Overview
SHADE is an 851 sq.ft. home that is constantly in tune with the living environment and seeks equilibrium with its surroundings. It takes advantage of the desert ecosystem by sitting within the landscape to create microclimates.

Desert
The home is meant to adapt to the environment that surrounds it. SHADE is located in the Southwest region of the United States, and is designed for the Phoenix, Sonoran Desert environment. Set in an inviting desert landscape, SHADE interacts with its surroundings through the use of a versatile deck space and “operable” walls which open up the interior spaces to the external environment. The landscape is a vital strategy to SHADE. Seasonal blooming, attraction of birds, bees and butterflies, as well as the encouragement of engagement with nature, create an interactive environment. SHADE does not only engage with the surroundings but displays it in architecture. The solar canopy highlights the Southwest’s unique abundance of the sun. The canopy has the ability to absorb solar radiation while providing shade for the inhabitants below. 1 sq.ft. of solar sun radiation = 1 sq.ft. of shade. A productive garden within the landscape strategy of SHADE encourages a net zero lifestyle on an energy standpoint, as well as a consumptive one.

Flexibility
Due to the homes’ functional flexibility, it encourages engagement with neighbors and the surrounding community. The large operable window on the south side of the home not only adds exterior square footage when opened, but allows for engagement with neighbors and passersby. The flex-space, which is comparable to a large living room, can easily be turned into a bedroom at night and a home office during the day. It not only transforms the living room but also spills into the dining room and kitchen. This entire space can be used as an extension of the living room. The southern portion of the flex-space, through the use of a collapsible table, is able to seat 8 guests for a dinner party, or 2 for a more intimate evening. This flex-space provides accommodation for the phenomena of the boomerang generation that is being experienced in today’s day and age. Flexibility is embodied throughout the design concepts within SHADE.

Modularity
The notion of modularity was developed while addressing a typical condition in Phoenix and Albuquerque; abandoned inner ring suburban spaces and large sprawl. The home is designed as a kit of parts (modules and components). The components can be adapted in many ways to serve the existing housing stock and improve the use of existing buildings in a more sustainable way. The two interior modules were designed for ease of construction and economy. The mechanical module is centralized for efficiency and ease of systems distribution. The interiormodules are prefabricated and later attached at a single seam which houses the connections and controls for the radiant comfort system, as well as electrical distribution. Not only is modularity functional for rapid change but economical as well.
1. All face dimensions shown are to the finished face of external walls.
2. Shown is square footage of finished area.
3. Mechanical room is not included in this calculation.
4. Mechanical room is not a conditioned space.
5. Finished square footage calculations for the house were made based on plan dimensions only and may vary from the finished square footage of the house as built.
1. General muster area is to be set on Decathlon way, south of lot line.

Denotes direction of out

Denotes turning radius (5 ft)
1. TOUR ROUTE COMPLIES WITH ADA GUIDELINES

DENOTES DIRECTION OF TOUR ROUTE
DENOTES TURNING RADIUS (5 FT)
GENERAL SHEET NOTES

FOR DETAILED SPECIFICATIONS FOR TEAM-SUPPLIED LIQUIDS REFER THE PROJECT MANUAL.

REFERENCE KEYNOTES

11 31 13 A 11 31 13 B 11 31 13 C 22 11 23 A 22 11 23 B 22 11 23 C 22 12 00 22 33 00 22 41 13 22 41 16 A 22 41 16 B 22 41 23 23 12 23

SHEET TITLE

LIQUID AND SPILL CONTAINMENT

H-101
<table>
<thead>
<tr>
<th>LIQUID</th>
<th>QUANTITY</th>
<th>PURPOSE</th>
<th>ASSOCIATED CONTAINER / EQUIPMENT SPEC</th>
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<tbody>
<tr>
<td>COLD WATER SUPPLY</td>
<td></td>
<td></td>
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<tr>
<td>4 x 5 = 20 GAL</td>
<td></td>
<td>DISHWASHER</td>
<td>(11 31 15)</td>
</tr>
<tr>
<td>10 x 10 = 120 GAL</td>
<td></td>
<td>CLOTHES WASHER</td>
<td>(31 22 10)</td>
</tr>
<tr>
<td>20 x 5 = 100 GAL</td>
<td></td>
<td>VAPOR SUPPRESSION</td>
<td>(21 43 23)</td>
</tr>
<tr>
<td>100 GAL x 2</td>
<td></td>
<td>TESTING PRESSURE</td>
<td>(23 05 30)</td>
</tr>
<tr>
<td>4 x 5 = 20 GAL</td>
<td></td>
<td>DISHWASHER</td>
<td>(11 31 15)</td>
</tr>
<tr>
<td>16 x 8 = 128 GAL</td>
<td></td>
<td>CLOTHES WASHER</td>
<td>(31 22 10)</td>
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<tr>
<td>50 x 3 = 150 GAL</td>
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<td>WET &amp; FIRE SPRINKLER SYSTEM</td>
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<tr>
<td>350 GAL</td>
<td></td>
<td>BRANCHING FOR HVAC</td>
<td>(23 05 30)</td>
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<td>100 GAL x 2</td>
<td></td>
<td>RADIANT COOLING FLUID</td>
<td>(23 83 16)</td>
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<td></td>
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<td>HYDRONIC PUMPS</td>
<td>(23 21 23)</td>
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<td>THERMAL STORAGE</td>
<td>(23 71 00)</td>
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<td>HEAT EXCHANGERS</td>
<td>(23 57 00)</td>
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<tr>
<td>CHILLED WATER</td>
<td>105 GAL</td>
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<td>HEAT EXCHANGERS</td>
<td>(23 57 00)</td>
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<tr>
<td>WATER FOR GLYCOL</td>
<td>4.5 GAL</td>
<td>LIQUID COOLING FLUID</td>
<td>(22 14 00)</td>
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<td>HOT WATER</td>
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<td>ELECTRIC DOMESTIC WATER HEATER</td>
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<td></td>
<td>144 GALLONS TOTAL</td>
<td>DOMESTIC WATER PIPING</td>
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<td></td>
<td>21 GALLONS TOTAL</td>
<td>KITCHEN SINK</td>
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<tr>
<td>WATER GRAPHITE MIXTURE</td>
<td>4.5 GAL</td>
<td>THERMAL STORAGE</td>
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<td>HEAT EXCHANGERS</td>
<td>(23 57 00)</td>
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<tr>
<td>PROPYLENE GLYCOL</td>
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<td>(22 14 00)</td>
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<td>185 GAL</td>
<td>LIQUID COOLING FLUID</td>
<td>(22 14 00)</td>
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<tr>
<td></td>
<td></td>
<td>GREY WATER TANKS</td>
<td>(22 14 00)</td>
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</tbody>
</table>
1. Placement of all pots will be inside the external modular planters.

2. The planters will all be aligned at their respective planter heights using conventional lumber.

1. See L-601 for planting schedule
2. See L-144 for the landscape modules plan
3. See L-503 for box tree detail (24)
4. See L-503 for vine screen details (13)
5. Desert rock (6)
6. See L-504 for bench details

1/4" = 1'-0"
1. There are a total of 20 (FB) up lights in the landscape lighting plan.
2. There are a total of 7 (LE) down lights in the landscape lighting plan.
3. There is 1 Luxor transformer box located inside the mechanical room.
4. There is a total of 229' of low-voltage wire inside of 1.5" PVC conduit.
5. The up lights are placed within 2 gallon pots that sit on 2x4 wood to raise them to grade.
6. The down lights are fastened to beams above, or are hung in the canopy of the tree.

Legend:
- 1. Up light, see detail A
- 2. Down light, see detail E
- 3. 2 gallon pot
- 4. Low voltage wire
- 5. Transformer, see detail A

Drawing Title: Landscape Lighting Plan

Team Name: ASUNM
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TEMPE, AZ 85287-1605
JODY.WASHINGTON@ASU.EDU
WWW.ASUNM.ORG
1. Planter panels: Planter panels are comprised of canvas clad panels attached across with joist hangers and 2x4s. Each "panel" consists of 2 individually built panels that are hinged together with hinges. These panels are also strung together with these hinges, but the pins are removed to pull panels apart for shipping.

2. All planter panels will be built to typical details (L-502), unless otherwise specified in the panel schedule on L-602.
1. Lighting transformer and fixtures are FX Luminare products and are all LED.

2. FX Luminare Luxor 150 watt transformer compatible with FX ZED ZD lights only. Mount inside bicycle storage room. Low voltage wires travel to up lights through the base of the exterior planters and into each 2 gallon pot housing the LED up lights. All metal parts must be grounded in accordance to NEC guidelines.

3. FX Luminare Lumen Eclairage (LE) hangs with hook screwed into beam. Make waterproof connection to 12-16 GA main line on the back side of beam out of sight.
1. Planters are comprised of canvas clad panels attached. Across with joist hangers and 2x4s. Each "panel" consists of 2 individually built panels that are hinged together to facilitate shipping. The panels are built in this manner with these hinges, but the pins are removed to full panels apart for shipping.

2. All planter panels will be built to typical details unless otherwise specified in the panel schedule on L-602. Panel widths and 32 91 16.19 netting planting stabilization has only 2". On exterior corner panels, the panel that passes the corner will have 2" between the 2x4 post and the edge of plywood, whereas the panel which meets the corner on only 1". The joist hangers will stagger by at least 2" to pass each other when the panel is folded in half.

3. On continuous (non-corner) panels, typical spacing from the end of the panel to the first 2x4 brace spacing can be found on the planter plan L-104.

4. On continuous (non-corner) panels, typical spacing from the end of the panel to the first 2x4 brace spacing can be found on the planter plan L-104.

5. Joist hangers will stagger by at least 2" to pass each other when the panel is folded in half.

6. On continuous (non-corner) panels, typical spacing from the end of the panel to the first 2x4 brace spacing can be found on the planter plan L-104.

7. The edge of plywood, whereas the panel which meets the corner on only 1". The joist hangers will stagger by at least 2" to pass each other when the panel is folded in half.

8. On continuous (non-corner) panels, typical spacing from the end of the panel to the first 2x4 brace spacing can be found on the planter plan L-104.

9. The planter panels will be built to typical details unless otherwise specified in the panel schedule on L-602. Panel widths and 32 91 16.19 netting planting stabilization has only 2".
1. The vine screens are 3' x 9'.
2. The mounting of the vine screen to the brise soleil is through 3/8" RH UNC MOUNTING HARDWARE.

1. Each vine screen is designed to hold up the plant material that is shown in L-101.
1. Bench construction is wood framing cladded in Trex. The Trex is mounted to the wood using screws at 12" O.C.

