TEAM USC

fluxHome™

PROJECT INFORMATION

PROJECT NAME: fluxHome™
LOCATION: ORANGE COUNTY GREAT PARK, (OGSP) IRVINE, CA
OCCUPANCY: RESIDENTIAL
CONSTRUCTION TYPE: TYPE V
BUILDING DESCRIPTION: SINGLE STORY DWELLING
MAX BUILDING HEIGHT: 18'
DESIGN TEAM: UNIVERSITY OF SOUTHERN CALIFORNIA SCHOOL OF ARCHITECTURE
CO-PROJECT MANAGER: JUSTIN KANG

DESIGN NARRATIVE

fluxHome™

USC’s fluxHome™ is an innovative and affordable model for sustainable living incorporating off-the-shelf elements with compact, efficient building mass and an innovative heat pump package that seamlessly merges indoor and outdoor space. fluxHome™ embraces the idea of change while reflecting the diverse craftsman bungalow as well as new smart home technologies. fluxHome™ celebrates its reimagining of Southern California’s environment in a characteristic landscape of Southern California.

DESIGN PHILOSOPHY

fluxHome™ design is motivated by a combination of cultural, environmental and economic factors. With a climate that averages 300 days of sun per year, the suburban tract house as a transformable space is reconceived as the interior space seamlessly integrated with the exterior space. fluxHome™ is an innovative heat pump package that seamlessly merges indoor and outdoor space, resulting in a home that can grow or change according to the user’s needs.

FEATURES

Some of the unique features of fluxHome™ include:

- A compact, efficient building mass and envelope system to minimize solar heat gain and maximize natural ventilation.
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- A hyper-efficient bathroom environment that regulates sunlight, air and privacy.
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- A thermally-responsive screen facade system that works as a plenum for passive cooling and low-impact energy efficiency as a focus, fluxHome™ can be configured as a starter home for a young couple or outfitted to suit the needs of an extended family. Several families can be accommodated.

TECHNOLOGIES

fluxHome™ employs an array of innovative technologies including:

- A climate-friendly heat pump package that provides heating, cooling and domestic water heating in one product, thereby minimizing the potential for ozone depletion and global warming.
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MARKET STRATEGY

While the initial user profile is based on a family of four, fluxHome™ is designed with flexibility and adaptability in mind. Various arrangements can easily be accommodated. Designed as a model for smart growth and sustainable development, fluxHome™ contains a compact off-the-shelf home that can be reimagined at any time.

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MACHINE NAILING:

4. SATISFACTORY JOBSITE DEMONSTRATION FOR EACH PROJECT & THE APPROVAL OF THE PROJECT ARCHITECT OR STRUCTURAL ENGINEER & THE ENFORCEMENT CODES & STANDARDS IN THE LISTED CONTRACT.

WIND EXPOSURE = 18.6 psi BUILDING CODE, THE UNIFORM PLUMBING, ELECTRICAL CODES & STANDARDS IN THE LISTED CONTRACT.

5. OF ANY DISCREPANCIES OR INCONSISTENCIES. THE CONTRACTOR SHALL FOLLOW DRAWING DIMENSIONS. DRAWINGS SHALL NOT BE SCALED. IN CASE OF CONFLICT, THESE GENERAL NOTES & TYPICAL DETAILS ARE IN PRIORITY.

6. PROJECT SPECIFICATIONS FORM A PART OF THESE GENERAL NOTES & TYPICAL DETAILS. THE CONTRACTOR SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCORRECTNESS.

CONTRACTOR SHALL FOLLOW DRAWING DIMENSIONS. FRAMEWORK FOR 18 INCH WALLS IS BUILT AT 48 INCH OC, AND FOR 8 INCH WALLS IS BUILT AT 24 INCH OC, IN ACCORDANCE WITH THE INTERNATIONAL RESIDENTIAL CODE. ALL FRAMING CONNECTORS TO BE SIMPSON STRONG TIE KWIK BOLT II OR AN APPROVED 1CBO/ICC MANUFACTURER & FULLY DRIVE NAILS INTO ALL HOLES THROUGH THE FACE GRAIN OF THE PLYWOOD. OVERLOAD IS ANTICIPATED TO SHOWER.


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1. FINISHED SQUARE FOOTAGE CALCULATIONS FOR THIS HOUSE WERE MADE BASED ON PLOT DIMENSIONS ONLY AND MAY VARY FROM THE FINISHED SQUARE FOOTAGE OF THE HOUSE AS BUILT.

2. GROSS AREA SQUARE FOOTAGE CALCULATIONS ARE MEASURED TO THE EXTERIOR ENVELOPE.
1. DECKS AND PLATFORMS HAVE A FINISHED FLOOR HEIGHT OF 27-1/4" FROM GRADE. GUARDS ARE NOT REQUIRED.

2. BEDROOM EGRESS: BEDROOM WINDOWS OPENINGS HAVE A MINIMUM NET CLEAR OPENING OF 5.75 SF AND HAVE A MINIMUM NET CLEAR WIDTH OF 20" AND A MINIMUM NET CLEAR HEIGHT OF 24".

3. EGRESS DOOR IN ACCORDANCE WITH IRC R311.2. MINIMUM NET CLEAR WIDTH EXCEEDS 32".

4. TEAM PROVIDED RAMP TRANSITION PLATE.

5. SUPPLY WATER TANK SHADING STRUCTURE.

6. ALL EGRESS DOOR OPENINGS COMPLY WITH MINIMUM NET CLEAR WIDTH OF 32".

7. TEAM USC UNIVERSITY OF SOUTHERN CALIFORNIA WATT HALL 204 LOS ANGELES, CA 90089-0291 (213) 740-2723

PROJECT MANAGER:
FACULTY ADVISOR:

1/4" = 1'-0"
2. Doors will remain fixed in open position during public tours.
3. Team provided ramp transition plate.
4. Supply water tank shading structure.

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SOLAR ENVELOPE

A1 ELEVATION - WEST

A2 ELEVATION - SOUTH

SOLAR ENVELOPE

GENERAL SHEET NOTES

BOTTOM EDGE PROTECTION WILL BE USED AT BOTTOM EDGE OF RAMPS IF SLOPE IS IN EXCESS OF 1:20.

REFERENCE KEYNOTES

SHEET KEYNOTES

ISSUE DATE: 7/16/13

8/22/2013 12:48:52 PM

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SOLAR ENVELOPE

COMPLIANCE

ELEVATIONS

TEAM NAME:

ADDRESS:

CONTACT:

USC SCHOOL OF ARCHITECTURE

UNIVERSITY OF SOUTHERN CALIFORNIA

WATT HALL 204 LOS ANGELES, CA90089-0291 (213) 740-2723

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PRODUCED BY AN AUTODESK STUDENT PRODUCT

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1. Hatch pattern indicates all containers, equipment, and fixtures that will contain liquid at any point during the competition in compliance with Rule 4-6 Spill Containment.

2. All pressured water systems shall have proper containment and shall be equipped with an overflow pan or valve and drain below unit.

3. In the event of a spill, team will consult safety plan and contact event organizers.

4. For a schedule of liquid containment devices and fixtures, refer to P-series.

5. All tanks will be shaded from direct sunlight.

6. All tanks beneath house except supply tanks.

130 GALLON GRAY WATER TANK
52 GALLON GRAY WATER TANK
53 GALLON GRAY WATER TANK
53 GALLON PORCH DRAIN TANK
SHOWER
90 GALLON GRAY WATER TANK
DRAINAGE PIPE
4" PORCH DRAINAGE PIPE
4" GRAY WATER DRAINAGE PIPE
RAINWATER OVERFLOW DRAIN
RAINWATER DRAIN

0' 2'
4'
8'

1/4" = 1'-0"
1. THE FOUNDATION DESIGN IS BASED ON MINIMUM DESIGN ASSUMPTIONS AS LISTED BELOW.

1. FOUNDAITION TYPE: BRICKWORK PILER SHAPES CENTRAL M.I.C. INC.

2. MATERIALS:
   - ALL STEEL: ASTM A36 (FY = 36 KSI)
   - ALL OTHER WATER PLUMBING: ASTM A572 GRADE 50 (HY = 50 KSI)
   - STRUCTURAL STEEL CHANNEL: ASTM A500 GRADE B (FY = 46 KSI)
   - STRUCTURAL STEEL ANGLE: ASTM A500 GRADE B (FY = 46 KSI)
   - STRUCTURAL STEEL WAY SHAPES: ASTM A992 (FY = 70 KSI)
   - ANCHOR RODS: ASTM A325-N

3. BOLTS, UNLESS OTHERWISE NOTED ON DRAWINGS:
   - HIGH TENSILE (1/4"")
   - ANCHOR RODS

HOLE NO. 3/4" DIAMETER TO MATCH 1 1/16" DIA BOLT OR CAPScrew

4. BOLT HOLES IN STEEL SHALL BE 1/16" LARGER DIAMETER THAN NOMINAL SIZE OF BOLT USED, UNLESS OTHERWISE NOTED.

5. FOR BOLTED CONNECTIONS, PROVIDE 1 1/2" EDGE AND END DISTANCE, UNLESS OTHERWISE NOTED.

6. ALL WELDS SHALL BE PREQUALIFIED OR QUALIFIED BY TEST IN CONFORMANCE WITH THE "STRUCTURAL WELDING SPECIFICATIONS FOR BUILDING" SPECIFICATIONS.

