

DRAFT Outline Specifications

For:

**Mosaic Commons Cohousing Community
At Sawyer Hill Development
Berlin, MA**

Owner: Mosaic Commons LLC

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July 27, 2006 – DRAFT

*Tracking of changes since “post survey” specifications, including feedback from Owner
(August 2 2006)*

Color Coding of this draft Specification is as follows:

Red items are the changes that reflect your survey results, some of these have been incorporated (black) according to July 17 email from San

Blue Items – feedback requested from Landmark Structures

Yellow highlighted items need to go to Owner for their input

Grey highlighted items need more research by Architect

Green highlighted items need more input from consultants

Blue items are comments from Mechanical engineers that provide additional information but are not yet resolved.

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Division 1 - General Requirements

01010: Summary of Work

- ◆ The overall scope of the project is the Mosaic Commons Neighborhood within the Sawyer Hill Development. The Scope of the work at Mosaic Commons includes:
 - 34 units of housing, in 13 buildings, configured in 4 standard building types. All buildings are two-story with unfinished, insulated attics. Nine (9) buildings are slab-on-grade. Four (4) buildings have walkout basements, creating a variation in two of the four standard building types. The residential units are configured in duplexes (R-3 use group) and triplexes (R-2 use group). All units shall be equipped with a 13R automatic fire suppression system and separated by ½ -hour construction. Note: there is no code requirement for fully accessible units. However, (2) 1-bedroom units shall be accessible to the degree shown on drawings. Most units will have unfinished attics, but some will have small areas of finish (to meet 40B area requirements – refer to drawings for attic finish locations. All units shall have some degree of accessibility to the ground floor, as indicated on the drawings. Heating systems for the residential units shall be...
 - Common house: one story, trussed roof, slab on grade, approximately 5,000 SF with automatic fire suppression.
 - Workshop building: one story, trussed roof, slab on grade, approximately 820 SF.
 - Parking structures: Seven total carports, open on one side, (3) 6-car and (4) 4-car structures, trussed roofs
 - Mechanical shed(s): one story, slab on grade, trussed roof, approximately 450 SF to be determined.
 - Silo(s) for wood pellet storage: to be determined.

The following are covered by **separate specifications and contract**:

- ◆ All site work: roadways, utilities, septic, water, pathways, exterior lighting, etc. Excavation, blasting, and backfilling for the building foundations is carried under this contract. Excavation for all utilities and other site work shall be under separate contract.
- ◆ Camelot Cohousing Neighborhood
- ◆ Office Building
- ◆
- ◆ Equipment and garden sheds (storage sheds attached to residential buildings **are** included in this contract)
- ◆ Commissioning of Mechanical Systems (if included in project)

Energy Conservation and Green Building Goals:

- ◆ Although LEED certification is not being pursued at this time, this project will attempt to meet the U.S. Green Building Council's LEED for Homes. LEED items are referenced throughout this specification to aid in the cost estimator's and contractor's understanding of the goals and details of this project.

- ◆ All Residential units and Common House shall comply with air tightness specifications (exceeds Energy Star requirements). **An Airtight Drywall Approach (ADA) shall be used for achieving air sealing**. A blower door test will be conducted by Energy Star (at no cost to the contractor) in each and every building. Improvements shall be made by the Contractor to the air sealing as necessary to bring each and every building into compliance. Standards for the air sealing are listed within the specifications. The General Contractor shall submit documentation of experience and test results in meeting blower door testing on a minimum of three previous projects. See Mechanical section for passive and active ventilation strategies for “tight” homes.

01028 Change Order procedure

- ◆ Follow procedures set forth in standard Construction Contract

01100: Alternates

Provide Pricing for the following alternates:

Adds: The following items are to be considered for add alternates in this order. They are listed in the order of biggest positive environmental (green) impact to the project and/or difficulty of adding at a later date.

1. Window upgrade: Substitute triple–glazed fiberglass windows by Accurate Dorwin, with insulated sash and frames. (Note: Double hung windows will be replaced with single hung.)
 - Two types of Glazing:
 - South and East Elevations: Tripane 3MM glass, Superspace with two argon filled cavities, PPG Sungate, 500 low E on two surfaces
 - North and West Elevations: Tripane 3MM glass, Superspace with two argon filled cavities, PPG Sungate, 1000 low E on two surfaces
 - Whole Unit U-value = 0.22, 0.19
 - Solar Heat Gain Coefficient (SHGC) = 0.56, 0.43
 - Visible Light Transmittance (VLT) = 65, 57
2. Super insulation package A: add 1” rigid insulation to exterior of studs. Siding nails to be increased accordingly.
3. Super insulation package B: add 1” rigid insulation to underside of roof rafters (**headroom problems??**). Note: Strapping is already included in base package to hold the blown-in insulation in place.
4. FSC certified hardwood for Common House Floors: Massachusetts Woodlands Cooperative
5. Window Trim at Units: add painted poplar or natural no. 2 pine trim in place of gypsum board returns at all exterior windows.
6. The following items are also to be considered for add alternates. **We should get the input of the Contractor regarding their inclusion.** All of these items can be added fairly easily at a later date.
 - ◆ Workshop Building
 - ◆ 2nd Coat of paint in Common House (primer only in base bid)
 - ◆ Finishing of Common House screen porch (deck only included in base bid)
 - ◆ Tubular Skylights in Common House interior hallways and bathrooms

- ◆ Acoustic treatment in kids and multi-purpose room
- ◆ Common House entry grate (see misc. metals)
- ◆ Common House central vacuum
- ◆ Wiring and speakers for Common House sound system (?).

Deducts: The following items are to be considered for deduct alternates in this order. They are listed in the order of biggest price deduct relative to disruption to project.

1. Deduct all finishes (flooring, painting, trim) in the following Common House rooms:
 - Guest Room 1
 - Guest Room 2
 - Multi-purpose Room
 - Exercise Room
 - ◆ Kid's play rooms
2. Deduct last of two finish coats of interior wall paint at all units. Spray one coat of finish paint SAME color as ceiling ("Dover White", no cutting and rolling).
3. Deduct all cubbies, closet shelving, and bulletin boards in common house
4. Deduct all closet doors in units
5. Deduct all finish flooring at second floors of all units, paint subfloor (will banks accept this???)
6. Reduce the size of front porches on all units to 6' deep.
7. Deduct dense pack cellulose in walls and sloped ceiling areas. Substitute fiberglass batts and add vapor barrier to walls (already included at the ceilings).