2 x 4 Post

2 x 4 Cross Bracing

1/8" Gap Between Trex

06 73 00 Composite Decking
<table>
<thead>
<tr>
<th>NAME</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>TYPE</th>
<th>QUANTITY</th>
<th>GALLON/BOX SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CEREUS PERUVIANUS</td>
<td>PERUVIAN APPLE CACTUS</td>
<td>CACTUS</td>
<td>1</td>
<td>10 GAL</td>
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<tr>
<td>2</td>
<td>PEDILANTHUS MACROCARPUS</td>
<td>LADY'S SLIPPER</td>
<td>SUCCULENT</td>
<td>8</td>
<td>7 GAL</td>
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<tr>
<td>3</td>
<td>PEDILANTHUS EQUESTRIS</td>
<td>PINK BEAKY PLANT</td>
<td>SUCCULENT</td>
<td>6</td>
<td>5 GAL</td>
</tr>
<tr>
<td>4</td>
<td>CORRIENTA GIGANTEA</td>
<td>EAGLE WING CACTUS</td>
<td>CACTUS</td>
<td>1</td>
<td>24&quot; BOX</td>
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<tr>
<td>5</td>
<td>ECHINOCACTUS GRUSSONII</td>
<td>GOLIATH CACTUS</td>
<td>CACTUS</td>
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<td>5 GAL</td>
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<tr>
<td>6</td>
<td>AGAVE VICTORIA REGINA</td>
<td>QUEEN VICTORIA'S AGAVE</td>
<td>AGAVE</td>
<td>3</td>
<td>3 GAL</td>
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<tr>
<td>7</td>
<td>AGAVE FLEHARI</td>
<td>PEARLY PLANT</td>
<td>AGAVE</td>
<td>2</td>
<td>3 GAL</td>
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<tr>
<td>8</td>
<td>ACE X BLUE INFLORESCENT</td>
<td>BLUEgef AFFLUECE</td>
<td>SUCCULENT</td>
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<tr>
<td>9</td>
<td>SCHIZOPHYLLUM PSYCLANGI</td>
<td>PURPLE HEART</td>
<td>PERENNIAL</td>
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<td>10</td>
<td>PROLAMAS X MACVEGETUS</td>
<td>SUPERSOFT PLANT</td>
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<td>WISCONSIN</td>
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<td>GEODESALVIA SPECTABILIS</td>
<td>BOUGAINVILLE/'S RIM</td>
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<td>25</td>
<td>SIMMONDIA DICHIFOLIA</td>
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<td>28</td>
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1. The planting schedule on this sheet corresponds with the plant materials represented on the landscape and planting site plan on L-101.
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<thead>
<tr>
<th>PANEL TYPE</th>
<th>HEIGHT</th>
<th>WIDTHS SEGMENT A</th>
<th>SEGMENT B</th>
<th>EXCEPTIIONS</th>
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<tr>
<td>EXTERIOR CORNER ON SEGMENT A</td>
<td>4' 0 1/2&quot;</td>
<td>2' 4&quot;</td>
<td>2' 3&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
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<tr>
<td>EXTERIOR CORNER ON SEGMENT B</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
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<tr>
<td>CONTINUOUS ON BOTH ENDS</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
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<tr>
<td>CORNER ADJACENT TO 2' PLANTER; PANEL PASSES CORNER, MEETS OTHER CORNER</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
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<tr>
<td>PANEL MEETS DECK SIDE CORNER, PASSES OPEN CORNER</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
</tr>
<tr>
<td>PANEL MEETS BOTH CORNERS</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
</tr>
<tr>
<td>PANEL MEETS BOTH CORNERS</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
</tr>
<tr>
<td>PANEL PASSES BOTH CORNERS</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
</tr>
<tr>
<td>PANEL PASSES BOTH CORNERS</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
</tr>
<tr>
<td>PANEL PASSES BOTH CORNERS</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
</tr>
<tr>
<td>PANEL PASSES BOTH CORNERS</td>
<td>3' 6&quot;</td>
<td>3' 6&quot;</td>
<td>2' 4&quot;</td>
<td>Panel meets corner. Panel passes corner.</td>
</tr>
</tbody>
</table>

**Address:** PO Box 871605

**Contact:** JODY.WASHINGTON@ASU.EDU

**Website:** WWW.ASUNM.ORG

**Website:** BDAENGINEERS.COM

**Website:** ACCELERATEDCONSTRUCTIONTECHNOLOGIES.COM

**Website:** ROY OTTERBEIN, P.E.

**Website:** U.S. DEPARTMENT OF ENERGY

**Website:** WWW.SOLARDECATHLON.GOV

**Website:** ACCELERATED CONSTRUCTION TECHNOLOGIES, INC.

**Website:** TEAM ASUNM

**Website:** ACCELERATED CONSTRUCTION TECHNOLOGIES, INC.
1. STRUCTURAL AND MISCELLANEOUS STEEL:

A. MATERIAL PROPERTIES:
   a) ALL PLATES, ANGLES, AND CHASIS TO BE ASTM A 36 UNLESS OTHERWISE NOTED.
   b) ALL HSS MEMBERS TO BE ASTM A 660.
   c) ALL STEEL TO BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH A.W.S. SPECIFICATIONS, LATEST ADDITION.

B. WELDING:
   a) FOR STRUCTURAL STEEL, TO BE IN ACCORDANCE WITH A.W.S. REQUIREMENTS FOR EITH ELECTRODES.

C. BOLTS:
   a) ALL BOLTS AND THREADED STUDS TO BE 3/4" DIAMETER ASTM A 307.

D. DEFERO BRAND ANCHORS TO BE ASTM A 496.

2. WOOD:

A. DIMENSIONAL LUMBER: ALL TO BE GRADE STAMPED PER W.C.L.B. RULES.
   a) ALL JOISTS, BEAMS, PLATES, HEADERS AND OTHER LUMBER TO BE FROM LUMBER #1 UNLESS OTHERWISE NOTED.

B. PLYWOOD:
   a) ROOF SHEATHING TO BE 1/2" EXTERIOR CD SHEATHING WITH EXTERIOR GLUE, IDENTIFICATION INDEX 24/0. NAIL WITH 8d NAILS AT 6" O.C. AT ALL EDGE SUPPORTS AND WITH 8N NAILS AT 12" O.C. AT ALL INTERMEDIATE SUPPORTS UNLESS NOTED OTHERWISE.
   b) EXTERIOR WALLS TO BE 1/2" EXPOSURE I 1 SHEATHING WITH EXTERIOR GLUE, NAIL WITH 8N NAILS AT 6" O.C. AT ALL EDGE SUPPORTS AND WITH 8N NAILS AT 12" O.C. AT ALL INTERMEDIATE SUPPORTS UNLESS NOTED OTHERWISE.

C. WOOD CONNECTORS:
   a) ALL LUMBER CONNECTORS SPECIFIED AS "SIMPSON STRONG-TIE COMPANY, INC." PRE-FORMED HDG. IPE FOR USE.

3. SPECIAL INSPECTION:

A. FIELD WELDING, IF REQUIRED.
1. TYP. DECK RIM JOIST: 2X8 DF#2
   WEATHER TREATED
2. TYP. DECK JOISTS: 2X6 DF#2 @ 12" O.C.
   WEATHER TREATED
3. LONG RAMP SLOPE: 1'/13.75'
4. SHORT RAMP: 1'/13.5'
5. 600S200 - 54 @ 12" O.C.
**Diagram Description:**

The diagram represents a canopy framing plan. The framing is composed of typical beams made of 2x2 members of DF #2 sandwiched around an equal depth member of 1/4" plate steel.

**Notes:**

- **Flitch Beam Assembly:** 2 - 2x6 DF#2 with 1/4" plate steel.
- **Flitch Beam Assembly:** 2 - 2x8 DF#2 with 1/4" plate steel.

**Dimensions:**

- Dimensions marked in feet and inches (e.g., 4' 9").
- Scale of the drawing is indicated as 1/4" = 1'-0".

**Materials:**

- 10"x5"x5/16" (05 12 00 - HSS)
- 2 - 2x6 DF#2 (06 11 00 - WOOD FRAMING)
- 2 - 2x8 DF#2 (06 11 00 - WOOD FRAMING)
- 1/4" PLATE STEEL

**References:**

- Reference notes for flitch beam assemblies.
- Reference notes for specific dimensions and materials.

**Sheet Title:**

- CANOPY FRAMING PLAN

**AutoCAD:**

- Mark date: 8/21/2013
- Creation date: 01.10.2012

**Contact Information:**

- TEAM ASUNM
  - Address: PO Box 871605
  - Contact: JODY.WASHINGTON@ASU.EDU
  - Website: WWW.ASUNM.ORG

**Materials:**

- TYP. BEAM COMPOSED OF 2 - 2X MEMBERS OF DF #2 SANDWICHED AROUND AN EQUAL DEPTH MEMBER OF 1/4" PLATE STEEL.
1. UNLESS OTHERWISE NOTED, ALL WOOD FRAMING SHALL BE DOUGLAS-FIR LARCH #2

### SHEET KEYNOTES

1. IS0984 RATED STRUCTURAL 1 PLYWOOD FASTENED WITH 1 1/2" - G. M" SHANKED SCREW 
2. 15/32" APA RATED STRUCTURAL PLYWOOD FASTENED WITH 5/16" - 0.14" KNURLED SHANK - 5/16" dia. BUGLE HEAD NAIL

### GENERAL SHEET NOTES

1. 15/32" APA RATED STRUCTURAL PLYWOOD FASTENED WITH #8 PPSD SCREW AT 6" O.C. ON ALL SUPPORTED EDGES

### REFERENCE KEYNOTES

- 05 12 00 - STRUCTURAL STEEL FRAMING
- 05 17 00 - STEEL STAKES
- 05 40 00 - COLD-FORMED METAL FRAMING
- 05 50 00 - METAL FABRICATIONS
- 06 05 23 - WOOD, PLASTIC, AND COMPOSITE FASTENINGS
- 06 11 00 - WOOD FRAMING
- 05 12 00 - HSS 5x5x3/8
- 05 12 00 - HSS 7x7x1/2
- 05 12 00 - HSS 10x5x1/4

### FRAMING DETAILS

- 06 11 00 - 2x8 FLITCH BEAM
- 05 12 00 - HSS 3x3x3/16
- 05 12 00 - HSS 5x5x3/8
- 05 12 00 - HSS 3x3x3/16
- 06 05 23 - FLAT A34
- 06 11 00 - 4x4 RIPPED TO 2 3/4" x 3"
- 06 05 23 - 3 1/2" - 5/8" ASTM A34

### SUBMITTAL

- U.S. DEPARTMENT OF ENERGY
- SOLAR DECATHLON 2013
- WWW.SOLARDECATHLON.GOV

### TEAM NAME

- U.S. DEPARTMENT OF ENERGY
- SOLAR DECATHLON 2013
- WWW.SOLARDECATHLON.GOV

### ADDRESS

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- TEMPE, AZ 85287-1605

### CONTACT

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- WWW.ASUNM.ORG

### COPYRIGHT

- NONE: PROJECT IS PUBLIC DOMAIN

### CONSULTANTS

- BDA ENGINEERS
- BDAENGINEERS.COM

### MARK DATE

- 8/21/2013 1:01:56 PM
1. UNLESS OTHERWISE NOTED, ALL WOOD FRAMING SHALL BE DOUGLAS-FIR LARCH #2.

