Construction Document
Submittal - 06/02/09

Solar House 1

2009 Solar Decathlon

The Ohio State University
Columbus, Ohio

Drawing Index

notes

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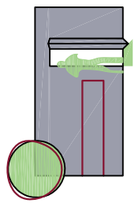


SOLAR HOUSE I

OSU SOLAR DECATHLON '09

Construction Documents
June 2, 2009

U.S. Department of Energy
2009 Solar Decathlon

revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

General Information

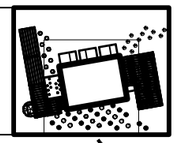
scale:

n/a

G-001

Madison Drive

119	117	115	113	111	109	107	105	103	101
120	118	116	114		110	108	106	104	102

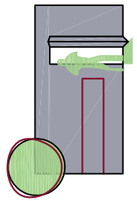


The Ohio State University,
Solar House 1 Lot

Jefferson Drive

Randomly Generated Selection Schedule - NREL			
8:00 a.m.	Kentucky (UKY)	10:30 a.m.	Santa Clara (SCU)
8:15 a.m.	Penn State (PSU)	10:45 a.m.	Puerto Rico (UPR)
8:30 a.m.	Virginia Tech (VT)	11:00 a.m.	Missouri S&T (MST)
8:45 a.m.	Team Ontario/BC (ONTBC)	11:15 a.m.	Illinois (UIUC)
9:00 a.m.	WI-Milwaukee (UWM)	11:30 a.m.	Darmstadt Tech (TUD)
9:15 a.m.	Rice (RICE)	11:45 a.m.	Cornell (CORNELL)
9:30 a.m.	Team Boston (BOS)	12:00 p.m.	Minnesota (UMN)
9:45 a.m.	Iowa State (ISU)	12:15 p.m.	Arizona (UAZ)
10:00 a.m.	Ohio State (OSU)	12:30 p.m.	Team Alberta (ALB)
10:15 a.m.	Madrid Tech (UPM)	n/a	LA-Lafayette (LAF)

1. The OSU Solar House I is located in lot #112
2. A minimum accessible clear width of 36" will be maintained at all times along touring path.
3. The touring path begins along the north edge of the site from Decathlete Way.
4. Once through the house, the touring path exits to the east side of the lot along a 'cross street'.
5. See G1.03 for ADA and Egress information.
6. See G1.05 for Touring Plan



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revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
National Mall Site Location

scale:
1" = 80'-0"

G-002

notes

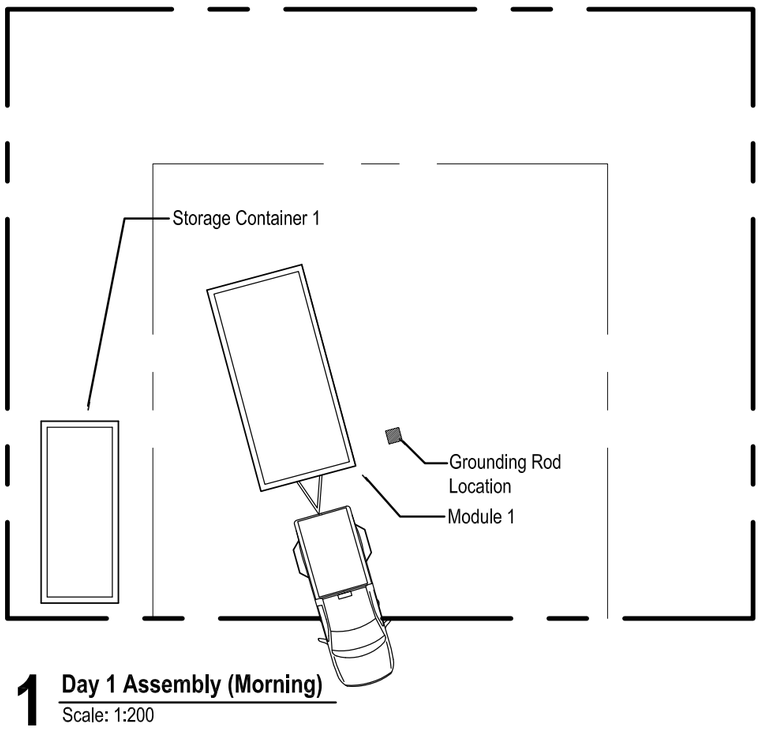
Sequence

Arrival of the 20' Solar Powered Tool Container.

Mark out the site for proper orientation.

*Locate and place grounding rod.

Back the house module frames in to place.



1 Day 1 Assembly (Morning)
Scale: 1:200

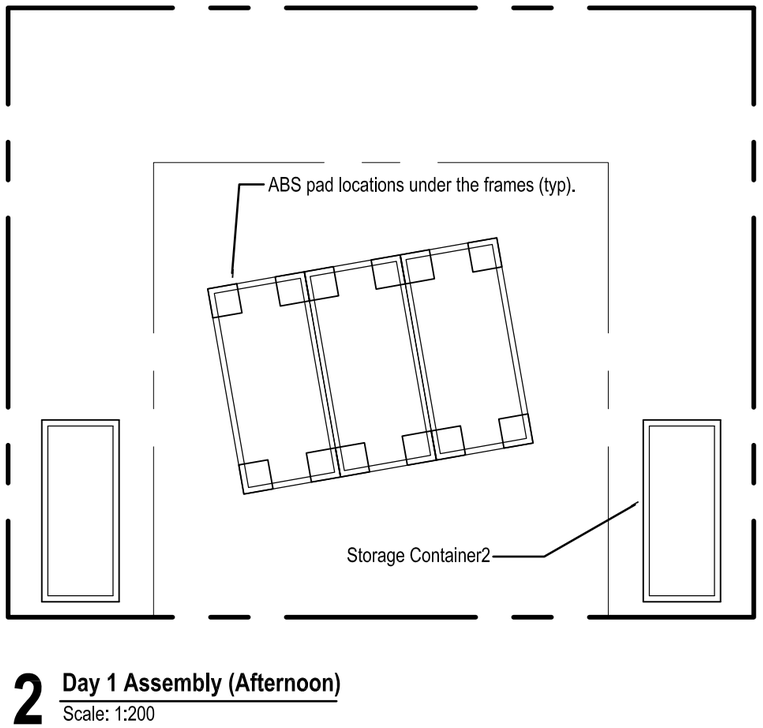
Sequence

Arrival of the 20' container containing decking and solar array.

Raise each frame to the appropriate elevation.

Place piers under steel frames.

Adjust piers and shim the frames level.



2 Day 1 Assembly (Afternoon)
Scale: 1:200

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revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Site Operations Plan

scale:
as noted

G-101

notes

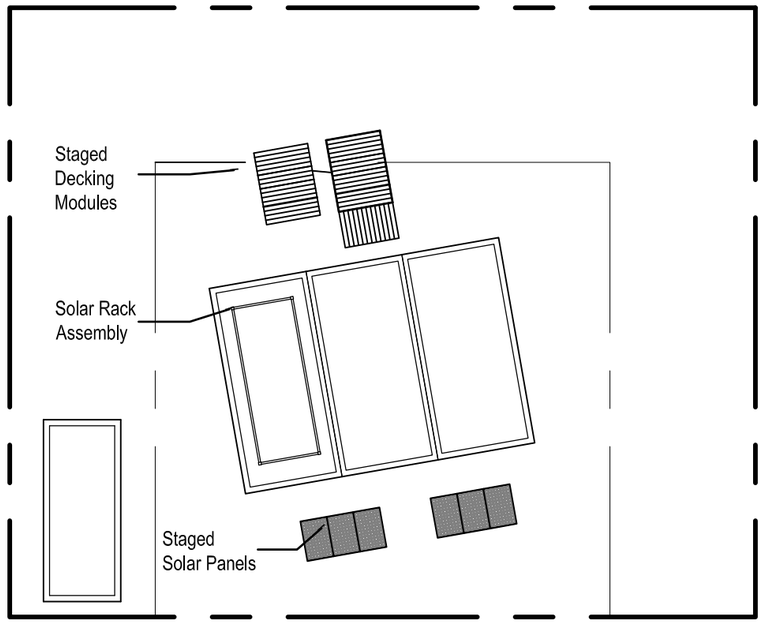
Sequence

Arrival of the 20' container containing decking and solar array.

Raise each frame to the appropriate elevation.

Place piers under steel frames.

Adjust piers and shim the frames level.



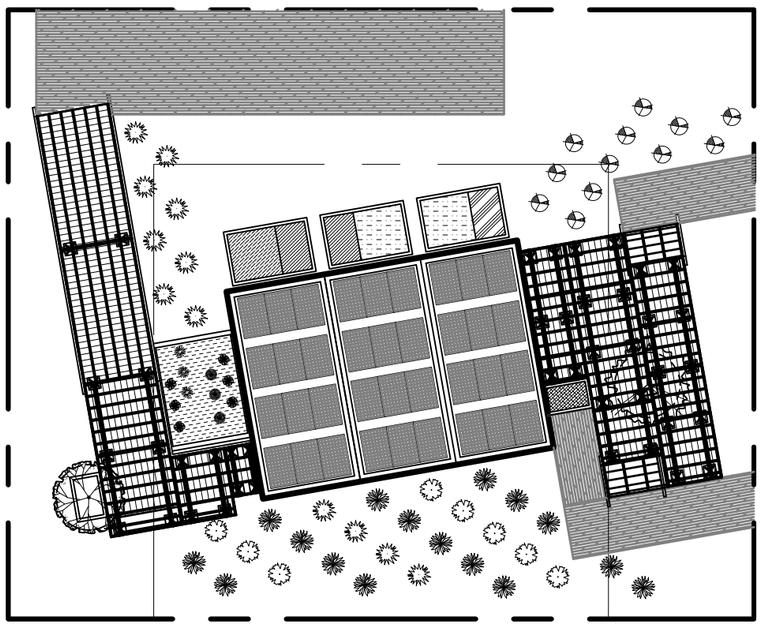
1 Assembly Day (Evening)
Scale: 1:200

Sequence

Decking and landscaping installed.

Solar array finished.

All storage containers removed from the site.



2 Assembly Complete
Scale: 1:200

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revisions:
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3 06.02.09

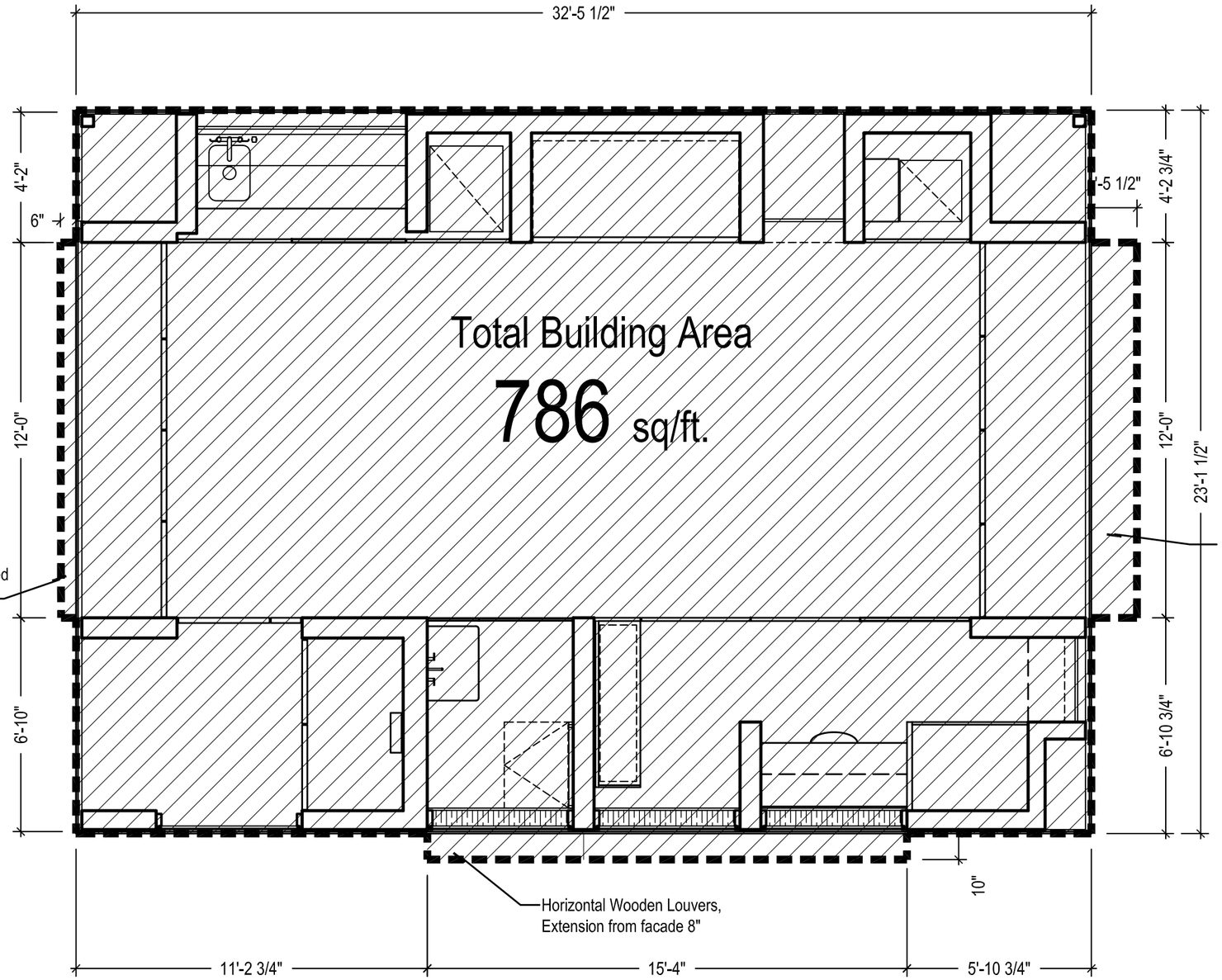
sheet name:
Site Operations Plan

scale:
as noted

G-102

notes

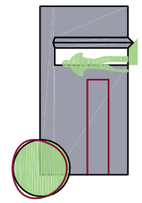
1. All dimensions are to outermost face of deck/house.



north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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June 2, 2009

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

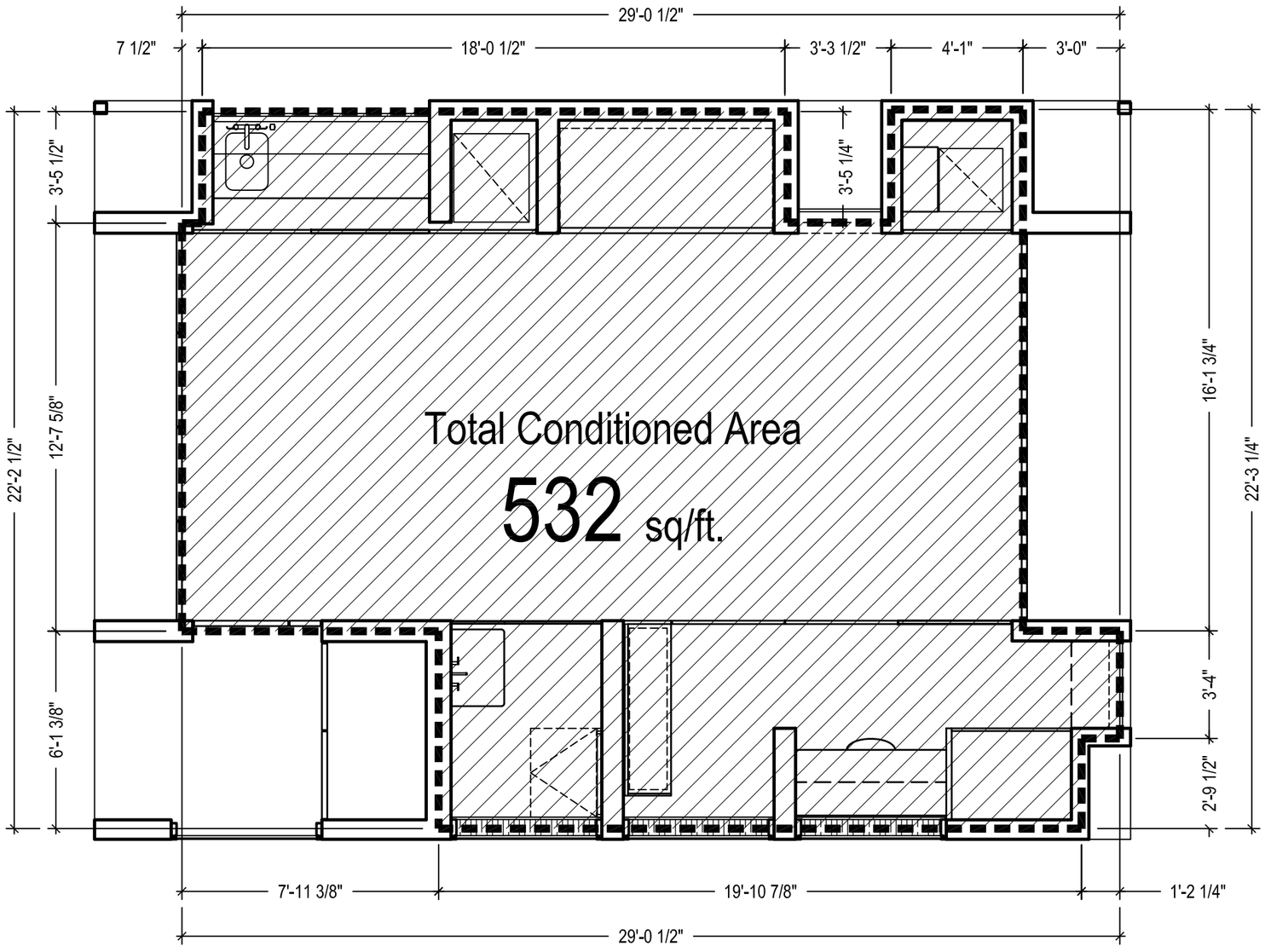
sheet name:

Building Area Plan

scale:

1/4"=1'-0"

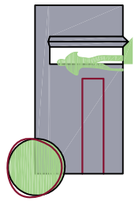
G-201



notes

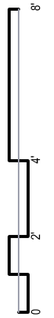
1. All dimensions are to centerline of house walls, or center of glazing.
2. Interior partition walls are included within conditioned area footprint.

north



SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

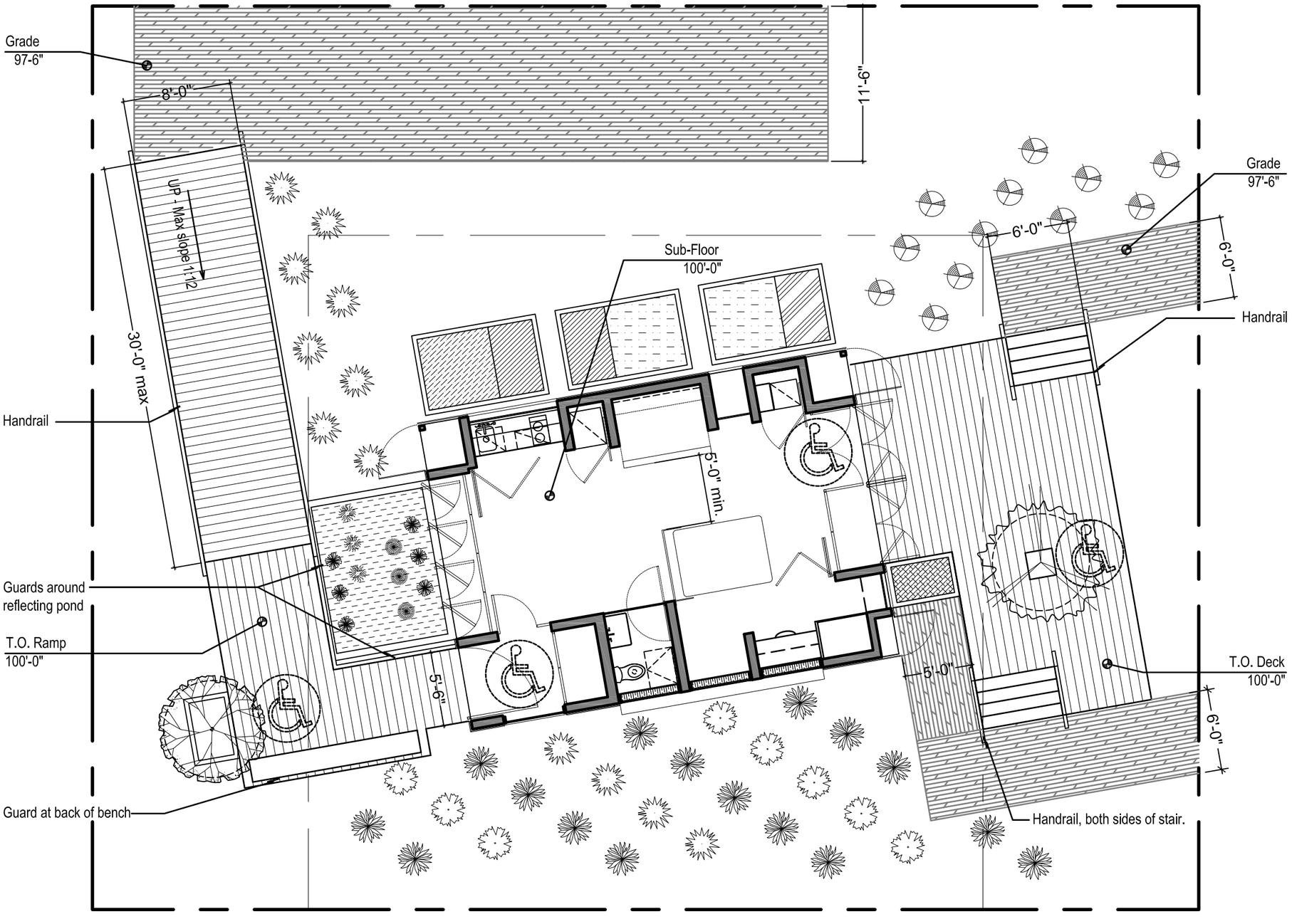
sheet name:

Conditioned Area Plan

scale:

1/4"=1'-0"

G-202



notes

1. When the home is being toured, the minimum clear width of the touring route shall be 36 in (915 mm) except at doors.
2. Thresholds at doorways shall not exceed 1/4 in. Raised thresholds and floor level changes at accessible doorways greater than 1/4 in shall be beveled with a slope no greater than 1:2.
3. Hardware required for accessible door passage shall be mounted no higher than 48 in above finished floor.
4. The maximum slope of all ramps shall be 1:12
5. Handrails shall be provided on at least one side of all ramps and stairs.
6. Handrails shall not be less than 34" and not greater than 38" above finish surface of the ramp.
7. Handrail grip size shall comply with R311.5.6.3 of the 2006 IRC.
8. All hardscape deck surfaces in this project will be no greater than 30" above grade. If found conditions on the site alter any elevations above 30", then guards no less that 36" in height shall be provided at these locations.

symbol key

Standard ADA turning area, 60" diameter.

north

SOLAR HOUSE I

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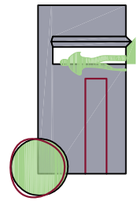

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revisions:

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3 06.02.09

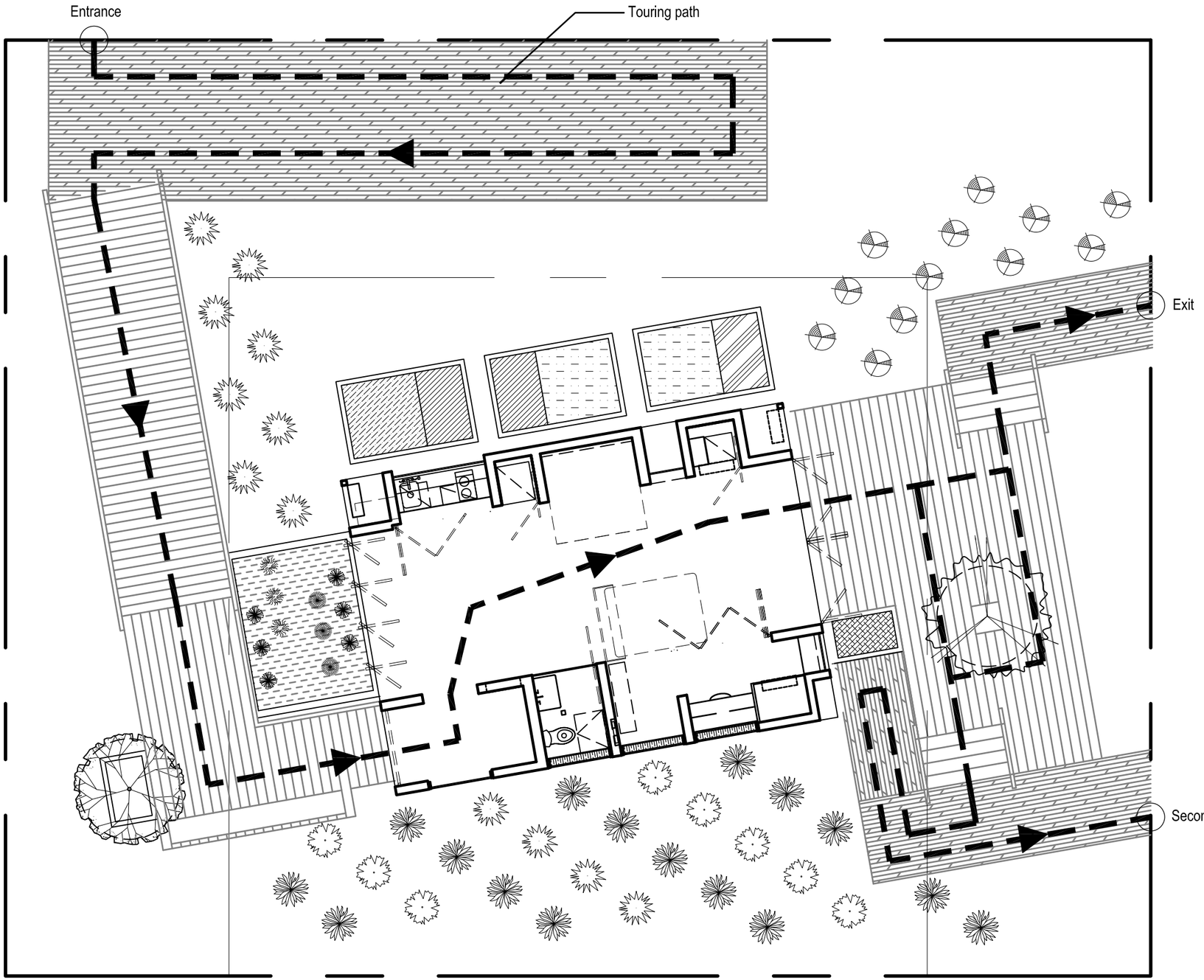
sheet name:

ADA & Egress Plan

scale:

1/8" = 1'-0"

G-203

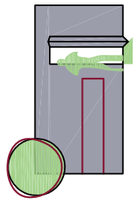


notes

1. Maintain a minimum accessible clear width of 36" at all times along touring path.
2. The touring path begins along the north edge of the site from Decathlete Way.
3. Once through the house, the touring path exits to the east side of the lot along a 'cross street'.
4. See G1.03 for ADA and Egress information.

Line indicates circulation tour path.

Arrow demonstrates directional flow.



SOLAR HOUSE I

OSU SOLAR DECATHLON '09

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3 06.02.09

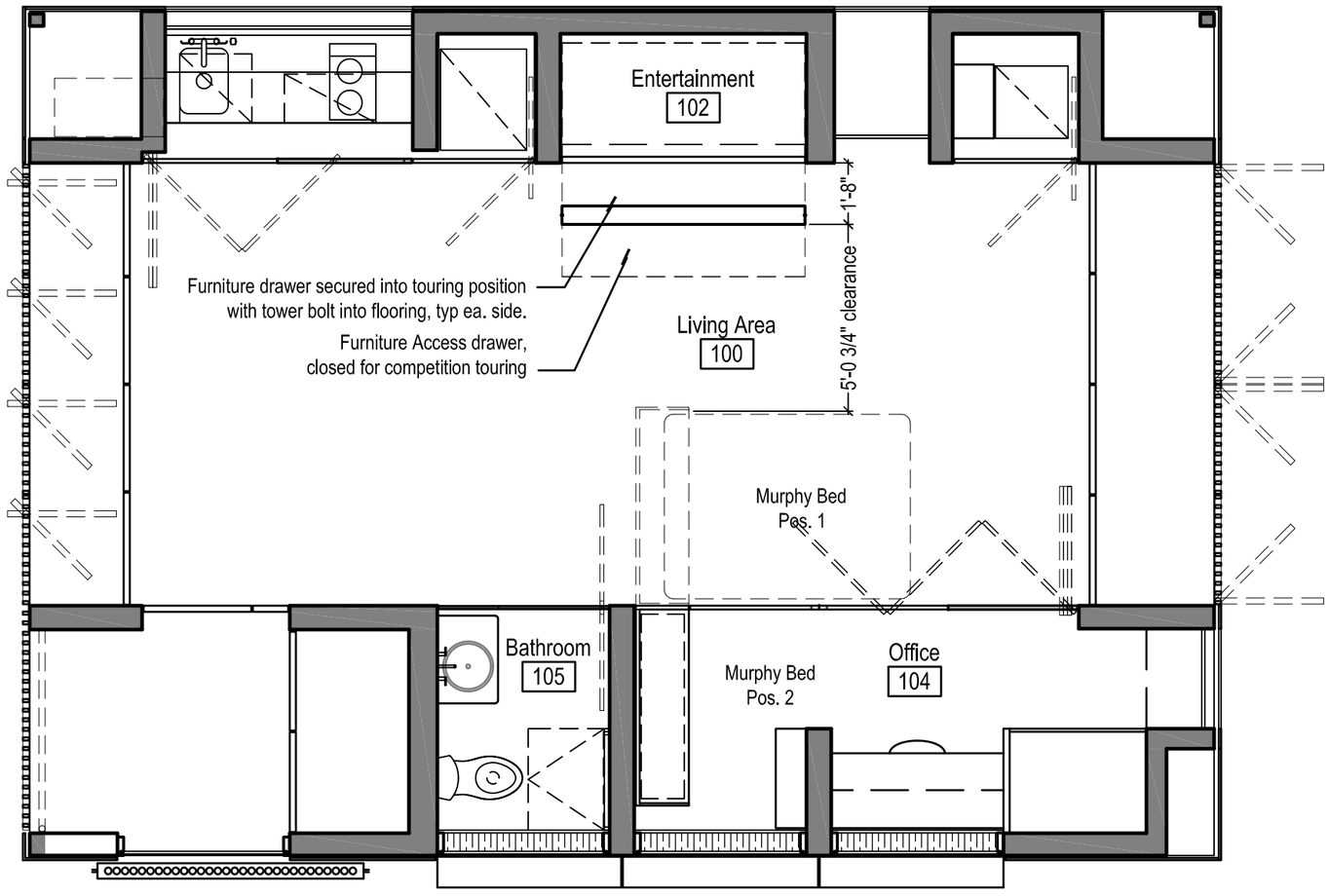
sheet name:

Touring Plan

scale:

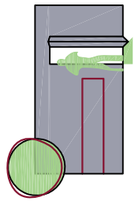
1/8" = 1'-0"

G-301



notes

1. Operable components are to be locked into position during touring hours using tower bolts which will anchor their position into the finish floor material.
2. Components will be set up to maintain a clear, accessible width of 36" for the touring route. This complies with ADAAG guideline 4.3.3.
3. Only members of the OSU Solar Decathlon Team are permitted to move operable components.
4. See Interior Details for additional information on operable components.



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revisions:

1 12.16.08
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3 06.02.09

sheet name:

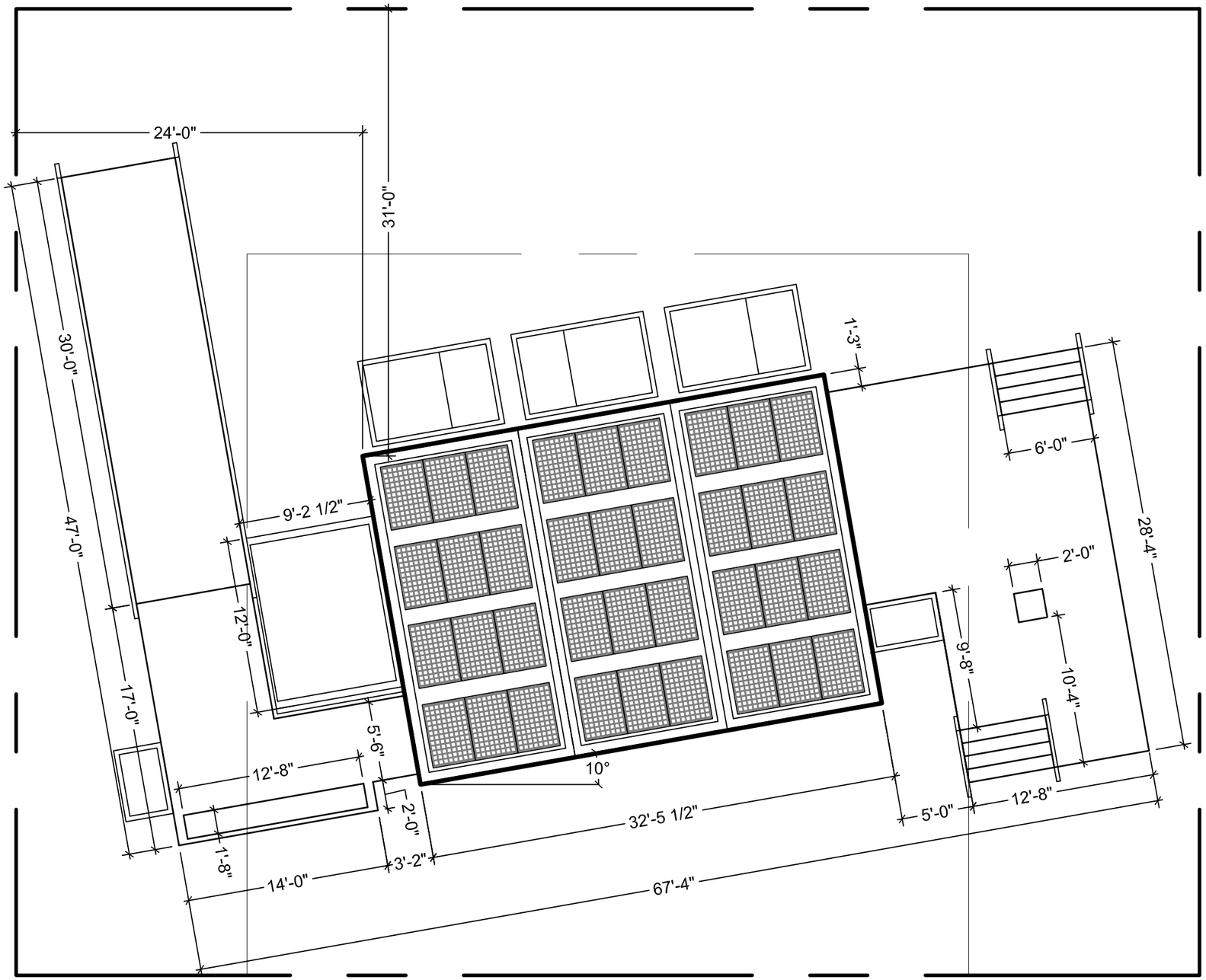
Operability Area Plan

scale:

1/4"=1'-0"

G-302

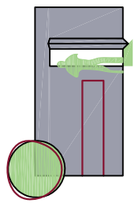
north



notes

1. All dimensions are to outermost face of deck/house.
2. Verify location of structural footprint before placement on site.

north



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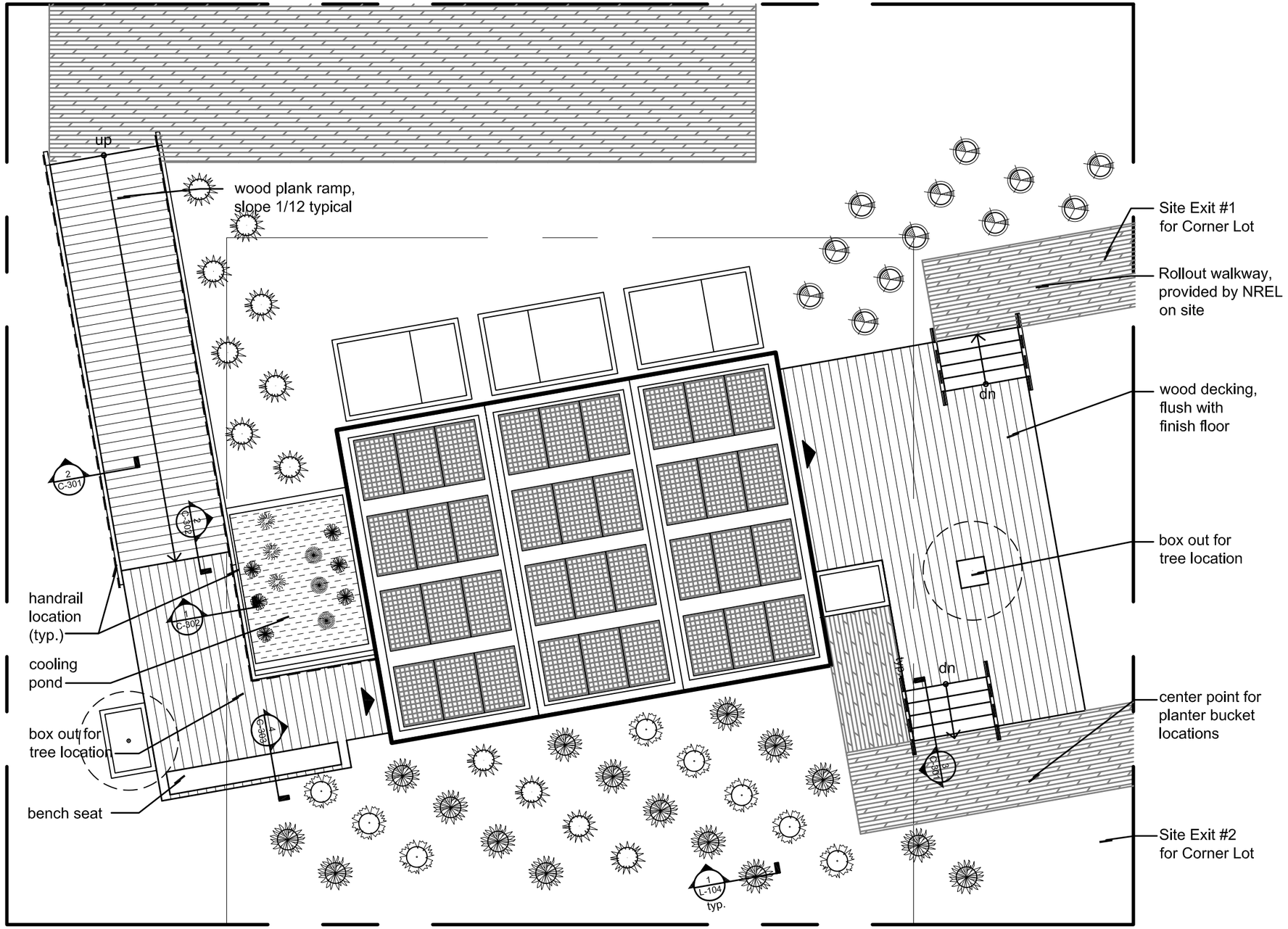
sheet name:

Site Plan - Dimesnions

scale:

1/8" = 1'-0"

C-101



notes

1. All decking to be supported w/ minimal load points above National Mall. See S1.07 for additional information.
2. Rollout walkway to be provided by NREL on site
3. All planter boxes, planter buckets, etc. to be supported above the site with minimal footprint impact. See site details for additional information.
4. All ramps to be 1/12" slope per code.
5. Handrails (shown dashed). See C1.10 for details.