7. FIELD WELDS SHALL BE DONE IN FIELD AS INDICATED.

8. BOLTED CONNECTIONS WITH PREQUALIFIED OR QUALIFIED WELDS SHALL BE SPECIFIED.

9. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT IF PLACED ON FRAMED FLOORS OR ROOFS. LOAD SHALL NOT EXCEED THE DESIGN LOAD PER SQUARE FOOT. PROVIDE ADEQUATE SPACING WHERE LOADS CONSTITUTE SPECIAL INSPECTION.

10. ALL STRUCTURAL STEEL, MISCELLANEOUS METAL AND CONNECTORS EXPOSED TO WEATHER SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.

11. NO PENETRATIONS THROUGH STRUCTURAL STEEL COLUMNS, BEAMS OR GIRDERS ARE ALLOWED EXCEPT AS PROVIDED FOR."
STATEMENT OF SPECIAL INSPECTIONS

STRUCTURAL STEEL
1. SHOP DRAWINGS AND ERECTION DRAWINGS:
   - A. INDICATE PROFILES, SIZES, SPACING, LOCATIONS OF STRUCTURAL MEMBERS, OPENINGS, ATTACHMENTS, AND FASTENERS.
   - B. INDICATE ALL WELDED CONNECTIONS, INDICATOR MARKS FOR MACHINABLE FRACTURE TESTS, INDICATOR MARKS FOR H feminism, AND ALL WELDED CONNECTIONS, INDICATOR MARKS FOR MACHINABLE FRACTURE TESTS, INDICATOR MARKS FOR H feminism, AND ALL WELDED CONNECTIONS, INDICATOR MARKS FOR MACHINABLE FRACTURE TESTS, INDICATOR MARKS FOR H feminism, AND ALL WELDED CONNECTIONS, INDICATOR MARKS FOR MACHINABLE FRACTURE TESTS, INDICATOR MARKS FOR H feminism, AND ALL WELDED CONNECTIONS, INDICATOR MARKS FOR MACHINABLE FRACTURE TESTS, INDICATOR MARKS FOR H feminism, AND ALL WELDED CONNECTIONS, INDICATOR MARKS FOR MACHINABLE FRACTURE TESTS, INDICATOR MARKS FOR H feminism, AND ALL WELDED CONNECTIONS, INDICATOR MARKS FOR MACHINABLE FRACTURE TESTS.
   - C. INDICATE WELDED CONNECTIONS WITH AWS A2.4 WELDING SYMBOLS. INDICATE NET WELD LENGTHS
2. INSTALLATION OF JOINTS: INDICATE JOINTS THAT ARE NOT PART OF THE PRIMARY LOAD RESISTING SYSTEM (PLRS), NO REQUIREMENTS FOR NON-DESTRUCTIVE TESTING.
3. THE STRUCTURAL ENGINEER WILL PERFORM STRUCTURAL OBSERVATIONS OF THE FOLLOWING:
   - A. USES WELDED AND BOLTED CONNECTIONS IN THE PRIMARY LOAD RESISTING SYSTEM (PLRS).

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   - A. USES WELDED AND BOLTED CONNECTIONS IN THE PRIMARY LOAD RESISTING SYSTEM (PLRS).
TO THE WALL. NOT LESS THAN THREE STUDS SHALL BE INSTALLED AT EACH CORNER OF AN EXTERIOR OVERLAPPING AT INTERSECTIONS. SPLICES IN DOUBLE TOP PLATES SHALL BE OFFSET AT LEAST 48".

1. ALL SIZES SHOWN ON THE DRAWINGS ARE STAT ED IN TERMS OF STANDARD NOMINAL SIZES.

2. WALL FRAMING. STUDS SHALL BE PLACED WITH THEIR WIDE DIMENSION PERPENDICULAR TO THE GROUND AND THEIR TALL DIMENSION ALONG THE GROUND. ATTACHED TO WALLS AND ATTACHED TO THE DIAMETER-OF-CONCRETE OR MASONRY FOUNDATIONS, SHALL BE BLOCKING EQUAL IN SIZE TO THE STUDDING.

3. IN INTERIOR LOCATIONS SUBJECT TO WATER SPLASH AND IN EXTERIOR LOCATIONS SUBJECT TO PROTECTION FROM A ROOF, EAVE, OVERHANG OR OTHER COVERING TO PREVENT WATER OR MOISTURE ACCUMULATION ON THE SURFACE OR AT JOINTS BETWEEN THE PANELS OF SILL TIMBERS OR BOLTS.

4. ALL LUMBER SHALL BE DOUGLAS FIR (LARCH) OF THE GRADE SHOWN BELOW UNLESS OTHERWISE SET FORTH IN THE PREVIOUS PARAGRAPHS FOR SPECIFIED APPLICATIONS IS REQUIRED. IN ADDITION, WOOD USED IN CONSTRUCTION OF PERMANENT STRUCTURES AND LOCATED NEARER THAN 6" TO EARTH SHALL BE TREATED WOOD.

5. TIMBER CONNECTORS NOTED ON THE DRAWINGS HAVE BEEN BASED ON THE CAPACITIES OF “SIMPSON STRONG-TIE” LARR NO’S.: 22086, 24818, 24947, 24949, 24950, 33540, 69728, 69729, 69730 AND AN ALTERNATE MANUFACTURER SHALL LIST EACH CONNECTOR TYPE SPECIFIED WITH THE PROPOSED SUBSTITUTIONS PRIOR TO INSTALLATION. (“SIMPSON STRONG-TIE” LARR NO’S.: 22086, 24818, 24947, 24949, 24950, 33540, 69728, 69729, 69730)

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7. WATER SPLASH. WHERE WOOD FRAME WALLS AND PARTITIONS ARE COVERED ON THE OUTSIDE WITH A FINISH, A ROOF, EAVE, OVERHANG OR OTHER COVERING TO PREVENT WATER OR MOISTURE ACCUMULATION ON THE SURFACE OR AT JOINTS BETWEEN THE PANELS OF SILL TIMBERS OR BOLTS.

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9. PLYWOOD JOINTS SHALL OCCUR ON THE CENTER OF FRAMING MEMBERS AND BLOCKING. NAILS SHALL NOT BE PLACED LESS THAN 3/8" IN FROM THE PANEL EDGE AT 2X MEMBERS, NOT LESS THAN 1/2" AT 3X MEMBERS, AND NOT LESS THAN 1 1/2" IN FROM THE PANEL EDGE AT 4X MEMBERS. THE MINIMUM EDGE DISTANCE FOR NAILS IN THE RECEIVING MEMBER SHALL BE 1 1/2".

10. CONTRACTOR SHALL CLOSELY EXAMINE ANY WOOD FRAMING LAID OPEN BY REMODEL WORK FOR SIGNS OF FUNGUS INFESTATION OR INSECT INFESTATION THAT SUBSTANTIALLY REDUCES THE LOAD CARRYING CAPACITY OF THE LUMBER USED.

11. GENERAL CONSTRUCTION REQUIREMENTS.

A. PREPARATION OF FOUNDATIONS. ALL STUDS AND HOLES SHALL BE REMOVED FROM THE AREA TO BE COVERED BY THE FOUNDATION. ALL WOOD FENCES WHICH HAVE BEEN IN CONTACT WITH EARTH MUST BE REMOVED TO A DISTANCE NOT LESS THAN 24" AND 1/2" IN FROM THE OUTER FACE. BEFORE THE FOUNDATION IS LIFTED INTO PLACE, IN ALL HOLES AND SPACES FROM WHICH WOOD HAS BEEN REMOVED, THE AREA MUST BE TREATED WITH A PRESERVATIVE APPROVED BY THE ARCHITECT AND THE ENVIRONMENT AGENCY.

B. ALL LUMBER SHALL BE SHOWN TO BE DRY AND IN THE ARRANGEMENT TO BE USED AS SHOWN. THE INSTALLATION OF WOOD LUMBER TO BE USED AS SHOWN ON THE DRAWINGS IS SUBJECT TO THE APPROVAL OF THE ARCHITECT AND THE ENVIRONMENT AGENCY.

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REQUIREMENTS.

1. LAMINATED VENEER LUMBER (L.V.L.):
   - FB = 2600 PSIFC (PERPENDICULAR TO GRAIN) = 750 PSIFC (PARALLEL TO GRAIN) = 2,510 PSIF
   - V = 285 PSI
   - E = 1,900,000 PSI

2. PARALLEL STRAND LUMBER: (P.S.L.)
   - 4X AND LARGER STUDS/POSTS TO SOLE PLATE ................    (4) 16D END NAIL
   - DOUBLE STUDS, FACE NAIL ...   16D @ 16"
   - DOUBLED TOP PLATES, @ LAP SPLICES, EACH SIDE OF SPLICE .......              (12) 16D

   - FB = 2900 PSIFC (COMP. PERPENDICULAR TO GRAIN PARALLEL TO WIDE FACE OF STRANDS) = 650 PSIFC (COMP. PARALLEL TO GRAIN) = 2,900 PSIF
   - V = 290 PSI (HORIZ. SHEAR PERPENDICULAR TO WIDE FACE OF STRANDS)
   - E = 2,000,000 PSI

   - BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE, TOENAIL ...........        (3) 8D
   - RIM JOIST TO TOP PLATE, TOENAIL .................................................      8D @ 6"
   - TOP PLATES, LAPS AND ...