SHEET KEYNOTES

C1   S. MODULE S. SHEAR WALL DETAIL LOW

C5   MODULE CONNECTION AT SHEAR WALL DETAIL HIGH

A1   S. MODULE S. OVERHANG DETAIL LOW

A3   S. MODULE S. BIFOLD DETAIL LOW

A5   MODULE CONNECTION AT SHEAR WALL DETAIL LOW

REFERENCE KEYNOTES

GENERAL SHEET NOTES
1. 15/32" APA RATED STRUCTURAL 1 PLYWOOD FASTENED WITH 1 1/2" - 0.14" KNURLED SHANK - 5/16" dia. BUGLE HEAD NAIL AT 6" O.C. AT PANEL EDGES AND 12" O.C. IN PANEL FIELD.

2. 15/32" APA RATED STRUCTURAL 1 PLYWOOD FASTENED WITH #8 PPSD SCREW AT 6" O.C. ON ALL SUPPORTED EDGES.

3. 1-1/8" T&G O.S.B FASTENED WITH #10 PPSD COLLATED SCREW AT  6" O.C.

4. 1/2" PLY WOOD PAD

---

**Framing Details**

**C1**

N. Module East Wall Detail High

**C3**

N. Module Mech. Connection Detail High

**C5**

N. Module North Window Detail High

**A2**

N. Module Mech. Connection Detail Low

**A5**

N. Module North Window Detail Low

---

**Notes:**

1. UNLESS OTHERWISE NOTED, ALL WOOD FRAMING SHALL BE DOUGLAS-FIR LARCH #2.
1. UNLESS OTHERWISE NOTED, ALL WOOD FRAMING SHALL BE DOUGLAS-FIR LARCH #2.

MECHANICAL ROOM DETAIL HIGH

MECHANICAL ROOM DETAIL LOW

MECHANICAL ROOM DOOR

GENERAL SHEET NOTES

REFERENCE KEYNOTES

SHEET KEYNOTES

A1

A2
## Deck Details

**Typical Deck Connection**

- 1 1/2" brackets bolted to pier with 1/2" bolt
- 2 1/4" neoprene pad

---

**Typical Deck Supports**

- 06 10 00 - Blocking
- 06 11 00 - 2X6 DF #2
- 05 05 23 - 1/2" bolt
- 06 11 00 - 4X8 DF #2

---

**Seismic Pier at Deck**

- 31 06 00 - Seismic Piers
- 05 10 00 - Blocking
- 32 14 13
- 06 11 00 - 2X6 DF #2
- 06 10 00 - 4X4 DF #2
- 06 11 00 - 1X4 DF #2
- 06 11 00 - 4X8 DF #2

---

**Reference Keynotes**

- 05 05 23 - Wood fasteners
- 05 17 00 - Tent stake
- 05 54 00 - Decorated metal pan
- 06 10 00 - Wood framing
- 06 11 00 - Central piers
- 32 05 16 - River rock
- 32 14 13 - 24" x 28" x 2" GFRC paver

---

**Team Name:**

- ASUNM

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- TEMPE, AZ 85287-1605

**Contact:**

- JODY.WASHINGTON@ASU.EDU

**Website:**

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---

**Mark Date:**

- 08 21/2013 12:24:52 PM

---

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---

**Shade Solar Decathlon 2013**

- WWW.SOLARDECATHLON.GOV

---

**Sheets:**

- S-521

---

**General Sheet Notes:**

- 0.5 0.5 23 - Wood fasteners
- 0.5 17 00 - Tent stake
- 0.5 54 00 - Decorated metal pan
- 0.6 10 00 - Wood framing
- 0.6 11 00 - Central piers
- 32 05 16 - River rock
- 32 14 13 - 24" x 28" x 2" GFRC paver

---

**Sheet Title:**

- Deck Details

---

**Drawn By:**

- [Name]

**Checked By:**

- [Name]

---

**Project:**

- 80% DOE/NREL DD SUBMISSION

---

**Project:**

- 80% DOE/NREL DD RE-SUBMISSION

---

**Project:**

- 100% DOE/NREL CD SUBMISSION

---

**Project:**

- 100% DOE/NREL CD RE-SUBMISSION

---

**Project:**

- 100% DOE/NREL AS-BUILTS

---

**Client:**

- U.S. DEPARTMENT OF ENERGY

**Consultants:**

- BDA ENGINEERS
  - BDAENGINEERS.COM

---

**Description:**

- 1. L Brackets bolted to pier with 1/2" bolt
- 2. 1/4" neoprene pad

---

**Sheet Notes:**

- 06 11 00 - 2X6 DF #2
- 06 11 00 - 4X4 DF #2
- 06 11 00 - 4X8 DF #2
- 05 05 23 - 1/2" bolt
- 06 11 00 - 4X8 DF #2
- 05 17 00 - Seismic Piers
- 06 11 00 - 2X6 DF #2
- 06 10 00 - Blocking
1. Canopy structure consists of a flitch beam system which is bolted at all joints and transitions between continuous pieces. All steel is either welded or laps at bolted connections. The beams that run east/west are continuous and part of a rigid frame, while the beams that run north/south are broken at the cantilevers in order to fit within a shipable width. These beams also hinge at the south end to allow them to lay flat during travel and fit within a shipable height.

**Reference Keynotes**
- 05 12 00 - Structural Steel
- 05 12 00 - HSS 5x5x3/8" and 5x5x3/16"
- 06 11 00 - 2X6 DF #2
- 06 05 23 - 1/2" Bolts
- 05 12 00 - W 6X12
- 05 12 00 - W 12X22

**Sheet Keynotes**
- 06 11 00 - 266 DF #4
- 06 05 23 - 1/2" Bolts
- 05 12 00 - HSS 10x5x3/16" and 10x5x3/8"
- 05 12 00 - HSS 5x5x1/4"
- 09 75 00 - 1/4" Plate Steel
- 05 75 00 - 5/8" Plate Steel
- 06 05 23 - 1/2" Bolts
- 05 12 00 - Wixi12
- 05 12 00 - W 12x22

**Sheet Title**
- S-522

**General Sheet Notes**
- 05 17 00 - Tent Stakes
- 06 11 00 - Wood Fasteners
- 06 05 23 - Wood Framing
- 06 05 23 - W 6X12
- 05 12 00 - Wood 6X12
- 05 12 00 - Wood 12X22

**Revision Log**
- 01 10.11.2012
- 02 11.20.2012
- 03 2.14.2013
- 04 4.05.2013
- 05 8.22.2013

**Drawing Information**
- Client: U.S. Department of Energy
- Project: Solar Decathlon 2013
- Website: WWW.SOLARDECATHLON.GOV
- Team Name: ASUNM
- Address: PO Box 871605
- Contact: JODY.WASHINGTON@ASU.EDU
- Client: U.S. Department of Energy
RAMP DETAILS

C1 RAMP

C3 SHORT RAMP SECTION SOUTH

B3 LONG RAMP SECTION EAST

A1 TYP HAND RAIL WALL DETAIL

A3 LONG RAMP SECTION WEST

D3 SHORT RAMP SECTION NORTH

GRADE LEVEL

1'-11 1/4" 1'-11 5/8" 1'-4 3/8" 18'-0" 18'-3 1/2" 8'-9 5/8" 8'-10" 6'-4 1/2" 18'-0 1/2" 3'-1 1/8" 3'-0" 8" 3'-0" 3'-0" 2'-0" 2'-0" 2'-0" 3'-0" 4.17° 8" 3'-0" 3'-0" 8" 3'-0" 3'-0" 2'-0" 8" 2'-0" 3'-0" 3'-0" 8" 2'-0" 3'-0" 3'-0" 4.17° 10.11.2012 11.20.2012 2.14.2013 4.05.2013 8.22.2013 8/22/2013 4:59:12 AM
C1 CANOPY TO HOUSE CONNECTION

05 12 00 - HSS 5"X5"X3/8"
05 25 23 - 3/8" BOLT
3/4 " HOLE
05 12 00 - 3"X3/4"X1/4" ANGLE
05 12 00 - HSS 3"X3"X1/4" COLUMN

B1 UPPER COLUMN DETAIL

05 12 00 - HSS 5"X5"X3/8"
05 75 00 - 1/4" PLATE STEEL
06 05 23 - 2X6 DRYWALL

A1 UPPER COLUMN PLATES

05 75 00 - 1/4" PLATE STEEL
06 25 23 - 1/2" TAPPED STUD

A5 UPPER CANOPY BEAM/COLUMN LAYOUT

05 12 00 - HSS 5"X5"X3/8"
05 12 00 - HSS 5"X10"X3/8"
05 12 00 - HSS 5"X5"X3/8"
05 12 00 - HSS 5"X10"X3/8"
06 05 23 - 2X6 DRYWALL

GENERAL SHEET NOTES

- ALL BOLT HOLES ARE 9/16" DIAMETER.
- 1/4" PLATE STEEL ON EITHER SIDE OF UPPER COLUMNS HOLDS WOOD IN PLACE DURING TRANSPORT, AND PINS THE COLUMNS IN PLACE WHILE CONSTRUCTED.

REFERENCE KEYNOTES

05 12 00 - STRUCTURAL STEEL
05 75 00 - PLATE STEEL
06 05 23 - WOOD FASTENERS
06 11 00 - WOOD FRAMING

SHEET KEYNOTES

1. 9/16" HOLE FOR 1/2" BOLT

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1. Refer to structural calculations for specific bracing requirements.