01200: Meetings & Coordination

- ◆ Standard Pre-Construction Meeting: Architect, General Contractor, Owner's representative. The following shall be provided by the Contractor in advance of the meeting:
 - Schedule of Values
 - List and contact information of all major subcontractors and suppliers
- ◆ Energy Performance Meeting for all subs with work in energy performance. Note: The goal of this meeting is to reinforce the air tightness goals and to get everyone on board (meet and educate subcontractors).
- ◆ Pre-Submittal Mechanical Meetings: Mechanical Contractor is invited to an optional pre-submittal meeting at the Kohler and Lewis office to help them prepare submittals. The ATC subcontractor has a required pre-submittal meeting at Kohler and Lewis office.
- ◆ Weekly Jobsite Meetings: Architect, General Contractor, Owner's representative in attendance at all meetings. Sub-contractors in attendance for all meetings related specifically to their work. Mechanical engineers and contractors in attendance at meetings prior to commencement of work, and as needed. Alternatively, attendance by speakerphone may be acceptable, for encouraging maximum economy and energy conservation.
- ◆ Progress Schedules (bar chart): required and updated monthly
- ◆ General Contractor is responsible for the Coordination of scheduling, submittals, and Work of various sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

01300: Submittals and Substitutions

Submittals shall be required for the following. Contractor-initiated requests for substitutions to materials and systems specified, shall be made in writing for review by architect.

- ◆ Concrete mix
- ◆ Wall assembly and air sealing: full mockup with window installed and flashed per drawings
- ◆ Trusses
- ◆ Cabinetry
- ◆ Roofing
- ◆ Doors, frames, hardware
- ◆ Windows, skylights
- ◆ Fire code gypsum board
- ◆ Experience with Airtight Drywall Approach or similar airtight construction: The General Contractor shall submit documentation of experience in meeting blower door testing on a minimum of three previous projects.
- ◆ Paint
- ◆ Acoustic panels
- ◆ Equipment
- ◆ Toilet accessories
- ◆ Mechanical
- ◆ Sprinklers
- ◆ Electrical
- ◆ Plumbing

01350: Selections, Options and Upgrades

- ◆ **Selections** shall be offered to the individual unit Owners at no additional cost for the following. All color palettes listed within this section shall to be determined by architect (working with client subcommittee). Distribution of exterior colors within community shall be determined by architect (working with client subcommittee). Selection of interior colors shall be by individual home owner.
 - Roof shingle colors: from palette of 4 (light colors to minimize heat gain)
 - Exterior paint colors: from palette of 5
 - Exterior trim paint color: from palette of 3 (see Alternates and Upgrades)
 - Interior wall color: from palette of 2 (see Alternates and Upgrades)
 - Plastic Laminate color: from palette of 5
 - Swanstone Countertop colors: from palette of 5 standard colors.
 - Linoleum color: from palette of 3
 - Natural pine (with natural finish, all coats) or poplar interior trim (primed only - Painting by upgrade, see below)

Options and Upgrades: A limited number of predetermined upgrades and options shall be offered to the individual unit Owners PRIOR to the commencement of construction. Absolutely no options or upgrades shall be accepted by the Contractor after construction start-up. The Contractor will establish a cost for each upgrade, dependent on unit type. The list of upgrades will NOT include any changes that require any structural changes to the buildings. **NOTE: these lists need to be reviewed by selected**

contractor for his/her input on how easily they are accommodated without adding costs and/or delays to overall project. Upgrades:

- Gas range: substitute standard gas range for standard electric range. To include gas piping and individual propane tanks located close to unit.
- Painting (walls): 2 coats of finish paint unit walls
- Painting (trim): 2 coats of finish paint unit trim
- Wood flooring upgrade to hardwood from pine
- Countertops: upgrade from standard plastic laminate to other (selections to be determined)
- Kitchen Upper Cabinets (base spec is for lower cabinets only, except at range vent)
- Interior doors:
 - upgrade from standard flush, hollow-core birch doors, to solid-core, OR
 - upgrade to solid pine, 4-panel doors
- Kitchen sink: from double to single Roy thinks this can be a selection between single and double. Check with contractor.
- Toilets: from 1.6 gallon to dual flush

Options:

- Carport within shared carport structure (this item needs to be coordinated with site plan for distribution, etc.)
- Skylights and light-tubes in pre-designed location(s)
- Air conditioning within individual units – ductless mini-split as the only option to be offered (DISCUSSION ITEM – do we put refrigerant lines in every unit?)
- Dishwashers: furnish and install standard Energy Star dishwasher within individual units.
- Microwave ovens: furnish and install standard Energy Star microwave within individual units
- Waste water heat recovery (per shower, but in slab-on-grade, first floor locations) – Roy does not recommend this, solar more important
- Solar domestic hot water. DISCUSSION ITEM: possibly include in base spec for all buildings?
- Additional electric lighting fixtures (e.g. track lights, wall sconces, recessed cans in uninsulated ceiling areas)
- Additional electric items (ceiling fans, whole house fans)
- Central Vacuum (units, included under base spec for common house)
- RECOMMENATION: Do NOT include finishing of attic as an option. This is a BIG item and can easily be done by homeowner or contractor later.

01400: Quality Control

- ◆ Energy Star Requirements, Inspections, etc.
- ◆ Performance Testing - Blower Door testing: 0.18 CFM50/ft2 of shell. (which does not include any floor slab but does include basement walls – need MR to explain this better). Note: This is roughly equal to the Energy Crafted Home standard of 1 in 2 ELA per 100 ft2 of shell.

- ◆ Commissioning of mechanical systems. Expensive but effective – *I recommend it as an upgrade option for units. Would be a good idea as base bid for the common house and wood boiler plant. (RS)*
- ◆ Mock-ups – build entire wall mock up including window – use as educational tool for subs. Contractor shall follow window installation sequence indicated on drawings.

01500: Construction Facilities & Temporary Controls

- ◆ The General Contractor shall maintain an office on site with facilities for conferencing and teleconferencing.
- ◆ Temporary Electric Service installed and paid for by General Contractor
- ◆ Dumpster provided and paid by General Contractor.
- ◆ Port-a-potty(ies) shall be provided and maintained on site by General Contractor.
- ◆ Premises will be left each day by each subcontractor broom clean.
- ◆ Temporary Controls:
 - ◆ Construction Materials shall be stored off the ground and covered to avoid absorption of moisture and damage.
 - ◆ Mechanical ducts shall be sealed during construction.
 - ◆ Avoid exposure of absorbent materials to VOCs during construction.

01505: Construction Waste Management

- ◆ Waste Management: maximum 2.5 lbs per square foot of construction waste sent to landfill (LEED MR-6.2) – **does this impact cost?**
- ◆ Have framers make all cuts in one central area to maximize the usage of scrap that has already been cut.
- ◆ Provide Staging Areas for sorting, separating, and storing different types of construction wastes. **Review this section with contractor to determine what is achievable without significant cost to project.**
- ◆ Contractor shall separate all solid wood scraps. **RECOMMENDATION:** Owners shall be responsible for periodic consolidation and storage of wood waste that has been separated by contractor.

