipped with additional controls to operate in dehumidification mode	At Pre-Drywall Inspection.	Contractor must attest to installation of equipment designed to meet this performance guideline in writing.
☐	☐	Indoor Air Quality	Fireplaces. New wood –burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace. Where using tight-fitting doors on masonry fireplaces, the doors shall be listed and labeled in accordance with UL 907.	Initially at Pre-Drywall and confirmed at Final Inspection	Confirms that combustion air for wood-burning fireplace will come from the outside. Verifier confirms presence of glass door on fireplace.

☐	☐	Indoor Air Quality	Use water-based mastic to seal ducts.	At Pre-Drywall Inspection.	Confirms presence by visual inspection.
☐	☐	Indoor Air Quality	Use minimum MERV 8 filters for AC return. There should be no visible bypass between the filter and the filter rack.	At Final Inspection.	Confirms filter rating of at least MERV 8.
☐	☐	Indoor Air Quality	**All homes equipped with combustion appliance(s) or an attached garage shall have a carbon monoxide (CO) alarm installed in a central location in the immediate vicinity of each separate sleeping zone (e.g., in a hallway adjacent to bedrooms.)** The alarm(s) shall be hard-wired with a battery back-up function and placed according to NFPA 720. The alarms shall be certified by either CSA 6.19-01 or UL 2034.	At Final Inspection.	Confirms presence of CO detector and compliance with NFPA 5.2.3 is confirmed by manufacturer statement/specifications/label.
PROPOSED	**BUILDER VERIFIED**	**CATEGORY**	**PROTOCOL ELEMENT**	**WHEN VERIFIED**	**HOW VERIFIED**
Select any two (2) of the following strategies to enhance indoor air quality:					
☐	☐	Indoor Air Quality	Strategy #1: Select carpets, paddings, and adhesives that are compliant with emission levels in accordance with the Carpet and Rug Institute's (CRI) Green Label or Green Label Plus indoor air quality program.	At Final Inspection.	Presence can be attested to by providing copy of manufacturer statement/specifications and purchase order **OR** Verifier confirms that at least 80% of all carpet, pad, and floor covering adhesives are Green Label.
☐	☐	Indoor Air Quality	Strategy #2: **Interior paints and finishes, including 90% or more of such products applied to interior surfaces of homes, shall be certified low-VOC or no-VOC by one of the following:** • Green Seal Standard GS-11, **OR** • Greenguard Certification for Paints and Coatings, **OR** • Scientific Certification Systems (SCS) Standard EC-10.2-2007, Indoor Advantage Gold, **OR** • Master Painters Institute (MPI) Green Performance Standards GPS-1 or GPS-2, **OR** A third-party low-emitting product list based on CA Section 01350, e.g., the CHPS List at www.chps.net/dev/Drupal/node/381	At Final Inspection	Presence can be attested to by providing copy of manufacturer statement/specifications and purchase order.
☐	☐	Indoor Air Quality	Strategy #3: Install central vacuum (canister unit) outside conditioned space.	At Final Inspection.	Confirmed via visual inspection.
☐	☐	Indoor Air Quality	Strategy #4: Structural plywood and OSB shall be certified compliant with PS1 or PS2, as appropriate, and shall be made with moisture-resistant adhesives as indicated by "Exposure 1" or "Exterior" on the American Plywood Association (APA) trademark. Hardwood plywood shall be certified compliant with the formaldehyde emissions requirements of ANSI/HPVA HP- 1-2004 and U.S. HUD Title 24, Part 3280, **OR** certified compliant with CA Title 17.	At Final Inspection	Presence can be attested to by providing copy of manufacturer statement/specifications and purchase order.
☐	☐	Indoor Air Quality	Strategy #5: Particleboard and MDF shall be certified compliant with the formaldehyde emissions requirements of ANSI A208.1 and A208.2, respectively, and U.S. HUD Title 24, Part 3280, **OR** certified compliant with EPPS CPA 3-08 by the CPA Grademark certification program, **OR** certified compliant with CA Title 17.	At Final Inspection	Presence can be attested to by providing copy of manufacturer statement/specifications and purchase order.

☐	☐	Indoor Air Quality	Strategy #6: Cabinetry contains no added urea formaldehyde and is made with component materials that are certified to comply with all the appropriate standards listed in Strategies 5 or 6 **OR** shall be registered brands or produced in registered plants certified under KCMA's Environmental Stewardship Certification Program (ESP 01-06).	A Final Inspection.	Presence can be attested to by providing verifier copy of manufacturer statement/specifications and purchase order.
☐	☐	Indoor Air Quality	Strategy #7: Upgrade AC return filtration to minimum 4-inch pleated or MERV 9 or greater (in lieu of item #9). There should be no visible bypass between the filter and the filter rack. Ensure that filter is compatible with and accounted for in HVAC design calculations.	A Final Inspection.	Presence can be attested to by providing verifier copy of manufacturer statement/specifications and purchase order.
ENERGY EFFICIENCY (CHOOSE ONE OF THE FOLLOWING STRATEGIES)					
☐	☐	Energy Efficiency	Strategy #1: Achieve HERS Index of 65 or below and comply with ENERGY STAR Version 3.0 Thermal Enclosure System Checklist.	Per EPA Guidelines and RemRate software	HERS Rater (can be the same entity as verifier) attests that home meets required HERS Index. (as proven by RemRate software). New state energy code requires ERI (HERS) 65.
☐	☐	Energy Efficiency	Strategy #2: Obtain ENERGY STAR Version 3.0 certification.	Per EPA Guidelines.	HERS Rater (can be the same entity as verifier) attests that home meets performance guidelines set forth by ENERGY STAR after following EPA guidelines as they stand or may be amended.
☐	☐	Energy Efficiency	Strategy #3: Meet or exceed Texas Building Energy Performance Standards. NCTCOG approved Air Change Per Hour Tradeoffs are acceptable per guidance document issued to code officials, raters and builders.	Per code requirements or NCTCOG-issued guidance document	HERS Rater (can be the same entity as verifier) attests that home meets performance guidelines and issues compliance certificate per code requirements or follows NCTCOG approved tradeoffs.
DURABILITY AND MOISTURE MANAGEMENT					
☐	☐	Durability and Moisture Management	Comply with Energy Star Version 3.0 Water Management System Checklist	At Final Inspection.	Confirms presence by visual inspection.
HOMEOWNER EDUCATION					
☐	☐	Homeowner Education	Provide homeowner with operations and maintenance kit and perform walk-through.		Builder must provide a walkthrough of the home to familiarize the homeowner with the operation and maintenance of mechanical systems.
☐	☐	Homeowner Education	Provide homeowner with information on local recycling programs, green energy service providers.		Builder provides homeowner with information.

Property Address: _____

Builder: _____

Company Name: _____

Date: _____