As-Built Construction Drawings
Team Middlebury
US Department of Energy
2013 Solar Decathlon

August 22, 2013
midsd@middlebury.edu
FINISHED SQUARE FOOTAGE COMPLIANCE PLAN

1. FINISHED AREA: 971 SQUARE FEET. FINISHED SQUARE FOOTAGE CALCULATIONS BASED ON AS-BUILT MEASUREMENTS, BUT MAY VARY FROM THE FINISHED SQUARE FOOTAGE OF THE HOUSE AS BUILT AT THE COMPETITION SITE DUE TO CONSTRUCTION TOLERANCES.

2. DIMENSIONS ARE TAKEN FROM EXTERIOR FINISH FACE OF WALLS AT T.O. FINISH FLOOR LEVEL.
Window size and height "means of egress" 4'W x 4'H x 36" off the floor

Farthest distance to travel: 184' 6 1/2"

Organizer equipment panel during competition.
ORGANIZER EQUIPMENT PANEL DURING COMPETITION THE ELECTRICAL CABLES STRINGING FROM THE ORGANIZER EQUIPMENT PANEL TO THE HOME SHALL BE PROTECTED BY A SLIP RESISTANT COVER WHEN INTERSECTING WITH TOUR ROUTE.

ADA TOUR ROUTE COMPLIANCE PLAN

1. THE PATH/5 POINTS
2. WELCOME TO THE HOME
3. LIVING SPACE
4. QUICK TURN-AROUND
5. PUBLIC SPACE CONT.
6. MECHANICAL MODULE
7. MASTER BEDROOM
8. GREEN ROOF
9. FAREWELL

GENERAL SHEET NOTES

TOUR ROUTE STATIONS
1. THE PATH/5 POINTS
2. WELCOME TO THE HOME
3. LIVING SPACE
4. QUICK TURN-AROUND
5. PUBLIC SPACE CONT.
6. MECHANICAL MODULE
7. MASTER BEDROOM
8. GREEN ROOF
9. FAREWELL

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CLIENT: U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON 2013
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TEAM INSITE
TEAM INSITE

ARCHITECTURE
A. MURRAY, A. NELSON
VERMONTINTEGRATEDARCHITECTURE.COM

ENGINEERING
G. SELLERS
CONSULTANTS

ADA TOUR ROUTE COMPLIANCE PLAN

MARK DATE DESCRIPTION

80% COMPLETE SUBMISSION
100% CONSTRUCTION DOCUMENTATION
AS BUILT DOCUMENTATION

G-103

1/4" = 1'-0"
1. OSHA compliant guardrails around upper roof, across mechanical module roof, and tank cover roof, at locations indicated.
HSS 4x4x1/2 STEEL COLUMNS
W6X12 STEEL CROSS PIECES
W8X15 STEEL TOP BENT

PERSONAL FALL ARREST SYSTEM DESIGN FOR TWO PERSONAL FALL ARREST SYSTEMS PER STRUCTURE, ONLY ONE ANCHOR PER BEAM AT A TIME.

W6X12 AND W8X15 BEAMS OKAY FOR ALL ASSOCIATED FORCES ASSOCIATED WITH ONE PFAS ANCHOR (AT LEAST 5,000LBS), STRUCTURES OKAY FOR ALL FORCES ASSOCIATED WITH TWO PFAS ANCHORS (AT LEAST 10,000LBS)

SEE STRUCTURAL CALCULATIONS - PROJECT MANUAL PAGE 103 (SOLAR ARRAY STRUCTURE SECTION)

WORKER SHALL NEVER BE MORE THAN 4' FROM THEIR ANCHOR, SO FREE FALL IS LIMITED TO 6' (SRL LIMITS FALL TO 2')

ENSURE 100% COVERAGE BY EMPLOYING A TWO LEAD SYSTEM AND CLIPPING INTO THE SECOND ANCHOR BEFORE UNCLIPPING THE FIRST ANCHOR. TRANSITION BETWEEN PARALLEL W6X12 BEAMS AT W8X15 BEAM.

ANCHORS ARE PASS THROUGH SLINGS THAT SLIDE PARALLEL TO WORKER, NEVER MORE THAT 15 DEGREES FROM ANCHOR TO AVOID SWING FALL.

W6X12 BEAMS W8X15 BEAM 4X6 CEDAR PURLINS COLUMN CLAMPS SEE S-503 SECTIONS 5 & 6

W6X12 BEAMS W8X15 BEAM 4X6 CEDAR PURLINS 1/2" BOLTS

IN ADDITION TO OUR PFAS, THE ADJUSTABLE INTEGRATED SCAFFOLD PROVIDES AN IDEAL PLATFORM FROM WHICH TO MOUNT THE PV MODULES. UP TO 2 PEOPLE AND 750LBS ON PLATFORM. NO GUARDRAIL NECESSARY BECAUSE WORKERS ANCHORED TO PFAS. WORKERS CAN STAND ON PLATFORM WHILE SETTING TRANSITIONAL SECOND ANCHOR ON W8X15 BEAM TO MOVE BETWEEN W6X12 BEAMS.