01700: Contract Closeout

- ◆ Substantial and Final completion as defined in standard Construction Contract
- ◆ Punch list procedures: Contractor shall walk through each unit with architect and/or Owner's representative to determine punch list which shall be monetized by the architect.
- ◆ **Commissioning for the common house and mechanical building would be a separate contract with a third party commissioning agent. Any optional unit commissioning would also be separate individual contracts, but should be bid out as one package for cost economy. Commissioning may not be required for anything but the common house, depending on the mechanical systems approach to be chosen.**
- ◆ **Final Cleaning: We should get the input of the Contractor regarding these items (cost)**
 - Final cleaning of units and common house (including plumbing fixtures) by Owner.
 - Unit and Common House windows washed by Owner

- ◆ Project Record Documents (as-builts) of all buildings shall be required.
- ◆ Operation and maintenance manuals of all systems shall be required.

Division 2 - Site Work

Except as noted below, this work is under site specifications and contract
what else should be in this section of spec?? Ask Walt and Mollie Coordinate with site specifications and GPR.

Owners to install pavers at common house courtyard (are there other areas of pavers) and plant all trees and shrubs. Coordinate this with GPR, what about fire truck access?

- ◆ Excavation for building foundations
 - Stripping and stockpiling of topsoil under site contract
 - Blasting by unit cost. Contractor shall provide a unit cost for blasting and removal of rock. Rock storage on site as per directives in site contract.
- ◆ Foundation Drainage: Install 4-inch diameter perforated footing drain in backfill of gravel or suitable site material, pitched to daylight or drywell. Are there affordable alternatives to PVC?
- ◆ Backfilling of Foundations (rough and finish grading under site contract)

Division 3 - Concrete

03300 Cast-in-Place Concrete

- ◆ All concrete to be 2500 PSI or better; foundation walls to be 3000 PSI or better.
- ◆ All concrete form tie holes to be water plugged.
- ◆ Contractor may consider fly-ash additive, if cost effective. MR – I would set a requirement for either fly ash or blast furnace slag – check with the structural engineer – there are ASTM and ACI standards for these

Since most of the buildings are slab on grade, does it save much money to have concrete floors instead of sleepers and wood floors (first floor only). The slabs would be scored at 48” grid, and stained.

03310 Preparation for future Radon Mitigation (LEED 9.1 and/or 9.2 ?)

To permit future radon mitigation, basement slabs and slabs on grade to be constructed as follows:

- Install 4” of clean, uniform-sized stone (approximately 3/4" diameter). Provide capped pipe to penetrate slab in locations as shown on drawings.

Division 5 – Metals

- ◆ Fasteners
- ◆ Grate at common house entrance: 48 x 24 metal grate with 1x2 grill, set flush into front deck. See Add Alternate List

Division 6 - Wood and Plastics

06100 Rough Carpentry

Advance framing techniques (LEED MR-2.2) – For more detailed descriptions and drawings, refer to <http://www.buildingscience.com/designsthatwork/advanced-framing/default.htm>

- Space joists and studs at approximately 24" o.c.
- Size headers for actual loads; eliminate headers in non-bearing walls
- Use ladder blocking at rake overhangs
- Use drywall clips
- Use single top plate with plate connectors
- Use two-stud corners

Wall Framing and Sheathing:

- ◆ Exterior walls: #2 SPF 2x6 studs @ 24" on center (see Alternates for additional 2x strapping), 1/2" OSB or CDX plywood sheathing. Corners shall be insulated using advanced framing techniques.
- ◆ Interior partitions: #2 SPF 2x4 studs @ 16" o.c.. Stand perpendicular walls off exterior walls to allow gypsum board installation to be continuous.
- ◆ Party Walls: double 2x6 stud wall detailed as per drawings (separated by 1", with sound dampening as per section 07210)
- ◆ Headers: #2 SPF, sizes as noted in plans; exterior headers to be insulated.
- ◆ Sills: 2x6, treated with TimberSIL's patented Sodium Silicate Technology (SST)
- ◆ Carport frame and walls: #2 SPF 2x4 studs @ 16" on center

Blocking:

- ◆ As required by code.
- ◆ Provide additional blocking as required for the following locations:
 - Grab bars in all Common House bathrooms
 - Future grab bars in first floor bathrooms of all units.
 - All kitchen cabinetry, including blocking for future upper cabinets if upper cabinets are deleted (see Alternates).

Floors:

- ◆ Floor joists: TJI, truss joists, sizes as noted on drawings.
- ◆ Sleepers: pressure treated (treated with TimberSIL's patented Sodium Silicate Technology (SST)) (first floor over slab on grade): or floating floor on dri-core
- ◆ Subfloors: 3/4" CDX plywood, complying with the following outgassing standard for formaldehyde: On the ASTM E-1333 test, the level shall be 100 ppb or less. (Note: This is more stringent than the HUD compliance level of 300 ppb.) MR - is there a brand you prefer - it always helps the builder to spec one product that meets you spec. Does the subfloor need to be plywood or can it be OSB such as Advantech?

- ◆ Underlayment for resilient flooring: additional layer of ULX plywood, complying with same standard as above if possible. MR - you should find out if it's possible and specify what you want

Roofs:

- ◆ Trussed Roofs (Common House, Carports, Mechanical Shed): engineered and stamped by truss manufacturer to meet design and loads as designated on drawings.
- ◆ Main Roof Rafters (all units): sized and spaced as noted on plans (see Alternates for thicker roof assembly).
- ◆ Sheathing: 5/8" CDX plywood secured with clips as required for 24" rafter and truss spacing. MR - is OSB acceptable?
- ◆ Porch Rafters (Common House and Units): sized and spaced as noted on plans.
- ◆ Porch sheathing: exposed from below: beaded plywood, painted..

Porches and Decks:

- ◆ Joists: Treated southern yellow pine, sized and spaced as noted on plans. Treated with TimberSIL's patented Sodium Silicate Technology (SST)
- ◆ Decking: 1 x 6 recycled plastic / wood composite decking - "Trex", "Choice Deck", or equal

Exposed Exterior Posts, Beams, Brackets, & Rafters:

- ◆ STK cedar, sized as noted on plans, painted (local sustainable, or Port-Orford).

Construction Adhesives:

Water-based adhesives: RL1168 sub-floor and shear wall adhesive by Tacc International, available from Environmental Construction Outfitters (800-238-5008), or equal.

06200 Finish Carpentry - Interior

Interior Trim:

- ◆ Common House:
 - All door and window trim and baseboard to be No. 2 pine (natural finish, all coats included)
- ◆ Units
 - All door and interior trim and baseboard to be poplar (primed only, painting as upgrade), or No. 2 pine (natural finish, all coats listed in painting section included in base spec.). See Selections and Upgrades.
 - Note: exterior windows shall have gypsum board returns with the exception of the sills (see below). See Alternates for addition of trim.
- ◆ Sizes of trim shall be as follows (all sizes are nominal):
 - 1" x 5" windowsills
 - 1x4 headers
 - 1x4 casing on sides and aprons
 - 1x6 baseboard

Common House Tack Boards:

- ◆ Painted Homasote or equal (fire rated?) in pine frame

Common House Closet Shelving:

- ◆ 6 shelves in lengths and configuration as shown on plans
- ◆ Solid Pine fixed shelving. **DISCUSSION ITEM:** Should Common House shelving be included at all?