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

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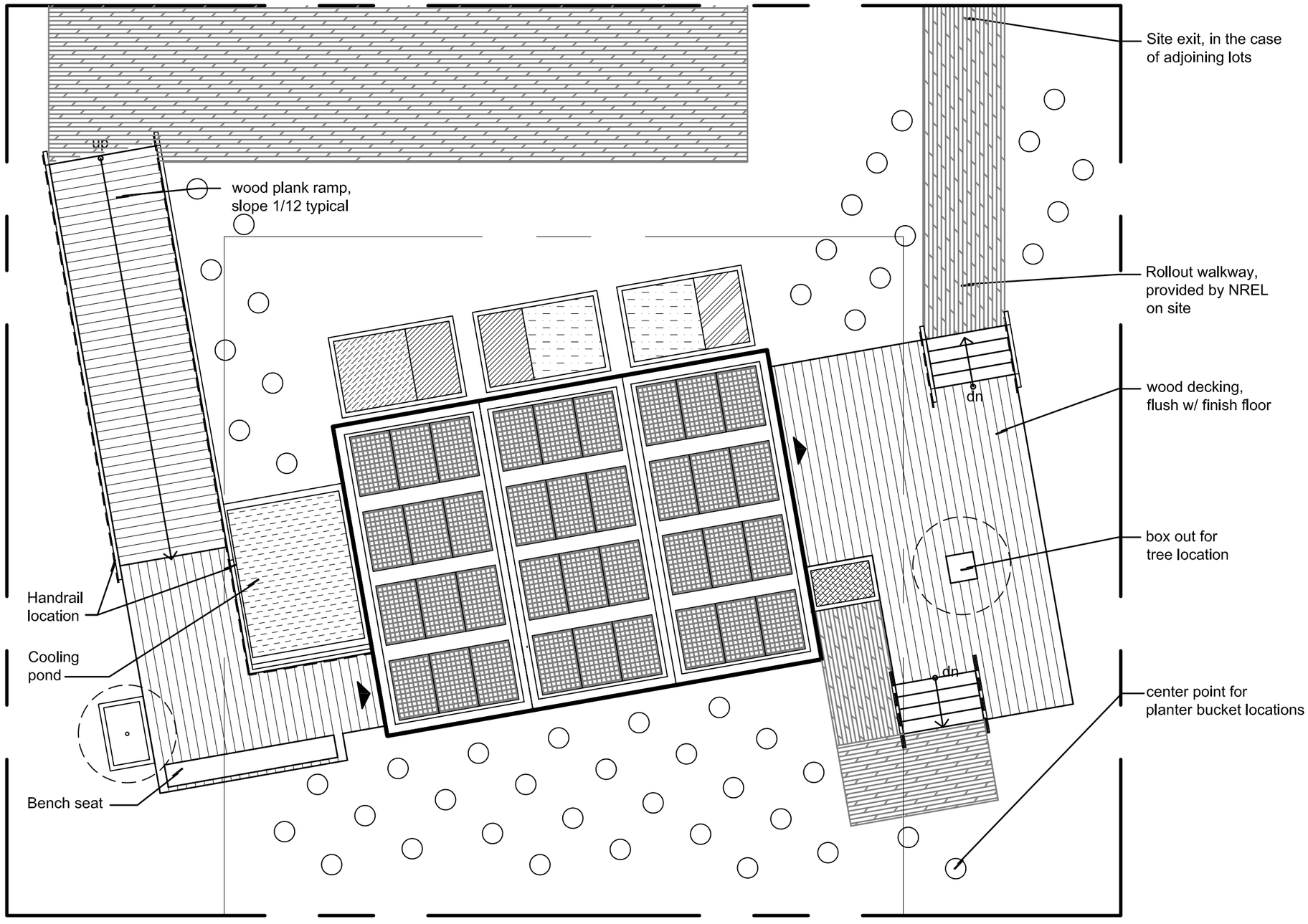
sheet name:
Site Plan - Callouts

scale:
1/8" = 1'-0"

C-102



notes

1. All decking to be supported w/ minimal load points above National Mall. See S1.07 for additional information.
2. Rollout walkway to be provided by NREL on site
3. All planter boxes, planter buckets, etc. to be supported above the site with minimal footprint impact. See site details for additional information.
4. All ramps to be 1/12" slope per code.
5. Handrails (shown dashed). See C1.10 for details.

north

SOLAR HOUSE I

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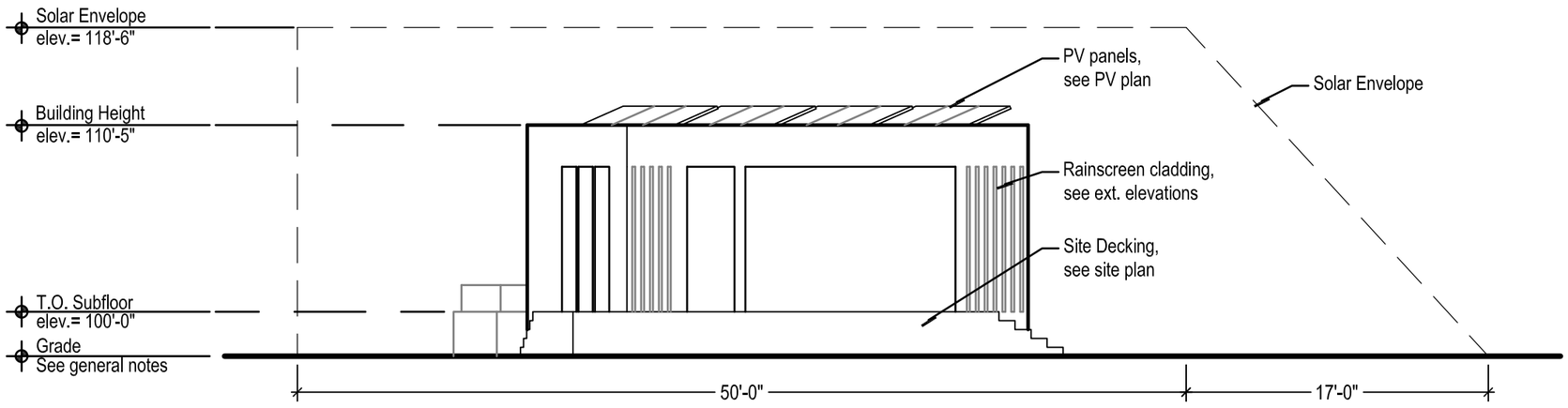
sheet name:

Site Plan - Callouts (alt.)

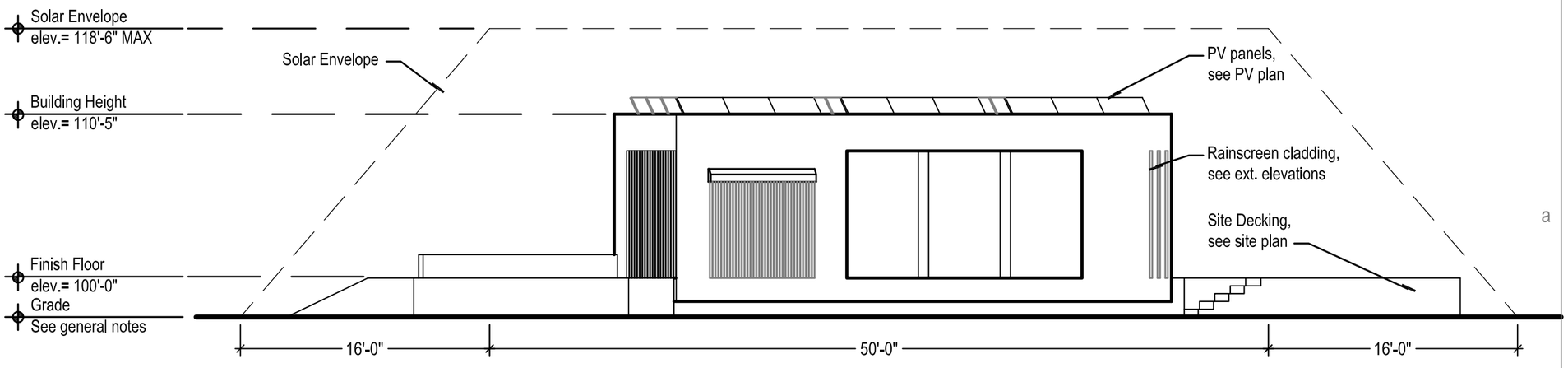
scale:

1/8" = 1'-0"

C-102a



2 **East Site Elevation**
Scale: 1/8" = 1'-0"



1 **South Site Elevation**
Scale: 1/8" = 1'-0"

notes

b

a

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

16"
8"
4"
0

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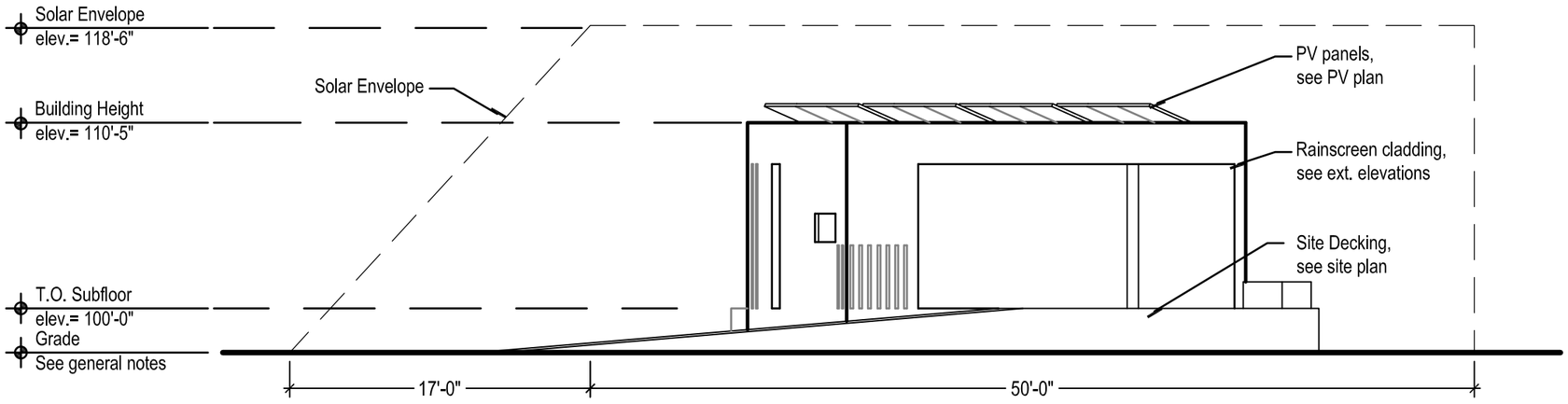
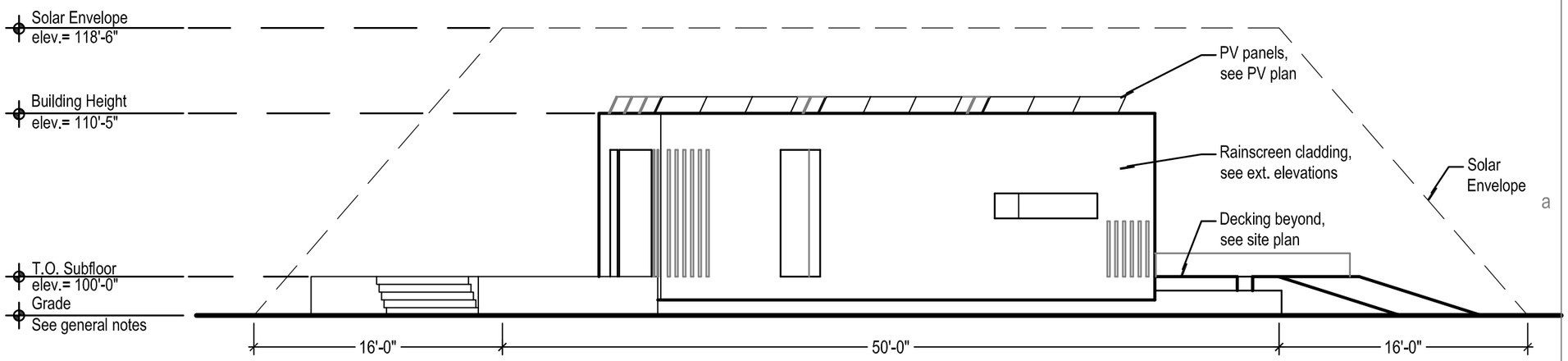
sheet name:
Site Elevations

scale:
1/8" = 1'-0"

C-201



2 West Site Elevation
Scale: 1/8" = 1'-0"



1 North Site Elevation
Scale: 1/8" = 1'-0"

notes

b

a

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

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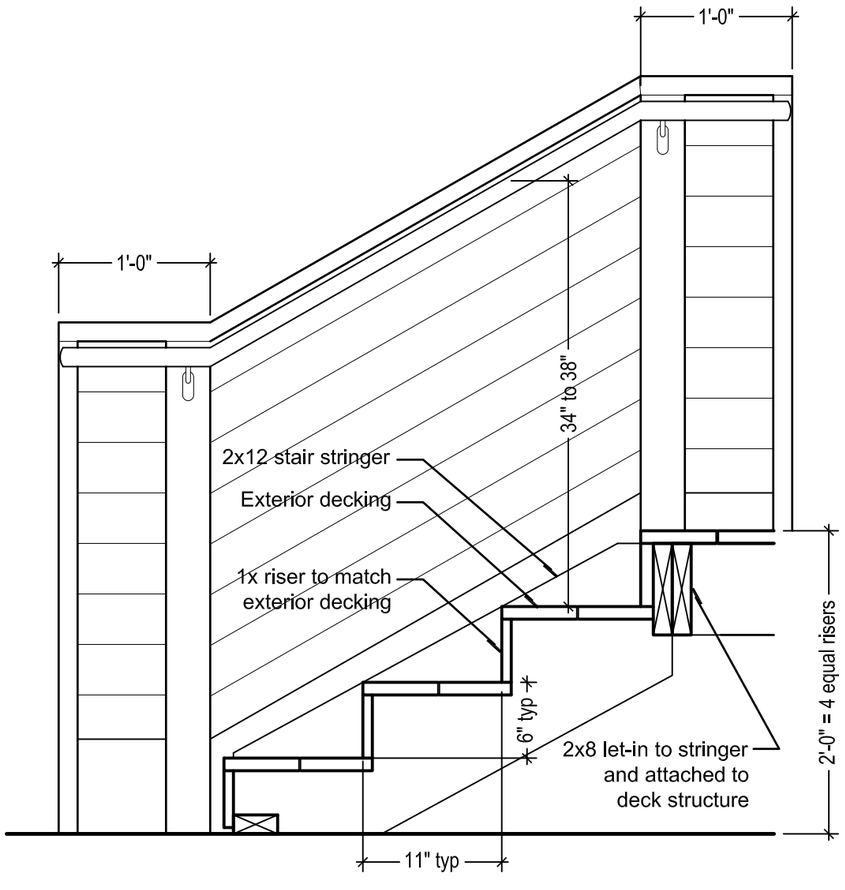
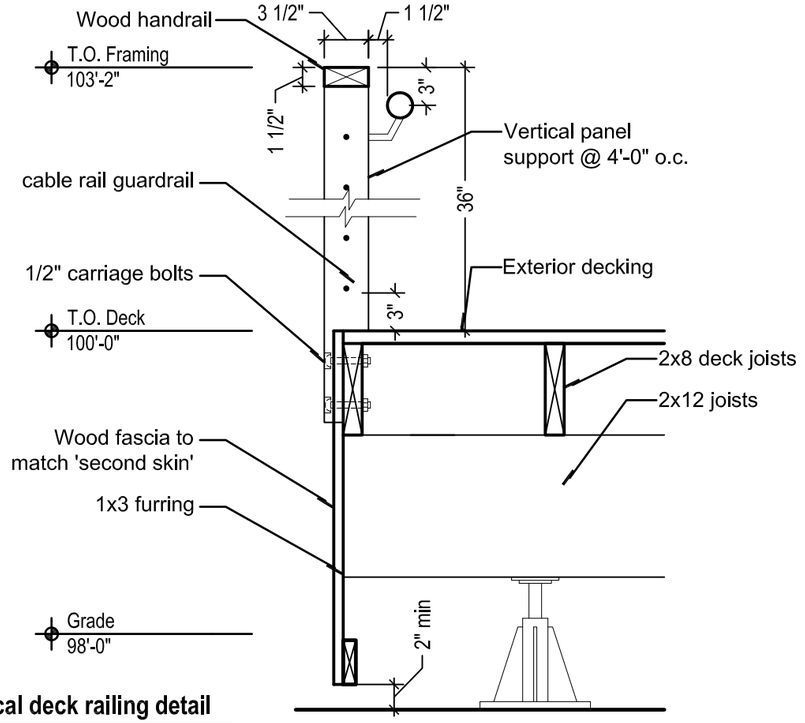
sheet name:
Site Elevations

scale:
1/8" = 1'-0"

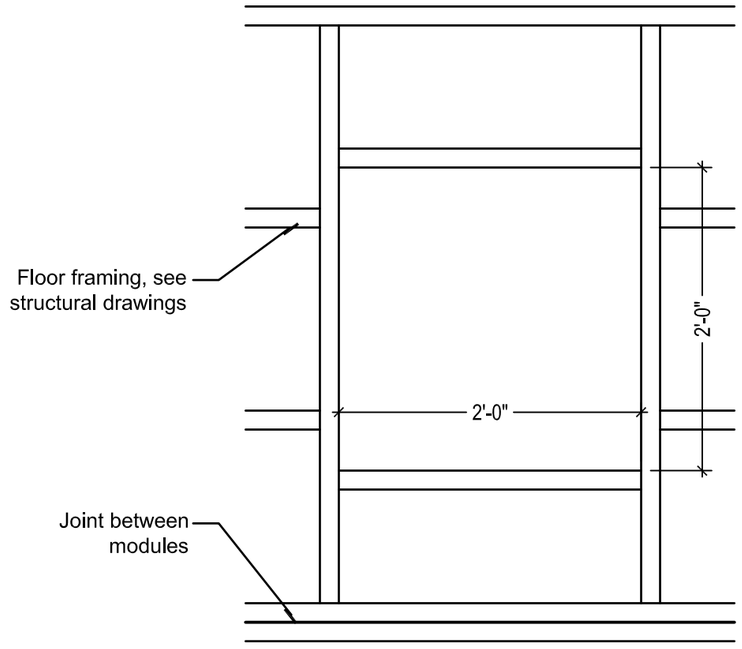
C-202



3 **Deck stair detail**
Scale: 1" = 1'-0"



2 **Typical deck railing detail**
Scale: 1" = 1'-0"



1 **Framing plan detail**
Scale: 1" = 1'-0"

notes

1. All exterior wood structure shall be pressure treated.
2. All visible exterior wood decking, handrails, stair risers, stair stringers, etc. shall be cedar.

specification notes

1. 05 52 00 - Metal Railings
2. 06 10 63 - Exterior Rough Carpentry

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

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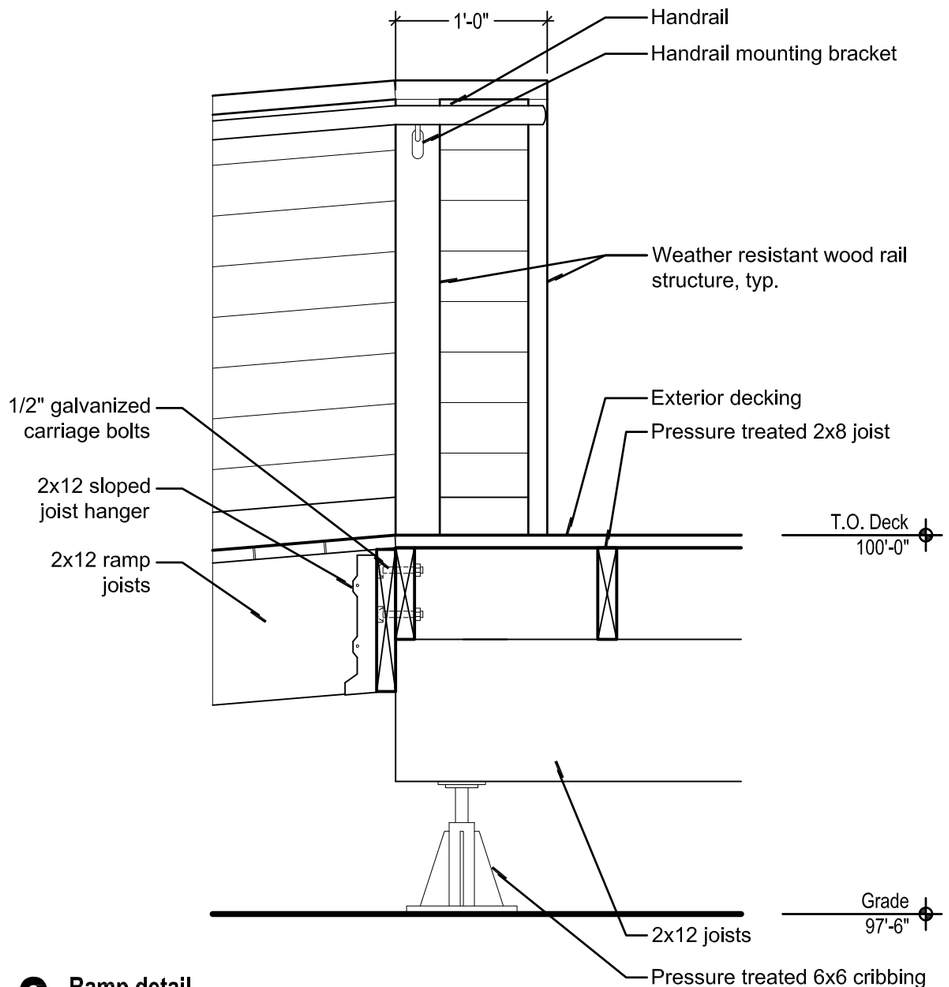
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