3. B1" BRACE TO EACH STUD AND PLATE, FACE NAIL ..............................         (2) 8D

4. ENGINEERED (MANUFACTURED) LUMBER SHALL BE FABRICATED IN AN LA CITY BUILDING AND AT EACH SPLICE

   - HOLDOWN CONNECTORS SHALL BE TIGHTENED JUST PRIOR TO COVERING THE WALL FRAMING.

   - WHERE SHEAR WALL BOUNDARY ELEMENTS ARE COMPOSED OF DOUBLE OR TRIPLE 2X MEMBERS (STUDS, SILL PLATES, TOP PLATES, ETC.), THE EDGE NAILING REQUIRED IN THE SHEAR WALL SCHEDULE

   - HOWEVER, SHALL THE NAILING TO THE 2X BOUNDARY AT THE EXTREME EDGE OF THE SHEAR WALL PANEL EXCEED A SPACING OF 12".  BUILT-UP STUDS AT THESE BOUNDARY MEMBERS SHALL BE NAILED TOGETHER WITH TWO ROWS OF 16D NAILS, EACH ROW SPACED AT NO MORE THAN 8" ON CENTER (NET SPACING = 4" ON CENTER) UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS.

   - INSPECTION OF PLYWOOD SHEAR WALLS BY A SPECIAL DEPUTY INSPECTOR IS REQUIRED FOR ALL PLYWOOD SHEAR WALL BOUNDARY ELEMENTS AND THE INSTALLATION OF THE HOLDOWN CONNECTORS TO THE VERTICAL SHEAR WALL BOUNDARY ELEMENTS.  APPROVED PLATE WASHERS, IN LIEU OF STANDARD CUT WASHERS, SHALL ALSO BE PROVIDED FOR HOLDOWN CONNECTOR BOLTS TO THE VERTICAL SHEAR WALL BOUNDARY ELEMENTS.  APPROVED PLATE WASHER SIZES ARE AS FOLLOWS:

   - 1/2" DIAMETER BOLTS .................................... 3/16" THICK X 2.00" X 2.00"
   - 5/8" DIAMETER BOLTS ...................................              1/4" THICK X 2.50" X 2.50"
   - 3/4" DIAMETER BOLTS ... 5/16" THICK X 3.00" X 3.00"
   - 1" DIAMETER BOLTS  ..................................     3/8" THICK X 3.50" X 3.50"

5. A COMPLETE SHOP DRAWING SUBMITTAL SHALL BE MADE TO THE ARCHITECT PRIOR TO FABRICATION.  SUBMITTALS SHALL INCLUDE:

   - COMPLETE LAYOUT PLANS SHOWING DIMENSIONS OF ALL MEMBERS AND SHOWING ALL REQUIRED BRIDGING, BRACING AND BLOCKING.
   - COMPLETE SET OF DETAILS SHOWING EACH DIFFERENT BEARING CONDITION.
   - COMPLETE SHEET OF CALCULATIONS FOR ALL JOIST TYPES INCLUDING DEFINITIONS OF ABBREVIATIONS USED.  SHEET METAL DETAILS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.

MANUFACTURED WOOD MEMBERS

1. LAMINATED VENEER LUMBER (L.V.L.):
   - FB = 2600 PSIFC (PERPENDICULAR TO GRAIN) = 750 PSIFC (PARALLEL TO GRAIN) = 2,510 PSIFV = 285 PSIE = 1,900,000 PSI

2. PARALLEL STRAND LUMBER: (P.S.L.)
   - FB = 2900 PSIFC (COMP. PERPENDICULAR TO GRAIN PARALLEL TO WIDE FACE OF STRANDS) = 650 PSIFC (COMP. PARALLEL TO GRAIN) = 2,900 PSIFV = 290 PSI (HORIZ. SHEAR PERPENDICULAR TO WIDE FACE OF STRANDS)E = 2,000,000 PSI
1. Seismic pier foundation jack anchored to concrete runway with threaded rods.
2. Seismic pier is adjustable to compensate uneven ground on site.
3. Seismic pier design uplift resistance @ 85 MPH.
4. Modular split line occurs at Grid 2 & 35. CP seismic piers on Grid 2 & 3 shifted 4" north away from horizontal grids B through E.

13 52 00 Seismic Pier
1. Floor LL Design = 40 PSF
2. Structural Intermittent Floor OSB Sheathing Diaphragm
3. Modular split line occurs at grid 2 and 3.
4. Dimensions measured to face of steel.
5. Bracing is required at CP seismic pier on grid 1 and 4.

- Double LSL 1-3/4x9-1/2 around the floor opening.
- TJI blocking occurs at every 4'.
- Typical bolt hole location for bottom plate to steel connection.
GENERAL SHEET NOTES
1. FOR E.N., F.N. SEE S-70
2. PERPENDICULAR TO JOIST
3. MODULAR SPLIT LINE @ GRID 2 & 3

FLOOR SHEATHING DIAPHRAGM PLAN

FLOOR SHEATHING TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SIZE</th>
<th>QUANTITY</th>
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<tbody>
<tr>
<td>A</td>
<td>4x8</td>
<td>19</td>
</tr>
<tr>
<td>B</td>
<td>4x6</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>4x5</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>4x4</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>4x3</td>
<td>2</td>
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<tr>
<td>F</td>
<td>2x8</td>
<td>5</td>
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<tr>
<td>G</td>
<td>2x6</td>
<td>10</td>
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<tr>
<td>H</td>
<td>2x5</td>
<td>4</td>
</tr>
<tr>
<td>J</td>
<td>2x3</td>
<td>1</td>
</tr>
<tr>
<td>K</td>
<td>2x2</td>
<td>2</td>
</tr>
</tbody>
</table>

REFERENCE KEYNOTES

1. JOISTS UNDERNEATH
ISOMETRIC FLOOR FRAMING
ISOMETRIC ROOF FRAMING

W

N

S

E

A1
1. S-401B is a bolt layout drawing for floor and ceiling. However, there will be additional bolts at ceiling level where doorways and openings with no sill plate that do not have a top plate over a lintel.

FENESTRATION

PRODUCED BY AN AUTODESK STUDENT PRODUCT

SYMBOL LEGEND

REFERENCES

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SOLAR DECATHLON 2013
WWW.SOLARDECATHLON.GOV

TEAM NAME:
TEAM USC
UNIVERSITY OF SOUTHERN CALIFORNIA
WATT HALL 204 LOS ANGELES, CA 90089-0291 (213) 740-2723

PROJECT MANAGER:
FACULTY ADVISOR:

CLIENT:

CONTACT:

ADDRESS:

COPYRIGHT:

ISSUE DATE:
7/16/13
MODULAR SPLIT LINE OCCURS @ GRID 2 AND 3

BOLT CANNOT EXCEED 4" - 9" FROM EDGE

S-401C IS A BOLT LAYOUT DRAWING FOR CEILING TOP PLATE. HOWEVER, THERE WILL BE ADDITIONAL BOLTS AT CEILING LEVEL WHERE DOORWAYS AND OPENINGS WITH NO SILL PLATE THAT DO HAVE A TOP PLATE OVER A LINTEL.
1. Timberland wood stud @ 16" O.C.
2. Fixed lite pane

1/2" OSB install on exterior walls for shear resistance
2. 3x4 blk. must place on sheerwall type II
1. TIMBERLAND WOOD STUD @ 16" O.C.

19/32" OSB INSTALLED ON EXTERIOR WALLS FOR SHEAR RESISTANCE

3 X 4 BLOCKING
SHEATHING DIAPHRAGM ELEVATION-NORTH

SHEATHING DIAPHRAGM ELEVATION-SOUTH

GENERAL SHEET NOTES
1. FOR E.N., F.N. SEE S-70
2. PERPENDICULAR TO JOIST
3. MODULAR SPLIT LINE @ GRID 2 & 3

TYPE | SIZE | QUANTITY
--- | --- | ---
A  | 4" x 8" | 10
B  | 4" x 4" | 1
C  | 2" x 2" | 1
D  | 2" x 1" | 1

REFERENCE KEYNOTES

SHEET KEYNOTES
1. WALL STUDS BEHIND

WALL SHEATHING DIAPHRAGM

S-603
**TYP. PLATE SPLICE PENETRATION THRU STUD**

1. Provide a minimum of (2) bolts per piece.
2. For coordination of hold down rods and anchor bolts at shear walls, see D5/S-702 and D4/S-706.
3. Cut, notch, and holes bored in trusses, structural composite lumber (SCL), joists are not permitted except where permitted by manufacturer’s recommendation and reviewed and approved by the engineer.
4. Bored holes shall not be located at the same section of joists as a cut or notch.