1'-6" 1'-5" 3'-6" 8" 1'-6" 6" 6"
NOTE: (2) 1" dia. x MIN. 42" LONG DRILLED ANCHORS REQUIRED AT EACH BEARING PLATE AT THE SOLAR WALKWAY. REFER TO S-701 FOR ADDITIONAL INFORMATION
PLANTING SCHEDULE

<table>
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<tr>
<td>ABEHMOSCHUS ESCULENTUS (OKRA)</td>
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<td>CALENDULA (MARIGOLD)</td>
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<tr>
<td>CEANOTHUS LEUCODERMIS (WHITE BARK CALIFORNIA LILAC AND CHAPARRAL WHITE-THORN)</td>
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<td>ENCELIA CALIFORNICA (BUSH SUNFLOWER)</td>
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<td>FESCUTCA GLAUCA (BLUE FESCUE)</td>
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<td>LAVENDULA (LAVENDER)</td>
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<tr>
<td>MATRICARIA RECUTITA (CHAMOMILLE)</td>
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<td>MENTHA (MINT)</td>
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<td>MYRICA CALIFORNICA (PACIFIC WAX MYRTLE)</td>
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<td>ROSMARINUS OFFICINALIS (ROSEMARY)</td>
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<td>SALVIA CLEVELANDII (BLUE SAGE)</td>
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<tr>
<td>SEDUM MIS FLATS</td>
</tr>
<tr>
<td>SOLANUM LYCOPIERCUS (TOMATOES)</td>
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<tr>
<td>TROPAEOLUM (NASTURTIUM)</td>
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# GENERAL NOTES

1.  **ология**

2. ** Structural Steel**

3. ** Product Certifications**

4. **Structure Details**

5. **Welding Details**

6. **Fasteners**

7. **Field Work**

8. **Quality Assurance**

9. **Safety Measures**

10. **Signatures**

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# ROUGH CARPENTRY

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# BASIS OF DESIGN

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# SHEATHING SCHEDULE

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# FRAMING SCHEDULE

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NOTE: (2) 1" dia. x MIN. 42" LONG DRILLED ANCHORS REQUIRED AT EACH BEARING PLATE AT THE SOLAR WALKWAY. REFER TO S-701 FOR ADDITIONAL INFORMATION.
1. TYPICAL SUBFLOOR SHEATHING TO BE 3/4" THICK APA RATED PLYWOOD, SEE SHEATHING SCHEDULE ON S-001 FOR ADDITIONAL INFORMATION.
2. TOP OF SUBFLOOR SHEATHING ELEVATION = 1' - 11 1/4".
3. FASTEN NORTEX LEVELER MOUNTING PLATE TO PSL BEAM WITH (4) LAG SCREWS AFTER BEAM ADJUSTMENT HAS BEEN COMPLETED.
REFER TO S-2 FOR DROPPED BEAM AND LEVELER POST LOCATIONS

2x8 LEDGER

2' - 0" 7' - 5" 7' - 5" 3' - 5" 8' - 0" 7' -10" 4' - 4 1/2" 7' - 9" 4' - 4 1/2"

PT 2x10 AT 16"oc

18' - 3" 5' - 5 1/2" 23' - 8 1/2" 7' - 9"

2x8 AT 24"oc

C1 S-301

A1 S-302

C3 S-301

A3 S-303

A4 S-304

A3 S-303

A1 S-701

S-701

S-103
GENERAL SHEET NOTES:

1. BOTTOM OF ROOF PANEL ELEV. = 14' - 11 3/8".

2. TYPICAL EXTERIOR ROOF SHEATHING TO BE 5/8" THICK APA RATED PLYWOOD, SEE SHEATHING SCHEDULE ON S-001 FOR ADDITIONAL INFORMATION.
1/4" x 2" WIDE PLATE W-SHAPE BEAM, SEE PLAN

1' - 10" 0' - 11" 0' - 11"

MAX. ø 0' - 9 1/4"

3/16 TYP.

0' - 8" W-SHAPE, SEE PLAN

WOOD ROOF TRUSS, SEE PLAN

EXTERIOR ROOF SHEATHING

18" LVL, CONTINUOUS

INTERIOR ROOF SHEATHING

18" LVL, CONTINUOUS

EXTERIOR ROOF SHEATHING

WOOD BLOCKING BETWEEN ROOF PANELS

1/2" PLYWOOD

6"x8"x1/4" BENT PLATE WITH #12 WOOD SCREWS TO BLOCKING AND TRUSSES ALIGN CONTINUOUS LVL WITH BEAM BEARING POINT

WOOD BLOCKING WITH (2) WOOD SCREWS AT EACH END

3

0' - 8" 0' - 1" 0' - 4" 0' - 6" 0' - 6" 0' - 1" 0' - 4"

PT 2x DECK FRAMING, SEE PLAN

(4) 1/2" dia. LAG SCREWS AT EACH CONNECTION

PSL BEAM, SEE PLAN

PSL BEAM LOCATION AT SIM. (FOR MECHANICAL MOD LOCATIONS)

ELEVATION A-A

GRADE 0' - 0" T.O. FIN. FLOOR 2' - 0"

PT 2x RAMP JOIST, SEE PLAN

SHEATHING, SEE PLAN

SIMPSON L30 ANGLE ON OUTSIDE OF PERIMETER JOIST (TYP)

(2) 6x6, BOLTED TOGETHER

FACE MOUNT JOIST HANGER AT EACH JOIST

GRADE 0' - 0"

4x4x1/4 CONTINUOUS BENT PLATE

3/8" LAG SCREW AT 12"oc, MIN. 3-1/2" EMBEDMENT

4x4 BLOCKING BETWEEN STUDS, NOTCHED, REFER TO 1/S-6 FOR ATTACHMENT TO STUDS

4x4 AT 24"oc

INTERIOR ROOF SHEATHING

TJI WALL STUDS

CONTINUOUS BEVELED 1 1/4" LSL

CONTINUOUS BEVELED LVL RIM JOIST

EXTERIOR ROOF SHEATHING

ROOF TRUSS

WINDOW 2x6 AT 24"oc STUD WALL

(2) 2x6 POST IN CORNER (BEYOND)

LSL BOX BEAM, SEE C1/S-301

WALL PANEL BOX BEAM

RAMP, SEE PLAN

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vermontintegratedarchitecture.com