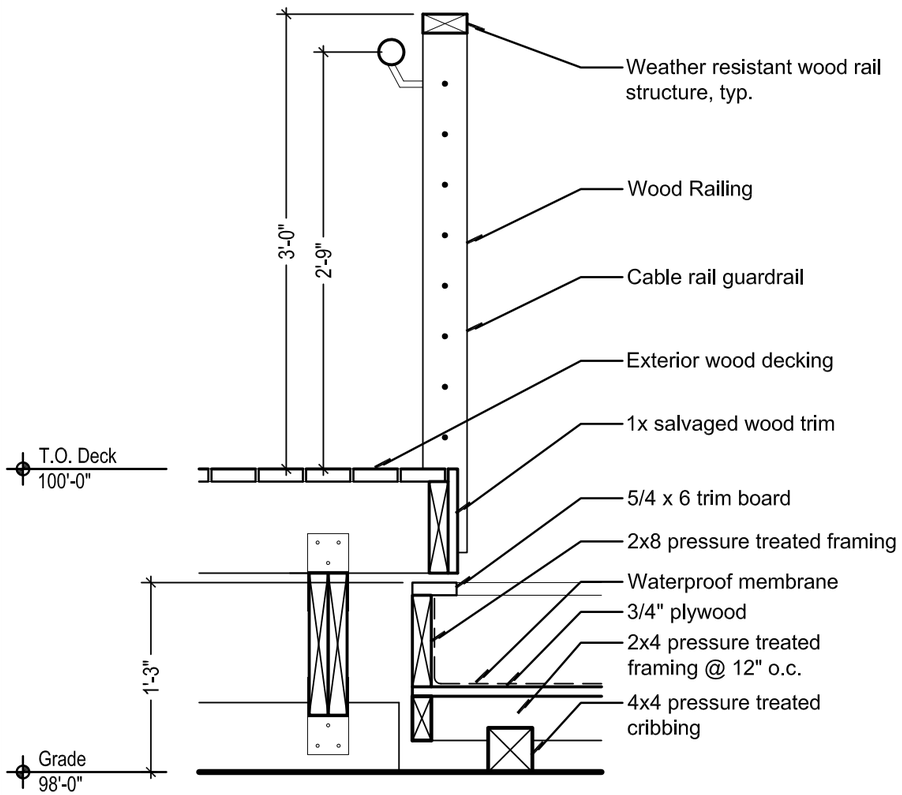
sheet name:
Site Details

scale:
as noted

C-301



2 **Ramp detail**
Scale: 1" = 1'-0"



1 **Reflecting pond detail**
Scale: 1" = 1'-0"

notes

1. All exterior wood structure shall be pressure treated.
2. All visible exterior wood decking, handrails, stair risers, stair stringers, etc. shall be cedar.
3. Reflecting pond shall be approximately 6" deep.
4. Reflecting pond shall be lined with a waterproof membrane suitable for sustaining plant life.
5. Reflecting pond will be lined with 3/4" gravel approximately 1-1/2" deep.

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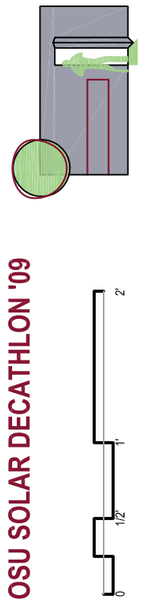

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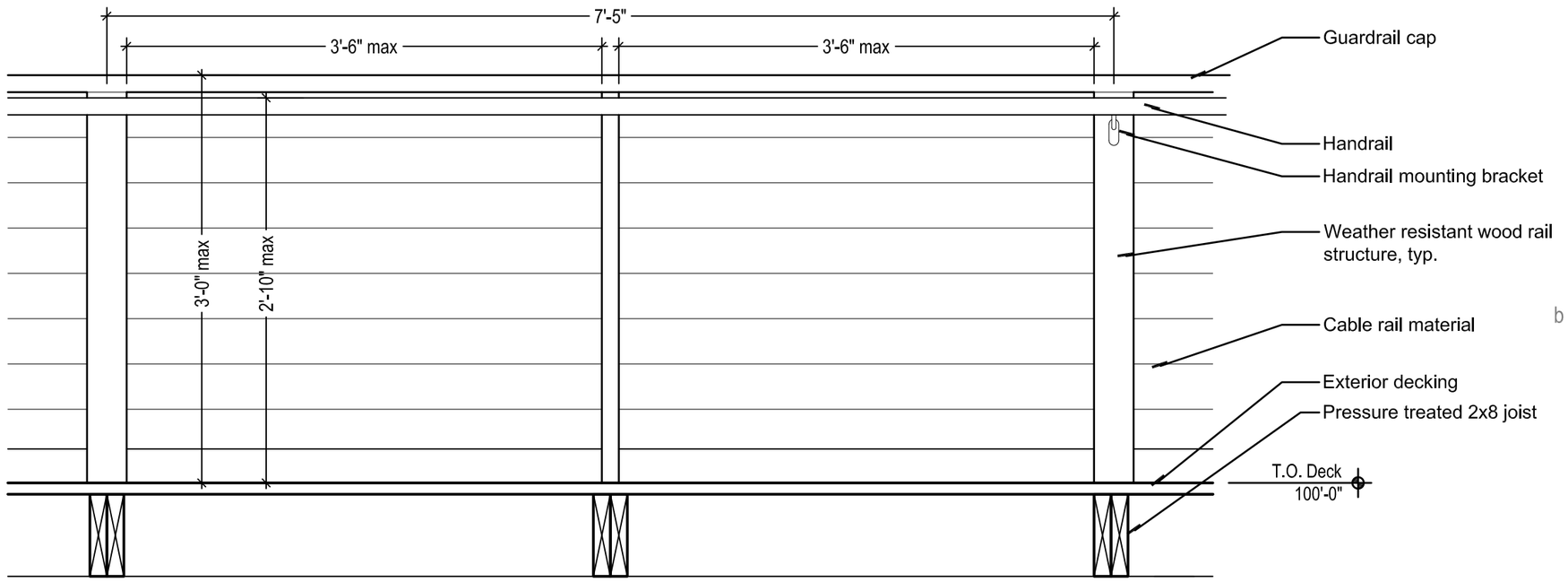
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

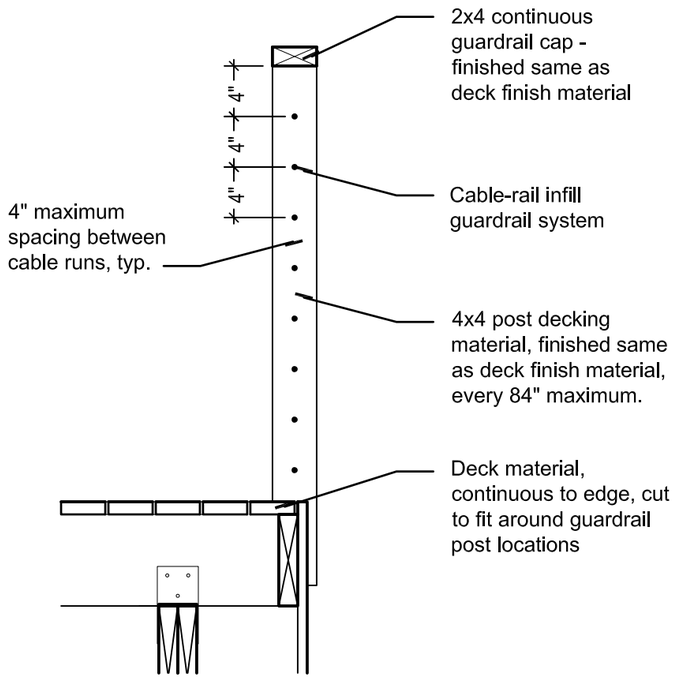
sheet name:
Site Details

scale:
as noted

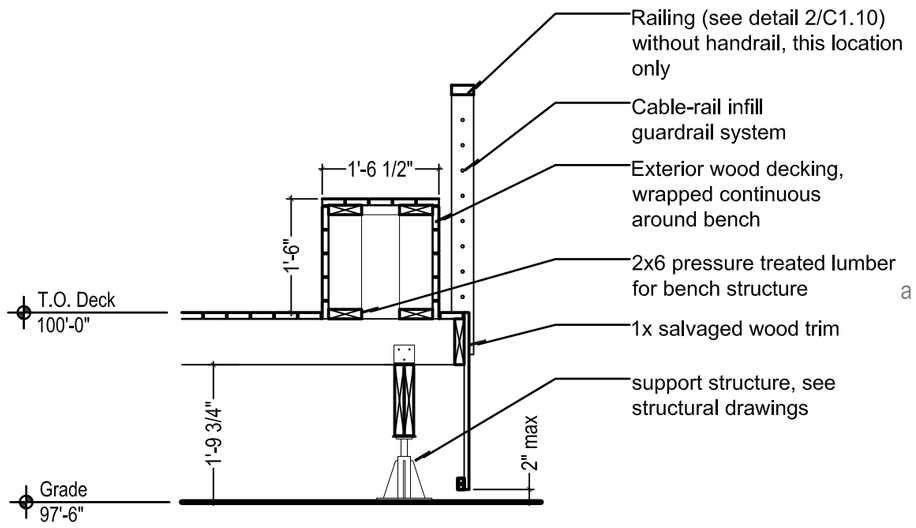
C-302



2 **Cable Guard Rail System**
Scale: 1" = 1'-0"



3 **Cable Guard Rail System**
Scale: 1" = 1'-0"



1 **Bench at Entry Decking**
Scale: 1/2" = 1'-0"

notes

1. All exterior wood structure shall be pressure treated.
2. All visible exterior wood decking, handrails, stair risers, stair stringers, etc. shall be cedar.
3. Reflecting pond shall be approximately 6" deep.
4. Reflecting pond shall be lined with a waterproof membrane suitable for sustaining plant life.
5. Reflecting pond will be lined with 3/4" gravel approximately 1-1/2" deep.

specification notes

1. 05 52 00 - Metal Railings
2. 06 10 63 - Exterior Rough Carpentry

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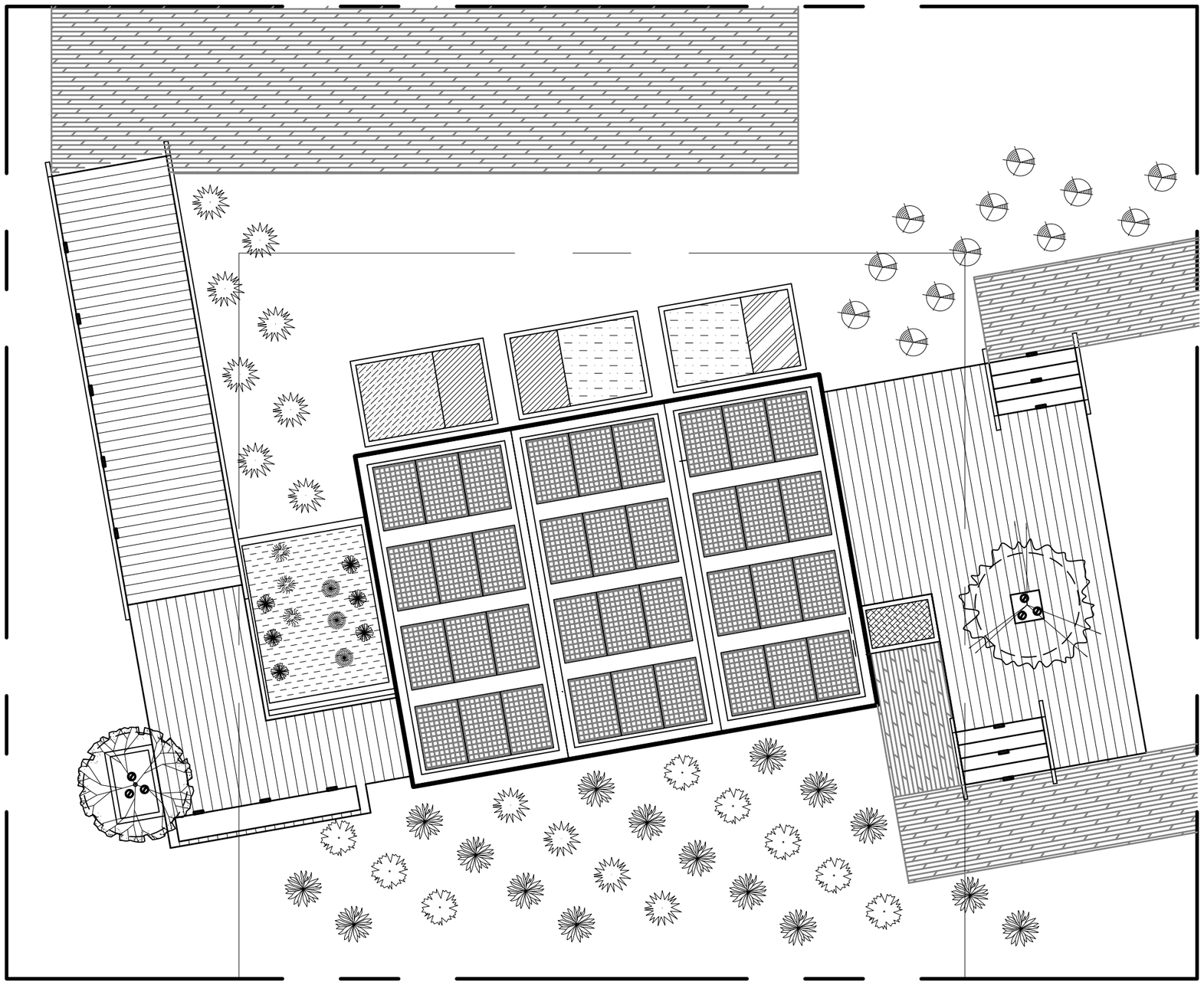
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Site Details

scale:
as noted

C-303



notes

1. All landscape plantings are to be grown locally and shipped to Washington, DC for the competition then returned to Ohio.
2. All planter boxes to be sealed to prevent irrigation water from leaking on to the site.
3. Water remediation pond to contain landscape elements and natural stone base.
4. See landscape details for footprint and water containment specifics.
5. Solar powered Up-lighting
6. Linear Bar - surface lighting

   ⊘ 5

   ▭ 6

7. All landscape site lighting to be solar powered, each unit with individual solar collector at base of fixture.

specification notes

1. 32 93 00 - Plants

north

SOLAR HOUSE I

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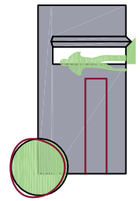

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

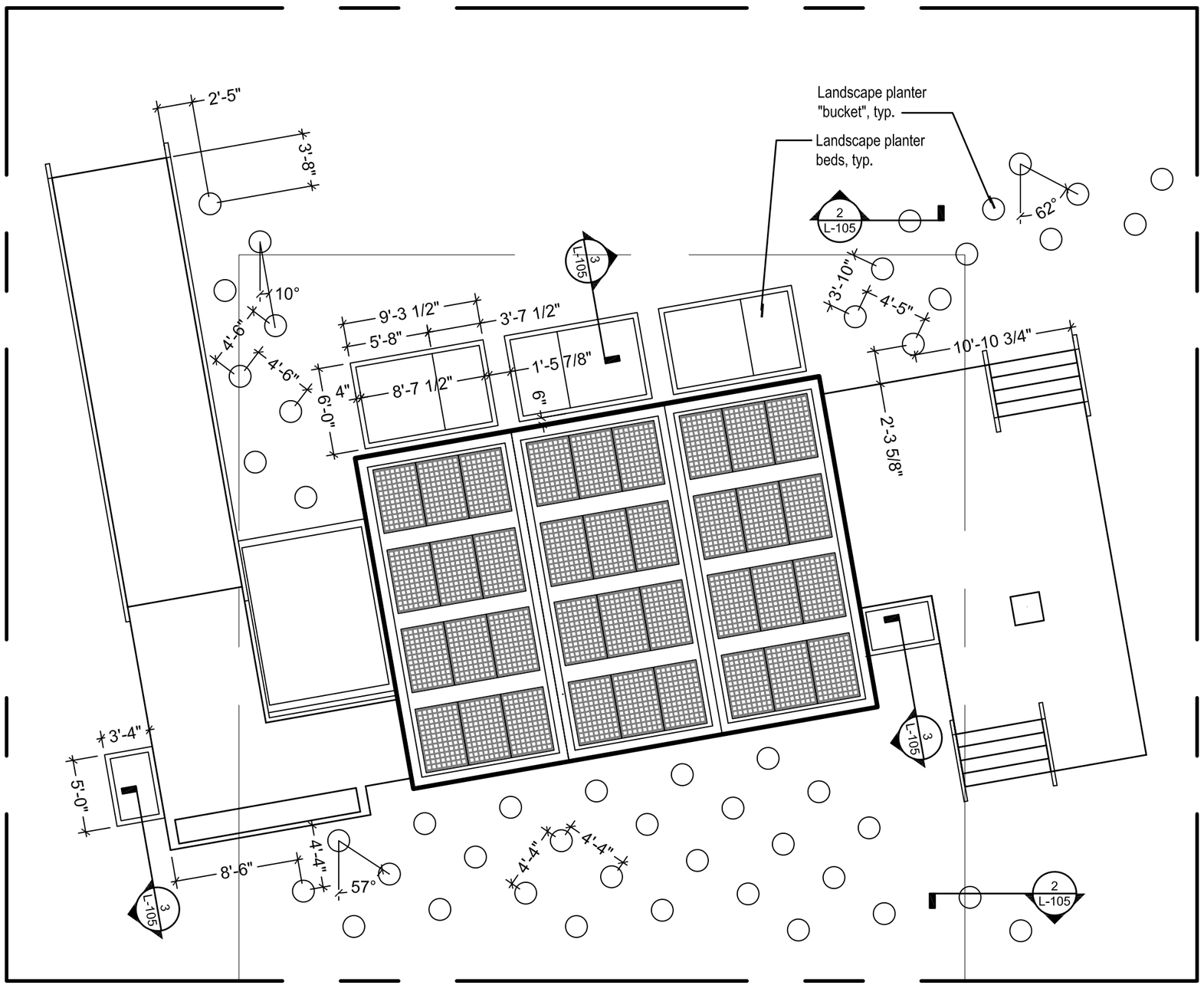
sheet name:

General Landscape Architecture Plan

scale:

1/8" = 1'-0"

L-101



notes

1. All landscape plantings are to be grown locally and shipped to Washington, DC for the competition then returned to Ohio.
2. All planter boxes to be sealed to prevent irrigation water from leaking on to the site.
3. Water remediation pond to contain landscape elements and natural stone base.
4. See landscape details for footprint and water containment specifics.

north

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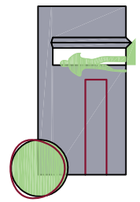

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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