Unit Closet Shelving:

- ◆ All shelving shall be solid pine, fixed. Wooden closet pole.
 - Storage, linen closets: 6 shelves in lengths and configuration as shown on plans
 - Bedroom and coat closets: 1 rod and two shelves in lengths and configuration as shown on plans
 - **DISCUSSION ITEM:** Should Unit shelving be included at all?

Stairs:

- ◆ Basement stairs (4 walk-out units only): utility grade with fir handrail.
- ◆ Main stairs (all units): Southern yellow pine treads and risers. Half-height walls where indicated on plans with wood cap (No 2 pine), natural finish.
- ◆ Attic stairs (all units except 1 BR): utility grade with fir handrail.
- ◆ Pull down attic stairs (2 locations: 1 BR, second floor units only)

Fireplace (Common House only):

- ◆ Installation of pre-fabricated fireplace unit and flue. Connect to outside combustion air duct (LEED 2.2).
- ◆ **Mantel:**

06210 Finish Carpentry - Exterior

Siding (Units and Common House):

- ◆ Hardi-Plank fiber-cement clapboard, factory primed all sides. 5" exposure - 1-1/4" overlap.
- ◆ Check into 15 year paint warranty (manufacturer and colors)???

Siding (carports) – See Options

- ◆ Hardi-Board panels, vertical siding, painted

Exterior Trim:

Georgia-Pacific Prime-Trim.

- ◆ Fascia - 1 x 6 w/ 1 x 3 drip
- ◆ **Soffit** (Common House only) – Painted T-111 (24" deep vented at eaves, 12" deep unvented at rake)
- ◆ **Soffit** (Units) – Painted pine of T-111 (12" deep vented at eaves, 6" deep unvented at rake)
- ◆ Rake Fascia - 1 x 8 w/ 1 x 3
- ◆ Window and door trim - 5/4 x 4

- ◆ Corner boards - 5/4 x 6
- ◆ Frieze - 5/4 x 4
- ◆ Horizontal band - 5/4 x 6

Common House Screened Porch – See Add Alternates

- ◆ Insect screening in custom frames
- ◆ Frames: cedar
- ◆ Window stops

06240 Plastic Laminate

- ◆ Plastic laminate
 - Counter tops and backsplash (Common House bathrooms)
 - Counter tops and backsplash (Unit Kitchens) – See Upgrades.
 - Wilsonart or equal, matte finish. Color and pattern to be selected by Owner (5 options will be identified for residential units).
- ◆ Substrate: Exterior grade plywood
- ◆ Adhesive: Laminate to be adhered to substrate using Elmer's Neoprene Contact Cement, available from Borden, Inc., 800-426-7336 (stock #E 752), or other water-based contact adhesive.

06405 Cabinetry:

Unit Kitchens

In configurations as shown on drawings: Note: kitchen cabinets are standardized (5 unit types with one less cabinet in the 1-BR units and additional “island” in Large 3 and 4 BR units).

- ◆ Kitchen Cabinets shall be Solid Pine by Young Cabinets,
 - Base cabinets included
 - One upper wall cabinet at range ventilation hood only, include additional upper cabinets as a standard upgrade.
- ◆ Kitchen base cabinets to be 36” high
- ◆ Countertops and backsplashes: (see 06240 Plastic Laminate and Upgrades)

Unit Bathroom vanities:

- ◆ Vanities shall be 36” high
- ◆ One piece molded sink / countertop – Swanstone VT series, or equal. Standard colors to be selected by Owner Selection.

Common House kitchen:

- ◆ All Common House kitchen bases, shelving and overhead racks shall be stainless steel wire, purchased by Owner and installed by Contractor.
- ◆ Island counter top: maple butcher block
- ◆ Pass-thru counter top: Wood?
- ◆ Work table surfaces: stainless steel counters, purchase by Owner and installed by Contractor.

Common House Bathrooms:

- ◆ No base cabinet (open for handicap access)
- ◆ One piece molded sink / countertop – Swanstone, or equal. Support countertop with custom wall mounted bracket, painted.

Common House laundry

- ◆ Laundry Counter:
 - Solid wood supporting frame, unfinished
 - Countertops: (see 06240 Plastic Laminate)

Common House coat room

- ◆ Coat Hooks
 - 1x6 hardwood back, in lengths as shown on drawings
 - Shaker pegs stagger height @ 3” o.c.
- ◆ Cubbies
 - Cubbies shall be constructed of solid pine. **DISCUSSION ITEM: Should Common House cubbies be included now?**

Division 7 - Thermal and Moisture Protection

LEED EA-2.3 Above Code Insulation: at least 5% > local code per REScheck

07110 Foundation Dampproofing:

- ◆ Asphalt foundation coating to be applied on all foundation walls (four walkout buildings only). MR – I’d spec a water-based dampproofing. I prefer cementitious dampproofing like Thoroseal.

07210 Building Insulation and Air Sealing

Coordinate thermal insulation in exterior walls and sound damping at Party walls with plumbing contractor to insure proper installation of insulation behind fiberglass tub units.

Thermal Insulation:

- ◆ Walls: 5 ½” dense-packed cellulose. Cellulose shall be blown to minimum 3.2 pcf behind Polypropylene Fiber Mesh (“Insul-Web” or equal). Cloth shall be secured to studs and plates with staples and glue (*refer to installation guidelines for Regal Wall system.*) See Alternates for increased wall insulation.
- ◆ Roofs/Ceilings: dense-packed cellulose to full depth of roof cavity (air space maintained at sloped ceilings with Propa-Vent, or equal). Blow Min. 3.2 pcf installed density behind “Insul Web” or similar cloth. Cloth to be secured to plates and studs with staples and glue. Support insulation in sloped ceilings with 1x strapping @ 16” o.c. See Alternates for increased ceiling insulation.
- ◆ First Floor (over unfinished walk-out basements – 4 buildings total): paper faced fiberglass batts (R-19). **Ask MR for his input on type of insulation for this location.**
- ◆ Underslab: 1.5” dense EPS, Type IX (1.5 lb/CF minimum) or XPS (R-7.5), continuous under entire slab, including walkout basements.
- ◆ Slab edge: 2” dense EPS, Type IX (1.5 lb/CF minimum), (R-10)

- ◆ Sealing of cracks: All exterior cracks to be sealed with Pur-Fill 1G expanding urethane foam, or equal; for Pur-Fill 1G, use Pageris Foam Gun; both available from Energy Federation (508-651-3818).
- ◆ Band joists: Insulate with 2" EPS (R-10) at exterior MR - need to show detail on drawings. NB that you can't nail anything substantial in the band joist area if you use exterior foam.
- ◆ Headers: Insulate exterior headers with EPS.
- ◆ Window rough openings: fill with non-expanding foam.