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G. SELLERS

CONSULTANTS

NONE: PROJECT IS PUBLIC DOMAIN

TEAM INSITE

TEAM INSITE

U.S. DEPARTMENT OF ENERGY

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I

II

III

10/11/2012

2/14/2013

8/22/2013

80% COMPLETE SUBMISSION

100% CONSTRUCTION DOCUMENTATION

AS BUILT DOCUMENTATION

8/22/2013 5:34:52 PM

OTHER SECTIONS AND DETAILS

S-303
SIMPSON HGU5.50/10 FACE MOUNT HANGER
SEE A1/S-302 FOR CONNECTIONS
INTERIOR ROOF SHEATHING
EXTERIOR ROOF SHEATHING
ROOF TRUSS SEE A3/S-301 FOR CONNECTION
HSS COLUMN, SEE PLAN
W-SHAPE, SEE PLAN
PSL BEAM, SEE PLAN
BOTTOM OF ROOF PANEL
ELEV. SEE PLAN
18" LVL, CONTINUOUS
EXTERIOR ROOF SHEATHING INTERIOR ROOF SHEATHING
CONTINUOUS 1 1/4" x 14" LSL 1.3E
SEE S-303 FOR CONNECTION INFO
ROOF TRUSS TJI WALL STUDS
L4x4x1/4 x 0' - 8" WITH #12 WOOD SCREWS TO FLOOR PANEL AND DROP BEAM (4) ANGLES PER PANEL CONNECTED NEAR PANEL CORNER TO DROPPED PSL BEAM
2x4, FLAT, AT 24"oc
LVL BLOCKING AT 24"oc SIMPSON A35 ANGLE
(2) 1-1/4 x 9-1/2" LSL SIMPSON IUS2.37/9.5 HANGER AT TJI JOISTS
(2) 1-1/4 x 9-1/2" LSL SIMPSON IUS2.37/9.5 HANGER AT TJI JOISTS

SECTION AT MECHANICAL ROOM SOUTH WALL
SECTION AT MECHANICAL ROOM EAST OR WEST WALL

MARK DATE DESCRIPTION

PRODUCED BY AN AUTODESK STUDENT PRODUCT
1/2" x 12" x 4" CAP PLATE

L3x2x1/4 x 4" LONG CLIP ANGLE WELD TO W-SHAPE BEAM

(2) 3/8" dia. LAG SCREWS, STAGGERED

3/8" dia. LAG SCREWS, 18" ON CENTER

LSX RAIL, PERFORATED

4x6 RED CEDAR BEAM

4x4 STEEL POST

1/4" STEEL PLATE TAB

(3) 1/2" DIA. BOLTS  WELDED TO STEEL PLATE TAB

6"X6" PLANTER  BOX, 3/4" WHITE CEDAR, SEE PLAN FOR LENGTH

(3) 1/2" DIA BOLT FOR OPPOSITE TABS

4x6 CEDAR BEAM

BENCH, 6x8 CEDAR BEAM, NOTCHED  AT BRACKETS TO 4x8 1/4" STIFFENER PLATE

1/4" STIFFENER PLATE

1/2" DIA. BOLT

1/2" DIA. BOLTS

2" DIA. WASHER

2" DIA. WASHER
GREEN ROOF TRAYS, SEE L-101

O.C. DISTANCES BETWEEN DECK POSTS

DECK/RAMP DIMENSIONS

WATER TANK COVER

MECHANICAL MODULE

SOLAR PATH

SITE PLAN
ALL DIMENSIONS AT WALLS ARE TO FACE OF FRAME UNLESS OTHERWISE NOTED.

ALL OPENINGS DIMENSIONED AT CENTER LINES UNLESS OTHERWISE NOTED.

SEE S-101 FOR GRID LINES DIMENSIONS.

CELLULOSE INSULATION WITHIN WALL PANELS

DENIM BAT INSULATION BETWEEN PANELS
1/12 PITCH

12" X 24" GREEN ROOF TRAY SYSTEM, TYP.
300 TRAYS DISTRIBUTED EVENLY ACROSS ALL ROOFS, INCLUDING TANK COVER, EXCLUDING MECHANICAL MODULE.

METAL COPING AT EDGES OF ROOF, TYP.
SEE STRUCTURAL DRAWINGS

EPDM ROOF MEMBRANE, TYP.
CURB, TYP.

GENERAL SHEET NOTES
1. MECHANICAL MODULE DIMENSIONS ARE TO EXTERIOR FINISH FACE OF SIDING

A1
ROOF PLAN

A-112
GENERAL SHEET NOTES

1. ALL CABINETS MADE OF 3/4" MAPLE PLY STAINED WITH CHERRY FINISH UNLESS OTHERWISE NOTED.
2. 1/8" REVEALS BETWEEN DRAWER/DOOR FACES, 1/4" REVEALS BETWEEN BOTTOM OF COUNTER AND TOP OF FACES. 1/8" REVEAL BETWEEN WALLS.
3. ALL DOORS HAVE ZERO-CLEARANCE HINGES.
4. VERTICAL PULLS INDICATE DOORS, HORIZONTAL PULLS INDICATE DRAWERS.
5. ASSEMBLE WITH WOOD GLUE, STAPLES, AND SCREWS. HIDE SCREWS WHEN POSSIBLE.
6. USE 1/8" THICK BUMPERS BETWEEN FACES AND CARCASS.

DOORS OPEN AND SLIDE BACK INTO CABINET TO REVEAL STACKED WASHER/DRYER.

SOLID MAPLE GLUE-UP, 12" DEEP, STAINED TYP.
1. ALL WINDOWS, SWING DOORS, AND INTUS DOORS HAVE 4X1 WOOD FRAME AROUND INSIDE FACES.