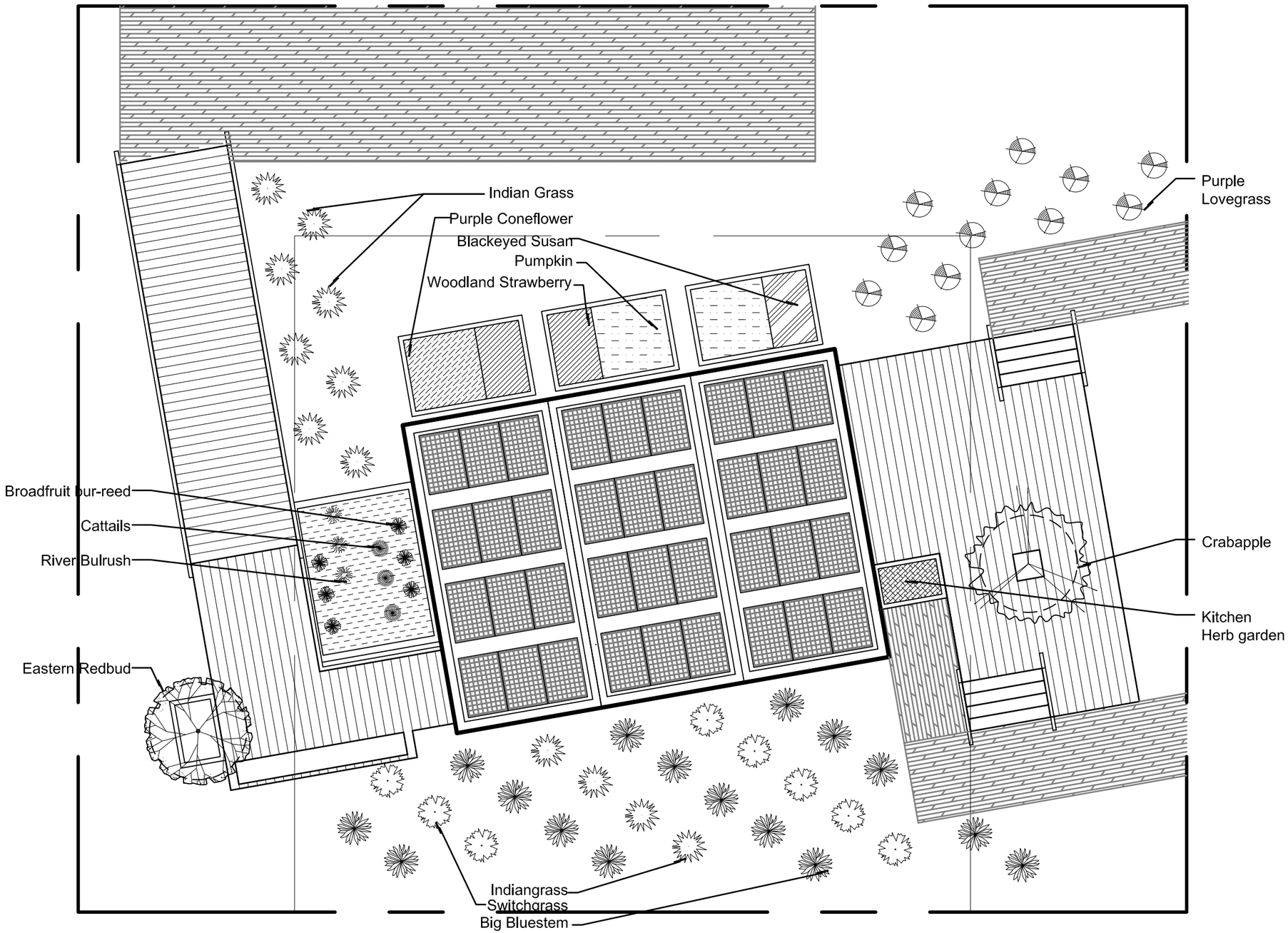
sheet name:

Landscap Plan - Dimensions

scale:

1/8" = 1'-0"

L-102



notes

1. Hydrophilic grasses to be planted 18" apart for adequate growth.
2. All planter boxes to be sealed to prevent irrigation water from leaking on to the site.
3. Water remediation pond to be filled at beginning of competition by NREL.
4. See landscape details for footprint and water containment specifics.

- Thymus L. (Thyme)
- Echinacea Purpurea (Purple Coneflower)
- Fragaria Vesca L. ssp. Vesca (Woodland Strawberry)
- Cucurbita Pepo L. Var. Pepo (Pumpkin)
- Rudbeckia Hirta (Blackeyed Susan)
- Bio Remediation Pond Rainwater and Stone infill
- Typha Angustifolia (Cattails)
- Sparganium eurycarpum (Broadfruit bur-reed)
- Scirpus Fluviatilis (River Bulrush)
- Sorgastrum Nutans (Indiangrass)
- Eragrostis Spectabilis (Purple Lovegrass)
- Panicum Virgatum (Switchgrass)
- Andropogon Gerardii (Big Bluestem)
- Malus 'Royal Raindrops' (Crabapple)
- Cercis Canadensis 'Forest Pansy' (Eastern Redbud)

north

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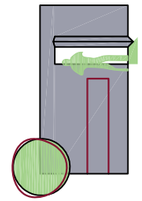

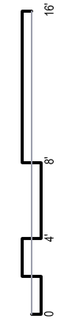

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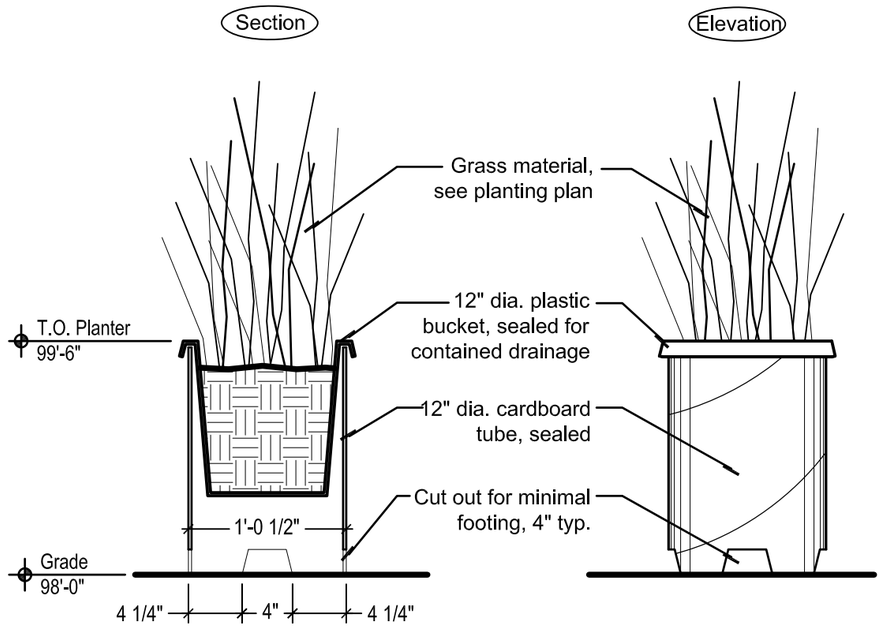
revisions:
1. 12.16.08
2. 05.15.09 (engineering)
3. 06.02.09

sheet name:
Landscape Planting Plan

scale:
1/8" = 1'-0"

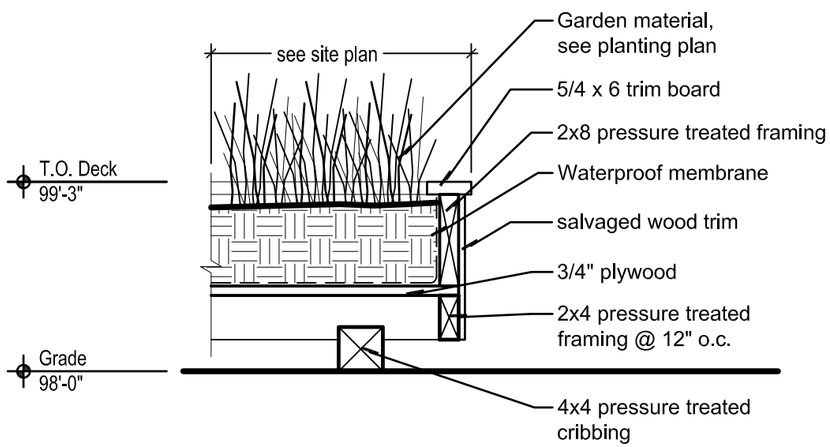
L-103

notes



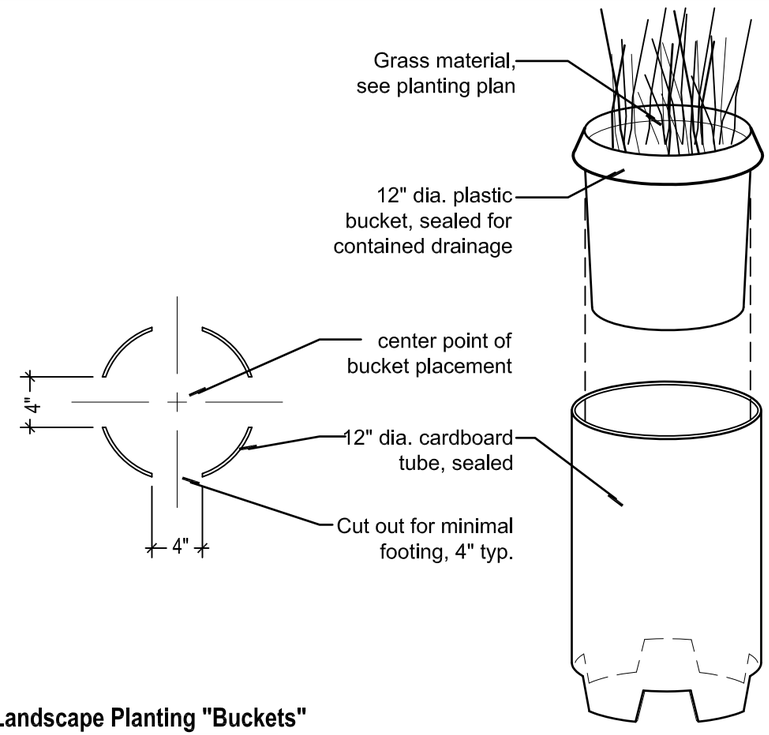
2 Landscape Planting "Buckets"
Scale: 1" = 1'-0"

b



3 Landscape Planter Bed
Scale: 1" = 1'-0"

2



1 Landscape Planting "Buckets"
Scale: 1" = 1'-0"

a

1

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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Landscape Details

scale:
as noted

L-104

Solar Decathlon Buidling Code - Section 5: Structural

1. The structural drawings and calculations included in the Construction Documents shall be stamped by a qualified, licensed design professional. Obtaining the stamp is the responsibility of the teams, not the organizers.
2. The organizers will submit stamped structural drawings and calculations to the National Park Service for final approval. It is strongly recommended that teams involve a qualified, licensed professional throughout the design process, because he or she could require structural design changes that could affect other aspects of the house.
3. In addition to meeting applicable IRC requirements, special attention must be given to the structural design challenges unique to the Solar Decathlon. These challenges include, but are not limited to, the following:
   a. Increased live loads because of public access to houses
   b. Necessity for tie-downs because of the lack of a permanent foundation (tie-downs must not penetrate more than 18 in. [45.7 cm] into the competition site topsoil)
   c. Use of low-impact footings to protect the competition site grass
   d. Unique wind-loading conditions because of roof-mounted solar systems
   e. Increased dead loads because of unusual mechanical and electrical components equipment.

Section 5-1: Prescriptive Requirements

Structural systems shall be designed in accordance with the appropriate prescriptive provisions of the IRC (see alternate materials provisions in IRC, Sec. CC2.6). For structural framing, a one-line structural plan view drawing is required at a minimum. Successive plan sheets shall be provided and shall include foundation footings, floor framing, wall locations, and roof framing. All structural components shall be listed including sizes, species and grade, and repetitive spacing (on-center distances). Include details on connections between joists and beams, floor systems and foundations, walls and floors, rafters and beams, etc. Specify proprietary hangers or other mechanical connections (IRC, Sec. R301.1).

Section 5-2: Design Loads

The following minimum loads must be used in the structural design:

a. Wind: 60 mph (26.8 m/s) (3-second gust), exposure category C (if tie-downs are not used, you must show that there is no overturning or uplifting with a safety factor of 2)
b. Railings: 200-lb (890-N) concentrated load applied in any direction at any point at the top of the rail
c. Interior floor, decks, ramps: 50 psf (2.39 kPa) live load
d. Roof: 20-psf (0.958-kPa) live load
e. Soil: 1,500-psf (71.8-kPa) load-bearing pressure on top of the soil
f. Additional structural design requirements at the post-event house location (to be determined by the licensed professional of record).

Structural plans shall indicate the design loads (e.g., 50 psf [2.39 kPa] floors, 100 psf [4.78 kPa] means of egress components, 20 psf [0.958 kPa] snow roof live load) and the location, size, and weight of special loads such as liquid storage tanks and mass or trombe walls.

Section 5-3: Exterior Construction

Structural plans shall include design details for any exterior appurtenances such as decks, stairs, ramps, awnings, canopies, and roof projections (IRC, Sec. R301.1).

Section 5-4: Specific Point Loads

Provide wind-analysis calculations for point-load connections demonstrating the components' abilities to withstand 60-mph (26.8-m/s), exposure category C wind conditions. Provide point-load connection details for all solar panel connections to demonstrate that the connections will resist uplift (IRC, Sec. R301.1).

Section 5-5: Foundation

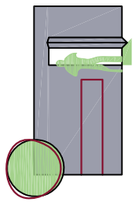
Provide a foundation plan for temporary setup on the competition site. Plans shall include location and size of all pad footings and required tie-down anchors (e.g., type, number, and installation configuration) to prevent wind uplift or overturning (IRC, Sec. R401.1 and R401.2). Please provide consideration for sloping or variable site conditions. The surface of each assigned site on the competition site may vary up to 18 in. (45.7 cm) depending upon location.

a. General Requirements All houses, decks and other structures shall be provided with foundations sufficient to safely transmit gravity, lateral, and uplift loads. For purposes of design, the presumptive soil bearing capacity shall be 1,500 psf (7,323.6 kg/m_2). Design wind speed shall be 60 mph (26.8 m/s) (3-second gust) with a C exposure. The design winds have been reduced to accommodate the season and short duration of the Washington, D.C., event and to acknowledge mandatory evacuation when anticipated winds are expected to exceed 50 mph (22.4 m/s).

b. Pad and Spread Footing Leveling The surface of Solar Decathlon lots may vary up to 18 in. (45.7 cm) across the lot. Foundations should be designed to accommodate site variations without relying on imported fill materials for anything other than leveling the surface for complete pad contact. Any imported fill materials must be demonstrated to transmit all required loads. The surface of the National Mall must be protected from contamination by fill materials via geotextile fabric or other approved barriers. All fill materials shall be retained by approved methods to prevent displacement by water or wind erosion.

c. Uplift Design Uplift design may employ uplift anchorage, dead-load analysis, or a combination of both. Anchorage embedment in the National Mall is limited to an 18 in. (45.7 cm) depth. Teams are encouraged to configure their structures to take advantage of dead loads to resist uplift, overturning, and sliding. All designs shall be supported by calculations demonstrating the efficacy of the system. Foundation designs and calculations shall be APPROVED prior to placement of the structure on the National Mall.

notes



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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Competition Rules - Structural Design

scale:
n/a

S-001

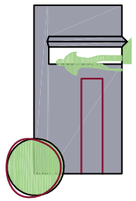
Section 5-6: Alternate Materials

Alternate materials are permitted as follows.

a. Engineered lumber (e.g., TJIs, LPIs, and BCIs) pursuant to specific manufacturer's design data. The product selected must carry a current International Code Council (ICC) Evaluation Services report. See http://www.icc-es.org/.
b. Structurally insulated panel systems pursuant to specific manufacturer's design data. The product selected must carry a current ICC Evaluation Services report. Also be advised that foam plastics must be thermally isolated from the interior of the dwelling (see Section 3-6 for more details).
c. Engineered trusses (floor or roof) must be designed in accordance with IRC Sections R502.11 or R802.10 as appropriate. Individual truss reports shall be provided for review and shall bear the seal of a registered design professional (IRC, Sec. R104.11).
d. Other alternate materials may be permitted if approved pursuant to IRC Section 104.11. It is the responsibility of the applicant to provide adequate proof to document the alternate as meeting the intent of the prescriptive code requirements. The organizers reserve the right to deny any alternate for failure to clearly demonstrate code equivalence.
e. Phase-change materials included within building components must be identified on the plans. Specifications for the material composition must be provided with any available fire-performance testing data. Be advised that phase-change embedment in gypsum board or interior wall or ceiling finishes may affect the ability of these materials to pass required fire tests.

Section 5-7: Structural Steel

Provide structural details for load-carrying structural steel assemblies. Include welded or bolted connections within the assembly and where attached to other structures (IRC, Sec. R301.1.3).



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3 06.02.09

sheet name:

Competition Rules - Structural Design

scale:

n/a

S-002

Design Loads

Wind:	Per Solar Decathlon Code, 60 mph (3-second gust), exposure category C with no tie-downs (if tie-downs are not used, you must show that there is no overturning or uplifting with a safety factor of 2) Ohio will be the location of the house following the competition. IRC Figure R301.2(4) requires a wind speed design of 90 mph in Central Ohio. The 90 mph design value will govern.
Railings:	200-lbs
Interior floor, decks, ramps:	50 psf live load 5 psf dead load (uplift calculations) , 10 psf dead load (gravity calculations)
Roof:	30-psf live load (20-psf + 10 psf for solar panel array) 10-psf dead load
Soil:	1,500 psf per competition guidelines. Once a permanent location is determined for the house when it returns to Central Ohio, a permanent foundation will be designed per the specific site parameters.
Seismic:	Seismic Design Category 'A' per IRC Figure R301.2(2) for Central Ohio
Egress components:	100 psf

Foundations

1. Competition foundations shall be constructed using prefabricated steel foundation piers.
2. Prefabricated piers shall be set upon prefabricated plastic pier plates specified by the manufacturer.
3. Install piers in accordance with manufacturer's recommendations for anchorage. See project specification for additional information.

Wood Frame

1. Light wood framing requirements shall conform to the International Residential Code (IRC).
2. All solid wood floor joists and wall studs shall be Hem-Fir.
3. Floor Joists: 2x8's @ 16" o.c. attached to sill plate with Simpson Strong-tie joist hangers, typical unless noted otherwise. Sill plate shall be attached to steel structure using Simpson Strong-Tie self tapping screws at a staggered spacing of 24" o.c. on the long sides of each module and 12" o.c. on the short sides of each module. See Table 1/S0.04 for additional information.
4. Roof Joists: 14" deep engineered I-Joists @ 24" o.c. capable spanning 22'-0" with of a uniform live load of 30 PSF with allowable deflection of L/240. Attachment shall utilize Simpson Strong-tie joist hangers, typical unless noted otherwise.

   For this project, the joist selected to meet this criteria is an 14" deep LPI32Plus by LP Building Products, www.lpcorp.com.
5. LVL Rim Joists: 14" deep engineered LVL rim joist capable of spanning 11' with a maximum deflection of L/240.

   For this project, the joist selected to meet this criteria is an 1-3/4" thick x 14" deep LP LVL 2950 Fb-2.0 E by LP Building Products, www.lpcorp.com.
6. Exterior bearing walls: 2x6's @ 24" o.c. with 1/2" plywood sheathing. Bearing wall sheathing shall be nailed 6" o.c. in to the sill plate directly attached to the steel. Studs shall be clipped at the top of the wall to the roof joist using a steel hurricane clip (see Table 1/S-004). See details for additional information regarding methods of connection to subfloor and roof joists.
7. Shear walls: Shear walls shall conform to IRC Section R602.10.3 - Braced Panel Construction Methods, method #3. See S2.01 for additional information.
8. Interior walls (non bearing) - 2x4's at 16" o.c.
9. Sheathing - All sheathing shall be installed using construction adhesive and a 12 & 6 (12" inside, 6" outside edges) pattern recommended by the APA (American Panel Association) and IRC Table R602.3(1) - Fastener Schedule for Structural Members.

   All Sheathing shall be installed with face grain running perpendicular to the studs/joists in a staggered pattern. Panels shall be gapped per APA recommendations

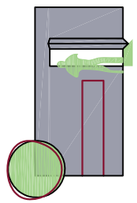
   9.1. Floor sheathing: 1-1/8" 'Warmboard' tongue & groove subfloor with integral radiant heating channel.
      - 9.1.1. Fasten with panel adhesive and 2 1/2" screws, ring shank nails, or 10 D common nails.
      - 9.1.2. Use manufacturer provided alignment pins on the two outer most channels, across the seam between the adjacent panels, to ensure proper channel alignment.
      - 9.1.3. Per APA guidelines all subfloor panels should be gapped 1/8" on the 4' side.