Sound dampening:

- ◆ Units:
 - Party walls:
 - ◆ Acoustic fiberglass or mineral fiber batts in double framed wall.
 - ◆ 1/4" sound board, installed on both sides of wall
 - Plumbing: Install fiberglass around plumbing pipes in walls and floors above 1st floor deck, and around bathrooms. No plumbing supplies or vents shall be run within party walls.
- ◆ Common House
 - See 09500 Acoustical Ceilings
 - Install fiberglass around bathrooms.

Fire Sealing:

- ◆ All penetrations in fire separation walls
- ◆ Fire seal around common house kitchen hood. Units too???

Air Sealing:

- ◆ Air-tight Drywall Approach (ADA) shall be utilized for air sealing: See 09260 Gypsum Wallboard System.
- ◆ Air-seal to exceed Energy Star (LEED EA-1.1 and 3.1). Specify
- ◆ 6 mil polyethylene stapled inside all ceilings, taped or sealed at all joints and penetrations in ceilings. Note: poly air-barrier is NOT required at the walls in ADA approach.
- ◆ Tape: 3M 8086 construction tape or approved equal.
- ◆ Sealant: Tremco acoustical sealant or approved equal.
- ◆ Taping to be used instead of sealant wherever practicable.
- ◆ Sills: Foam between foundation and sills using Pur-Fill 1G expanding urethane foam, or equal. MR - caulk may be better here as the gaps are usually small. Make sure they hold the sill seal back 1/2 inch from inside face of sill to allow for sealing.
- ◆ Other locations: Seal between wall bottom plates and deck and both edges of band joists with a bead of construction adhesive.
- ◆ See also "sealing of cracks" above (under "Insulation").

07311 Roofing

- ◆ Shingles:
 - Units and Common House: 30-year asphalt-fiberglass shingles. Color selected by Owner (see Selections).
 - Carports: cheaper shingle or corrugated translucent panels?
- ◆ Drip edge: 8" heavy gauge aluminum.
- ◆ Flashing: as required.
 - Step flashing: 3x5 step flashing.
- ◆ Bituthene in all valleys and eaves
- ◆ Gutters: none
- ◆ Rain Diverters: install diverters on porch roofs above all front doors where pitch runs towards front walk.
- ◆ Roof venting: Continuous baffled ridge vent (by AirVent) and soffit vent. Propane Vents in rafter bays at all eave ends and in sloped ceiling areas. Provide insulation baffles to maintain continuous ventilation channel at all sloped ceilings (note: all units have insulated attics); baffles must be sufficiently solid to prevent buckling during cellulose installation; overlap baffles to prevent cellulose from pushing through joints into ventilation cavity. I don't understand the need for roof venting when the roof is insulated. I wonder if, with the 1" rigid added underneath, no roof venting would be needed at all. (RS)

07810 Skylights

- ◆ Venting Skylights
 - See 01350: Options
 - Meet ENERGY STAR for windows (LEED EA-4.1)
- ◆ Tubular skylights
 - Common House bathrooms & halls: See Add Alternates
 - Units: See 01350: Options
 - DayLite 8 by The DayLite Company with light fixture (www.huvco.com), or equal,
 - 8” diameter tube with extensions as required to reach roof. Exterior penetrations shall be on north side of roof (so as not to interfere with current or future solar collectors on south side).

Division 8 - Doors and Windows

08100 Exterior Doors:

- ◆ All doors per door schedule on plans, painted.
- ◆ All glass on exterior doors to be low-e, Argon-filled, tempered.
- ◆ All exterior doors shall have weatherstripping at full perimeter.
- ◆ Units:
 - **DISCUSSION ITEM:** Should all unit exterior swing doors be fiberglass? Survey indicates a slight preference for this choice but it costs more money than insulated metal. **Marc thinks insulated metal is fine – magnetic weatherstrip is best**
 - **All exterior doors shall have screen / storm door with heavy duty hardware**
 - **DISCUSSION ITEM:** do we eliminate screen / storm doors and offer them as an upgrade?
 - Front Doors: half glass
 - Side / Rear doors: full glass
- ◆ Unit Door Hardware
 - All exterior doors shall have deadbolts
 - **DISCUSSION ITEM:** Should all residential doors have regular knobs? Should front door have lever handle? Should lever handles (for all doors in unit) be provided as a standard upgrade?
- ◆ Common House
 - Front door: Solid wood (fir), double leaf with weatherstripping between panels, full glass, divided lites.
 - Side and rear doors: full or half glass as per plans and schedules.
 - **DISCUSSION ITEM:** Should all side and rear common house exterior swing doors be fiberglass? Survey indicates a slight preference for this choice but it costs more money than insulated metal.
 - Great Room doors: double leaf with weatherstripping between panels, full glass, removable mullions
 - Screen door (one door at back hall near kitchen, only); **is sliding type possible???**
- ◆ Common House door hardware
 - Lever handles throughout

- Front and Kitchen door shall have code operation on locking device
- Panic devices as per schedule
- Kick and push plates
- Closers on all exterior (and fire rated?) doors
- ◆ Mechanical Shed
 - Exterior door: insulated flush metal, painted
- ◆ Screened Porch Doors

08200 Interior Doors:

- ◆ Interior doors: sizes as indicated on door schedule, natural finish, except as noted
- ◆ All glazing shall be single, tempered
- ◆ Unit Interior Doors
 - Hollow core, flush birch, 1 3/8” thick, with bi-fold hardware at closet doors where indicated. See Upgrades. **DISCUSSION ITEM:** do we eliminate closet doors and offer them as an upgrade?
- ◆ Unit Interior Door Hardware:
 - **DISCUSSION:** Should all residential doors have regular knobs? Could lever handles (for all doors in unit) be provided as a standard upgrade? What is the cost difference?
 - Locks at bathrooms and master bedroom
- ◆ Common House
 - Fire rated doors:
 - Regular interior doors: flush, solid-core birch, with a natural wood finish
 - Glazed French Doors: Brosco Pine M-3912
 - Shuttered openings between Kitchen and Great Room: custom built with hollow core, flush birch doors (cut to fit) panels, framed as required in solid birch.
- ◆ Common House Interior Door Hardware
 - Lever handles
 - Keyed locksets at Guest Rooms
 - Locksets at Bathrooms
 - Latch (mounted above child’s reach at: mechanical and storage doors)
 - Closers on fire rated doors

08400 Interior Windows

- ◆ Site built frames
- ◆ Single glass, tempered where indicated on schedule
- ◆ Removable glazing stops

08600 Exterior Windows:

- ◆ See Alternates for improved windows.
- ◆ Windows shall be double hungs (tilt-n-wash) and casements in sizes and locations as indicated on schedules and drawings.
- ◆ Window Manufacturer: Andersen, wood-clad (vinyl clad), with double low-e, Argon-filled glazing. Note: We are researching moderately priced, good quality

alternatives to Andersen that are not vinyl clad. However, most seem to have reduced solar heat gain and visible light transmittance.