1/2" = 1'-0"

1 1/2" - 0.14" Knurled Shank - 5/16" dia. Bugle Head Nail

362S162-54 15/32" plywood

362T150-68

Typical Shear Wall Fastening Pattern

<table>
<thead>
<tr>
<th>MARK</th>
<th>REFERENCE</th>
<th>LENGTH</th>
<th>BOUNDARY MEMBER</th>
<th>HOLD-DOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Modules EW 1</td>
<td>7.79'</td>
<td>2 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>2</td>
<td>Modules EW 2</td>
<td>6.52'</td>
<td>3 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>3</td>
<td>Modules EW 3</td>
<td>3.3'</td>
<td>4 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>4</td>
<td>Modules EW 4</td>
<td>5.57'</td>
<td>5 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>5</td>
<td>Modules EW 5</td>
<td>6.79'</td>
<td>6 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>6</td>
<td>Modules EW 6</td>
<td>2.47'</td>
<td>7 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>7</td>
<td>Modules EW 7</td>
<td>2.96'</td>
<td>8 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>8</td>
<td>Modules EW 8</td>
<td>13.3'</td>
<td>9 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>9</td>
<td>Modules NS 1</td>
<td>7.7'</td>
<td>10 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>10</td>
<td>Modules NS 2</td>
<td>4.86'</td>
<td>11 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>11</td>
<td>Modules NS 3</td>
<td>3.52'</td>
<td>12 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>12</td>
<td>Modules NS 4</td>
<td>2.52'</td>
<td>13 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>13</td>
<td>MECH. EW 1</td>
<td>13.25'</td>
<td>14 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>14</td>
<td>MECH. NS 1</td>
<td>5.31'</td>
<td>15 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>15</td>
<td>MECH. NS 2</td>
<td>2.52'</td>
<td>16 - 362S162-54</td>
<td>SHIORS</td>
</tr>
<tr>
<td>16</td>
<td>MECH. NS 3</td>
<td>2.52'</td>
<td>17 - 362S162-54</td>
<td>SHIORS</td>
</tr>
</tbody>
</table>

SHEAR WALL SCHEDULE
1. SITE AS SHOWN IS FOR INFORMATIONAL PURPOSES ONLY. SUBJECT TO CHANGE.
2. ACCESS TO IRVINE GREAT PARK PROVIDED BY ORGANIZERS.
3. LOT LINES ESTABLISHED BY COMPETITION ORGANIZERS. TEAM HOUSES ARE TO COMPLY WITH GIVEN SOLAR ENVELOPE/LOT LINES

1. DECKING (MODULES/MATERIAL)
2. WATER HOGS/RAINWATER HARVESTING
3. PV COLLECTORS
4. GREEN SCREEN
5. PLANTER MODULES
6. PLANTER BENCH NOT IN CONTRACT
7. BOX TREE
8. SHADE CANOPY STRUCTURE
9. BENCH

A-101  SITE PLAN

1/4" = 1'-0"
1. SLOPES ON ROOF PLAN ARE APPROXIMATIONS. REFER TO STRUCTURAL PLANS FOR EXACT SLOPES.

2. ROOF FINISH IS SPRAY APPLIED FOAM OVER RIGID INSULATION SHAPED FOR SLOPES.
1. THE REFLECTED CEILING PLAN (A-121) SHOWS CEILING MOUNTED LIGHT FIXTURES ONLY. FOR FULL LIGHTING PLAN REFER TO E-104.

2. THIS SHEET CAN BE USED TO LOCATE SMOKE DETECTORS ONLY. FOR FULL FIRE SUPPRESSION SYSTEM REFER TO F-102.

3. FINISHED CEILING HEIGHT TO BE MEASURED FROM FINISHED FLOOR.

PLASTER
PLYWOOD
FIBER CEMENT
LINEAR COVE LIGHT

GENERAL SHEET NOTES

REFERENCE KEYNOTES

SHEET KEYNOTES

22 41 39 Residential Faucets, Supplies, and Trim
23 38 00 Ventilation Hoods
28 31 46 Smoke Detection Sensors

A1 REFLECTED CEILING PLAN
1. **General Sheet Notes**

   1. Maximum elevation difference between highest grade point on site and top of roof shall be no more than 18'.
   2. Foundation system of house envelope are shown on site elevations. For foundation system refer to S-101.
   3. For details on planter system refer to L-502 and L-503.

2. **Reference Keynotes**

3. **Sheet Keynotes**

   1. Constructed planter system
   2. Sliding glass door system
   3. Shade skin structure
   4. PV collectors - monocrystalline
   5. Vine screen
   6. Site furnishing

---

**GENERAL SHEET NOTES**

1. Maximum elevation difference between highest grade point on site and top of roof shall be no more than 18'.

2. Foundation system of house envelope are shown on site elevations. For foundation system refer to S-101.

3. For details on planter system refer to L-502 and L-503.

**REFERENCE KEYNOTES**

**SHEET KEYNOTES**

1. Constructed planter system
2. Sliding glass door system
3. Shade skin structure
4. PV collectors - monocrystalline
5. Vine screen
6. Site furnishing
1. Maximum elevation difference between highest grade point on site and top of roof shall be no more than 18'-0".

2. All components besides foundation system of house envelope are shown on site elevations. For foundation system refer to S-101.

1. Site furnishing not in contract
2. Sliding glass door system
3. Shade skin structure
4. Rollup storage door system
5. Vine screen

Sheet Title: A-202
Sheet Notes: Site Elevations

Reference Keynotes:
- Shade
- Accelerated Construction Technologies
- BDA Engineers
- Otterbein Engineering

Sheet Keynotes:
- 1/4" = 1'-0"
- East
- West

General Sheet Notes:
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SOLAR DECATHLON 2013
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GENERAL SHEET NOTES

REFERENCE KEYNOTES

SHEET KEYNOTES

1. FIBER CEMENT BOARD WITH RAIN SCREEN
2. FIBER CEMENT WITH BLACK LACQUER

BARE ELEVATIONS NORTH

BARE ELEVATIONS SOUTH

ELEVATIONS

A-211
1. All height dimensions are relative to the top of the finish floor, and wall finish schedules for wall finishes.

2. Carpentry, finishes, and drywall.

3. Fixtures.

4. Temperature control valve.

5. Closet.


REFERENCE KEYNOTES

SHEET KEYNOTES

1. ROOM DIMENSIONS
   - B-1: 12' x 12'
   - C-1: 12' x 12'
   - D-1: 12' x 12'
   - E-1: 12' x 12'

2. REFERENCE SHEETS
   - A2: Bedroom South Elevation
   - A4: Bedroom West Elevation
   - C-2: Bath South Elevation
   - C-4: Bath West Elevation
   - D-2: Bath North Elevation
   - D-4: Bath East Elevation
   - B-2: Room South Elevation
   - B-4: Room East Elevation

3. DIMENSIONS
   - 1'-0" = 1/4" for all elevations.

GENERAL SHEET NOTES

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        TEMPE, AZ 85287-1605

CONTACT: JODY.WASHINGTON@ASU.EDU

WEB: WWW.ASUNM.ORG

CONSULTANTS: BDA ENGINEERS

WEB: BDAENGINEERS.COM

DRAWN BY: ROY OTTERBEIN, P.E.

CHECKED BY:

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CLIENT: U.S. DEPARTMENT OF ENERGY

SOLAR DECATHLON 2013

WWW.SOLARDECATHLON.GOV

MARK DATE: 01.10.11.2012

DESCRIPTION:
- 80% DOE/NREL DD SUBMISSION
- 80% DOE/NREL DD RE-SUBMISSION
- 100% DOE/NREL CD SUBMISSION
- 100% DOE/NREL CD RE-SUBMISSION
- 100% DOE/NREL AS-BUILTS

PROJECT IS PUBLIC DOMAIN: NONE
1. All height dimensions are relative to the top of the finish floor.
2. See schedules for wall finishes.

---

**GENERAL SHEET NOTES**

**REFERENCE KEYNOTES**

**SHEET KEYNOTES**

1. Carpentry, finishes, and drywall
2. Fixtures
3. Smoke detector

---

**INTERIOR ELEVATIONS**

A-214
1. BRISE SOLEIL 2X4s AND 2X6s INSERTED INTO 14 GA. SHEET STEEL
2. BEKA SYSTEM W/ 1/4" PLASTER
3. FLOOR FINISH OVER 3/4" PLYWOOD
4. FIBER CEMENT BOARD RAIN SCREEN
1. BRISE SOLEIL 2X4s AND 2X6s INSERTED INTO 14 GA. SHEET STEEL MONOCRYSTALLINE 60 CALL 265 W
2. SOLAR ENVELOPE "D. B. SCOTT"
3. BEKA SYSTEM W/ 1/4" PLASTER
4. FLOOR FINISH OVER 3/4" PLYWOOD
5. FIBER CEMENT BOARD RAIN SCREEN
6. STRUCTURAL STEEL MODULE CONNECTION
7. CAP FLASHING FOR MODULE CONNECTION
REFERENCE KEYNOTES

1. BRISE SOLEIL 2X4s AND 2X6s INSERTED INTO 14 GA. SHEET STEEL
2. MONOCRYSTALLINE 60 CALL 265 W SOLAR MODULES
3. BEKA SYSTEM W/ 1/4" PLASTER
4. FLOOR FINISH OVER 3/4" PLYWOOD
5. FIBER CEMENT BOARD RAIN SCREEN
6. STRUCTURAL STEEL MODULE CONNECTOR
7. CAP FLASHING FOR MODULE CONNECTION

BUILDING SECTIONS

A-303
FINISH FLOOR
GRADE LEVEL -2'-0" 
C T.O. NORTH PARAPET 10'-6"

07 62 00
07 62 00
07 62 00
05 12 00
06 10 00
07 62 00
06 10 00
06 05 23
05 12 00
06 10 00
07 14 00

T.O. CHASSIS BEAMS -7 5/8"
B.O. COLUMNS -2 3/8"

T.O. SOUTH ROOF BEAM 9'-9"
T.O. FIN. CEILING 8'-0"

A-512 A1

FINISH FLOOR 0"
GRADE LEVEL -2'-0"

07 62 00
07 21 19
06 10 00
07 21 19
05 12 00
06 10 00
06 73 00
05 12 00
06 11 00
06 11 00
07 14 00
07 27 00

T.O. CHASSIS BEAMS
T.O. C-2 10'-11 1/2"
T.O. C-4 11'-5"

T.O. SOUTH ROOF BEAM
T.O. FIN. CEILING

Level 34
11'-8"
SHOWER PAN FLOOR DETAIL

REFERENCES:
- 05 00 00 Steel Angle
- 05 12 00 Structural Steel Framing
- 06 11 00 Wood Framing
- 06 40 23 Bamboo
- 22 41 00 Drainage Pans
- 22 41 23 Shower Receptor and Basin

GENERAL SHEET NOTES

SHEET KEYNOTES

REFERENCE KEYNOTES

SHOWER PAN FLOOR DETAIL

FINISH FLOORS

GRADE LEVEL

FINISH FLOORS

GRADE LEVEL
**Sheet Title:** A-501

**Reference Keynotes:**

- 06 10 00 - Rough Carpentry
- 06 16 00 - Sheathing
- 10 22 23.23 - Operable Partition System
- 11 31 23 A/B - Residential Laundry Appliances
- 22 14 05 - Facility Storm Drainage

**Sheet Keynotes:**

- **D1** Typical Fiber Cement End Detail
- **D2** Mechanical Chase
- **D3** Storage Water Hogs
- **D4** Corner Detail Storage
- **D5** Folding + Sliding Assembly
- **D6** Folding Slider Stack

**General Sheet Notes:**

- 1" = 1'-0"
- 1 1/2" = 1'-0"
- 2'-3"
ELEVATION DETAILS

SCREEN A

SCREEN B

SCREEN C

SCREEN D

REFERENCE KEYNOTES

05 00 00 TYP. 06 11 00 TYP.