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<td>1'-11&quot;</td>
<td>3'-10 1/2&quot;</td>
<td>EFORTE LIVING IN TUS</td>
<td>110</td>
<td>EFORTE U-PVC GRAPHIT</td>
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<tr>
<td>101B</td>
<td>1</td>
<td>5'-2&quot;</td>
<td>5'-9&quot;</td>
<td>EFORTE DINING EAST INTUS</td>
<td>110</td>
<td>EFORTE U-PVC GRAPHIT</td>
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<tr>
<td>102A</td>
<td>1</td>
<td>3'-11&quot;</td>
<td>3'-10&quot;</td>
<td>EFORTE KITCHEN INTUS</td>
<td>110</td>
<td>EFORTE U-PVC GRAPHIT</td>
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<tr>
<td>102B</td>
<td>1</td>
<td>3'-6 5/8&quot;</td>
<td>1'-10 1/2&quot;</td>
<td>EFORTE EXIT SOUTH INTUS</td>
<td>110</td>
<td>EFORTE U-PVC GRAPHIT</td>
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<tr>
<td>104A</td>
<td>1</td>
<td>5'-2 1/4&quot;</td>
<td>1'-6&quot;</td>
<td>EFORTE HALL NO RTH INTUS</td>
<td>110</td>
<td>EFORTE U-PVC GRAPHIT</td>
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<tr>
<td>104B</td>
<td>1</td>
<td>3'-0&quot;</td>
<td>4'-8 3/8&quot;</td>
<td>INSITE_WINDOWS EAT GENERIC</td>
<td>110</td>
<td>GENERIC NONE DOUBLE FIXED THREE WINDOWPANES AROUND SEAT</td>
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GENERAL SHEET NOTES:

- WINDOW SCHEDULE:
- WINDOW TYPES:
- DOOR TYPES:
- WALL TYPES:
- SCHEDULES:
- DRAWN BY: TEAM INSITE
- CHECKED BY: TEAM INSITE
- MIDDLEBURY COLLEGE
- ADDRESS: 5'-2", 3'-11", 1'-11", 3'-11", 3'-10" MIDDLEBURY, VT 05753
- CONTACT: MIDDSD@MIDDLEBURY.EDU
- CLIENT:
- SOLAR DECATHLON 2013
- U.S. DEPARTMENT OF ENERGY
- WWW.SOLARDECATHLON.GOV
GENERAL SHEET NOTES

FIRE PROTECTION SYSTEM TO BE DESIGNED AND INSTALLED PER NFPA 13D STANDARDS. SYSTEM SHALL ALSO COMPLY WITH FM GLOBAL AND MIDDLEBURY COLLEGE REQUIREMENTS AS WELL.

1. PIPES ON CEILING SHALL FOLLOW 5 DEG. SLOPE OF 1/8" IN 12".

2. ALL FIRE PROTECTION PIPES ARE 1"Ø UNLESS OTHERWISE SPECIFIED.

3. SEE PLUMBING SCHEDULE DRAWING FOR FIRE PROTECTION ENTRANCE DIAGRAM. COORDINATE EXACT RISER LOCATION IN FIELD.

4. THE MECHANICAL CHIMNEY UNDERNEATH THE HOUSE INTO THE MECHANICAL CHIMNEY PER THESE DRAWINGS, SPECIFICATIONS, MIDDLEBURY COLLEGE, LOCAL FIRE MARSHALL, AND ALL OTHER RELEVANT CODES, INCLUDING NFPA, VERMONT FIRE AND SAFETY CODE, AND SPRINKLER HEAD REQUIREMENTS AND CIRCUIT CAPACITIES REQUIRED FOR COMPLETE SYSTEM.

5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR AND MATERIALS NECESSARY TO PROVIDE A COMPLETE, CODE COMPLIANT FIRE ALARM SYSTEM.

6. THE DRAWINGS ARE SCHEMATIC IN NATURE AND INDICATE GENERAL ARRANGEMENT AND ROUTING OF CONDUIT OR CABLING. THE ELECTRICAL CONTRACTOR SHALL NOT INSTALL EQUIPMENT, DEVICES, OR CONDUIT IN A NON-CODE COMPLIANT FASHION DUE TO DRAWING'S INTERPRETATION. THE ELECTRICAL CONTRACTOR SHALL VERIFY CANDELA OUTPUT OF ALL DEVICES REQUIRED FOR MECHANICAL AND PLUMBING EQUIPMENT.

7. PRODUCED BY AN AUTODESK STUDENT PRODUCT
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<th>Mark Family Type</th>
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<td>60 GALLON ELECTRIC WATER HEATER</td>
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<td>2</td>
<td>LEAD FREE THERMOSTATIC MIXING VALVE</td>
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<td>4 TOBI TALL SINGLE-CONTROL LAVATORY FAUCET</td>
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<td>DOMESTIC WATER EXPANSION TANK</td>
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<tr>
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<td>21 RECESSED CLOTHES DRYER BOSCH WAS24460UC</td>
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<td></td>
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<td>22 RECESSED CLOTHES DRYER BOSCH WAS24460UC</td>
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<td>24 RECESSED CLOTHES DRYER BOSCH WAS24460UC</td>
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### Pipe Fitting Schedule

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<th>Count</th>
<th>Size</th>
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<th>Size</th>
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<td>2&quot;ø-2&quot;ø</td>
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<td>2&quot;ø-2&quot;ø</td>
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<td>2&quot;ø-2&quot;ø</td>
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<td>4</td>
<td>2&quot;ø-2&quot;ø</td>
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<td>2&quot;ø-2&quot;ø</td>
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</tbody>
</table>