**TYP. HOLES / NOTCHES IN JOISTS AND STUDS**

1. Bored holes or notches are not permitted in curves (curve > 4") on joists.
2. Notches and holes are not permitted in studs or beams.
3. Cut, notch, and holes bored in trusses, structural composite lumber (SCL), joists and beams are not permitted except where permitted by manufacturer’s recommendation and reviewed and approved by the engineer.
4. Bored holes shall not be located at the same section of joists as a cut or notch.

**TYP. SILL PLATE BOLT LAYOUT**

1. Provide a minimum of (2) bolts per piece.
2. For coordination of hold down rods and anchor bolts at shear walls, see D5/S-702 and D4/S-706.
3. Cut, notch, and holes bored in trusses, structural composite lumber (SCL), joists are not permitted except where permitted by manufacturer’s recommendation and reviewed and approved by the engineer.
4. Bored holes shall not be located at the same section of joists as a cut or notch.
NOTE: FOR WELD AND PLATE INFORMATION NOT SHOWN, SEE A4/S-702.
1. Framing at shower is modified for appropriate water drainage. TJI joists need to be reinforced and appropriate hangers. See detail drawings.

**Modified TJI**

**4x10 Beam**

**Steel Frame**

### ENLARGED BATHROOM FLOOR FRAMING

- **D1**: Cut TJI @ Shower for Depression
  - Bend over on top of necessary
  - Top of TJI
  - BLK. to match top of cut joist
  - Faces must be flushed
  - 11/2" X 1 1/2" nail in all holes
  - Less than 422 or than 2
  - 4x10 beam
  - 2" bottom plate
  - A 35 angle
  - To NAIL

- **D3**: Cut TJI Support @ Shower
  - Cut TJI @ Shower for Depression
  - TJI 230 x 9 1/2 Cut
  - TJI 230 x 9 1/2 Cut
  - C12X20.7

- **D6**: Beam Support North End
  - Beam support north end
  - 4x10 beam
  - Steel frame

### SYMBOL LEGEND

- **D1**: Cut TJI @ Shower for Depression
- **D3**: Cut TJI Support @ Shower
- **D6**: Beam Support North End

### SHEET KEYNOTES

- **D1**: Cut TJI @ Shower for Depression
- **D3**: Cut TJI Support @ Shower
- **D6**: Beam Support North End

### GENERAL SHEET NOTES

- Framing at shower is modified for appropriate water drainage. TJI joists need to be reinforced and appropriate hangers. See detail drawings.

### ENLARGED FLOOR FRAMING

- **D1**: Cut TJI @ Shower for Depression
- **D3**: Cut TJI Support @ Shower
- **D6**: Beam Support North End

### SYMBOL LEGEND

- **D1**: Cut TJI @ Shower for Depression
- **D3**: Cut TJI Support @ Shower
- **D6**: Beam Support North End

### SHEET KEYNOTES

- **D1**: Cut TJI @ Shower for Depression
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### GENERAL SHEET NOTES

- Framing at shower is modified for appropriate water drainage. TJI joists need to be reinforced and appropriate hangers. See detail drawings.

### ENLARGED FLOOR FRAMING

- **D1**: Cut TJI @ Shower for Depression
- **D3**: Cut TJI Support @ Shower
- **D6**: Beam Support North End

### SYMBOL LEGEND

- **D1**: Cut TJI @ Shower for Depression
- **D3**: Cut TJI Support @ Shower
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### SHEET KEYNOTES

- **D1**: Cut TJI @ Shower for Depression
- **D3**: Cut TJI Support @ Shower
- **D6**: Beam Support North End

### GENERAL SHEET NOTES

- Framing at shower is modified for appropriate water drainage. TJI joists need to be reinforced and appropriate hangers. See detail drawings.
1. Create a box frame around the pipe penetration.

2. Appropriate TJI blocking is required at every footing. See detail drawing.
1. GLUE & NAIL FLOOR SHEATHING. NAIL COMPLETELY IMMEDIATELY AFTER GLUING.
2. MIN. SHEATH. WIDTH IS 2'-0".
3. MIN. SHEATH. AREA IS 4 SQ. FT.

FOR DIAPHRAGM SEE SCHEDULE

TYPICAL NAILING DIAPHRAGM

**DIAPHRAGM NAILING SCHEDULE**

<table>
<thead>
<tr>
<th>AREA</th>
<th>SHEATHING</th>
<th>MIN. BOARD</th>
<th>MAX. BOARD</th>
<th>EXPANSION JOINT</th>
<th>CAPACITY</th>
<th>DIMENSIONS</th>
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<tbody>
<tr>
<td>MIN. PANEL AREA</td>
<td>4 SQ. FT.</td>
<td>2'-0&quot;</td>
<td>2'-8&quot;</td>
<td>1/8&quot; +/-</td>
<td>1/8&quot;</td>
<td>3'-0&quot;</td>
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FOR E.N. @ HEADER, SILL, FULL HEIGHT KING STUD, SEE SCHEDULE

2'-8" MAX. OPENING DIMENSIONS, SEE ARCH & MECH. DRAWINGS FOR SIZES AND LOCATIONS.

HOLDOWN WHERE OCCURS, SEE PLANS

2X4 STUD

NOTE:

PANELS MAY BE INSTALLED EITHER HORIZONTALLY OR VERTICALLY

MIN. PANEL AREA 4 SQ. FT.

2X SOLID BLANKS @ STAGG'D HORIZ JOINTS
3X SOLID BLANKS @ CONT. HORIZ JOINTS OR AS REQ. PER SPEC

E.N.

INTERMEDIATE NAILING PROVIDE E.N. AT ALL POSTS, BUILT-UP STUDS AND NAILED ON STEEL FRAMING

3X4 SILL PLATE FOR SHEARWALL SCHEDULE, SEE SPEC

DOUBLE TOP PLATE

EDGE NAILING IN ADJACENT PANEL SHEETS

1/8" BETWEEN PANELS AT TIME OF INSTALLATION SHEATHING, PER SPEC JOIST, STUD, BLANKS, ETC.

**DIAPHRAGM NAILING SCHEDULE**

<table>
<thead>
<tr>
<th>SHEAR WALL</th>
<th>SHEATHING</th>
<th>MIN. BOARD</th>
<th>MAX. BOARD</th>
<th>EXPANSION JOINT</th>
<th>CAPACITY</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. PANEL AREA</td>
<td>12 SQ. FT.</td>
<td>2'-8&quot;</td>
<td>2'-10&quot;</td>
<td>1/8&quot; +/-</td>
<td>1/8&quot;</td>
<td>3'-0&quot;</td>
</tr>
</tbody>
</table>

FOR E.N. @ HEADER, SILL, FULL HEIGHT KING STUD, SEE SCHEDULE

2'-10" MAX. OPENING DIMENSIONS, SEE ARCH & MECH. DRAWINGS FOR SIZES AND LOCATIONS.

HOLDOWN WHERE OCCURS, SEE PLANS

2X4 STUD

NOTE:

PANELS MAY BE INSTALLED EITHER HORIZONTALLY OR VERTICALLY

MIN. PANEL AREA 4 SQ. FT.

2X SOLID BLANKS @ STAGG'D HORIZ JOINTS
3X SOLID BLANKS @ CONT. HORIZ JOINTS OR AS REQ. PER SPEC

E.N.

INTERMEDIATE NAILING PROVIDE E.N. AT ALL POSTS, BUILT-UP STUDS AND NAILED ON STEEL FRAMING

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<th>MAX. BOARD</th>
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<tr>
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<td>2'-8&quot;</td>
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<td>1/8&quot; +/-</td>
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FOR E.N. @ HEADER, SILL, FULL HEIGHT KING STUD, SEE SCHEDULE

2'-10" MAX. OPENING DIMENSIONS, SEE ARCH & MECH. DRAWINGS FOR SIZES AND LOCATIONS.

HOLDOWN WHERE OCCURS, SEE PLANS

2X4 STUD

NOTE:

PANELS MAY BE INSTALLED EITHER HORIZONTALLY OR VERTICALLY

MIN. PANEL AREA 4 SQ. FT.