1" = 1'-0"

C2

C4

A2

A4

GENERAL SHEET NOTES

SCREEN A

SCREEN B

SCREEN C

SCREEN D

A-521
N. MODULE WINDOW JAMB DETAILS

D1

HEAD AT WINDOW
A1

SILL AT WINDOW
A3

KITCHEN WINDOW DETAIL
B4

REFERENCE KEYNOTES

05 40 00 - COLD FORMED METAL FRAMING
05 50 00 - RAINSCREEN CLIPS
06 10 00 - NDS
06 12 00 - JOIST HANGER
06 10 00 - BLOCKING
06 22 - BAMBOO FINISH
07 21 10 - FOAM-IN-PLACE INSULATION
07 44 56 - FIBER CEMENT PANELS
07 62 00 - FLASHING
09 25 26 - CLAY PLASTER FINISH
09 29 00 - GYPSUM BOARD
31 66 00 - SPECIAL FOUNDATIONS (PIERS)

GENERAL SHEET NOTES

GLASS STOPS REMOVED FROM EXTERIOR FOR REPAIRS
**A-542**

**BI-FOLD JAMB DETAIL**

**BI-FOLD SECTION**

**GENERAL SHEET NOTES**

**REFERENCE KEYNOTES**

05 12 00 - HSS
05 40 00 - COLD-FORMED METAL FRAMING
05 50 00 - RAINSCREEN CLIPS
06 05 23 - JOIST HANGER
06 10 00 - BLOCKING
06 12 23 - SUBFLOORING
06 14 13 - BAMBOO FLOORING
07 06 14 - FIBER CEMENT PANELS
07 21 19 - FOAM-IN-PLACE INSULATION
08 35 13.13 - BI-FOLDING DOOR
09 25 26 - CLAY PLASTER FINISH
09 30 00 - MARMOLEUM FLOORING

**SHEET KEYNOTES**

1. NEOPRENE BACKER ROD
2. SHIM
3. BLACK LACQUER ON FIBER CEMENT
1. VOGA PRIVACY RIGHT HANDED DOOR LEVER
2. TECTUS CONCEALED DOOR HINGE
3. HAFELE POCKET DOOR KIT

1. CEMENT PANEL CORNER TRIM
2. STRIKE PLATE

A1. BEDROOM DOOR DETAIL
A4. FLEX SPACE BARN DOOR
A6. WEST BARN DOOR
**Panel Schedule:**

<table>
<thead>
<tr>
<th>Panel Type</th>
<th>Quantity</th>
<th>Height</th>
<th>Width</th>
<th>Thickness</th>
<th>Mortise Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barn Door</td>
<td>2</td>
<td>7'-10.5&quot;</td>
<td>3'-6&quot;</td>
<td>1 3/8&quot;</td>
<td>Hafele Slido Classic + Mortise Pull (2 Sides)</td>
</tr>
<tr>
<td>Inswing Door</td>
<td>1</td>
<td>7'-11.25&quot;</td>
<td>3'-1&quot;</td>
<td>1 3/4&quot;</td>
<td>Tectus Hinge + Almar Handles Lever Set (2-3/8&quot;)</td>
</tr>
<tr>
<td>Partition Door</td>
<td>6</td>
<td>7'-10 5/8&quot;</td>
<td>1'-10.5&quot;</td>
<td>1 3/4&quot;</td>
<td>HAWA Aperto</td>
</tr>
<tr>
<td>Pocket Door</td>
<td>1</td>
<td>6'-11.25&quot;</td>
<td>2'-8&quot;</td>
<td>1 3/8&quot;</td>
<td>HAWA Concepta</td>
</tr>
</tbody>
</table>

**Notes:**

1. All doors to be UP Core.
2. Mortising pattern to be provided
3. Doors to be made of Birch Wood
4. Finish to be Plain Sliced Select White Birch
5. All door heights include under-cut
6. All door hardware to be Hafele Architectural Hardware.
7. Hafele Hardware to be provided by owner.
8. Slido Classic - Hafele Hardware - to be used for Bedroom and Flex Space Barn Doors
9. Hafele Tectus Hinges to be used for Bedroom Inswing Door.
10. Hafele - HAWA Aperto Hardware to be used for Sliding Partition Panels
11. Hafele - Concepta Hardware to be used for Laundry Room Pocket Panel Door.
SIDING DETAILS

A-571

SKIN ASSEMBLY

1. 2x4 Lumber
2. 2x6 Lumber
3. 18 gauge Steel
4. 5/16" Fiber Cement Board
5. Bolts
6. Steel Angle
7. Staggered Stud Wall
1. PLEASE REFER TO A-582 VIEW 1 AND 2 FOR NORTH AND SOUTH KITCHEN ELEVATION.

REFERENCE KEYNOTES

06 22 00 - MILLWORK
11 31 13 - REFRIGERATOR
11 31 13 - OVEN AND RANGE
11 31 13 - DISHWASHER
12 36 00 - COUNTERTOP
22 40 00 - KITCHEN SINK
22 41 39 - KITCHEN FAUCET

SHEET KEYNOTES

MILLWORK PLAN

A3

A-581
# ROOM FINISH SCHEDULE

<table>
<thead>
<tr>
<th>ROOM NO</th>
<th>ROOM NAME</th>
<th>FLOOR</th>
<th>BASE</th>
<th>WALL</th>
<th>CEILING</th>
<th>CEILING HEIGHT</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td>101</td>
<td>FLEX SPACE</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>102</td>
<td>KITCHEN</td>
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<tr>
<td>103</td>
<td>BEDROOM</td>
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</tr>
<tr>
<td>104</td>
<td>BATHROOM</td>
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# WINDOW SCHEDULE

<table>
<thead>
<tr>
<th>MARK</th>
<th>WIDTH</th>
<th>HEIGHT</th>
<th>MANUFACTURER</th>
<th>MODEL</th>
<th>FINISH</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4'-7 1/4&quot;</td>
<td>8'-4&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 700</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td>SANDBLASTED TO A HEIGHT OF 42 INCHES</td>
</tr>
<tr>
<td>8</td>
<td>3'-8&quot;</td>
<td>9'-4&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 700</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>1'-8&quot;</td>
<td>8'-4&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 700</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>3'-8&quot;</td>
<td>8'-4&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 700</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td>SANDBLASTED TO A HEIGHT OF 42 INCHES</td>
</tr>
</tbody>
</table>

# DOOR SCHEDULE

<table>
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<tr>
<th>MARK</th>
<th>WIDTH</th>
<th>HEIGHT</th>
<th>MANUFACTURER</th>
<th>MODEL</th>
<th>FINISH</th>
<th>HARDWARE FINISH</th>
<th>COMMENT</th>
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<tr>
<td>1</td>
<td>11'-0&quot;</td>
<td>9'-0 1/2&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 900</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td>BLACK/BRONZE</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3'-3&quot;</td>
<td>8'-0&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 900</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td>BLACK/BRONZE</td>
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<tr>
<td>3</td>
<td>3'-3&quot;</td>
<td>8'-0&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 900</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td>BLACK/BRONZE</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3'-3&quot;</td>
<td>8'-0&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 900</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td>BLACK/BRONZE</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3'-3&quot;</td>
<td>8'-0&quot;</td>
<td>WESTERN WINDOWS</td>
<td>SERIES 900</td>
<td>THERMALLY BROKEN DARK BRONZE ANODIZED</td>
<td>BLACK/BRONZE</td>
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</tr>
<tr>
<td>7</td>
<td>6'-0&quot;</td>
<td>6'-8&quot;</td>
<td>COOKSON COUNTER DOOR</td>
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<td></td>
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<tr>
<td>10</td>
<td>3'-6&quot;</td>
<td>8'-0&quot;</td>
<td>GRAHAM DOORS</td>
<td>EARTH DOOR</td>
<td>SELECT WHITE BRUSH</td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td>3'-6&quot;</td>
<td>8'-0&quot;</td>
<td>GRAHAM DOORS</td>
<td>EARTH DOOR</td>
<td>SELECT WHITE BRUSH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3'-1&quot;</td>
<td>8'-0&quot;</td>
<td>GRAHAM DOORS</td>
<td>EARTH DOOR</td>
<td>SELECT WHITE BRUSH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2'-4&quot;</td>
<td>8'-0&quot;</td>
<td>GRAHAM DOORS</td>
<td>EARTH DOOR</td>
<td>SELECT WHITE BRUSH</td>
<td></td>
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</tbody>
</table>
1. All movable components shall be demonstrated during the competition juried walk-through pending site rules.
2. Sheet reference 1 - Resource furniture LGM Tavoilo desk/bed combo should pivot from desk to bed.
1. All movable components shall be demonstrated during the competition juried walk through, pending SD rules.

REFERENCE KEYNOTES

1. Resource Furniture Kubico Sofa, N.I.C.
2. Resource Furniture LGM Tavolet Desk/Bed Combo, N.I.C.
3. Ceiling Mounted Projector
4. Resource Furniture Goliath Table, N.I.C.
5. Resource Furniture Pocket Folding Chair, N.I.C.
6. Retractable Movie Screen
7. Resource Furniture Double Door Wardrobe 42.5" Wide x 24.5" Deep, N.I.C.

SHEET KEYNOTES

1. C2 Furniture Layout Indoor Movie Night
2. C4 Furniture Layout Outdoor Movie Night
3. JM J
4. JM C
5. JM C

GENERAL SHEET NOTES

- All movable components shall be demonstrated during the competition juried walk through, pending SD rules.

TEAM ASUNM
PO Box 871605
TEMPE, AZ 85287-1605
JODY.WASHINGTON@ASU.EDU
WWW.ASUNM.ORG

1/4" = 1'-0"
1. Sheet indicates interior design and furniture layout.
2. Refer to sheets A-603, A-604 for furniture schedule.
4. Refer to sheets I-401, I-402 for interior materials and specifications.
5. Refer to Sheet I-502 for casework details.
1. SHEET INDICATES INTERIOR DESIGN AND MATERIAL, FIXTURE AND FURNITURE CALL OUTS.
2. REFER TO SHEETS A-603, A-604 FOR FURNITURE SCHEDULE.
3. REFER TO SHEETS A-401, A-402, A-403 FOR INTERIOR DIMENSIONS IN PLAN.
4. REFER TO SHEETS I-401, I-402, I-403 FOR ADDITIONAL INTERIOR MATERIALS AND SPECIFICATIONS.