- “High Performance Glass”: Low-E double-glazing, argon filled
 - Whole Unit U-value = 0.32
 - Center of glass U-factor = 0.28
 - Solar Heat Gain Coefficient (SHGC) = 0.43
 - Visible Light Transmittance (VLT) = 73%
 - High-Performance Sun II Glass: Low-E double-glazing, argon filled - Consider using this glazing on any elevations with western exposure. Would this add much to the cost?
 - Whole Unit U-value = 0.33
 - Center of glass U-factor = 0.31
 - Solar Heat Gain Coefficient (SHGC) = 0.31
 - Visible Light Transmittance (VLT) = 40%
 - Wood interior, vinyl exterior cladding.
 - Cladding color shall be standard colors as provided by the manufacturer and as selected by Owner.
 - Provide insect screens for all operable windows: standard flat insect screen
 - Hardware shall be standard finish
 - Tempered safety glass in any locations??
 - Mullions are not included in this project.
- ◆ Refer to 01400: Quality Control for mock-up of window installation. Contractor shall follow window installation sequence indicated on drawings.

Division 9 - Finishes

09500: Acoustical Ceilings

- ◆ Common House
 - Great Room Ceiling(s): 1” wrapped, fiberglass panels. “Nubby” by Armstrong, or equal. Mount with ½” x 1 ½” wood batts, nailed to truss chords in 48” x 48” grid. **RECOMMENDATION:** It is fairly easy to add acoustic treatment to rooms later. Therefore we do not recommend that you treat the Children’s Play room, music rooms, or recreation room at this time.

09560: Wood Flooring

- ◆ Common House:
 - ALL floor areas except common house kitchen and toilet rooms: Least expensive hardwood species readily available (see Alternates for FSC certified)
 - Note: subfloor on sleepers over slab-on-grade (see Rough Framing)
- ◆ Units:
 - ALL floor areas, including but not limited to Living, **Kitchens**, Bedrooms, and **bathrooms**: White pine, locally sourced if possible. See Upgrades.
 - **DISCUSSION ITEM:** Should we consider eliminating flooring in all second level room and paint subfloor?
 - Note: first floor subfloor on sleepers over slab-on-grade (see Rough Framing)

09601: Flooring Adhesives

- ◆ Low- or no-VOC, use flooring manufacturer’s recommendation where complies.
- ◆ Consider max of 150 g/l.
- ◆ Envirotech, W. F. Taylor.

09650: Resilient Flooring

- ◆ Install over ULX plywood underlayment (06100 Rough Carpentry). Note: first floor on sleepers over slab-on-grade units and common house (see Rough Framing)
- ◆ Common House Bathrooms: either natural linoleum or cork, whichever is least expensive and/or more readily available, to be decided
- ◆ Unit Bathrooms: See wood flooring, above.

09700: Epoxy Flooring

- ◆ Epoxy flooring shall be used in the Common House kitchen – Check pricing. Install over ULX plywood underlayment (06100 Rough Carpentry). Note: subfloor on sleepers over slab-on-grade (see Rough Framing).

09260 Gypsum Wallboard System

- ◆ Airtight Drywall Approach (ADA): for more information and details go to: http://www.southface.org/web/resources&services/publications/factsheets/24ada_drywal.pdf
- ◆ For all ceilings and walls, except party walls: 5/8" gypsum board where framing is 24" o.c.; 1/2" gypsum board where framing is 16" o.c..
- ◆ Party walls, fire-rated ceilings and other fire separation assemblies: 5/8" fire code gypsum board (in quantity and location as shown on plans and details)
- ◆ Finish: Smooth finish (no texture applied).

09900 Painting

Interior Paint (units and common house):

- ◆ Walls: Benjamin Moore Pristine non-VOC latex. Primer and eggshell finish paint –
 - 1 coat primer
 - 2 finish coats on all walls and ceilings (see Deduct Alternates for finish coats in units, see Add Alternative for finish coat in Common House).
 - See 01350 Selections: for color selections
- ◆ Ceilings: Benjamin Moore Pristine non-VOC latex. Primer and eggshell finish paint - 1 coat primer, 1 finish coat on all ceilings, Color: “ceiling white”
- ◆ Trim:
 - See 01350 Selections and Upgrades: for finish and color selections
 - See 01100 Add Alternates for addition of window trim

Exterior Paint:

- ◆ Hardi-plank: Factory primed all sides. Two top coats 100% acrylic latex exterior paint. **Research Factory painted (first top coat) for 15-year paint warranty.**
 - See 01350: for color selections
- ◆ Exterior trim (Georgia-Pacific Prime Trim): Factory primed. Two top coats 100% acrylic latex exterior paint.
 - See 01350: for color selections
- ◆ Painted doors: Factory primed. Two top coats 100% acrylic latex exterior paint.
 - See 01350: for color selections

09950 Clear (“natural”) Finishes

Wood floors (Common House and residential units):

- ◆ Water-based Polyurethane, Matte, 3 coats, shall be used on all wood floors..

Natural Pine Trim and Interior doors (Common House and residential units):

- ◆ Water-based Polyurethane, Matte, 2 coats.

Division 11 - Equipment

11400 Common House Kitchen Equipment

- ◆ Owner to purchase all equipment, Contractor shall install:
 - Gas range (6 burner with 2 ovens and grill or one oven/range and convection oven)
 - Electric range (2 burners for accessible range)
 - Microwave oven
 - Floor-mounted commercial dishwasher (with gas booster heater and ventilation as required) to be installed. **DISCUSSION:** Should Dishwasher be raised +/- 12” or to counter level?
 - Range Hood (may require Ansul (or equal) fire suppression). I think the contractor should purchase and install the range hood system. We normally spec a variable airflow hood that greatly reduces energy consumption. We would need to know the size and BTUs of the range to be used. (RS)
 - Refrigerator(s): one or two to be determined
- ◆ Central Vacuum: installed by supplier under separate Contract (LEED IEQ-8.2). See Add Alternates

11450 Residential Equipment

- ◆ Furnish and install the following appliances: Electric oven / range (option Owner-purchased standard upgrade to gas), multi-speed, quiet range hood, refrigerator. Contractor shall select ENERGY STAR appliances from LEED list (LEED EA-9.1). **We would like to spec the range hood, with your suggestions. (RS)**
- ◆ Dishwasher shall be a standard Owner-purchased option in 2, 3 and 4 BR units. See Options.
- ◆ Microwave shall be a standard Owner-purchased option in all unit types. See Options.
- ◆ On range hood, install ducting out of the building shell.

Division 12: Furnishings

Bathroom furnishings:

- ◆ Units: all accessories (medicine cabinet, mirror, towel bar, toilet paper holder) will be provided and installed by individual homeowners AFTER move-in. **DISCUSSION ITEM:** To have units ready for aging-in-place, consider 1-inch grab bars as towel bars, securely mounted, installed as part of the regular project. (RS)
- ◆ Common House: The following will be furnished by the Owner and installed by the Contractor: mirrors, towel bars, toilet paper holders.
- ◆ Grab bars: grab bars for handicap accessible toilets (in Common House) shall be furnished and installed by the Contractor. See 06100 Rough Carpentry for blocking.