2X SOLID BLANKS @ STAGG'D HORIZ JOINTS
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3X4 SILL PLATE FOR SHEARWALL SCHEDULE, SEE SPEC

DOUBLE TOP PLATE

EDGE NAILING IN ADJACENT PANEL SHEETS

1/8" BETWEEN PANELS AT TIME OF INSTALLATION SHEATHING, PER SPEC JOIST, STUD, BLANKS, ETC.
1. Skylight framing is tapered on all sides. Refer to Sheet A-315.
**NOTES:**

1. T = WALL STUD THICKNESS (E.G., FOR 2x4 STUDS, T=4.)

2. HEADERS SHALL BE DF #1.

3. FOR TYPICAL FRAMING DETAILS, SEE SCHEDULE AT BEARING WALLS AT NONBEARING WALLS

4. PRE-BORED "CLEARANCE HOLES" AND "LEAD HOLES" ARE REQUIRED FOR LAG BOLTS

5. PRE-BORED "CLEARANCE HOLES" AND "LEAD HOLES" SHALL BE DRILLED AS FOLLOWS:
   - 1. THE CLEARANCE HOLE FOR THE SHANK SHALL HAVE THE SAME DIAMETER AS THE SHANK, AND THE SAME DEPTH OF PENETRATION AS THE LENGTH OF UNTHREADED SHANK, "S." SEE TABLE AND DIAGRAM ABOVE.
   - 2. THE LEAD HOLE SHALL HAVE A LENGTH "T" AND A DIAMETER AS NOTED IN THE DIAGRAM AND TABLE ABOVE.
   - 3. LEAD HOLE OR CLEARANCE HOLES MAY NOT BE REQUIRED FOR 3/8" AND SMALLER DIAMETER LAG BOLTS, PROVIDED THAT EDGE DISTANCES, END DISTANCES, AND SPACING ARE SUFFICIENT TO PREVENT SPLITTING OF WOOD.
   - 4. THE LAG BOLTS SHALL BE INSERTED IN ITS LEAD HOLE BY TURNING WITH A WRENCH NOT BY DRIVING WITH A HAMMER.
   - 5. BEE'S WAX SHALL BE USED ON THE LAG BOLT OR IN THE LEAD HOLE TO FACILITATE INSERTION AND PREVENT DAMAGE TO THE LAG BOLT.

D **REQ. DIA. (INCH) OF CLEARANCE HOLE**

3/8" O

D **REQ. DIA. (INCH) OF LEAD HOLE**

1/2" O

5/8" O

3/4" O

7/8" O

1" O

D **SHEAR WALL REQUIREMENTS**

<table>
<thead>
<tr>
<th>SHEATHING</th>
<th>EDGE NAIL (E.N.)</th>
<th>SOLE NAIL (S.N.)</th>
<th>LSILL P</th>
<th>ANCHOR BOLTS</th>
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<tbody>
<tr>
<td>15/32&quot; CC STRUCT. I</td>
<td>10d @ 6&quot; O.C.</td>
<td>20d @ 6&quot; O.C.</td>
<td>10d @ 4&quot; O.C.</td>
<td>5/8&quot; O @ 3'-4&quot; O.C.</td>
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<tr>
<td>15/32&quot; CC STRUCT. I</td>
<td>10d @ 4&quot; O.C.</td>
<td>20d @ 4&quot; O.C.</td>
<td>10d @ 2'-8&quot; O.C.</td>
<td>5/8&quot; O @ 2'-8&quot; O.C.</td>
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**COMMENTS:**

SILL ~PL. SHALL BE 3x MEMBER, U.O.N.

**SHEAR WALL SCHEDULE**

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<th>SHEET TITLE</th>
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<td>Author</td>
<td>Checker</td>
<td>USC SCHOOL OF ARCHITECTURE</td>
<td>ISSUE DATE: 8/22/2013</td>
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</table>

**SECTION DETAIL**


2. THE LEAD HOLES SHALL HAVE A LENGTH "T" AND A DIAMETER AS NOTED IN THE DIAGRAM AND TABLE ABOVE.

3. LEAD HOLE OR CLEARANCE HOLES MAY NOT BE REQUIRED FOR 3/8" AND SMALLER DIAMETER LAG BOLTS, PROVIDED THAT EDGE DISTANCES, END DISTANCES, AND SPACING ARE SUFFICIENT TO PREVENT SPLITTING OF WOOD.

4. THE LAG BOLTS SHALL BE INSERTED IN ITS LEAD HOLE BY TURNING WITH A WRENCH NOT BY DRIVING WITH A HAMMER.

5. BEE'S WAX SHALL BE USED ON THE LAG BOLT OR IN THE LEAD HOLE TO FACILITATE INSERTION AND PREVENT DAMAGE TO THE LAG BOLT.

**BOLT TO WOOD MEMBER REQUIREMENTS**

<table>
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<th>BOLT TO WOOD MEMBER REQUIREMENTS</th>
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<td>ISSUE DATE: 8/22/2013</td>
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**PRE-BORED CLEARANCE HOLES AND LEAD HOLES ARE REQUIRED FOR LAG BOLTS**

**PRE-BORED CLEARANCE HOLES AND LEAD HOLES ARE REQUIRED FOR LAG BOLTS AS FOLLOWING:**


2. THE LEAD HOLES SHALL HAVE A LENGTH "T" AND A DIAMETER AS NOTED IN THE DIAGRAM AND TABLE ABOVE.

3. LEAD HOLE OR CLEARANCE HOLES MAY NOT BE REQUIRED FOR 3/8" AND SMALLER DIAMETER LAG BOLTS, PROVIDED THAT EDGE DISTANCES, END DISTANCES, AND SPACING ARE SUFFICIENT TO PREVENT SPLITTING OF WOOD.

4. THE LAG BOLTS SHALL BE INSERTED IN ITS LEAD HOLE BY TURNING WITH A WRENCH NOT BY DRIVING WITH A HAMMER.

5. BEE'S WAX SHALL BE USED ON THE LAG BOLT OR IN THE LEAD HOLE TO FACILITATE INSERTION AND PREVENT DAMAGE TO THE LAG BOLT.
1. OPERABLE SKYLIGHT ABOVE BATHROOM. SEE A-312 FOR DETAILS
2. OPERABLE SKYLIGHT ABOVE COURTYARD. SEE A-313 FOR DETAILS
3. VERSIFLEX ROOF DRAIN
4. VERSIFLEX OVERFLOW DRAIN
5. FALL RESTRAIN HOOK
6. SUNESTA SKYLIGHT SHADING
7. OPERABLE SKYLIGHT MOTOR

1. HOUSE AND FLEX SPACE ROOF TO BE EQUIPPED WITH FALL RESTRAINTS THAT COMPLY WITH SAFETY REQUIREMENTS
2. PIPES FOR ROOF DRAINS & OVERFLOW ARE BUILT INSIDE WALL AND MUST CONTAIN ALL SPILLAGE TO PREVENT RUNOFF ON THE SITE
1. Courtyard Skylight (Retractable)
2. Shower Skylight (Retractable)
3. Ceiling Cove
4. Ceiling Cove for Drapes
5. Aluminum Hood
6. Ceiling Mounted Speakers

A1 Reflected Ceiling Plan
WEST ELEVATION

1. EXTERIOR SKIN DRAWING IS FOR NOTATION, NOT ACTUAL. SEE WALL SECTIONS FOR DETAILS.
2. SUPPLY WATER TANKS ARE SHADED. SEE A-711 FOR DETAILS.
3. EXTERIOR CLADDING IS FOR NOTATION, NOT ACTUAL.

REFERENCE KEYNOTES

1. 1/4" = 1'-0"
2. A1
3. EAST ELEVATION
4. A-201
5. EXTERIOR ELEVATIONS
1. EXTERIOR SKIN DRAWING IS FOR NOTATION, NOT ACTUAL. SEE WALL SECTIONS FOR DETAILS.
2. SUPPLY WATER TANKS ARE SHADED. SEE A-711 FOR DETAILS.
3. EXTERIOR CLADDING IS FOR NOTATION, NOT ACTUAL.
1. Ceiling cove for LED uplight.
2. Ceiling mounted speakers.
3. Green wall.
2X8 JOISTS @ 16" O.C.
WOOD FLOOR DECKING
TREATED 2X4
BLOCKING
2X4 FRAMING
DBL 2X4 HEADER
BOSCH PV PANEL PER SPEC
50MM VERSIFLEX PVC
19/32" DIAPHRAGM
RIP STRIP
5/16 MINERIT HD CEMENT BOARD
19/32" OSB
PROSOCO CAT5 MEMBRANE
A-320
A1
A-320
A5
ALUMINUM SLIDING DOOR
WOOD FLOORING
C12X20.7
DBL 2X8 HEADER
1/2" GYPSUM WALLBOARD
19/32" OSB
BOSCH PV PANEL PER SPEC
UNIRAC EVOLUTION RACKING
WOOD FLOOR DECKING
TREATED 2X4
BLOCKING
2X4 FRAMING
DBL 2X4 HEADER
BOSCH PV PANEL PER SPEC
50MM VERSIFLEX PVC
19/32" DIAPHRAGM
RIP STRIP
5/16 MINERIT HD CEMENT BOARD
19/32" OSB
PROSOCO CAT5 MEMBRANE
A-320
A1
A-320
A5
CUTOUT SKYLIGHT SECTION

A1 BATHROOM SKYLIGHT SECTION

A4 TYPICAL WALL SECTION WITH LIGHT COVE

1" = 1'-0"
1. Luminaries shall be installed in accordance with NEC 410.10(A)(D).