GENERAL SHEET NOTES

REFERENCE KEYNOTES

SHEET KEYNOTES

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REFERENCE KEYNOTES
1. Sheet indicates interior design and material, fixture and furniture call outs.
2. Refer to sheets A-403, A-404 for furniture schedule.

REFERENCE KEYNOTES

1. Resource furniture double door wardrobe 48" wide x 84" deep, N.I.C.
2. Resource furniture single door wardrobe 14-3/4" wide x 13-3/4" deep
3. Resource furniture Lg tavolo bed/bend combo, N.I.C.
4. Birch plywood 4" base board stained midnight black.

SHEET KEYNOTES

1. Sheet indicates interior design and material, fixture and furniture call outs.
2. Refer to sheets A-603, A-604 for furniture schedule.

GENERAL SHEET NOTES

1. Sheet indicates interior design and material, fixture and furniture call outs.
2. Refer to sheets A-403, A-404 for furniture schedule.

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1. Resource furniture double door wardrobe 48" wide x 84" deep, N.I.C.
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GENERAL SHEET NOTES
1. SHEET INDICATES INTERIOR DESIGN AND MATERIAL, FIXTURE AND FURNITURE CALL OUTS.
2. REFER TO SHEETS A-603, A-604 FOR FURNITURE SCHEDULE.
3. REFER TO SHEETS A-401, A-402, A-403 FOR INTERIOR DIMENSIONS IN PLAN.
4. REFER TO SHEETS D-401, D-402, D-403 FOR ADDITIONAL INTERIOR MATERIALS AND SPECIFICATIONS.

REFERENCE KEYNOTES
06 22 03 MILLWORK
07 44 56 MINERAL-FIBER-REINFORCED CEMENTitous PANELS
08 11 16 ALUMINUM DOORS AND FRAMES
08 35 13.13 ACCORDIAN FOLDING DOORS
08 80 00 EXTERIOR GLAZING
09 25 26 22 41 16A RESIDENTIAL LAVATORIES AND SINKS
10 22 33 MOVEABLE PARTITION
11 31 13C DISHWASHER
11 31 13B FRIDGE
11 31 13 D COOKTOP
23 38 00 VENTILATION HOODS
36 31 00 INTERIOR LIGHTING

SHEET KEYNOTES
1. RESOURCE FURNITURE LGA TAVOLO DESIGNED COMBO, N.I.C. BIRCH PLYWOOD 4" BASE BOARD STAINED MIDNIGHT BLACK.

I.D. ELEVATION KITCHEN NORTH

I.D. ELEVATION KITCHEN WEST

I.D. ELEVATION KITCHEN SOUTH

I.D. ELEVATION KITCHEN EAST
2. Refer to project manual for reference keynotes and specifications of materials.

INTERIOR DESIGN LARGE SCALE FLEX NORTH

1. Resource furniture Kubico sofa
2. Resource furniture single door wardrobe, 2.5 ft x 4 ft
3. Resource furniture double door wardrobe, 4.2 ft x 3 ft
4. Resource furniture Tavolet bed/desk combo
Sprinkler design using Tyco LFII TY2524 Heads
16 X 16 spacing  13 GPM @ 7.0 PSI
26.2 GPM  (2 heads flowing)
X 10 minutes
262 Gallons
X 1.1 (10% buffer) = 288.2 gallons
required for sprinkler system.

PUMP DATA:
BUILDER SHALL PROVIDE PUMP
RATED 35 GPM AT 40 PSI AT
PUMP DISCHARGE.

Sprinkler design using Tyco LFII TY2524 Heads
16 X 16 spacing  13 GPM @ 7.0 PSI
26.2 GPM  (2 heads flowing)
X 10 minutes
262 Gallons
X 1.1 (10% buffer) = 288.2 gallons
required for sprinkler system.

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26.2 GPM  (2 heads flowing)
X 10 minutes
262 Gallons
X 1.1 (10% buffer) = 288.2 gallons
required for sprinkler system.
1. All drains to slope > 1/8":1' as per code.
2. 3x 500 gallon tank for day 7 - water delivery.
3. 2x 500 gallon tank for final day waste removal.

1. 500 gallon CRM-ZT hard tank.
2. Domestic water supply (CW).
3. Cold water return (CW1).
4. Cold water supply (CW).
5. Hot water supply (HW).
6. Hot water return (HW1).
7. Waste water.
8. Condensate drain.
10. Pump for domestic water supply.
<table>
<thead>
<tr>
<th>Classification Code</th>
<th>Length</th>
<th>Type</th>
<th>Keynote</th>
<th>Schedule/Type</th>
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</thead>
<tbody>
<tr>
<td>23-60</td>
<td>30</td>
<td>11</td>
<td>11</td>
<td>7/8&quot; Cold Water</td>
</tr>
<tr>
<td>23-60</td>
<td>6'-0</td>
<td>11</td>
<td>11</td>
<td>1/8&quot; Cold Water</td>
</tr>
<tr>
<td>23-60</td>
<td>8'-7</td>
<td>11</td>
<td>11</td>
<td>1&quot; Cold Water</td>
</tr>
<tr>
<td>23-60</td>
<td>11'-0</td>
<td>11</td>
<td>11</td>
<td>1/8&quot; Cold Water</td>
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<tr>
<td>23-60</td>
<td>1'-10</td>
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<td>1&quot; Cold Water</td>
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<tr>
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<td>4'-0</td>
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<td>23-60</td>
<td>35'-9</td>
<td>11</td>
<td>11</td>
<td>1&quot; Cold Water</td>
</tr>
<tr>
<td>23-60</td>
<td>17'-7</td>
<td>11</td>
<td>11</td>
<td>1&quot; Cold Water</td>
</tr>
<tr>
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<td>2'-10</td>
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<td>11</td>
<td>2&quot; Cold Water</td>
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<tr>
<td>23-60</td>
<td>23'-4</td>
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<td>1&quot; Hot Water</td>
</tr>
<tr>
<td>23-60</td>
<td>95'-11</td>
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<td>1&quot; Hydronic return-PP</td>
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<tr>
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<td>5'-8</td>
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<td>11</td>
<td>1&quot; Hydronic return-PP</td>
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<tr>
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<td>11</td>
<td>1/8&quot; Hydronic return-PP None</td>
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<tr>
<td>23-60</td>
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<td>1&quot; Hydronic supply-PP</td>
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<td>1'-3</td>
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<td>5/8&quot; Hydronic supply-PP None</td>
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<tr>
<td>23-60</td>
<td>1 1/8</td>
<td>11</td>
<td>11</td>
<td>1&quot; Hydronic supply-PP None</td>
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<tr>
<td>23-60</td>
<td>11 1/8</td>
<td>11</td>
<td>11</td>
<td>1&quot; Hydronic supply-PP None</td>
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<tr>
<td>23-60</td>
<td>18'-8</td>
<td>11</td>
<td>11</td>
<td>1&quot; Waste</td>
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<td>23-60</td>
<td>18'-6</td>
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<td>1&quot; Waste</td>
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<tr>
<td>23-60</td>
<td>82'-0</td>
<td>11</td>
<td>11</td>
<td>2&quot; Waste</td>
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**TOTAL:** 236 575'-3 3/4"
### Mechanical Symbols and Notes

#### General Sheet Notes

1. SEE TMS FOR HVAC CONTROLS

#### Reference Keynotes

#### Sheet Keynotes

#### Mechanical Symbols

**HB HC TEAM ASUNM PO Box 871605 TEMPE, AZ 85287-1605 JODY.WASHINGTON@ASU.EDU WWW.ASUNM.ORG**

#### Summary of Hydronic Characteristics for SHADE Beta System

<table>
<thead>
<tr>
<th>Section</th>
<th>PSL</th>
<th>PBD</th>
<th>Bathroom</th>
<th>Bedroom</th>
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<tr>
<td>Main area (sq. ft.)</td>
<td>26.4</td>
<td>3.4</td>
<td>27</td>
<td>1.27</td>
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<tr>
<td>Zone flow (gpm)</td>
<td>3.00</td>
<td>1.74</td>
<td>0.95</td>
<td>1.06</td>
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<tr>
<td>Zone total pressure drop (ft. H2O)</td>
<td>5.43</td>
<td>3.13</td>
<td>0.88</td>
<td>2.66</td>
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<tr>
<td>Main max fluid pressure drop (ft. H2O)</td>
<td>0.28</td>
<td>0.28</td>
<td>0.28</td>
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<tr>
<td>Main total pressure drop (ft. H2O)</td>
<td>15.30</td>
<td>15.30</td>
<td>15.30</td>
<td>15.30</td>
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<tr>
<td>Total pressure drop (ft. H2O)</td>
<td>21.00</td>
<td>18.72</td>
<td>14.47</td>
<td>18.15</td>
</tr>
<tr>
<td>Main flow (gpm)</td>
<td>7.06</td>
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<td></td>
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<tr>
<td>Main fluid velocity (ft. /sec)</td>
<td>2.63</td>
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<td></td>
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<tr>
<td>Main fluid pressure drop (ft. H2O)</td>
<td>0.28</td>
<td></td>
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</table>
GENERAL SHEET NOTES

INSTALLATION INSTRUCTIONS:
1. FABRIC ISOLATION AT ALL CONNECTION POINTS BETWEEN FAN
   COIL UNIT AND RIGID DUCT
2. USE FABRIC LINING OR DUCT BOARD IN RETURN DUCT TO FAN COIL UNIT
3. FLEX DUCT IN ALL CONNECTIONS
4. INSTALLATION AIR DUCT FROM FAN TO RETURN DUCT
5. INSTALL SUPPLY AIR DUCT WITH VARIABLE VOLUME TO SUPPLY AND EXHAUST DUCT FROM ERV
6. USE 3/4" COPPER FOR SUPPLY/RETURN LINES TO FAN COIL UNIT
7. PLACE DUCTS IN JOIST SPACE AS SUPPLY AND EXHAUST

REFERENCE KEYNOTES:

A3  BALANCING DAMPER IN AIR LINE
B  CALLOUT OF HVAC DISTRIBUTION - AIR
C  CALLOUT OF HVAC DISTRIBUTION - AIR
D  BALANCING DAMPER IN EXHAUST LINE
E  BALANCING DAMPER IN SUPPLY AIR LINE

SHEET KEYNOTES

23 37 13 Diffusers, Registers, and Grilles
23 82 19 Fan Coil Units

SHEET TITLE
HVAC EQUIPMENT AND DISTRIBUTION PLAN
HB JC TEAM ASUNM PO BOX 871605 TEMPE, AZ 85287-1605 JODY.WASHINGTON@ASU.EDU WWW.ASUNM.ORG
GENERAL SHEET NOTES

1. All hydronic piping to radiant mats beka polypropylene random copolymer ID 20 mm OD 24 mm unless otherwise specified.
2. All hydronic lines insulated with min. 1/2" pipe insulation.
3. Connection for PFS-Mats across the module break made with Plast-O-Matic ball valves and push low hose rated for >150 PSI.