Walk-off Mats

- ◆ Common House entrances: in sizes as shown on plans

U. S. Postal Mail box – Verify that post office accepts this

- ◆ One central mail box in Common house mail room, include 50 boxes

Division 15 - Mechanical

15330 Fire Protection Sprinkler System

- ◆ Common House – full system
- ◆ Mechanical Shed??
- ◆ Units: Sprinklers in all residential buildings
 - 13R Residential system.
 - Supply: estimated system would require 60 gallons per minute at 50-60 PSI; 20 minute supply. The wells do not supply this, but there is a tank for peak morning demand which probably could.
 - “Wet system” with “T” at the house (domestic and backflow/fire protection).
- ◆ Plastic pipe (*avoid PVC and CPVC?*)
- ◆ Coordinate with alarm

15400 Plumbing

General:

- ◆ Septic tank and field by separate contract. Plumbing Contractor to bring waste to point approximately 10’ from building.
- ◆ Well for domestic water to be by separate contract. Plumbing Contractor to bring water piping to approximately 10’ from building.
- ◆ Each residential building and common house to have backflow preventer and shutoff valves located at the outside of the building
- ◆ Water supply piping to be copper. (PEX or PVC/CPVC shall not be considered as an alternate)

- ◆ Include shut-off valves at all fixtures, including toilets, sinks, washers, and dishwashers. These shall be ¼ turn ball valves.
- ◆ No supply piping in exterior walls (except non-freeze outside faucets).
- ◆ Drain, waste, & vent to be ABS plastic in Units and Common House. Consider a bid alternate for cast iron pipe in the Common House. Advantages include: made from a recycled/recyclable material, not made from oil, probably longer lasting and lowest life cycle cost, and quieter. (RS)
- ◆ Seal penetrations at tub locations at floor level. For tubs on slab-on-grade floors access shall be provided to the traps. How do we provide this?
- ◆ Plumbing contractor to install gas lines within house to stub outside of house. Final connection shall be by gas company. Run gas piping underslab (in a sleeve and trench) or ceiling as per drawings. Gas piping to boiler (if there is one, for back-up purposes when the wood system is out of service), drier (in Common House) and kitchen range/oven. Also to optional gas ranges in units. And gas driers, if this is an option. (RS)
- ◆ Units: Hook-up for washing machine: Single lever control for shutting off the cold and hot water supplies. Note: see electrical section for drier hook-ups in units.
- ◆ Common House: Hook up for 3 washing machines and 2 gas driers These washers should have the electric valves, and a floor drain in the room. (RS)
- ◆ See 01350: Selections, Options and Upgrades
- ◆ Ball valves?

Coordination:

- ◆ Plumbing Contractor shall coordinate with insulation of exterior and party walls to insure full thermal and acoustical insulation installation, prior to installation of tubs. Tub installation shall not block access to wall cavities until they are insulated. No plumbing supplies or vents (with exception of kitchen sink) shall be run in exterior or party walls.

Unit Fixtures:

- ◆ All fixtures (toilets, showers, and faucets) shall be high efficiency (LEED WE-3.1)
- ◆ Bath / Shower units: one-piece fiberglass tub / shower with grab bars and low-flow showerhead with shut off (≤ 1.5 GPM) I have not been able to find any decent showerhead less than 1.75 GPM @ 50 PSI (except for one model that Marc hated). I will need help if we want to get to 1.5. (RS)
- ◆ Accessible Unit Bath / Shower.
- ◆ Toilets: 1.6 gallon maximum, Dual flush as upgrade only
- ◆ Bathroom sinks and controls: one piece molded sink / counter, Swanstone, or equal (see cabinetry section) include low flow aerator (≤ 1.5 GPM)
- ◆ Kitchen sinks and controls: stainless steel, double sink include “trickle” control at the aerator. High arch faucet and sprayer. Single sink as upgrade only.
- ◆ Faucets: Single handle, ceramic cartridge faucets. There are several “equal” brands, including American Standard and Symmons. Sprayer for the kitchen sink. Single handle pressure balance valve for tub/shower.

Common House Fixtures:

- ◆ All fixtures (toilets, showers, and faucets) shall be high efficiency (LEED WE-3.1)
- ◆ Guest Shower: one-piece acrylic roll-in shower with fold-down seat and grab bars.
Can we get roll-in as prefab, or does it have to be tiled?
- ◆ Toilets. Dual Flush toilets in all common house bathrooms. Flush valve operation.
- ◆ Bathroom sinks
 - Metering faucet
 - Insulate pipes under sinks in handicap accessible toilets, using a stainless steel guard, no PVC plastic.
- ◆ Kid's Room sink?
- ◆ Laundry sink
- ◆ Mop sink
- ◆ Kitchen hand sink
- ◆ Vegetable washing sink
- ◆ Pre-rinse sink and sprayer
- ◆ Pot sink(s)
- ◆ Bar sink
- ◆ Will need grease interceptor in the floor (by plumbing engineer) and probably a big concrete tank outside the building as well (by civil engineer). (RS)

Other requirements:

- Provide and install a minimum of one exterior frost-free faucet at each unit. Note: Mass plumbing code requires a minimum of one per 100 feet of perimeter.
- Provide and install a minimum of four exterior frost-free faucets at common house (one per elevation. Note: Mass plumbing code requires a minimum of one per 100 feet of perimeter.
- Grease trap? *probably not in the units; will have to check with plumbing inspector.*
(RS)
- Kitchen floor drain(s) in the common house; not in the units. (RS)

15500 HVAC

- ◆ Outdoor Air ventilation and local exhaust shall meet ASHRAE Standard 62.2 (LEED IEQ-4.1 and 5.1)
- ◆ Meet ENERGY STAR for HVAC with manual J & refrigerant charge test (LEED EA-6.1)
- ◆ Space heating and DHW equipment with closed/power-exhaust and CO Monitor (LEED 2.1) **Yes, unless there is a back-up gas boiler (RS).**

Propane Fuel

Common House: Buried tank for Common House provided and installed by gas company, coordinated by General Contractor. Excavating for tank hole and trenching by General Contractor. Backfilling after inspection by General Contractor. **Should the tank be buried?**

- ◆ Units: **For optional propane at units, small tanks on grade? (RS)**

Heating: DISCUSSION ITEM:

- ◆ Common House:
 - Pellet Boiler
 - Gas-fired back up boiler
 - Two or three air handling units in the attic, serving the following zones: (1) Great Room, dining niche, kitchen, (2) North side rooms, (3) South side rooms; (2) and (3) might be combined; all these areas would have air conditioning and CO2 optimization of fresh air.
 - A fan-powered heating(only) unit for the entry.
 - Programmable thermostats. LuxPro PSP511LA (5 day/2 day).
- ◆ Units:
 - One pellet stove per unit
 - Chimney or through-the-wall exhaust as required
 - Electric baseboard backup in remote rooms and additional locations as may be required by code or bank
 - Programmable thermostats. LuxPro PSP511LA (5 day/2 day)