### Client Information

- **Address:** 14 Old Chapel Road, Middlebury, VT 05753
- **Contact:** MIDDSD@MIDDLEBURY.EDU
- **Website:** vermontintegratedarchitecture.com
DOMESTIC SUPPLY DIAGRAMS

PLUMBING SPECIFIC NEW WORK NOTES:

1. DOMESTIC HOT AND COLD WATER PIPING TO BE RUN IN THE CAVITY BEHIND THE TOE KICK SPACE OF CABINETS.
2. PIPE DOMESTIC HOT WATER HEATER AND MIXING VALVE PER MANUFACTURER'S RECOMMENDATIONS.
3. DOMESTIC WATER PIPING TO DROP BELOW TO SHOWER FIXTURE IN CLOSET.
4. DOMESTIC WATER PIPING RUN LOW UNDER BATHROOM COUNTER. CONNECT TO SERVICE BOX FOR WASHER MACHINE AND RUN TO KITCHEN SINK AS SHOWN.
5. PIPE CONDENSATE DRAINAGE (WITH P-TRAP) TO LAVATORY WASTE LINE. CONNECT IN VERTICAL PRIOR TO P-TRAP.
6. VENT LINE TO BE RUN EXPOSED NEAR CEILING. WASTE FOR SHOWER, ALONG WITH LAVATORY AND CLOTHES WASHER ARE TO BE 2" AND RUN BELOW HOUSE AS HIGH AS POSSIBLE. SLOPE TO SUMP PUMP. CAP WATER CLOSET LINE JUST BELOW DISCHARGE FLANGE.
7. PLUG ORIGINAL HOLE IN SUMP PUMP AND CUT NEW INLET HOLE WHERE AT WASTE LINE INVERT HEIGHT. SUMP TO DISCHARGE TO SEPTIC TANK.

80% COMPLETE SUBMISSION
100% CONSTRUCTION DOCUMENTATION
AS BUILT DOCUMENTATION

3/8" = 1'-0"
GENERAL DISCIPLINE
NOTES
HVAC LEGEND

ALL NEW DUCTING SHALL BE RATED FOR AN AIR (TYP. FOR SUPPLY AND PRESSURE OF 6" W.G. RETURN CONNECTIONS)

ALL INSULATION SHALL BE FURNISHED AND INSTALLED AS PER THE SPECIFICATIONS.

FLANGE CONNECTION

3.

PROVIDE SHEET METAL GAUGE AND HANGER

SECTION

DUCTWORK

ALL AROUND W/1/8" SPACING PER THE 1995 EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

NEOPRENE GASKET, ALL 90 DEG. ELBOWS SHALL BE PROVIDED WITH

DOMESTIC COLD WATER BOLT, & WINGNUT ON ALL SIDES.

AIR VENT

TURNING VANES. PROVIDE TWO (2) TURNING VANES (TYP. FOR SUPPLY & RETURN AIR CONNECTIONS).

THREE (3) TURNING VANES FOR DUCTS BETWEEN 12" AND 18" WIDE. PROVIDE AN ADDITIONAL TURNING VANE FOR EVERY MULTIPLE OF 3" IN DUCT WIDTH. ONLY WHEN INSTALL TURNING VANES AS PER 1995 EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

5.

BUTTERFLY VALVE COORDINATION IS REQUIRED.

6.

FLEXIBLE DUCTS NOT PERMITTED ON INLET OR CONDENSATE OUTLET OF VAV BOXES.

4' MAXIMUM FLEXIBLE AIR DUCTS ON ALL TAKEOFFS. ALL FLEXIBLE DUCTWORK SHALL BE SUPPORTED. ANY FLEXIBLE DUCT TAKE-OFFS NOT SUPPORTED OR WITH GREATER THAN 90 DEG. CHANGE IN DIRECTION SHALL BE REMOVED AND REPLACED AT MECHANICAL CONTRACTOR'S EXPENSE.

9.

4x4 BASE PLATE BOLTED TO 4" INERTIA PAD

LEVELING GROUT UNDER ALL FEET

10.

24X12 R.A.

110% UNDERSIZED PIPING FOR WATER HEATING SYSTEMS. ALL EQUIPMENT SHALL BE SIZE RESTRAINTS AS PER SEISMIC ZONE TWO (2) REQUIREMENTS. ALL EQUIPMENT SHALL BE SEISMIC BRACING AS REQUIRED.

12.

ALL DUCT WORK 144 SQ. IN. AND OVER IN CROSS

AREA SHALL BE ALLOWED IN ALL FLEXIBLE DUCT TAKE-OFFS. ALL FLEXIBLE DUCTWORK SHALL BE SUPPORTED. ANY FLEXIBLE DUCT TAKE-OFFS NOT SUPPORTED OR WITH GREATER THAN 90 DEG. CHANGE IN DIRECTION SHALL BE REMOVED AND REPLACED AT MECHANICAL CONTRACTOR'S EXPENSE.

45° MAX

20° MAX

2Ì" RADIUS

2Ì" RADIUS WILL INSTALL TURNING VANES AS PER 1995 EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS.

4Ì" R

16X12 EACH CORNER OF THE HEAT PUMP) FOR VIBRATION ISOLATION.

5x1x3/16" ANGLE BRACES

1x1x3/16" ANGLE BRACES

24X12

A.F.F.

HWP

HWP

20° MAX

RHC

20° MAX

O.B.V.D.

R.A.

R.A.

S.A.

S.A.