REFERENCE KEYNOTES

ACCELERATED CONSTRUCTION TECHNOLOGIES
ACCELERATEDCONSTRUCTIONTECHNOLOGIES.COM
02 11.20.2012
80% DOE/NREL DD RE-SUBMISSION

OTTERBEIN ENGINEERING
ROY OTTERBEIN, P.E. 8/22/2013 12:29:18 PM

A3 HVAC EQUIPMENT AND DISTRIBUTION PLAN

SHEET KEYNOTES

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3. Connection for PFS-Mats across the module break made with Plast-O-Matic ball valves and push low hose rated for >150 PSI.

BEDROOM
FLEX SPACE NORTH
FLEX SPACE SOUTH
BATHROOM

SEE NOTE 3 FOR HYDRONIC CONNECTION DETAIL BETWEEN MODULES

HVAC EQUIPMENT AND DISTRIBUTION PLAN

PRODUCED BY AN AUTODESK STUDENT PRODUCT

PRODUCED BY AN AUTODESK STUDENT PRODUCT

PRODUCED BY AN AUTODESK STUDENT PRODUCT

PRODUCED BY AN AUTODESK STUDENT PRODUCT
### PUMP SCHEDULE

<table>
<thead>
<tr>
<th>ID</th>
<th>Service</th>
<th>Manufacturer and Model Number</th>
<th>Fluid type</th>
<th>Maximum flow rate (GPM)</th>
<th>Max. Static pressure (ft. water)</th>
<th>Volt/Ph/Hz</th>
<th>Weight (lbs.)</th>
<th>Dimension (L x W x H) (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1</td>
<td>Circulating pump, radiant heating</td>
<td>Grundfos Magna 32-100N</td>
<td>25% Prop Glycol</td>
<td>50</td>
<td>32.8</td>
<td>13.3</td>
<td>8.31 x 7.15</td>
<td>130 x 160 x 160</td>
</tr>
<tr>
<td>P-2</td>
<td>Circulating pump, thermal storage tank</td>
<td>Bell &amp; Gossett Ecocirc 10-14 Vari-</td>
<td>50% Prop Glycol</td>
<td>14</td>
<td>19</td>
<td>9.25</td>
<td>7.46 x 4.17</td>
<td>6.5 x 6.5</td>
</tr>
<tr>
<td>P-3</td>
<td>Domestic water pump, fire suppression</td>
<td>Goulds GT15</td>
<td>Potable water</td>
<td>64</td>
<td>120</td>
<td>60</td>
<td>21.1625 x 8.25</td>
<td>9.25 x 9.25</td>
</tr>
</tbody>
</table>

### VALVES/SENSOR ID MODEL NOTES

<table>
<thead>
<tr>
<th>ID</th>
<th>Manufacturer and Model Number</th>
<th>Type</th>
<th>Model</th>
<th>NOTES</th>
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</thead>
<tbody>
<tr>
<td>V-1</td>
<td>HONEYWELL, V30A3</td>
<td>V-2</td>
<td>HONEYWELL, V30A3</td>
<td>USED WITH MODULATING OUTPUT OF T77 FOR M-70 NO</td>
</tr>
<tr>
<td>V-2</td>
<td>HONEYWELL, V30A3</td>
<td>V-3</td>
<td>HONEYWELL, V30A3</td>
<td>USED WITH ON/OFF OUTPUT OF T77 FOR DIVERTING</td>
</tr>
<tr>
<td>V-4</td>
<td>HONEYWELL, V30A3</td>
<td>V-5</td>
<td>HONEYWELL, V30A3</td>
<td>USED WITH 24 VAC SIGNAL TO CHANGE OVER 1NC</td>
</tr>
<tr>
<td>V-6</td>
<td>HONEYWELL, V30A3</td>
<td>V-7</td>
<td>HONEYWELL, V30A3</td>
<td>UNEQUIVALENT</td>
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<tr>
<td>V-7</td>
<td>HONEYWELL, V30A3</td>
<td>V-8</td>
<td>HONEYWELL, V30A3</td>
<td>IMMERSION WELL WITH SENSOR, TO T778</td>
</tr>
<tr>
<td>V-9</td>
<td>HONEYWELL, V30A3</td>
<td>V-10</td>
<td>HONEYWELL, V30A3</td>
<td>STRAP TO LINE AND INSULATED, TO T775</td>
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<tr>
<td>V-11</td>
<td>HONEYWELL, V30A3</td>
<td>V-12</td>
<td>HONEYWELL, V30A3</td>
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### FAN COIL UNIT SCHEDULE

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<tr>
<th>ID</th>
<th>Manufacturer and Model Number</th>
<th>Type</th>
<th>Drive</th>
<th>Air type</th>
<th>Maximum airflow rate (CFM)</th>
<th>Static pressure (in. water)</th>
<th>Fan speed (RPM)</th>
<th>Water size (in.)</th>
<th>Weight (lbs.)</th>
<th>Dimension (L x W x H) (in.)</th>
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<tr>
<td>PCU-1</td>
<td>Johnson Controls #340-035 4 col</td>
<td>Supply</td>
<td>Direct</td>
<td>280</td>
<td>0.375</td>
<td>variable (ECOS)</td>
<td>1/2</td>
<td>120040</td>
<td>61</td>
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### ERV SCHEDULE

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<th>Type</th>
<th>Drive</th>
<th>Air type</th>
<th>Maximum airflow rate (CFM)</th>
<th>Static pressure (in. water)</th>
<th>Electrical</th>
<th>Volts</th>
<th>Weight (lbs.)</th>
<th>Dimension (L x W x H) (in.)</th>
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<td>Repair-20000-50</td>
<td>Supply</td>
<td>Direct</td>
<td>110</td>
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<td>0.05</td>
<td>120/180</td>
<td>35</td>
<td>28.3x 21</td>
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</tr>
</tbody>
</table>

### SHEET NOTES

1. ANY SUBSTITUTIONS MUST BE APPROVED BY ENGINEER

**PRODUCED BY AN AUTODESK STUDENT PRODUCT**
SUPPLY AND RETURN LINES TO/ZONES BEKA PP 20 mm
MANIFOLD PIPING NOM. DIAMETER 1"
MANIFOLD RISERS, AQUATHERM PP 25 MM
MANIFOLD PIPING AQUATHERM PP 32 MM
VFM-1
VFM-2
VFM-3
ERV
P-1
P-2
DHW
TS
DE-1
DE-2
DS-1
DR-1
SEE NOTE ABOUT CONNECTIONS BETWEEN
CHILLER AND PIPING LOOP
SEE NOTE ABOUT CONNECTIONS
BETWEEN DHW AND CHILLER
VFM-4
VFM-4
SEE HYDRONIC MANIFOLD DIAGRAM FOR DETAILS
T2
V-1
V-2
V-3
V-4
V-4
T1
T3
T4
1
2
3
4
5
6
7
A
B
C
D
E
SHEET TITLE
DRAWN BY:
CHECKED BY:
COPYRIGHT:
CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON 2013
WWW.SOLARDECATHLON.GOV
TEAM NAME:
ADDRESS:
CONTACT:
CONSULTANTS
NONE: PROJECT IS PUBLIC DOMAIN
BDA ENGINEERS
BDAENGINEERS.COM
01
10.11.2012
80% DOE/NREL DD SUBMISSION
MARK
DATE
DESCRIPTION
ACCELERATED CONSTRUCTION TECHNOLOGIES
ACCELERATEDCONSTRUCTIONTECHNOLOGIES.COM
02
11.20.2012
80% DOE/NREL DD RE-SUBMISSION
03
2.14.2013
100% DOE/NREL CD SUBMISSION
04
4.05.2013
100% DOE/NREL CD RE-SUBMISSION
05
8.22.2013
100% DOE/NREL AS-BUILTS
OTTERBEIN ENGINEERING
ROY OTTERBEIN, P.E. 8/22/2013 12:30:42 PM
M-602
MECHANICAL DIAGRAMS
HB JC TEAM ASUNM PO Box 871605 TEMPE, AZ 85287-1605 JODY.WASHINGTON@ASU.EDU WWW.ASUNM.ORG
GENERAL SHEET NOTES
REFERENCE KEYNOTES
SHEET KEYNOTES
1/4" = 1'-0"
C4
HYDRONIC MANIFOLD DIAGRAM
1. ZONE VALVES 24 VAC NC, HONEYWELL V8043E1145/U OR EQUIVALENT
2. CIRCUIT SETTERS FOR THE FOLLOWING FLOW RATES (GPM): ... SUPPLY AND RETURN TO HEAT RECOVERY STUBS ON CHILLER
7. ALL EXPANSION TANKS 2.1 GAL UNLESS OTHERWISE SPECIFIED BY ENGINEER
1" = 1'-0"
C1
MECHANICAL ONE-LINE DIAGRAM
BATHROOM
MANIFOLD HEATING/CHILLING
PP 25 MM
MANIFOLD HEATING/CHILLING
PP 32 MM
MANIFOLD PIPING AQUATHERM
PP 32 MM
HYDRONIC MANIFOLD DIAGRAM
C1
C4
MECHANICAL DIAGRAMS
M-602
20 m PP
3/4" Copper between water heater and chiller
25 m PP
3/4" PEX between chiller and hydronic loops
23 64 23
ELECTRICAL SYMBOLES AND NOTES

1. ALL CONDUCTORS AND CONDUITS SHALL BE SIZED AS PER NEC 2011. CONDUCTORS SHALL BE COPPER UNLESS OTHERWISE SPECIFIED.

2. ALL EQUIPMENT PROVIDE SHALL BE LISTED AND LABELED BY A NATIONALLY-RECOGNIZED TESTING AGENCY, ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION FOR THE CONDITIONS OF INSTALLATION.