2. Luminaries placed in clothes closets will be installed in accordance with NEC 410.16(A)(B) (C) and NEC 410.18.
SEISMIC PIER ELEVATION CHANGE DETAIL

SEISMIC PIER DETAIL

SEISMIC PIER IS ADJUSTABLE AND IS AN ADEQUATE SHIMMING METHOD IN THE EVENT THAT THE 18" OF VERTICAL CHANGE ARE PRESENT ON THE ORANGE COUNTY GREAT PARK COMPETITION SITE.
## DOOR SCHEDULE

<table>
<thead>
<tr>
<th>MODEL #</th>
<th>MANUFACTURER</th>
<th>MARK LOCATION</th>
<th>HEIGHT</th>
<th>TYPE</th>
<th>WIDTH</th>
<th>THICKNESS</th>
<th>FINISH</th>
<th>MATERIAL</th>
<th>HEAD JAMB</th>
<th>SILL</th>
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<td>SCHEDULED FRAME OR PANELS SLIDE INTO WALL CAVITY WHEN OPENED</td>
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### SOUTH ENTRY DOOR

- **Model #**: 01
- **Manufacturer**: DBL GLAZED LOW E INSULATED TEMP.
- **Type**: SLIDING
- **Height**: 9'-10" (Net Frame)
- **Width**: 8'-6"
- **Material**: NANAWALL SL45
- **Frame**: A1/A-317
- **Finish**: A1/A-317

### NORTH ENTRY DOOR

- **Model #**: 03
- **Manufacturer**: DBL GLAZED LOW E INSULATED TEMP.
- **Type**: SLIDING
- **Height**: 9'-11 1/4" (Net Frame)
- **Width**: 6'-3 3/4"
- **Material**: FLEETWOOD 1070EX
- **Frame**: A2/A-317
- **Finish**: A2/A-317

### INTERIOR DOOR

- **Model #**: 07
- **Manufacturer**: DBL GLAZED LOW E INSULATED TEMP.
- **Type**: HINGED
- **Height**: 8'-7 1/4"
- **Width**: 4'-2"
- **Material**: DOOR AMERICA
- **Frame**: A3/A-315
- **Finish**: A3/A-315

### MECHANICAL

- **Model #**: 08
- **Manufacturer**: DBL GLAZED SOLARBAN 60 CLEAR
- **Type**: POCKET
- **Height**: 7'-9 1/4"
- **Width**: 2'-6 1/8"
- **Material**: 1050EX

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### APPLIANCE AND ROOM FINISH SCHEDULE

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### TEAM NAME:
TEAM USC

### ADDRESS:
UNIVERSITY OF SOUTHERN CALIFORNIA
WATT HALL 204 LOS ANGELES, CA 90089-0291 (213) 740-2723

### PROJECT MANAGER:

### CONTACT:
FACULTY ADVISOR:

### CLIENT:
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON 2013
WWW.SOLARDECATHLON.GOV
NOTE:
ALL PRIMARY SUPPLY WATER TANKS ARE FULLY SHADED FROM DIRECT SOLAR RADIATIONS BETWEEN 9AM AND 5PM DURING COMPETITION.

ENLARGED WATER TANK COVER PLAN

SECTION THROUGH SHADE STRUCTURE
GENERAL SHEET NOTES

1. The area of coverage of a single sprinkler shall not exceed 400 square feet.
2. Spacing shall not exceed 20 feet.

SYMBOLS LEGEND

- SPRINKLER COVERAGE AREA
- SPRINKLER

REFERENCE KEYNOTES

SERVICE LINE
- FIRE SPRINKLER COVERAGE - PLAN

MARK DATE DESCRIPTION
- PRODUCED BY AN AUTODESK STUDENT PRODUCT
- PRODUCED BY AN AUTODESK STUDENT PRODUCT
- PRODUCED BY AN AUTODESK STUDENT PRODUCT
- PRODUCED BY AN AUTODESK STUDENT PRODUCT
LANDSCAPE SITE PLAN

1. LIVING WALL SYSTEM

REFERENCE KEYNOTES

PRODUCED BY AN AUTODESK STUDENT PRODUCT
GENERAL SHEET NOTES

SHEET KEYNOTES

1. GREENSCREEN
2. ELEVATED LANDSCAPE TECHNOLOGIES (E-WALL)
3. G-SKY GREEN WALL PANELS
4. JACOB ROPE SYSTEM

REFERENCE KEYNOTES

SHEET TITLE

LOT NUMBER:

DRAWN BY:

CHECKED BY:

COPYRIGHT:

CLIENT

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

TEAM NAME:

ADDRESS:

CONTACT:

USC SCHOOL OF ARCHITECTURE

PROJECT MANAGER:

FACULTY ADVISOR:

SHEET TITLE

L-102

LANDSCAPE PLAN

USC_11

Author
Checker

TEAM USC

UNIVERSITY OF SOUTHERN CALIFORNIA

WATT HALL 204 LOS ANGELES, CA90089-0291 (213) 740-2723

PRODUCED BY AN AUTODESK STUDENT PRODUCT
1. Water supply pipe
2. 4" Gray water drainage pipe
3. 4" Black water drainage pipe
4. 4" Rain water overflow drainage pipe
5. 4" Rain water drainage pipe

3/16" = 1'-0"
1. The Domestic Water Supply pump provides pressurized municipal water to the house as well as the fire sprinkler system.

2. All plumbing to be PEX piping or to meet code requirements.

3. All plumbing to be sized to meet code requirements.

4. All storage tanks and associated plumbing for competition purposes only.

5. Supply and fire suppression pumps and associated pressure tanks for competition purposes only.

SUPPLY WATER
WATER SUPPLY PUMP
COLD WATER
HOT WATER
PIPE RISE UP
PIPE DROP DOWN
PIPE CONNECTION TOP

DOMESTIC WATER TANK
DIRECT LINE DIAGRAM
DOMESTIC WATER TANK

DOMESTIC WATER HEATER

DO NOT SCALE DRAWING TO MEET CODE
WATER SUPPLY TANK CONNECTION LINES 4"

DOMESTIC WATER TANK

PRODUCED BY AN AUTODESK STUDENT PRODUCT

PRODUCED BY AN AUTODESK STUDENT PRODUCT

PRODUCED BY AN AUTODESK STUDENT PRODUCT
1. Rainwater Overflow Drain
2. Rainwater pipe sloped at 2%

1. All plumbing to be PEX piping or to meet code requirements.
2. All drains sloped to meet code requirements.
3. All storage tanks and associated plumbing for competition purposes only.

Waste Water Storage
Rainwater Overflow Tank
Rainwater Drainage Plan

Symbols Legend
- Rainwater Storage
- Rainwater
- Rainwater Overflow

Reference Keynotes
- PE02 Rain Overflow Collection Tank
- PE03 Rain Water Collection Tank

Team Name: USC
Address: University of Southern California
Watt Hall 204
Los Angeles, CA 90089-0291
(213) 740-2723

Project Manager: [Name]
Faculty Advisor: [Name]

Rainwater Drainage Plan
1. Graywater cannot be stored or held for more than 24 hours.

Domestic Water Tank 32.12.53
Solar Pump Station 31.94.00
Solar Plate Collector 23.56.00
Solar Pump Station 23.56.00
Solar ICT 23.56.00
Domestic Water Heater 32.33.00

To Plumbing Fixtures

A1 GRAY WATER REUSE SYSTEM
A3 GRAY WATER REUSE - PLAN
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### PLUMBING EQUIPMENT SCHEDULE

<table>
<thead>
<tr>
<th>MARK</th>
<th>DESCRIPTION</th>
<th>LOCATION</th>
<th>MANUFACTURER</th>
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<tbody>
<tr>
<td>PE01</td>
<td>CR-140-APROOF 23 56 00SOLAR FLAT PLATE COLLECTOR AO SMITH</td>
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<td>RAIN WATER OVERFLOW TANK 22 14 53 30&quot; x 20&quot; x 10&quot;</td>
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<td>DAIKIN ALTHERMA</td>
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<td>PE05</td>
<td>DOMESTIC WATER HEATER EKHWS080BA3VJU 79.2 GALLON TANK</td>
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1. UNIT
2. HEAT EXCHANGER
3. PUMP
4. SHUT-OFF VALVE
5. PIPE MANIFOLD
6. MOTORIZED 3-WAY VALVE
7. BOOSTER HEATER
8. HEAT EXCHANGER COIL
9. DOMESTIC HOT WATER TANK
10. SOLAR KIT
11. SOLAR PUMPING STATION
12. SOLAR COLLECTOR

MECHANICAL SCHEMATIC DESIGN

SYMBOL LEGEND

REFERENCE KEYNOTES

GENERAL SHEET NOTES
GENERAL NOTES:
1. All electrical work shall be performed in strict accordance with the National Electrical Code, local codes, and all other work.
2. Drawings indicate the general arrangement of circuits and outlets, locations of switches, panelboards, conductors, and other work.
3. All electrical materials shall be new and shall be listed by the Underwriter Laboratories, Inc. All defective equipment or equipment damaged in the course of installation or testing shall be replaced or repaired in a manner meeting the approval of the architect and engineer. Where applicable, all equipment shall be in accordance with NEMA standards.

WIRING METHODS:
1. All conductors shall be copper, conforming to the latest requirements of the National Electrical Code, stranded for No. 8 AWG and larger, solid for No. 10 AWG and smaller.
2. Minimum side conductor shall be No. 16 AWG.
3. All non-Romex conductors shall be color coded in accordance with the National Electrical Code.
4. Grounding of the entire electrical system shall be in accordance with the National Electrical Code and as indicated in drawings.
5. Photovoltaic connection shall be Enphase Engage interconnection cable.
6. All conduit and wiring shall be concealed in ceilings and/or walls unless specifically noted otherwise.
7. Provide access panels where required for proper access to conduits, wires, and terminals. All conduit and wiring shall be new and shall be approved by the architect.