RETURN AIR

SUPPLY AIR

THERMOMETER

MIDDLEBURY COLLEGE

TEAM MIDDLEBURY

TEAM NAME:

ADDRESS:

14 OLD CHAPEL ROAD

14 OLD CHAPEL ROAD

MIDDLEBURY, VT 05753

MIDDLEBURY, VT 05753

VERMONT INTEGRATED ARCHITECTURE

SOLAR DECATHLON 2013

10/11/2012

80% COMPLETE SUBMISSION

2/14/2013

8/22/2013 5:30:43 PM

DRAWN BY:

CHECKED BY:

COPYRIGHT:

InSite

Solar Decathlon

InSite
ENERGY RECOVERY VENTILATOR SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SUPPLY AIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULTIMATE</td>
<td>BACKWARD</td>
</tr>
<tr>
<td>AMPS</td>
<td>200 CFM</td>
</tr>
<tr>
<td>B.H.P.</td>
<td>0.4&quot; W.C.</td>
</tr>
<tr>
<td></td>
<td>W/OPPOSED BLADES</td>
</tr>
<tr>
<td></td>
<td>INCLINE VENTILATOR</td>
</tr>
</tbody>
</table>

1. PROVIDE UNIT WITH ENTHALPY CORE.
2. UNDER 6" S.A. DUCT AND ALSO DROP INTO JOIST DIAMETER WHEN PASSING THROUGH FLOOR JOIST.
3. UNIT TO BE WALL MOUNTED. PROVIDE PROPER SUPPORT.
4. ELECTRIC TANKLESS WATER HEATER TO BE CONNECTED TO ELECTRIC WATER HEATER IN ORDER TO PROVIDE HOT WATER NECESSARY.
5. UNIT SHALL HAVE RETURN AIR FILTERS. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR MORE INFORMATION.
6. UNIT SHALL BE PROVIDED WITH WIRED REMOTE CONTROLLER BRC1E71.

FAN SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MAKE &amp; MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALUMINUM STATIONARY</td>
<td>RUSKIN ELF375DX</td>
</tr>
</tbody>
</table>

1. KITCHEN HOOD TO BE 3 SPEED FAN EXTRA QUIET OPERATION. MAXIMUM OF 400 CFM OF FLOW.

DUCT SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MOUNTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRILLE</td>
<td>Duct</td>
</tr>
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</table>

1. PROVIDE BRANCH VOLUME DAMPER FOR ALL DIFFUSERS AND GRILLES WITHOUT INTEGRAL DAMPERS.
2. PROVIDE WITH INTEGRAL VOLUME DAMPER.
3. IF DUCT BRANCH TO DIFFUSER IS NOT TAGGED IN THE PLAN, THE BRANCH SIZE SHALL BE EQUAL TO THE SIZE OF THE DIFFUSER OR GRILLE TO WHICH IT IS CONNECTED.
4. TAMPER TO BE A DECK TYPE OPERATOR.
5. ATTENUATING LOUVER

EXPANSION TANK SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MAKE &amp; MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRIC WATER HEATER</td>
<td>WH-1</td>
</tr>
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</table>

1. PIPE WITH ISOLATION VALVES AND DRAIN.
2. PROVIDE 24 VOLT ACTUATOR CD-60.

SPLIT SYSTEM A/C SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MAKE &amp; MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTDOOR UNIT</td>
<td>TAG</td>
</tr>
</tbody>
</table>

1. COORDINATE EXACT LOUVER SIZE WITH ARCHITECTURAL DETAILS AND DIMENSIONS.
2. OUTDOOR UNIT TO BE PROVIDED WITH OPTIONAL WIND BAFFLE.
3. PROVIDE 24 VOLT ACTUATOR CDTI-50.

FURNITURE SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MAKE &amp; MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPENING SIZE</td>
<td>DEPTH</td>
</tr>
</tbody>
</table>

1. PROVIDE 24 VOLT ACTUATOR.

General Sheet Notes

- PROVIDE UNIT WITH ENTHALPY CORE.
- UNDER 6" S.A. DUCT AND ALSO DROP INTO JOIST DIAMETER WHEN PASSING THROUGH FLOOR JOIST.
- UNIT TO BE WALL MOUNTED. PROVIDE PROPER SUPPORT.
- ELECTRIC TANKLESS WATER HEATER TO BE CONNECTED TO ELECTRIC WATER HEATER IN ORDER TO PROVIDE HOT WATER NECESSARY.
- UNIT SHALL HAVE RETURN AIR FILTERS. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR MORE INFORMATION.
- UNIT SHALL BE PROVIDED WITH WIRED REMOTE CONTROLLER BRC1E71.
- KITCHEN HOOD TO BE 3 SPEED FAN EXTRA QUIET OPERATION. MAXIMUM OF 400 CFM OF FLOW.
- PROVIDE BRANCH VOLUME DAMPER FOR ALL DIFFUSERS AND GRILLES WITHOUT INTEGRAL DAMPERS.
- PROVIDE WITH INTEGRAL VOLUME DAMPER.
- IF DUCT BRANCH TO DIFFUSER IS NOT TAGGED IN THE PLAN, THE BRANCH SIZE SHALL BE EQUAL TO THE SIZE OF THE DIFFUSER OR GRILLE TO WHICH IT IS CONNECTED.
- TAMPER TO BE A DECK TYPE OPERATOR.
- ATTENUATING LOUVER
- PROVIDE 24 VOLT ACTUATOR CD-60.
- PROVIDE 24 VOLT ACTUATOR CDTI-50.
1. PROVIDE POWER SUPPLY FOR DAMPERS, 24VAC.
2. PROVIDE ACTUATORS FOR ALL DAMPERS.
3. "ECONOCOOL" AND FREE COOLING DAMPER SWITCH TO BE COMBINED INTO (1) SWITCH (2) BUTTONS. LABEL ALL SWITCHES.
4. GROUP THE ERV SPEED CONTROLLER, HEAT PUMP CONTROLLER, AND "ECONOCOOL"/FREE COOLING DAMPER SWITCH TOGETHER ON WIRING WALL MOUNT UNIT (LOCATE IN HALLWAY).
5. LABEL ALL SWITCHES.