   9.2. Wall sheathing: 1/2" plywood or OSB installed with 8D ring shank nails in accordance with APA recommendations.

   9.3. Roof Sheathing: 3/4" tongue and groove plywood or OSB installed with 8D ring shank nails in accordance with APA recommendations.
10. Unless otherwise noted, use Simpson Strong-Tie connectors per Table 1/S0.04. For exterior applications, metal connectors and fasteners shall be either stainless steel or hot-dipped galvanized. All metal connectors shall be installed per manufacturers recommendations.

notes

issues
1. Shear Walls



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2 05.15.09 (engineering)
3 06.02.09

sheet name:
Structural Notes

scale:
n/a

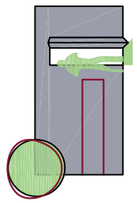
S-003

Table 1: Metal Connectors (all by Simpson StrongTie)

Model #	Description	Location of Use
TB1460S	Self-tapping screws	Attachment of sill plates to steel structure
LB28	Top Flange Hangers for Solid Sawn Lumber	Attachment of 2x8 floor joists to sill plate
WNP28-2	Top Flange Hangers for Solid Sawn Lumber	Attachment of double 2x8 floor joists to sill plate
THA218	THA Adjustable Truss Hanger	Attachment of 2x8 floor joists @ sloped porches.
THA413	THA Adjustable Truss Hanger	Attachment of double 2x8 floor joists @ sloped porches
SUR26	45-degree 2x8 joist hanger - right hand	Attachment of floor joists to sill plate @ steel braces.
SUL26	45-degree 2x8 joist hanger - left hand	Attachment of floor joists to sill plate @ steel braces.
THF25140	Engineered I-Joist Hangers (face mount)	Attachment of roof I-Joist to LVL rim joist
TB36	Tension bridging for I-Joists	Bridging of roof I-Joists
H2A	Sesimic & Hurricane Ties	Clipping roof joists to wall studs.
HH6	Header Hangers	Supporting headers @ kitchen window

Structrual Steel/Misc Metals

1. All structural steel shall conform to IRC R301.1.3.
2. Unless otherwise noted, apply one coat of shop primer and two coats of finish paint to all steel sub-structure.
3. All steel connections shall be fully welded both sides of flange and web unless noted otherwise.



SOLAR HOUSE I

OSU SOLAR DECATHLON '09

Construction Documents
June 2, 2009

U.S. Department of Energy
2009 Solar Decathlon

revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

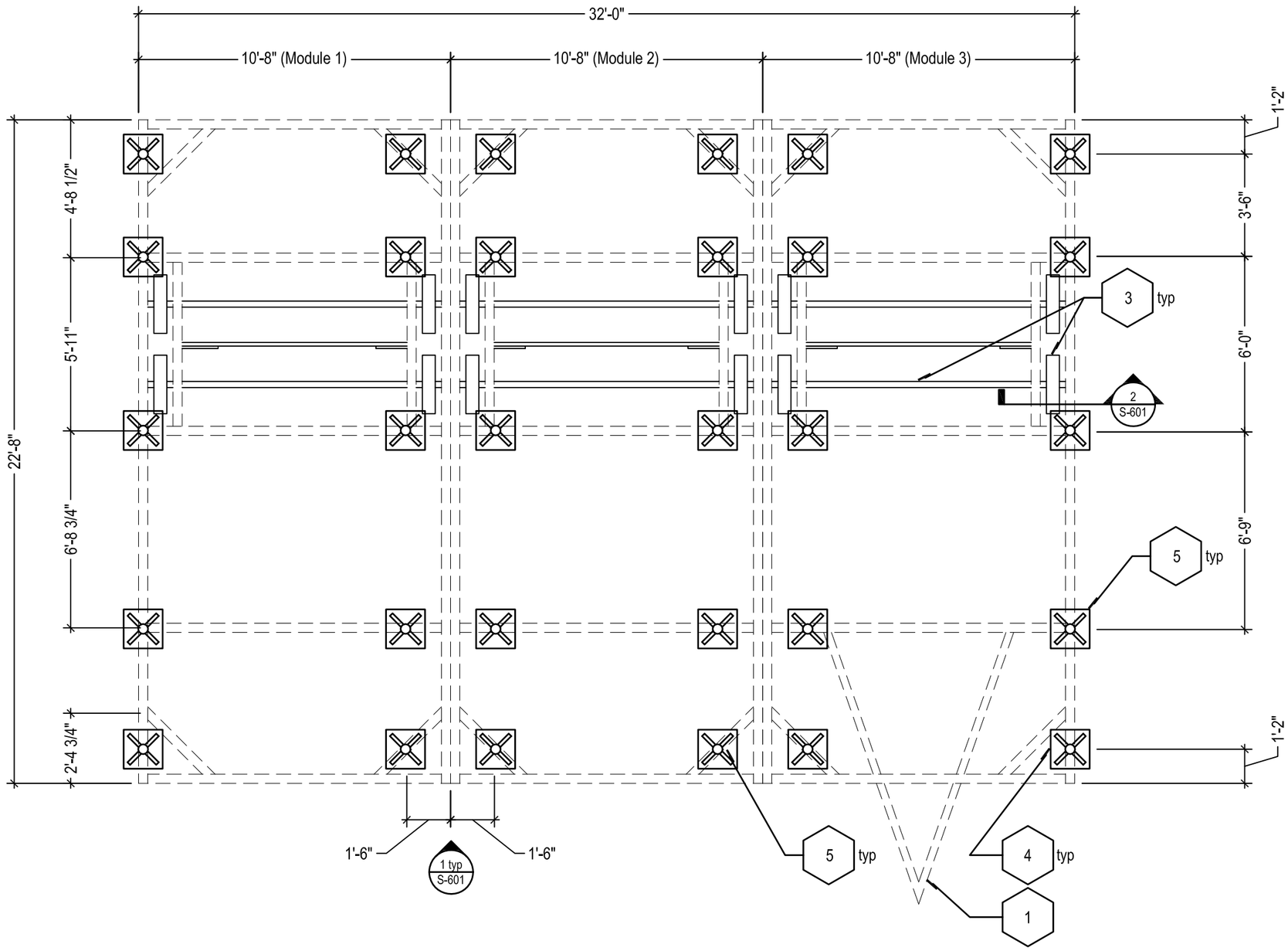
sheet name:

Structural Notes

scale:

n/a

S-004



notes

1. Trailers are pre-fabricated using W12x14 steel members, fully welded at all flanges and webs.
2. During transit, each module is supported by (2) axles capable of supporting 6000 lbs. each.
3. Trailers are leveled using bottle jacks and set on adjustable steel piers.
4. Trailers are bolted together per the detail noted on the drawings.

key notes

1. Removable trailer hitch shown dashed (typical all 3 modules)
2. W12x14 steel structure above (shown dashed, typical)
3. Trailer axle & wheels rated for 6000 lbs.
4. Prefabricated adjustable steel pier and 16"x16"bearing pad with ground penetrating anchors, typical along north and south edges of the house. See detail on S3 series.
5. Prefabricated adjustable steel pier and 16"x16" bearing pad.

specification notes

1. 05 12 00 - Structural Steel Framing

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

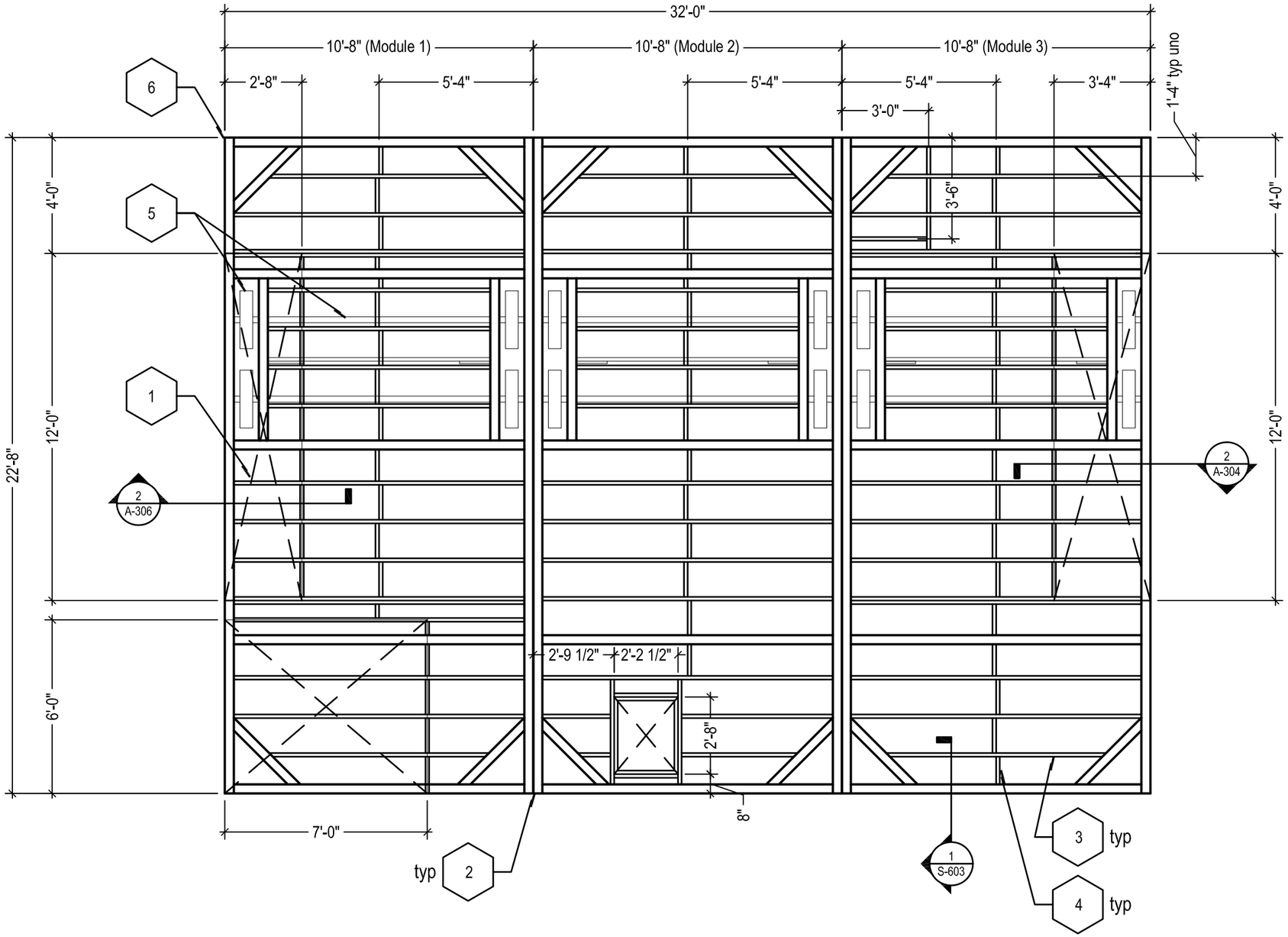
sheet name:

Sub-Structure Framing Plan

scale:

1/4" = 1'-0"

S-101



notes

1. Floor joists are 2x8 at 16" o.c. unless noted otherwise.
2. Steel trailers are pre-fabricated. See trailer drawings for additional information.
3. All floor sheathing is 1-1/8" "Warmboard" unless noted otherwise. See radiant floor drawings for panel layout.
4. All floor joists are secured to steel with joist hangers. See sheet S0.03 for joist hanger schedule.
5. 2x4 wood nailers are attached to the top flange of all steel beams using self tapping screws. Screws shall be driven in a staggered pattern @ 24" o.c. max on the long sides of the trailer, and 12" o.c. on the short sides of the trailer. See details, project specifications, and sheet S0.03 for additional information.

key notes

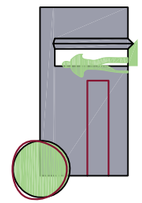
1. Area indicated with a dashed "x" slopes to shed water. See sections indicated for additional information.
2. Trailer joint (See detail 1/S-103)
3. 2x8 floor joist
4. 2x8 blocking (w/sloped edge at flat to slope transitions)
5. Trailer wheels & axle
6. Joists are 16" o.c. north to south starting from this workpoint, typical unless noted otherwise.

specification notes

1. 06 10 03 - Exterior Rough Carpentry

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

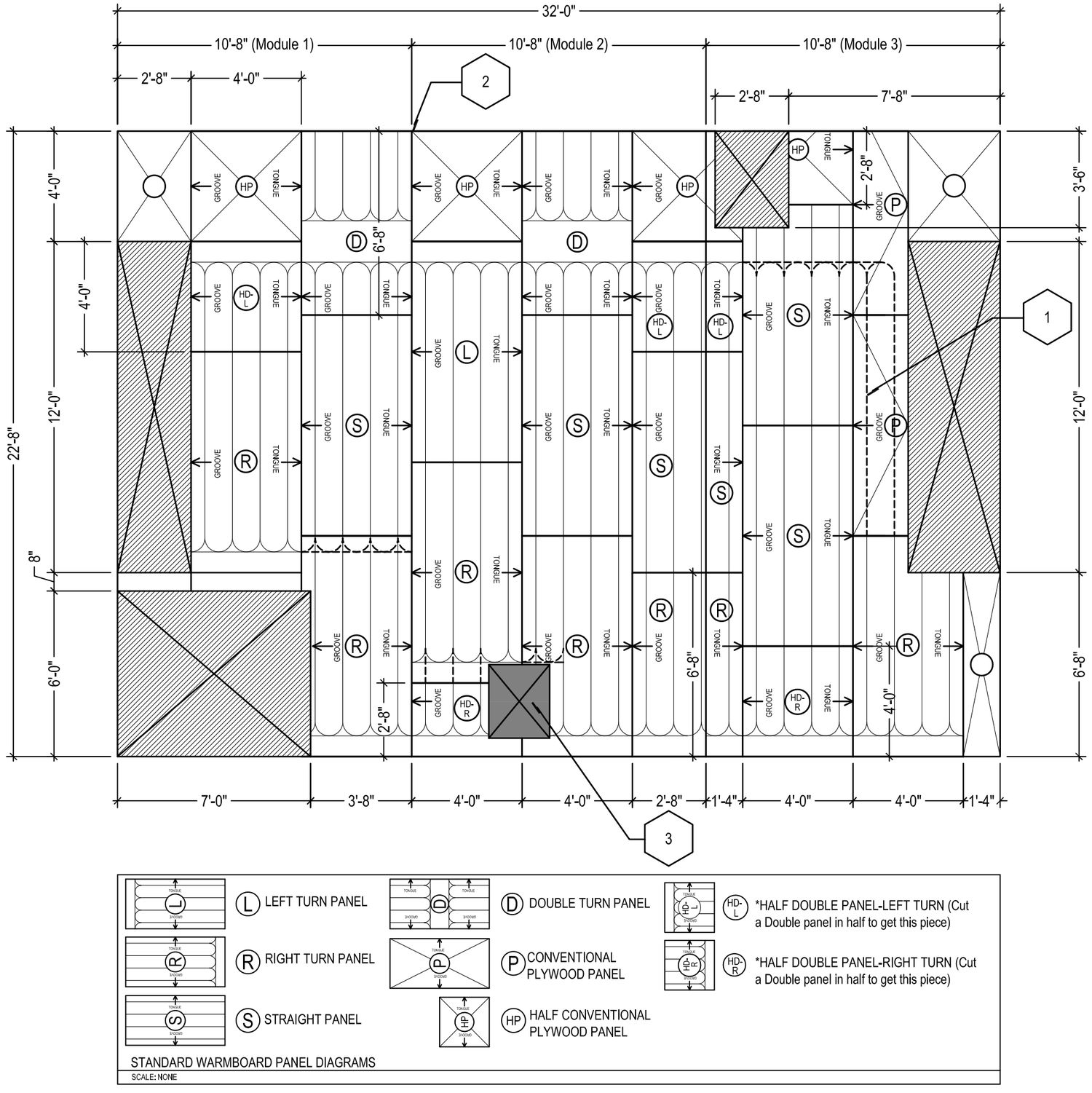
sheet name:

Floor Framing Plan

scale:

1/4" = 1'-0"

S-102



notes

1. All subfloor is 1-1/8" thick tongue and groove plywood with integral radiant heating tube tracks (aka 'warmboard') unless noted otherwise.
2. Areas shown with diagonal poche shall be 3/4" tongue and groove plywood subfloor instead of 1-1/8" subfloor.
3. Standard warmboard panel diagrams correspond to the floor sheathing plan.
3. Areas of warmboard subfloor with no standard panel letter designation are to filled with off-cuts from other full panels.
4. See radiant tubing layout plan for locations of radiant tubing and custom tubing routes.
5. All dimensions are taken from panel joint lines.

key notes

1. Custom tubing route, shown dashed. See radiant tubing plan for additional information.
2. Starting point for most efficient and accurate installation of warmboard panels.
3. See architectural drawings for detail of floor sheathing at shower pan.

specification notes

1. 06 16 00 - Sheathing

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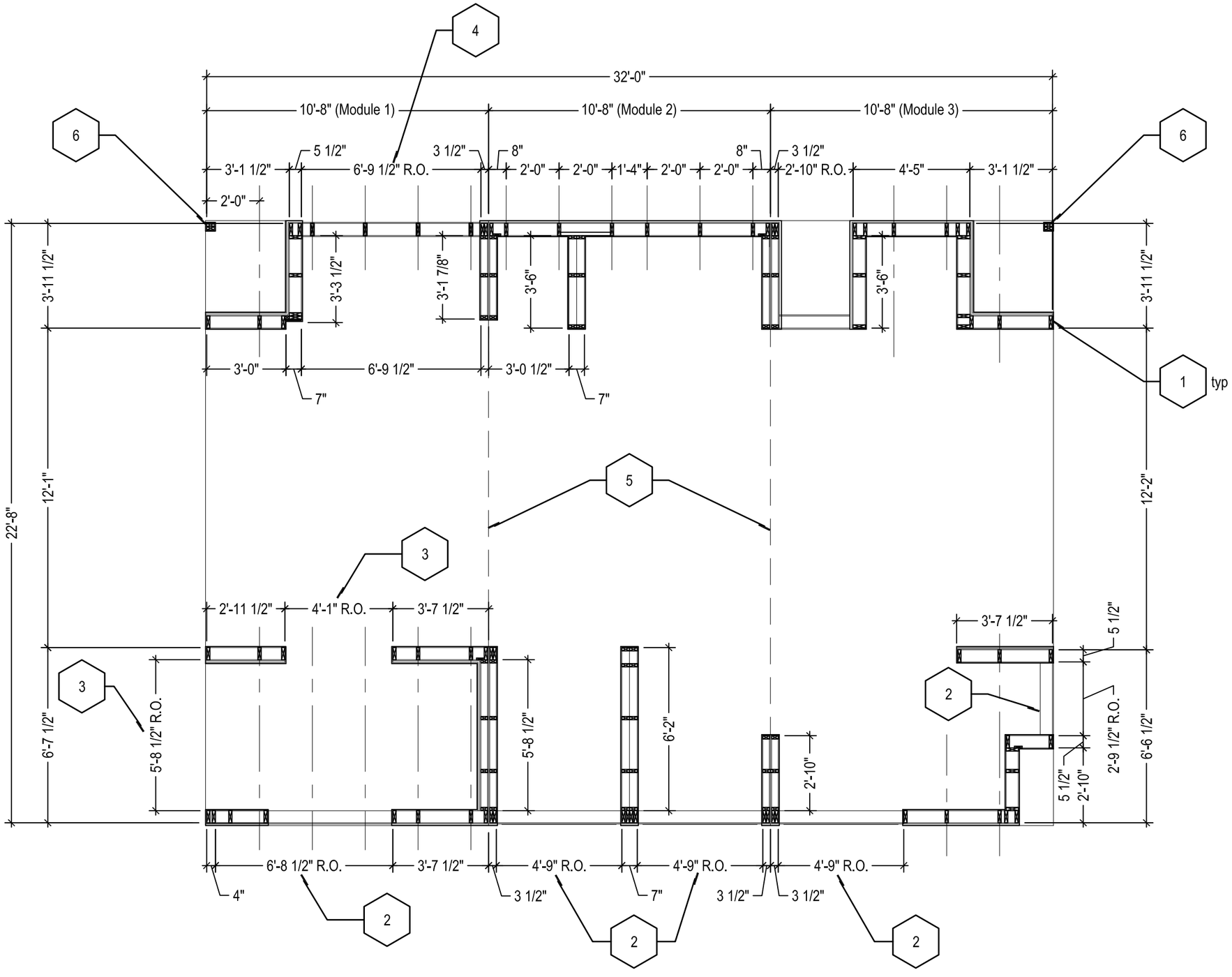
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Floor Sheathing Plan

scale:
1/4" = 1'-0"