3. DEVICE LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE.

4. ALL WORK TO BE IN ACCORDANCE WITH ALL GOVERNING STATE, COUNTY AND LOCAL CODES AND O.S.H.A.

5. ALL EMT CONDUIT SHALL HAVE COMPRESSION FITTINGS.
PV Calculations

Maximum Array Section Voltage

Inverter Output (Circuit Sizing and Current)

Inverter output current, I_{inverter} = 2.4 A

Conductor insulation rating, T_{con}, 75°C

Temperature Correction Factor, \( \Delta T \)

Adjustment Factor for conduct, A

Overcurrent Protection Device

DC Voltage Drop

Array voltage at DC bus, V_{array} = 193.7 V

Wire Resistance

Wire Voltage Drop

Percentage Drop

Notes:

1. Use minimum of 400 KCMIL for A_{DC} = 25.40 A
<table>
<thead>
<tr>
<th>Load Name</th>
<th>Load</th>
<th>Amps</th>
<th>Breaker</th>
<th>Ckt#</th>
<th>Amps</th>
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<tr>
<td>LIGHTING</td>
<td>3</td>
<td>15</td>
<td>3</td>
<td>3</td>
<td>LIGHTING</td>
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<tr>
<td>SM. APP</td>
<td>12.5</td>
<td>20</td>
<td>20</td>
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<td>12.5 SM. APP</td>
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<td>REFRIG</td>
<td>7.1</td>
<td>15</td>
<td>15</td>
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<td>7.1 REFRIG</td>
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<td>HOOD VENT</td>
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<td>15</td>
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<td>20</td>
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<td>DRYER</td>
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<td>20</td>
<td>20</td>
<td>WASH. PUMP</td>
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**TOTAL CONNECTED LOAD:** 29597.32 VA  
**TOTAL ESTIMATED DEMAND:** 27163 VA  
**TOTAL CONNECTED CURRENT:** 123A  
**TOTAL ESTIMATED DEMAND CURRENT:** 113.18A
1. All low voltage wires terminate in the mechanical room through the chase.
2. CAT5 is used to connect the temperature sensors to the thermostat.
3. 18 AWG wire is used to connect the dew point sensors to the thermostat.
4. Run all wires inside the ceiling.
5. RCS temperature sensor mounted at a height of 7ft from the finished floor.
6. HSS-DPS dewpoint sensor mounted to the uninsulated supply line in each radiant zone.
Manufacturer and Model | Lamps Description | Voltage
----------------------|------------------|--------
TECHLIGHTING POD TRACK LIGHTING HEAD-TL700M02POD03AC | 6 50w lamps Modern head surrounded by a translucent glass orb | 12v
CABLE+JACK-POWERJACK CANOPY 700PJCINC | Unit Incandescent ceiling light | 120v
FERGUSON PIPER PENDANT TL700MOPPRLLED | 2 6W Lamps A thin piper pendant track light | 12v
LITHONIA LIGHTING 5IN MATTE WHITE LED RECESSED BAFFLE KIT | 5 Lamps Includes a 5 IN decorative trim with integrated LED'S | 12v
NOVO LIGHTED MIRROR | 1 39w Mirror Backlit mirror | 120v
FERGUSON N PROGRESS PP564231 | 300w P5642 - Up/Down lighting. | 120v
COOPER LIGHTING LC32 LIGHT LEVEL | 1 9w/ft Multiple Strips LED strip light | 120v
NELSON LAMP-SAUCER PENDANT | 1 150W Lamp A Modern pendant lamp | 120v
LED STRIP 1.65w/250mm | Hafele strip lighting | 12v
LED PUCK 1.25w | Hafele puck lighting | 12v
1. All Z-Wave are two-way communication between device and Nexia Bridge.
2. All CCRF is two-way communication between device and Lutron Main Repeater through the Clear Connect RF protocol.
3. Refer to HVAC Control Schematic - Sheet T-601 for information regarding the HVAC control system.
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<th>Entry Number</th>
<th>Task/Description</th>
<th>Start Date</th>
<th>End Date</th>
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*Note: The construction schedule is produced by an Autodesk student product.*
ARRIVAL SEQUENCE

1. FOUNDATIONS, RAILS, AND PURLINS
   - DAY 1 NOON-2:00PM
   - DURATION: 2-3 HOURS

2. STAGING
   - STEP 2: SITE SURVEYING
   - DAY 1 7:00AM-8:00AM
   - DURATION: 1 HOURS
   - STEP 3: PLACEMENT OF SOLAR CANOPY MODULE
   - DAY 1 5:00PM TO 9:00PM
   - DURATION: 4-5 HOURS

3. PLANter BENCHES
   - STEP 4: PLACEMENT OF SOUTH MODULE
   - DAY 1 9:00PM TO 11:00PM
   - DURATION: 2-3 HOURS

4. Canopy Module
   - STEP 5: PLACEMENT OF SOUTH MODULE
   - DAY 1 1:00PM TO 5:00PM
   - DURATION: 4-5 HOURS

5. NORTH MODULE
   - STEP 6: PLACEMENT OF NORTH MODULE
   - DAY 1 5:00PM TO 9:00PM
   - DURATION: 4-5 HOURS

6. Mechanical Unit
   - STEP 7: PLACEMENT OF MECHANICAL UNIT
   - STEP 8: DEPLOYMENT OF SOLAR CANOPY
   - DAY 2 7:00AM-MIDNIGHT
   - DURATION: 12 HOURS
   - STEP 9: REMOVAL OF WHEELS, AXLES, AND HITCHES
   - STEP 10: ATTACHMENT OF THE FIBERCEMENT SKIN.
   - STEP 11: ATTACHMENT OF THE FIBERCEMENT SKIN.
   - STEP 12: SETTING OF DECKING STRUCTURE
   - STEP 13: STAGING OF RAMP AND ACCESSORY UNITS
   - DAY 2 8:00AM-1:00PM
   - DURATION: 5-6 HOURS

7. Foundation
   - STEP 7: PLACEMENT OF NORTH MODULE
   - DAY 2 10:00AM-3:00PM
   - DURATION: 5-6 HOURS

8. Ramps
   - STEP 7: PLACEMENT OF MECHANICAL UNIT
   - DAY 2 10:00AM-3:00PM
   - DURATION: 5-6 HOURS

9. Support Structure
   - STEP 7: PLACEMENT OF MECHANICAL UNIT
   - DAY 2 10:00AM-3:00PM
   - DURATION: 5-6 HOURS
STEP 13: PLACEMENT OF DECKING PAVERS

Day 2 5:00PM-MIDNIGHT

Duration: 3-4 hours

In the afternoon of Day Two and significant progress has been made on placing the decking structure. Truck Six, a 35-ton truck, will begin to transport the large pieces of the decking structure. The truck will begin to unload the truck and also to unload the water tanks and planter boxes. The water tanks and planter boxes will be unloaded and staged for use on Day 3.

STEP 14: TREE AND WATER TANK PLACEMENT

Day 3 7:00-9:00AM

Duration: 2-3 hours

To begin Day Three, the seventh truck containing landscape materials arrives on site. First to be unloaded from this truck will be the site’s large tree. The tree will be removed from the truck and placed in its pre-marked location. Once the tree is in place, water tanks are placed into the proper locations on the northwest corner of the site. The team begins to connect the water tanks together and then make the connections to the mechanical unit. The team may then begin making plumbing connections between the house and the mechanical unit.

STEP 15: PLACEMENT OF PLANTER BOXES

Day 3 9:00AM-2PM

Duration: 5-6 hours

After the tree and water tanks have been placed, a crew begins to connect the site’s water tanks together and to the mechanical unit. A separate crew begins to work around the house assembing the planter boxes.

STEP 16: POPULATION OF PLANTERS

Day 3 11:00AM-3:00PM

Duration: 3-4 hours

After progress on setting up planter modules has been made, a team can follow behind and place plants and mattr into the modules to start forming the home’s unique landscape. Once plants and mattr have been placed in each module, the module may then be filled with the appropriate mulch or gravel.
Step 1: Removal of Landscape
Planter elements and landscape are removed from the site and staged on the side.

Step 2: Take Down of Decking
Pavers are removed from decking and placed on a truck. Water tanks are also loaded onto this truck. After decking pavers have been removed, decking structure may be unplugged and moved away to be loaded onto the next truck.

Step 3: Take Down of Solar Panels
Once planters and decking have been removed from the front part of the site a crew can get up on ladders and scaffolding and begin to remove solar panels and purlins. These can be loaded onto the next truck.

Step 4: Removal of Overhead Shade Screens
Once all debris and planter elements have been taken down and removed from the site, overhead shade screens are taken down and staged to be removed from the site.

Step 5: Demounting of Building Skin
While overhead shade screens are being removed from the building skin and rain screen can be unmounted from the house.

Step 6: Removal of Accessory Units
Once the building skin has been removed all accessory units and the mechanical room can be unplugged and moved onto a flatbed to be removed from the site.

Step 7: Removal of North Module
After the accessory units are moved off site it is time to remove the house modules. The first module will be lifted and rolled back out to the expanded site on the north end of the lot. RAILS. Once on the north end of the lot, wheels and axles will be removed from the house and they will be set back onto the ground to be pulled away by a truck.

Step 8: Removal of South Module
After the accessory units are moved off site it is time to remove the house modules. The first module will be lifted and rolled back out to the expanded site on the north end of the lot. RAILS. Once on the north end of the lot, wheels and axles will be replaced onto the house and it will be set back onto the ground to be pulled away by a truck.

Step 9: Take Down of Solar Canopy
Before the solar canopy module can be removed, the beams that hold up the canopy need to be unfurled and returned to shipping position. Once the module has been returned to shipping position, it can be loaded onto this truck with the remaining elements to be removed from the site.

Step 10: Removal of Solar Canopy
After the accessory units are removed off site it is time to remove the house modules. The first module will be removed from the north module. The module will be lifted and rolled back out to the expanded site on the north end of the lot. RAILS. Once on the north end of the lot, wheels and axles will be replaced onto the house and it will be set back onto the ground to be pulled away by a truck.

Step 11: Removal of Anchors and Foundations
After the last module has left the site, anchors are to be saved for future use in the new building.

Step 12: Cleaning of Site
After work has been done on anchors, anything remaining on the site is cleaned and/or removed from the site leaving the site in its original condition.
1. Modules show without roofs to show orientation on truck.
2. Items shipped by others and arrival is coordinated with competition schedule.
3. Tools will be stored on site in shed unit.

1. SOLAR CANOPY W/ PLANTER
2. SOUTH MODULE
3. NORTH MODULE
4. FOOTINGS
5. FOUNDATION/SURVEYING EQUIPMENT
6. RAIL/WRILING/FLASHING CAPS
7. PLANTER BENCHES
8. MECHANICAL UNIT
9. RAMP
10. EAST WING WALL
11. WEST WING WALL
12. DECKING STRUCTURE
13. FIBER CEMENT RAIN/SHADE SCREENS
14. SOLAR PANELS
15. DECKING SURFACE
16. PLANTER BOXES
17. WATER TANKS
18. MULCH OR ROCKS
19. PLANTS
20. TREE
21. INTERIOR ELEMENTS
22. KNAACK BINS
23. SOFFIT PIECES
24. SCABBING
25. STUFF THAT GOES IN THE HOUSE

1/8" = 1'-0"