WIRING DEVICES:
1. All wiring devices shall be provided as located in the architectural plans, and as identified in the symbols list.
2. All outlet boxes shall be of sufficient size to accommodate the wiring devices and wiring to be installed.
3. Outlet boxes for wiring devices in finished walls shall be one piece standard gang type of size to accommodate number of devices noted. Boxes shall have plastic covers to bring box opening flush with finished wall or not more than 1/4" in back of same.
4. Wiring devices of the same or similar type shown adjacent to each other on the drawing shall be installed in a multi-ganged outlet box and under a common cover plate. Refer to all applicable notes.

LIGHTING FIXTURES:
1. Refer to architectural reflected ceiling plan and fixture arrangement in all areas.
2. Refer to architectural plans for fixture specification.
3. Notify architect of any lighting layout interference with structural members, and/or mechanical equipment before installation.

ELECTRICAL SHEET LIST

E-001 NOTES AND SYMBOLS
E-011 MICRO-GRID INTERCONNECTION PLAN
E-093 ELECTRICAL COMPONENT PLAN
E-094 RECEPTACLE PLAN
E-103 LIGHTING PLAN
E-104 PV ARRAY PLAN
E-105 PV ARRAY PLAN
E-106 PV ARRAY PLAN
E-201 ELECTRICAL CLOSET SECTION
E-202 TIMELINE DIAGRAM
E-301 PANEL BOARD SCHEDULE
E-302 BOSCH PV ONE LINE DIAGRAM
1. THE ORGANIZERS SHALL SUPPLY 150A 240/120V, 60HZ SINGLE PHASE, 3-WIRE SERVICE

2. EACH TEAM SHALL PROVIDE AND INSTALL THE CABLES (AWG 2/0 COPPER) FROM THE TEAM'S MAIN DISCONNECT VIA THE TEAM METER HOUSING TO THE BOTTOM (PLUS 3' ADDITIONAL) OF THE ORGANIZER'S JUNCTION BOX ON THE ORGANIZER UTILITY PANEL NEAR THE TEAM'S PROPERTYLINE.

3. THE CABLES TO AND FROM THE ORGANIZER UTILITY PANEL WILL BE GROUND LAID. ALL TEAMS SHALL BE RESPONSIBLE FOR PROTECTING GROUND-LAID CABLE FROM DAMAGE AND PREVENTING A TRIPPING HAZARD.

4. TEAM METER HOUSING SHALL BE LOCATED BETWEEN 50" AND 65" ABOVE GRADE OR ACCESSIBLE WALKING SURFACE TO QUALIFY FOR MICROGRID INTERCONNECTION APPROVAL.

5. ORGANIZERS SHALL SUPPLY AND INSTALL UTILITY METER.

6. TEAM SHALL PROVIDE ORGANIZER ACCESS TO THE TEAM PANELBOARD AND ONE KNOCK OUT TO ALLOW ORGANIZER INSTALLATION OF PV COVERING SENSORS.

7. ORGANIZER SHALL MAKE FINAL CONNECTION AT ORGANIZER UTILITY PANEL.

8. PANEL BOARDS SHALL BE RATED 10,000 AIC MINIMUM.

9. NEC SERVICE DISCONNECTION MEANS SHALL BE INSTALLED IN A READILY ACCESSIBLE LOCATION IN ACCORDANCE WITH NEC 230.70 (A)(1).


11. SWITCHES AND CIRCUIT BREAKERS SHALL BE LOCATED SUCH THAT THEY COMPLY WITH NEC 404.8. THE CENTER OF THE GRIP OF THE OPERATING HANDLE OF THE SWITCH OR CIRCUIT BREAKER, WHEN IT IS IN ITS HIGHEST POSITION, IS NOT MORE THAN 6FT 7 IN ABOVE THE FLOOR OR WORKING PLATFORM.

1. ORGANIZER SUPPLIED GROUNDING LOOP IN ACCORDANCE WITH IRC E3608.1 ROD AND PIPE ELECTRODES.

2. TEAM-SUPPLIED METER HOUSING.

3. 1" HOLE ON MECHANICAL ROOM FLOOR FOR HOOK UP TO ORGANIZER PANEL BOARD.

4. INSTALLATION ROUTE FOR 2/0 COPPER POWER CABLES.

5. ORGANIZER UTILITY CONNECTION-150A/240V/60HZ, 3 WIRE SERVICE.

6. JUNCTION BOX LOCATED UNDERNEATH FLOOR.
Provide data cable drops for energy monitoring and control of HVAC, electrical, water, PV and other systems as required.

Symbols Legend:
- CHF: Domestic water heater
- CR: Dishwasher
- FB: Refrigerator
- SR: Solar PV
- PCU: FAN COIL UNIT
- SP: Surround sound speakers
- SWP: WasHER/DryER
- MBC: MONOBLOC
- CV: Crestron keypad
- SW: Subwoofer
- LCP: Lighting Control Panel
- PR: Projector

General Sheet Notes:
1. Electrical equipment shall be installed in accordance with 110.26. Sufficient access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment.
2. Outdoor electrical equipment shall be installed in suitable enclosures and shall be protected from accidental contact by unauthorized personnel.
3. The service disconnecting means shall be installed in accordance with 230.70 (A)(1).
4. Switches and circuit breakers shall be located such that they comply with NEC 404.8. The center of the grip of the operating handle of the switch or circuit breaker when its highest position is not more than 6 ft 7 in. above the floor or working platform.
5. Permanently connected motor-driven appliances of more than 1/8 horsepower shall comply with 422.32. The switch or circuit breaker shall be located within sight from the appliance.
6. Lighting outlet locations shall comply with 210.70.1.

Sheet Keynotes:
1. HVAC Disconnect
2. Instant water heater disconnect
3. Dishwasher disconnect install below sink.
4. All equipment located in cabinets.

Reference Keynotes:
22 12 19: Facility: ground-mounted, potable water storage tanks
23 34 00: HVAC Fans
23 56 00: Solar energy heating equipment
26 05 33.07: Main electrical panel

E-102
1. ALL RECEPTACLES INSTALLED IN (2) BATHROOMS (2) OUTDOOR STORAGE AREAS (2) OUTDOORS (6) KITCHENS SHALL COMPLY WITH NEC 210.8 (A).

2. ALL RECEPTACLES ARE LOCATED IN ACCORDANCE WITH NEC 210.52.

3. 210.63 ALL 125-VOLT, SINGLE PHASE, 15 OR 20 AMPERE RATED RECEPTACLE OUTLET SHALL BE INSTALLED AT AN ACCESSIBLE LOCATION FOR THE SERVICING OF HEATING, AIR CONDITIONING, AND REFRIGERATION EQUIPMENT.

4. ALL RECEPTACLES INSTALLED ARE TAPER RESISTANT IN ACCORDANCE WITH NEC 406.11.

5. ALL RECEPTACLES INSTALLED IN WET LOCATIONS AND BATHROOMS SHALL COMPLY WITH NEC 406. (B)(1) AND 410.10(A)(D).


1. THE DISHWASHER RECEPTACLE WILL BE INSTALLED UNDERNEATH THE KITCHEN SINK. VERIFY EXACT LOCATION AND PROVIDE FINAL CONNECTIONS AS REQUIRED.

2. RECEPTACLE SHALL BE PLACED IN THE CEILING ABOVE.

3. SWITCH OUTLET OF GARBAGE DISPOSAL.

4. LOCATED IN CASE WORK.

5. ALL SWITCHES ARE CRESTRON KEYPAD.
1. LUMINARIES SHALL BE INSTALLED IN ACCORDANCE WITH NEC 410.10(A)(D).
2. LUMINARIES PLACED IN CLOTHES CLOSETS WILL BE INSTALLED IN ACCORDANCE WITH NEC 410.16(A)(B)(C) AND NEC 410.18.
3. FOR LUMINARIES SYMBOLS LEGEND REFER TO SHEETS A-121 AND E-001.

1. OPEN TO SKYLIGHT ABOVE
2. ALL SWITCHES ARE CRESTRON KEYPAD

LIGHTING PLAN

LIGHT SWITCHING PLAN

26 24 16  MAIN PANEL BOARD

0' 1/4" = 1'-0"
1. Installation and service of array shall comply with NEC 690.18. Open circuiting, short circuiting, or opaque covering shall be used to disable an array or portions of an array for installation and service.

2. Wiring methods of array shall comply with NEC 690.31. Where photovoltaic source and output circuits operating at maximum system and output circuits operating at voltages greater than 30 volts are installed in ready accessible locations, circuit conductors shall be installed in a raceway.
1. CABLES AND CONDUIT SHALL BE SECURED IN ACCORDANCE WITH 334.30 SECURED BY STAPLES, CABLE TIES, STRAPS, HANGERS OR SIMILAR FITTINGS DESIGNED AND INSTALLED SO AS NOT TO DAMAGE THE CABLE AT INTERVALS NOT EXCEEDING 4.5 FT AND WITHIN 12 IN OF EVERY OUTLET BOX, AND JUNCTION BOX, CABINET OR FITTING.