CONDITIONED SUPPLY TO SPACE
N.C.
INTAKE
DM

N.O.
DM

TEAM NAME: DM TEAM MIDDLEBURY

ADDRESS: 14 OLD CHAPEL ROAD
MIDDLEBURY, VT 05753

EXHAUST DISCHARGE
OUTDOOR AIR INTAKE
ERV SUPPLY AIR

HP-1

UNIT
RETURN
vermontintegratedarchitecture.com

CONSULTANTS
A. MURRAY, A. NELSON
G. SELLERS

SYSTEM INTERCONNECTION
SEQUENCE OF OPERATIONS
NORMAL OPERATION: WINDOWS ARE CLOSED, THE FREE COOLING LOUVER DAMPERS ARE CLOSED.
WHEN FREE COOLING IS DESIRED, THE OCCUPANTS SHOULD OPERATE THE "FREE COOLING DAMPER" SWITCH TO OPEN. THE SWITCH SHALL OPEN BOTH CONTROL DAMPERS CD-1 & 2. THE OCCUPANTS SHALL ALSO TURN ON THE CO2 MONITOR SHALL BE LOCATED IN THE LIVING ROOM. WHEN THE MONITOR SENSES A RISE IN CO2 LEVELS ABOVE SET POINT, THE UNIT SHALL REVERT BACK TO REGULAR OPERATION.

FREE COOLING/VENTILATION SYSTEM INTERCONNECTION
SEQUENCE OF OPERATIONS
NORMAL OPERATION: WINDOWS ARE CLOSED, THE FREE COOLING LOUVER DAMPERS ARE CLOSED. WHEN FREE COOLING IS DESIRED, THE OCCUPANTS SHOULD OPERATE THE "FREE COOLING DAMPER" SWITCH TO OPEN. THE SWITCH SHALL OPEN BOTH CONTROL DAMPERS CD-1 & 2. THE OCCUPANTS SHALL ALSO TURN ON THE "FREE COOLING DAMPER" SWITCH TO OPEN.

ERV/HEAT PUMP DAMPERS SEQUENCE OF OPERATIONS
CONTROL DAMPERS CD-3, 4, 5 SHALL OPERATE TOGETHER TO UTILIZE THE SUPPLY DUCTWORK TO DISTRIBUTE VENTILATION AIR WHEN THE HEAT PUMP IS NOT IN OPERATION. WHEN THE HEAT PUMP IS RUNNING, CONTROL DAMPERS CD-3 AND CD-4 SHALL BE OPEN AND CD-5 SHALL BE CLOSED. WHEN THE HEAT PUMP IS RUNNING IN OPERATION, CONTROL DAMPERS CD-1 AND CD-2 SHALL BE OPEN. CONTROL DAMPERS ACTUATION SHOULDN'T BE TRIGGERED FROM A CURRENT SWITCH AND RELAY CONNECTED TO THE HEAT PUMP FAN MOTOR.

ENERGY RECOVERY VENTILATOR SEQUENCE OF OPERATIONS
ENERGY RECOVERY VENTILATOR SHALL OPERATE USING FACTORY SUPPLIED WALL CONTROLLER. UNIT SHALL BE MANUALLY STARTED AND RUN CONTINUOUSLY EXCEPT NOTED. UNIT SHALL BE BALANCED TO SUPPLY A CONTINUOUSLY OPENED AIRFLOW.

THE OPTIONAL BOOST CONTROLLER TIMER SWITCH SHALL BE LOCATED IN THE BATHROOM. WHEN AN OCCUPANT ENTERS THE BATHROOM, THEY SHALL ACTIVATE THE SWITCH WHICH ENABLES THE UNIT TO BE CLOSER TO THE IBPSA STANDARDS. AN OCCUPANT SHALL ACTIVATE THE SWITCH WHICH ENABLES THE UNIT TO BE CLOSER TO THE IBPSA STANDARDS. AN OCCUPANT SHALL ACTIVATE THE SWITCH WHICH ENABLES THE UNIT TO BE CLOSER TO THE IBPSA STANDARDS. AN OCCUPANT SHALL ACTIVATE THE SWITCH WHICH ENABLES THE UNIT TO BE CLOSER TO THE IBPSA STANDARDS. AN OCCUPANT SHALL ACTIVATE THE SWITCH WHICH ENABLES THE UNIT TO BE CLOSER TO THE IBPSA STANDARDS. AN OCCUPANT SHALL ACTIV

THE CO2 MONITOR SHALL BE LOCATED IN THE LIVING ROOM. WHEN THE MONITOR SENSES A RISE IN CO2 LEVELS ABOVE SET POINT, THE UNITS SHALL BE INCREASED. WHEN OUTDOOR AIR CONDITIONS ARE ACCEPTABLE, OCCUPANTS MAY MANUALLY TURN THE UNIT TO "ECONOCOOL" MODE TO PROVIDE "FREE" COOLING TO THE SPACE.
1. The Two "Outside Junction Boxes" are in the central island for the oven and the induction cooktop. The "Center" junction box is in the ceiling to power the kitchen range hood.

2. (3) Fixtures to be mounted on built-in bench. Coordinate exact location in the field meeting NEC spacing requirements.

3. Compliant electrical system. The drawings coordinate arrangement and routing of circuits. The electrical contractor is responsible for coordinating exact location in field.

4. Coordinate exact location and requirements for CO "Blue Light" and exterior horn strobe with Middlebury College.

5. Provide exterior-rated disconnects for fire pump and domestic water pump. Provide receptacles as necessary.

6. Mount flow and tamper switch per NFPA requirements. Coordinate exact location in field. Mount in mechanical room if possible.