Air Conditioning - Common House

- ◆ Condensing Units. Mounted on pads on the ground, perhaps outside of kitchen north wall. One for each AHU. Non-ozone depleting refrigerant, and very efficient, SEER range 15-20.
- ◆ Ductwork:
 - Supply Air Distribution shall meet ACCA Manual D. (LEED IEQ 6.1)
 - Supply Air filtering shall be ≥ 8 MERV Filters, with adequate system air flow (LEED IEQ 7.1)
 - Contaminant Control: Seal off all ducts during construction (LEED IEQ 8.1)
 - Duct Tightness: third-party duct leakage tested ≤ 5.0 CFM25 / 100SF to outside (LEED EA-5.1) *Do we want to do this - expensive - more of a commercial issue. (DL)*
 - All ductwork to be included within the insulated envelope of the units and common house.
 - Seal all duct work (latexDL mastic)
 - Duct work trunk lines and plenums should be sealed metal duct (not flex)
 - Economizer; variable ventilation based on carbon dioxide monitoring; Direct Digital Control System (for AHUs and boiler only; conventional thermostats as described elsewhere). (RS)

Air Conditioning - Units:

- ◆ By upgrade only (see 01350: Selections, Options and Upgrades)
- ◆ Ductless mini splits
- ◆ DISCUSSION ITEM: should we consider plumbing all the units with refrigerant line. What would this cost? Roy recommends picking locations, placing electrical service.

Solar Domestic Hot Water:

- ◆ By upgrade only (see 01350: Selections, Options and Upgrades)
- ◆ Meet LEED EA-7.1 and 7.2 for improved hot water distribution, and water heating equipment

Domestic Hot Water

Common House

- Storage tank

Units – DISCUSSION ITEM

- ◆ Solar panels (per building)
- ◆ Preheat tank (per building)
- ◆ Electric tank (per unit)

Ventilation:

- ◆ Outdoor Air ventilation and local exhaust shall meet ASHRAE Standard 62.2 (LEED 4.1 and 5.1).
- ◆ Units: Exhaust-only ventilation in bathrooms and kitchen with small, 3-inch “passive inlets” for air admittance – probably not, confirm with MR.
- ◆ Unit CO2 monitoring. Roy recommends NOT including this because of budget concerns.
- ◆ Unit Bathrooms):
 - Provide exhaust-only ventilation using bathroom fans. Options include:
 - Use either Panasonic FV-08VQ2 (rated at 90 CFM at 0.1" static pressure, 0.9 sones), or FV-05VQ2 (rated at 50 CFM at 0.1" static pressure), or equal low-sones constant duty fan (1 sone maximum).
 - Some new Panasonic fans (WhisperGreen) can run continuously at a very low airflow, and then, at the touch of a button, run at a higher speed for a set amount of time. (DL & RS)
 - If the fans don't have built-in time-delay off, then this can be done with a simple switch: EFI 5100. (RS)
 - Duct exhaust to exterior
- ◆ Unit Kitchens:
 - See 11450 Residential Equipment for kitchen hood
 - Kitchen hood ducted directly to exterior
- ◆ Common House
 - ERV unit. – eliminate? Or standard or as a bid alternate (RS)
 - CO2 monitoring
 - Fireplace combustion air: mechanical damper operated by accessible switch to outside air. Provide underslab outside combustion air duct to fireplace
 - Laundry and toilets would be exhaust air only.
- ◆ Whole House Fans – by Option only, but may not work with heated attic anyway.

Division 16 - Electrical

16400 Electrical

Electrical service:

- ◆ Units: Provide and install 200 amp service, or as required by code.
- ◆ Common House:
- ◆ Mechanical Shed:
- ◆ Workshop, with power off panel
- ◆ Carports?
- ◆ Hot tub (location to be determined)

General:

- ◆ Party walls: avoid back-to-back installations of electrical boxes, etc. that may transfer noise. (There may be a fire requirement for this, too.) *How about keeping outlets out of exterior walls. (DL) I don't think we can by code (LF)*
- ◆ Hook-up for drier(s):
 - Units: Hook-up for electric drier in each unit
 - Common House: Electric valves. See plumbing section for gas driers. .
- ◆ Emergency electricity generation. A generator could serve the Common House only, which could also have a gas boiler, so the Common House would be the shared place of refuge and could be fully functional. (RS)

Smoke Detectors:

- ◆ Units: Locations and wiring as per code, hardwired with battery backup.
- ◆ Common House:

Carbon Monoxide Detection:

Units and Common House: Locations and wiring as per code, 1 per floor plus mechanical space(s).

Other Alarming and fire protection Devices (Common House only):

- ◆ Fire extinguishers
- ◆ Pull stations
- ◆ Horn / Strobes

Lighting fixtures:

- ◆ In quantities and locations as indicated on drawings and schedules: Meet ENERGY STAR advanced lighting package (LEED EA-8.2)
- ◆ Units:
 - Dimmers, tracks, additional fixtures, etc. will be discussed in more detail as possible OPTION items.
 - Exterior (porches / doors)– wall mounted compact fluorescent, shielded for glare and light pollution
 - Interior lighting to roughly follow the following guidelines, though specific floor plan layouts will influence final design:
 - Entry – compact fluorescent surface mounted ceiling fixture

- Living room – **RECOMMENDATION:** Switched outlets (2) only in Living Room, no overhead box.
- Dining Room – overhead box, fixture by Owner
- Kitchen – 1-2 compact fluorescent cans, plus one over sink; consider light over island where applicable
- Bedrooms(s) – Switched outlet (1) only in bedrooms
- Bathroom(s)
 - fluorescent over sink
 - Exhaust fan (see ventilation section) near shower.
- Hall (s) / Stair(s) – compact fluorescent, surface mounted ceiling fixture, 3-way switching
- Walk-in closets – compact fluorescent, surface mounted ceiling fixture
- Attic – compact fluorescent, bare bulb
- Basement - compact fluorescent, bare bulb
- *Indirect light from wall sconces provides much better lighting than ceiling fixtures (but probably is more expensive due to needing more fixtures). (RS)*
- ◆ **Common House:**
 - Fixtures as shown on drawings
 - Motion sensors in the following rooms:
 - Mail/Coat Room

Data / phone / cable

Data: **DISCUSSION:** Should the Common House have wireless or Ethernet? (The survey indicates a slight preference for wireless). Should the Individual units have a choice between Wireless and Ethernet? (The survey indicates a preference for having a choice).

Phone / cable: **two locations per unit (three locations for 4-Bedroom unit)**, as per Owners directions, coordinated with provider.

Speakers: See Add Alternates

Provide wiring and speakers for the following Common House locations: Great Room, Kitchen, Multi-purpose Room, and Screened porch.