2. NEC 609.34 ACCESS TO BOXES JUNCTION, PULL, AND OUTLET BOXES LOCATED BEHIND MODULES OR PANELS SHALL BE INSTALLED THAT THE WIRING CONTAINED IN THEM CAN BE RENDERED ACCESSIBLE DIRECTLY OR BY REPLACEMENT OF A MODULE(S).

3. CONDUCTOR AMPACITIES SHALL BE DERATED IN ACCORDANCE WITH 310.15 (B)(2) FOR THOSE IN CONDUIT EXPOSED TO SUNLIGHT.
1. TEAMS SHALL PROVIDE A TEAM METER HOUSING THAT WILL ACCEPT A STANDARD 4-JAW RING-LESS, ROUND UTILITY-GRADE SOCKET METER FOR USE WITH 240/120V SERVICES.

2. THIS METER MUST BE LOCATED BETWEEN 50" AND 65" ABOVE GRADE OR ACCESSIBLE WALKING SURFACE TO QUALIFY FOR MICROGRID INTERCONNECTION APPROVAL.

3. TEAM TO PROVIDE ORGANIZER ACCESS TO THE TEAM PANEL BOARD AND ONE KNOCK-OUT TO ALLOW ORGANIZERS INSTALLATION OF PV MONITORING SENSORS.

4. SWITCHES AND CIRCUIT BREAKERS SHALL BE LOCATED SUCH THAT THEY COMPLY WITH NEC 404.8. THE CENTER OF THE GRIP OF THE OPERATING HANDLE OF THE SWITCH OR CIRCUIT BREAKER, WHEN ITS HIGHEST POSITION IS NOT MORE THAN 6FT 7 IN. ABOVE THE FLOOR OR WORKING PLATFORM.
1. ALL WIRES SIZE #12 AWG NM-B ROMEX UNLESS OTHERWISE NOTED.
2. ALL BREAKERS ARE SINGLE POLE 15 AMP UNLESS OTHERWISE NOTED.

DIVISION 22 PLUMBING
22.11.23 BOOSTER PUMP
22.14.29 SUMP PUMP WITH HOLDING TANK
22.33.30 HEAT PUMP RETROFIT DOMESTIC WATER HEATER

DIVISION 23 HVAC
23.20.00 OUTDOOR HEAT PUMP AND INDOOR HEAT PUMP
23.84.00 BATHROOM FAN

DIVISION 26 ELECTRICAL
26.05.33 METER SOCKET
26.09.00 OCCUPANCY SENSORS
26.24.16 MAIN PANEL BOARD AND CIRCUIT BREAKERS
26.31.00 PHOTOVOLTAIC COLLECTORS AND PHOTOVOLTAIC ACCESSORIES
26.50.00 LIGHTING FIXTURES

DIVISION 27 COMMUNICATIONS
27.22.00 MOTION-SENSING TECHNOLOGY AND CONTROLLERS

SYMBOL LEGEND
AFCI
AFCI
AFCI
AFCI
AFCI

REFERENCE KEYNOTES
01-51 PLUMBING
02-10 ELECTRICAL
02-21 ELECTRICAL
02-45 ELECTRICAL
03-03 ELECTRICAL
03-05 ELECTRICAL
04-01 ELECTRICAL
05-01 ELECTRICAL
06-01 ELECTRICAL
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39-01 ELECTRICAL
40-01 ELECTRICAL
41-01 ELECTRICAL
42-01 ELECTRICAL

ONE-LINE ELECTRICAL DIAGRAM
1. PV design will comply with Lumos LSX 250 series maximum quantity (13) of micro-inverters per 240W branch unit.

END CAP INSTALLED ON FINAL INVERTER CABLE OF BRANCH CIRCUIT

ENPHASE M215 (240V)
215W MICRO-INVERTER

ENPHASE ENVOY COMMUNICATION GATEWAY

BOSH SOLAR MODULE
C-Si MINI/NA2117

JUNCTION BOX
10 AWG USE-2,
5/8in-2

2 POLE 15 AMP CIRCUIT BREAKER PER BRANCH CIRCUIT

10 AWG THHN/THWN-2 WHITE
12 AWG THHN/THWN-2 GREEN

10 AWG USE-2/RHW-2

L1 BLACK
L2 RED

NEUTRAL GROUND L1 BLACK
L2 RED

10 AWG THHN/THWN-2 (ENPHASE ENGAGE AC INTERCONNECT CABLE W/ INTEGRATED CONNECTORS)

12 AWG THHN/THWN-2 (ENPHASE ENGAGE AC INTERCONNECT CABLE W/ INTEGRATED CONNECTORS)
**GENERAL SHEET NOTES**

1. MAIN PANEL BOARD SELECTION SHALL COMPLY WITH NEC 220.82.

2. MAIN PANEL BOARD SELECTION SHALL COMPLY WITH NEC 220.82.

3. PERMANENTLY CONNECTED MOTORS (DRIVING GRINDERS, ELEVATORS, ETC.) SHALL BE SEPARATELY DERATED, 100% OF AIR CONDITIONING, 100% OF HEATING LOAD.

4. 65% OF 9660 VA (HEATING LOAD) + 100% OF AIR CONDITIONING.

5. D) + E) + F)

6. 100% OF AIR CONDITIONING

7. 65% OF 9660 VA (HEATING LOAD)

8. FIRST 10kVA

9. 40% OF 23000 VA

10. SUM OF 1 & 2

11. 1. D) + E) + F)

12. 1. A) + B) + C)

13. 100% OF AIR CONDITIONING

14. 65% OF 9660 VA (HEATING LOAD)

15. FIRST 10kVA

16. 40% OF 23000 VA

17. SUM OF 1 & 2

18. A) + B) + C)

19. D) + E) + F)

20. FEEDER AMPERAGE

21. FEEDER CALCULATION

22. SOLAR SUB PANEL

23. MAIN PANEL SCHEDULE

24. SHEET KEYNOTES

25. REFERENCE KEYNOTES

**SOLAR SUB PANEL**

**FEEDER CALCULATION**

**MAIN PANEL SCHEDULE**

**SOLAR SUB PANEL**
1. AV equipment in cabinet provide ventilation and cable management.
1. WATER DELIVERY TO BE RECEIVED THROUGH ACCESS HATCH ON SOUTHEAST DECK; 1470 GALLONS REQUESTED.

2. ACCESS HATCHES TO SUPPLY AND REMOVAL VALVES TO BE MINIMUM OF 12" X 12" SQUARE, WITH AT LEAST 8 FEET OF CLEARANCE ABOVE WHEN HATCH IS OPEN.

3. POTABLE WATER TANKS HAVE TOTAL CAPACITY OF 1470 GALLONS.

4. GRAY WATER TANKS HAVE TOTAL CAPACITY OF 508 GALLONS.

5. BLACK WATER TANKS HAVE TOTAL CAPACITY OF 97 GALLONS.

6. RAIN WATER TANKS HAVE TOTAL CAPACITY OF 100 GALLONS.

7. REMAINING WATER IN POTABLE TANKS TO BE PUMPED TO GRAY WATER TANKS FOR REMOVAL DAY.

8. WATER REMOVAL VALVE LOCATED ON SOUTHWEST FACADE, ESTIMATED QUANTITY TO BE REMOVED: APPROXIMATELY 1500 GALLONS.

9. SERIES OF TANKS, LINKED TOGETHER, WILL HAVE A MIN. 4" PIPE INTERCONNECTING THEM AND A MIN. 4" FILL PIPE.
NOTE: CUTOUT BOTTOM OF CABINET BELOW RACK AND ABOVE KICK PLATE FOR VENTILATION.

1/2" BACKING

KICK PLATE BELOW

D1 ENTR. CAB. CRESTRON EQUIP. COMPARTMENT PLAN

A1 ENTERTAINMENT CABINET CARCASS

NOTE: CUTOUT BOTTOM OF CABINET BELOW RACK AND ABOVE KICK PLATE FOR VENTILATION.
55" FLAT SCREEN LED TV

NOTE: USE CLUTCH BLUMOTION HINGES FOR ALL DOORS.

NOTE: HOLES TO BE CUT AT 3 1/8" DIAMETER

LED LIGHTING

CUTOUT

BACKING TO MOUNT SPEAKER

SENSOR

SUBWOOFER

ENTERTAINMENT CABINET

TEAM USC
UNIVERSITY OF SOUTHERN CALIFORNIA
WATT HALL 204 LOS ANGELES, CA 90089-0291 (213) 740-2723

PROJECT MANAGER:
FACULTY ADVISOR:

Z-113

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

TEAM NAME:
ADDRESS:
CONTACT:

MARK DATE DESCRIPTION

PRODUCED BY AN AUTODESK STUDENT PRODUCT

1" = 1'-0"
NORTH PORCH
(4) 2x10

EAST PORCH
(4) 2x10
(6) 2x8

SOUTH PORCH
(2) 2x10
(1) 2x8

INSIDE

OUTSIDE

DECKING SPACERS

QUANTITY TAKEOFF

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