7. Provide disconnects for WH-1, ERV-1, CP-1, and HP-1 and circuit per panel schedule. Coordinate exact location in field.

8. Connect all equipment requiring power indicated on the architectural and mechanical drawings.

9. Fabricate a structural ceiling over electrical panel to meet NEC requirements for clearances. Coordinate exact ceiling in field.

10. The electrical contractor is responsible for providing power and the final electrical connections to all equipment requiring power indicated on the architectural and mechanical drawings.

11. All work shall be performed in accordance with the latest edition of the National Electric Code (NEC).

12. All installations shall be as dictated in project specifications.

13. Coordinate all switch and receptacle locations and orientations with elevations.

14. Coordinate all floor outlet locations with architectural drawings.

15. Coordinate all work with other trades. Other trades showing the location of all devices and equipment.

16. Coordinate all work and install all labor, material, tools, equipment, devices, or conduit in a non-code compliant fashion due to drawings interpretation. The electrical contractor is responsible for all temporary power and lighting during all phases of the work.

17. All areas specified in NEC Article 210.52, all 120V and above circuits for controls. 125V 15A and 20A receptacles are to be tamper resistant.

18. All exterior electrical devices are to be weather proof.

19. Smoke alarms to be interconnected (hard-wired).

20. The electrical contractor shall furnish and install all labor, material, tools, equipment, devices, or conduit in a non-code compliant fashion due to drawings interpretation. The electrical contractor is responsible for all temporary power and lighting during all phases of the work.
AC DISCONNECT FOR SOLAR ARRAY TERMINAL BOXES

EQUIPMENT GROUND CONDUCTOR FOR RAILS, STEEL STRUCTURE, AND TERMINAL BOX

LFMC FOR EGC AND THWN-2 TO INVERTER DOWN COLUMNS AND UNDER DECK

UTILITY METER/SERVICE ENTRANCE/MAIN BREAKER GROUND HOME TO ORGANIZER PANEL FROM HERE WITH 4AWG Cu

D H I J K L

SUBFLOOR

1'-11 1/4"

SOLAR ENVELOPE

18'-0"

GRADE

0"

T.O. FIN. FLOOR

2'-0"

Level 1

GRADE

0"

10/11/2012

2/14/2013

8/22/2013

80% COMPLETE SUBMISSION

100% CONSTRUCTION DOCUMENTATION

AS BUILT DOCUMENTATION

1/2" = 1'-0"

ELECTRICAL EQUIPMENT ELEVATIONS
Current Carrying Conductor Sizing

Current: \( (8.62 \text{A} \times \text{iocl}) \times (1.25) = 10.775 \text{A max Isc} \)

Array 1 is one string of 10 solar modules

Array 2 is two strings of 8 solar modules each

75° C ambient temperature => 0.5 derate factor for 90° C rated conductor (NEC Table 310.15(B)(2a))

Conduit Fill Adjustment (NEC Table 310.15(B)(3)(a): Fewer than 4 conductors = no adjustment factor

Conductor Sizing

- #8AWG: \( 55 \text{A} \times 0.5 = 27.5 \text{A} \)
- #10AWG: \( 40 \text{A} \times 0.5 = 20 \text{A} \)
- #12AWG: \( 30 \text{A} \times 0.5 = 15 \text{A} \)

Can use #12AWG and larger

Either #10AWG or #8AWG conductors adequately limit voltage drop

Inverter Array Wiring Termination: Pressure Clamp accepts #4AWG - #8AWG

Conclusion: Use #8AWG THWN-2 to ensure minimal voltage drop, adequate overcurrent protection, and proper connection at inverter array wiring termination

Equipment Grounding Conductor (NEC 690.47(C), 250.120(C))

Use #6AWG Bare Copper so EGC does not need to be protected in a raceway
GENERAL SHEET NOTES:
1. Containers will arrive 24 hours before competition and will wait in staging area until required.
2. Containers will remain in staging area until required for loading, then will return there before departing for the railyard as a group.

ARRIVAL SEQUENCE

DEPARTURE SEQUENCE
Water delivery and removal plan and elevations.

Water trucks will arrive from the northwest corner of the lot and a minimum of six team members will assist in moving the water hose from the truck(s) to the domestic water tank located on the north end of the site.

Upon removal, a minimum of six team members will assist in directing the water hose from the water truck(s) to the tanks in order to drain all of the water from domestic water, grey water, and black water tanks. The water truck(s) will be located on the northwest side of the home.

1100-gallon domestic water tank (to be housed beneath a shaded structure for the entirety of the competition).

Tank covering structure.

80% complete submission.

100% construction documentation.

As built documentation.
1. Lay down foundation
2. Place mechanical mod
3. Place floor panels 1, 2, 3, 4, 5, and 6
4. Place bents 1, 2, 3, 4, 5, 6, and 7
5. Place wall panel 1 and roof panel 1
6. Place wall panels 2, 3, 4 and roof panel 2
7. Place wall panels 5, 6, and roof panel 3
8. Place wall panels 7, 8, 9, 10, 11, 12, and roof panel 4
9. Place wall panels 13, 14, 15, and roof panel 5
10. Place wall panels 16, 17, 18, 19, 20, 21, and roof panel 6
11. Place decks
12. Place railings
13. Place green roof
14. Place water tanks
15. Place water shed
16. Remove wall panel 1 and roof panel 1
17. Remove bents 1, 2, 3, 4, 5, 6, and 7
18. Remove floor panels 1, 2, 3, 4, 5, and 6
19. Remove mechanical mod
20. Remove foundation