S-103



notes

1. Interior wing walls at module joints use 3" wide framing members instead of full width 2x4s.
2. Wing walls are clad with plywood on the outside face.
3. Face of stud walls align with outside face of steel flange at exterior wall conditions unless noted otherwise. (See wall sections.)
4. Dimensions are taken from face of stud unless noted otherwise.
5. Coordinate locations of studs between window assemblies in the field.

key notes

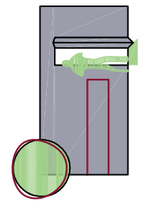
1. Outside face of stud aligns with edge of subfloor below.
2. Full height rough opening with continuous sill. See wall sections for additional information.
3. Full height rough opening with no sill. See wall sections for additional information.
4. Partial height rough opening. See wall sections 2/A-302 for additional information.
5. Module joint line
6. Workpoint for this module. Studs are spaced at 24" o.c. from this point to align with sheathing joints unless noted otherwise.

specification notes

1. 06 10 00 - Rough Carpentry

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



Construction Documents
June 2, 2009

U.S. Department of Energy
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revisions:

1. 12.16.08
2. 05.15.09 (engineering)
3. 06.02.09

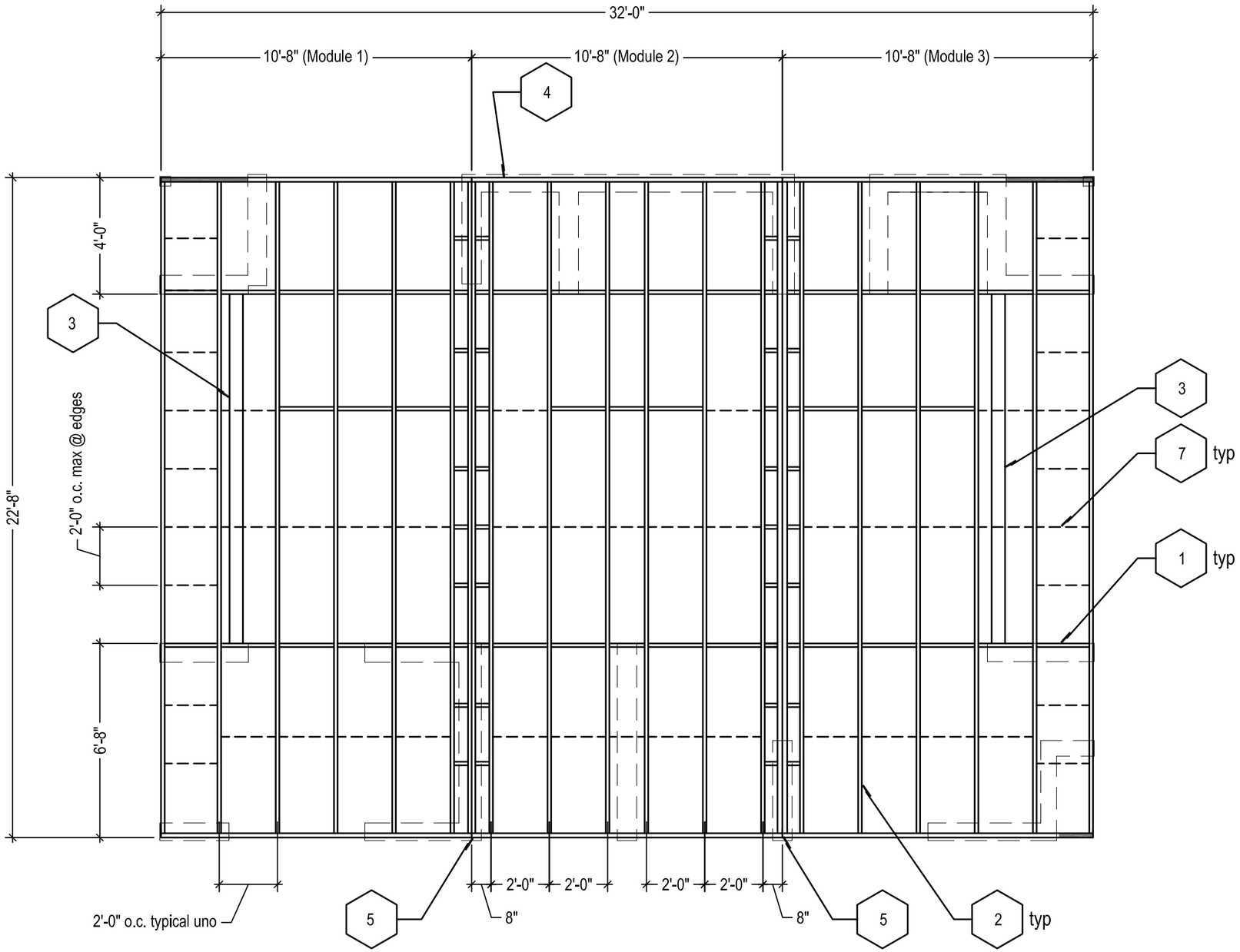
sheet name:

Wall Framing Plan

scale:

1/4" = 1'-0"

S-201



notes

1. Roof joists are spaced at 24" o.c. unless noted otherwise.
2. Areas where LVL sections are cantilevered are shown shaded gray.
3. Walls below are shown lightly dashed.
4. Dimensions are taken from face of wall stud below, typical unless noted otherwise.
5. Wood and metal bridging shall be spaced 2'-0" o.c. max at the perimeter of each module, and 4'-0" o.c. max at interior conditions.

key notes

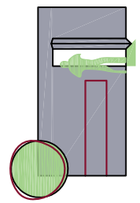
1. Full depth wood blocking between joists
2. Engineered I-joist
3. Box beam header above doors. See 1/A-308 for construction.
4. LVL rim joist
5. Joint between modules
6. Not used
7. Metal 'X' bridging between joists (shown dashed). See metal connector schedule on sheet S-003 for additional information.

specification notes

1. 06 10 00 - Rough Carpentry

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

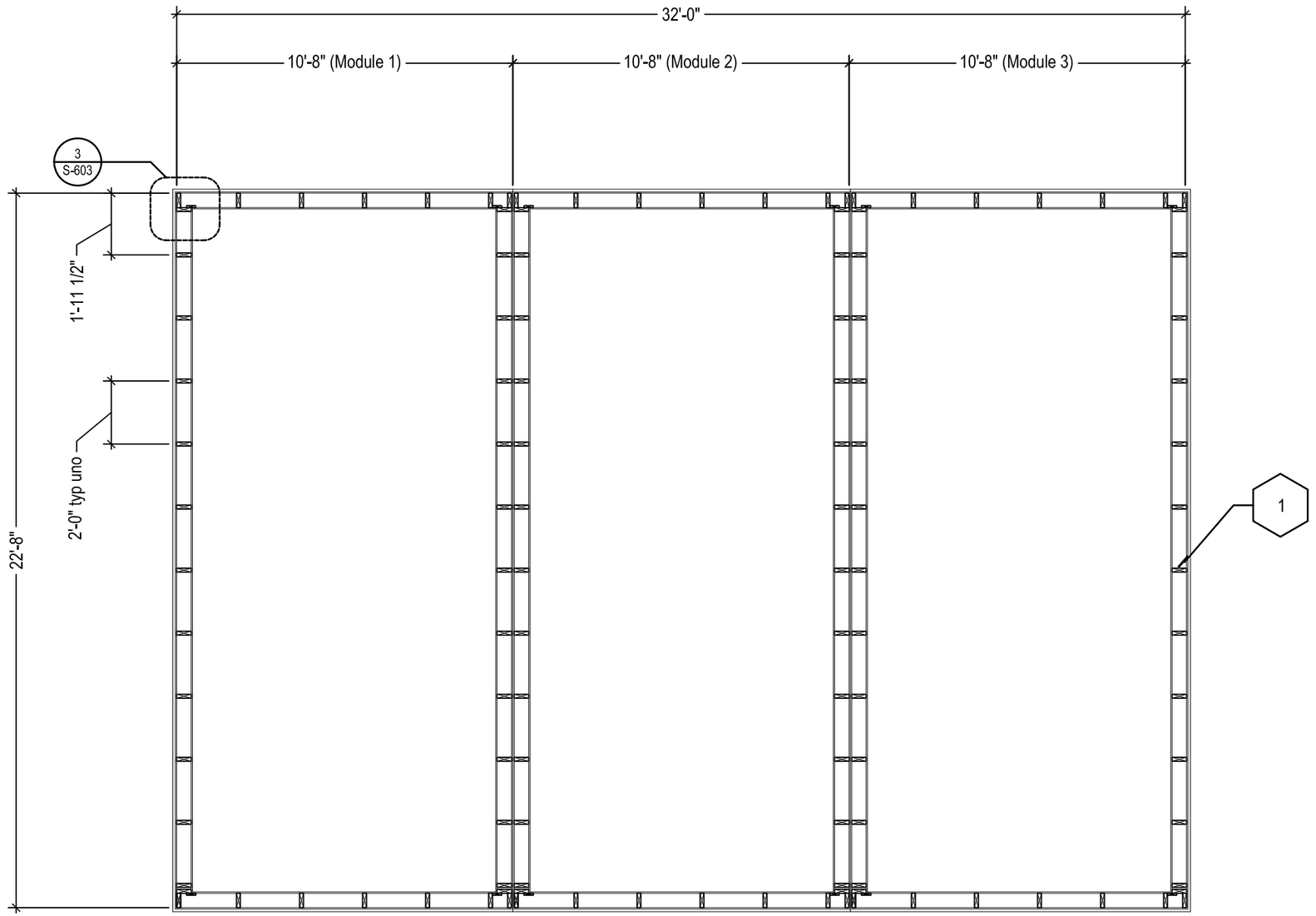
sheet name:

Roof Framing Plan

scale:

1/4"=1'-0"

S-301



notes

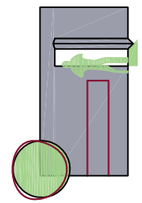
1. Parapet sill plates shall be screwed directly in to structure below with (2) 3" #10 deck screws in each stud bay.
2. Dimensions are taken from face of stud unless noted otherwise.

key notes

1. 2x6 stud. See wall sections for overall parapet height.

specification notes

1. 06 10 00 - Rough Carpentry



SOLAR HOUSE I

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revisions:

1. 12.16.08
2. 05.15.09 (engineering)
3. 06.02.09

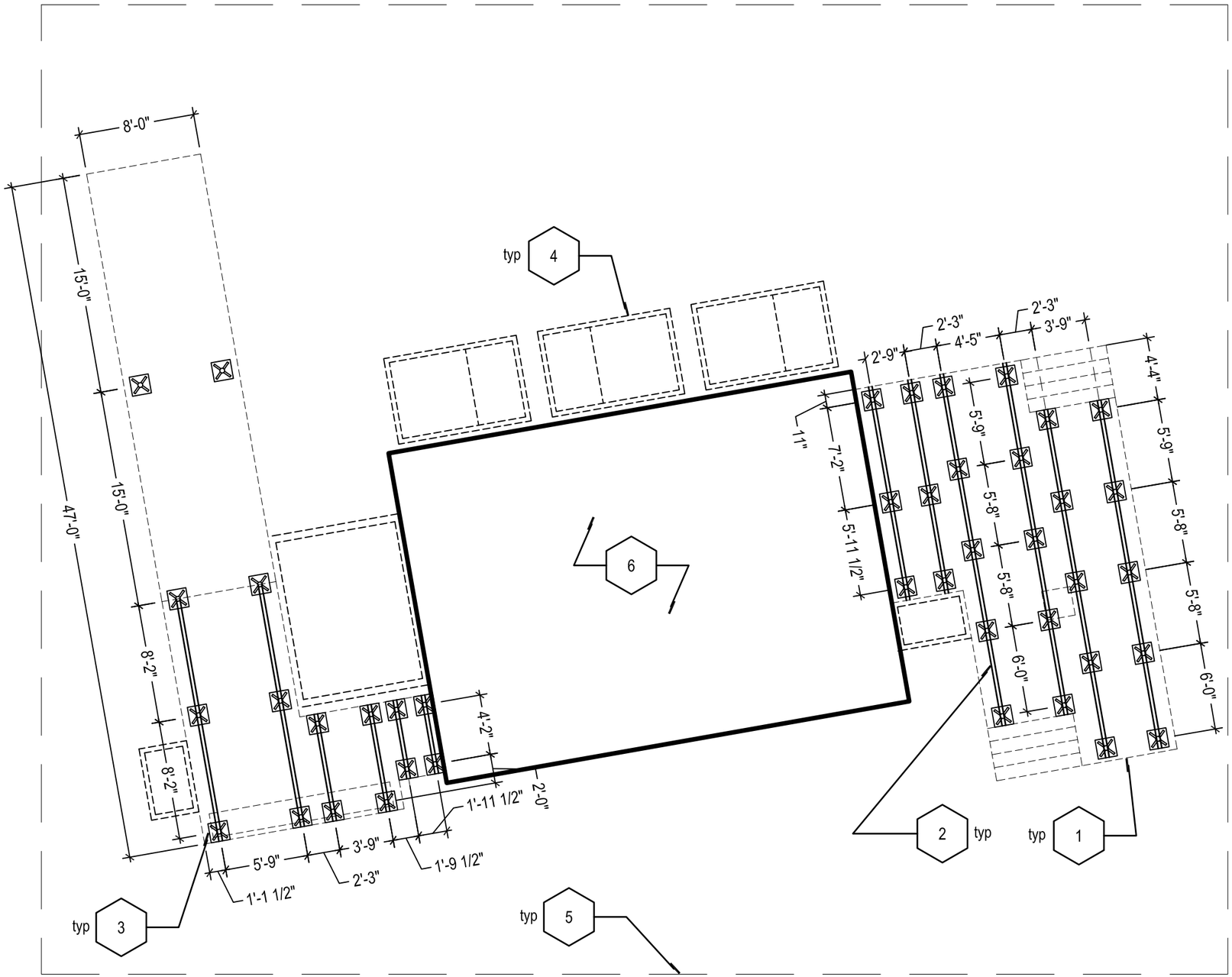
sheet name:

Parapet Framing Plan

scale:

1/4"=1'-0"

S-302



notes

1. All deck framing structure shall be pressure treated to resist weathering.
2. Deck framing is constructed in modules and will be assembled on the foundation on site.
3. All dimensions are to centerline of structure unless noted otherwise.

key notes

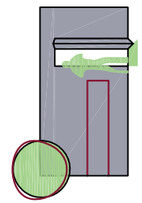
1. Outline of deck above shown dashed.
2. Double 2x12 joists
3. Adjustable steel pier with 16" x 16" pier pad
4. Planter location, shown dashed
5. Solar decathlon site boundary
6. House location

specification notes

1. 05 12 00 - Structural Steel Framing

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

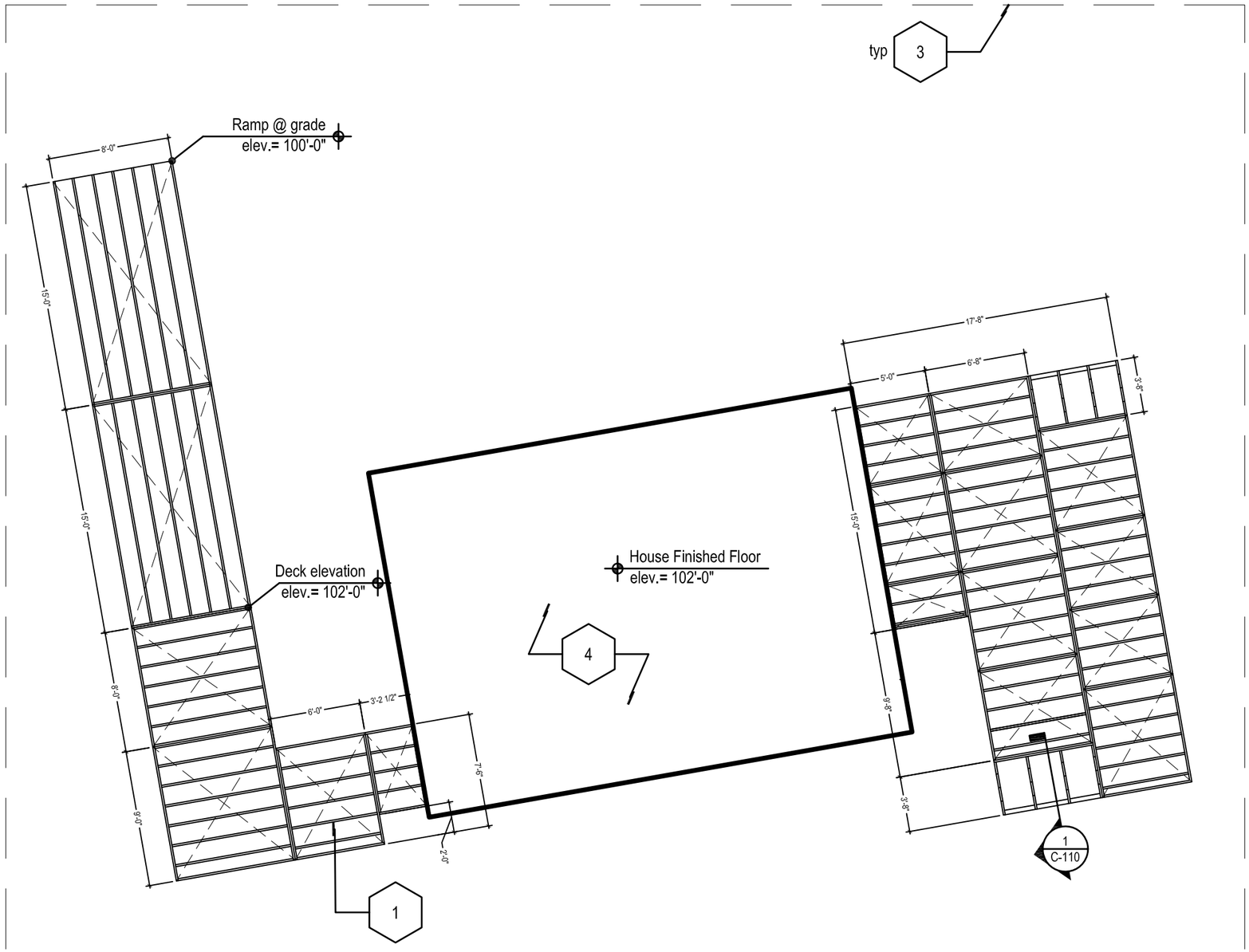
sheet name:

Deck Foundation Plan

scale:

1/8"=1'-0"

S-401



notes

1. All deck framing structure shall be pressure treated to resist weathering.
2. Deck framing is constructed in modules and will be assembled on the foundation on site.
3. All dimensions are from outside face of structure to module joint lines unless noted otherwise.
4. Modules are indicated with dashed "x" lines.

key notes

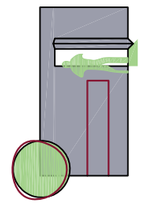
1. 2x6 floor joist @ 16" o.c., typical for deck
2. 2x12 floor joists @ 16" o.c., typical for ramps
3. Solar decathlon site boundary
4. House location

specification notes

1. 06 10 63 - Exterior Rough Carpentry

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1. 12.16.08
2. 05.15.09 (engineering)
3. 06.02.09

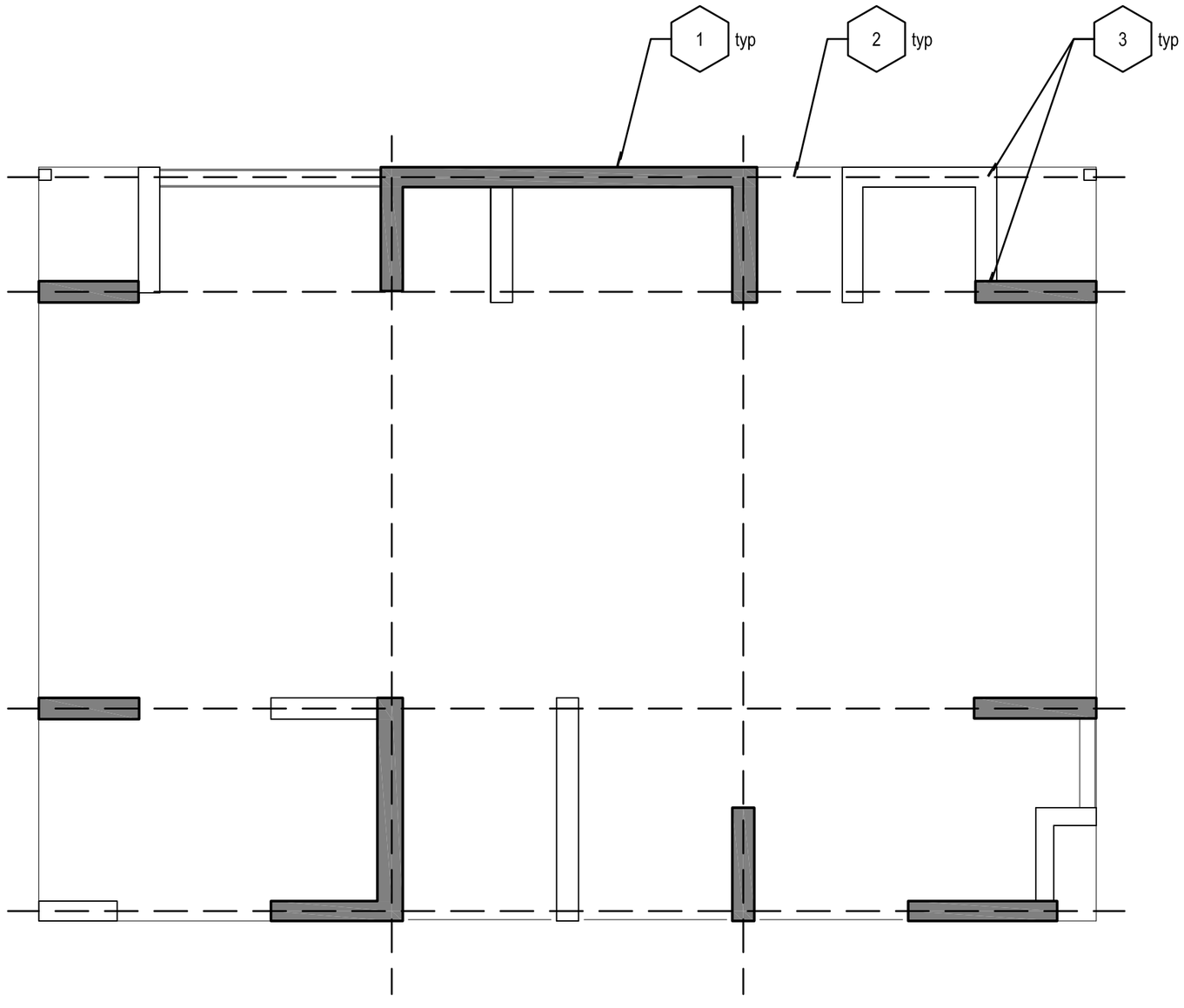
sheet name:

Deck Framing Plan

scale:

1/8"=1'-0"

S-402



notes

1. Lateral system design conforms to IRC R602.10.3 - Braced wall panel construction methods.
2. Walls are constructed based on R602.10.3 method #3 - Wood structural panel sheathing with a thickness not less than 3/8" for a 24-inch stud spacing installed in accordance with Table 602.3(3).
3. Sheathing is continuous at all exterior walls and interior wing walls at module joints.

key notes

1. Braced wall panel (shown shaded gray, typical)
2. Braced wall line
3. Typical corner framing for continuous structural panel sheathing. See detail 3/S-603. Details apply at outermost corners and at all braced walls.

specification notes

1. 05 16 00 - Sheathing

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

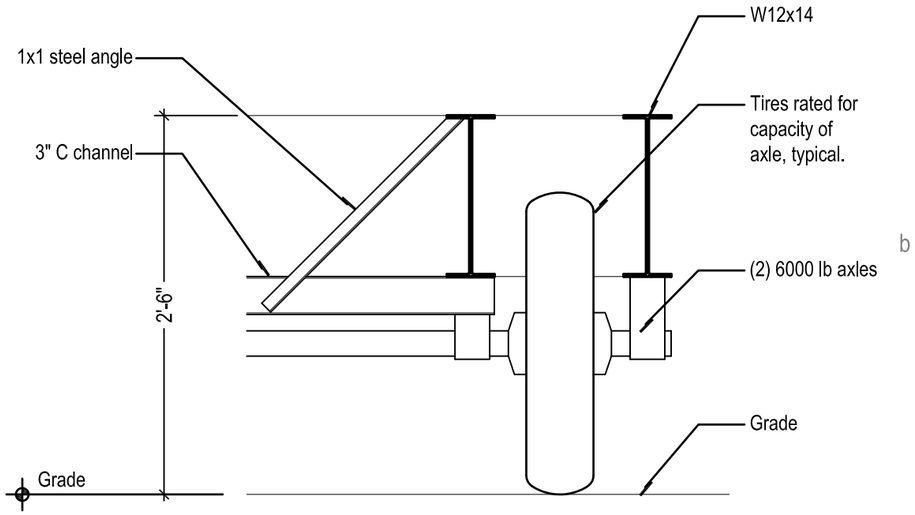
sheet name:

Lateral System Plan

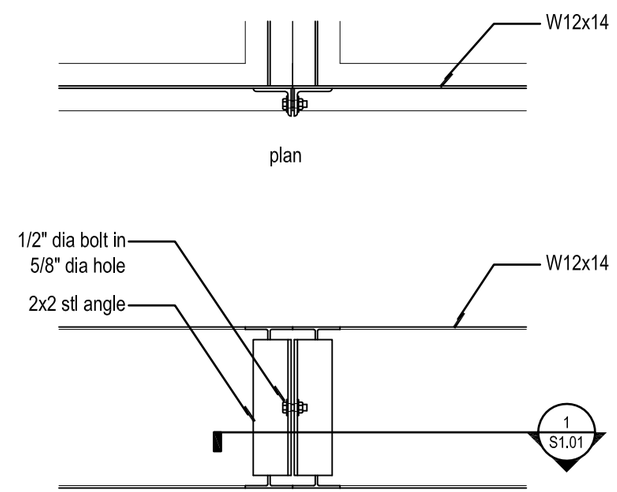
scale:

1/4" = 1'-0"

S-501



2 Axle Detail
Scale: 1" = 1'-0"



1 Trailer Connection Detail
Scale: 1" = 1'-0"

notes

1. All W12 steel connections are coped and fully welded the entire perimeter of both the web and flange.
2. Steel angles are fully welded their entire perimeter where they meet the W12 beam.
3. All plate steel is fully welded.

specification notes

1. 05 12 00 - Structural Steel Frame
2. 05 50 00 - Metal Fabrications

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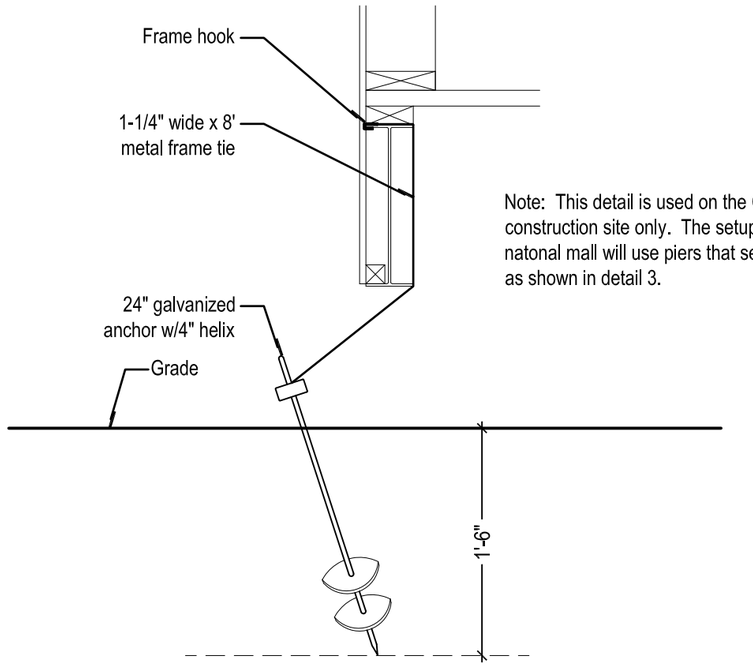
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Structural Details

scale:
as noted

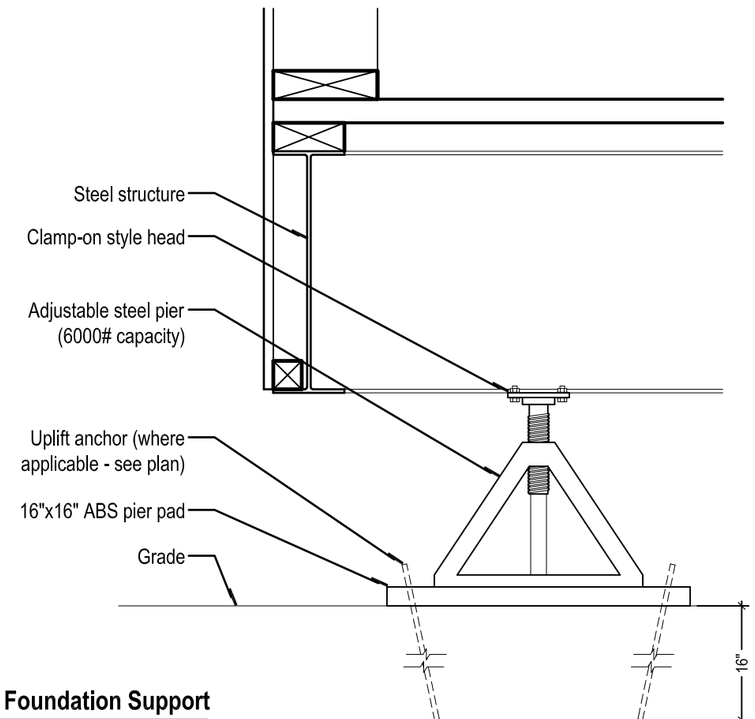
S-601



Note: This detail is used on the OSU construction site only. The setup on the natonal mall will use piers that self-anchor, as shown in detail 3.

4 Foundation Tie-down Detail
Scale: 3/4" = 1'-0"

2 Detail Not Used
Scale: 3/4" = 1'-0"



3 Typical Foundation Support
Scale: 1-1/2" = 1'-0"

1 Detail not used
Scale: 1" = 1'-0"

b

notes

1. The prefabricated adjustable steel pier details shown apply for the competition site. The wheels and axles used for transport have been removed to lower the house closer to grade.
2. The desired height above grade for the finished floor is 24".
3. The competition states that grade may vary by as much as 1'-6" on the National Mall in Washington, D.C.
4. In the event that grade varies, piers are adjustable to compensate for this difference.

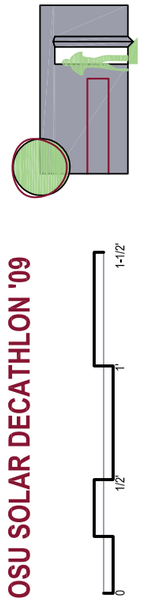
a

specification notes

1. 05 12 00 - Structural Steel Frame
2. 05 50 00 - Metal Fabrications

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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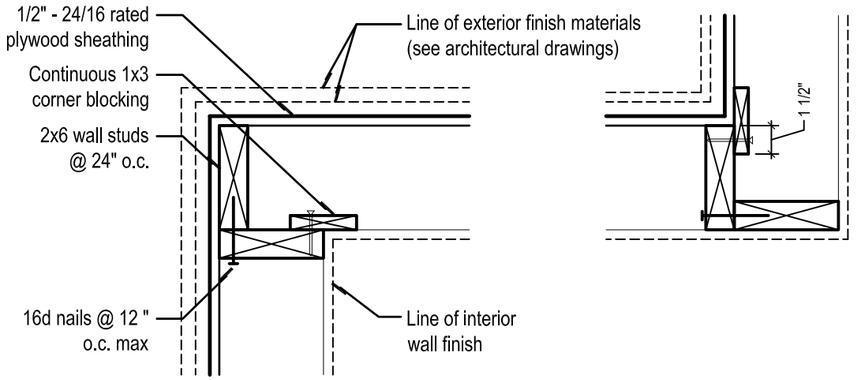
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Structural Details

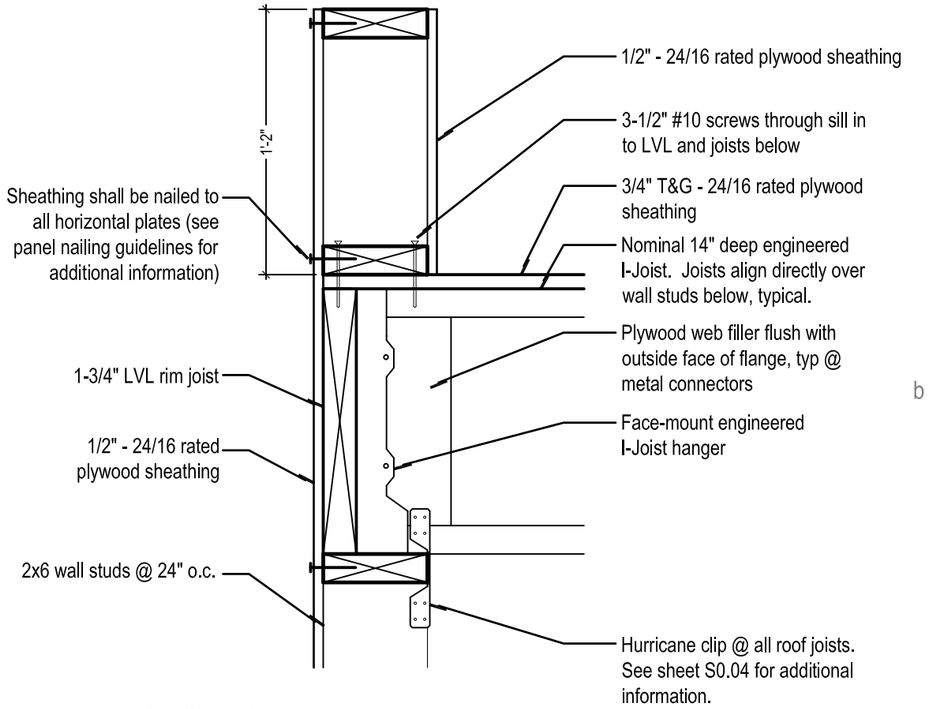
scale:
as noted

S-602



4 Typical Non-Structural Corner Framing Details

Scale: 1-1/2" = 1'-0"



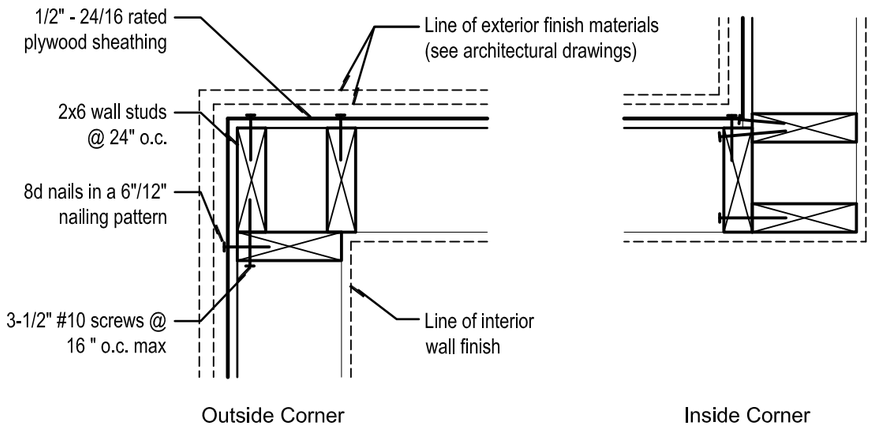
2 Typical Head Detail

Scale: 1-1/2" = 1'-0"

b

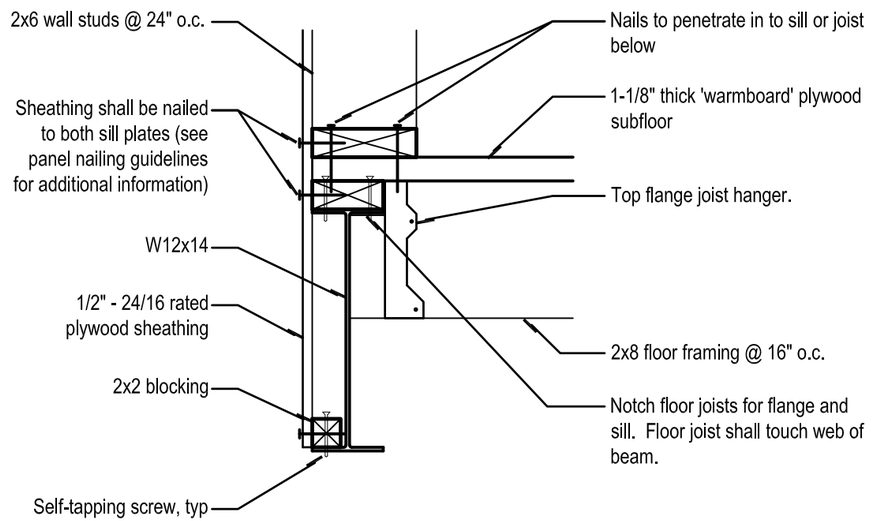
notes

1. See S0 series for additional information regarding metal connectors (aka Simpson Strong-Tie connectors)
2. Critical nail locations are shown in details, but are not exhaustive. See S0 series drawings for additional nailing size and spacing requirements.
3. See S0 series for additional information regarding spacing of self-tapping screws.
4. Attachment methods for all engineered wood products and sheathing products shall comply with manufacturer's standard attachment details.
5. Non-structural materials have been omitted for clarity. For additional information, see architectural drawings.



3 Typical Structural Corner Framing Details

Scale: 1-1/2" = 1'-0"



Note: See detail 4/S3.02 for tie-down strapping to be installed prior to installation of sill plate.

1 Typical Sill Detail

Scale: 1-1/2" = 1'-0"

a

specification notes

1. 05 12 00 - Structural Steel Frame
2. 05 50 00 - Metal Fabrications

SOLAR HOUSE I

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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

Structural Details

scale:

as noted

S-603

Solar House I

Solar House I re-imagines the domestic living experience for Ohio. The house promotes a theme of consolidation, and encourages the average Ohioan to re-consider space within their home. The proposal offers a centralized living space that reconfigures to accommodate the users' needs. The house defines two distinct interfaces, one exterior and one interior. The exterior interface is a 'second skin' that allows the user to negotiate between the interior living space and the surrounding environment. This connection to the exterior encourages the individual to employ the house's passive cooling strategies, via an ability to control natural ventilation, views, daylight and privacy. The operable veil, composed of re-claimed Ohio barn siding, creates a rain-screen and draws subtle reference to Ohio's agriculture industry.

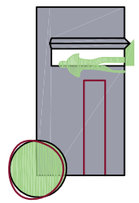
The house is organized around a center space. The interior interface is the interactive wall surface that mediates between the user and the house program. Program components are concealed or revealed by the interior interface which adapt the use of the space to the individuals' needs (i.e. space becomes kitchen, space becomes bedroom, space becomes theater for entertaining). Additionally, furniture is designed to be stored behind the interface when not in use. The spaces are designed for the users to live comfortably with their daily routine, and flexible enough to accommodate for entertaining.

Solar House I is sited to optimize passive cooling systems while seamlessly integrating with the landscape. The result is continuity between the interior and exterior environments. The house is canted 10 degrees, encouraging southwest winds to travel over the cooling pond, lowering the temperature before entering the house via ventilation. The drop in wind temperatures entering the house reduces summer cooling loads. The west façade is comprised of operable vertical louvers that facilitate the control of these passive systems. A rainwater catchment system supplies irrigation for the productive gardening components to the north. The living space extends exteriorly to the East, tracing the path of natural ventilation through the house. A translucent insulated window wall system on the South façade, provides filtered light and warms the occupied program spaces (bathroom, bedroom and office) beyond. To the south side of the house the landscape defines a quiet gathering area amongst a field of native-Ohio grasses.

Symbols

- 000 — Door indication
- X — Window indication
- Return Vent
- 000 — Space Designation
- Elevation Level
- 1 — Coded Note
- 1 / A-000 — Section Mark
- 1 / A-000 — Elevation Mark
- 1 / A5.01 — Detail Call-Out
- T — Tempered Glazing

notes



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

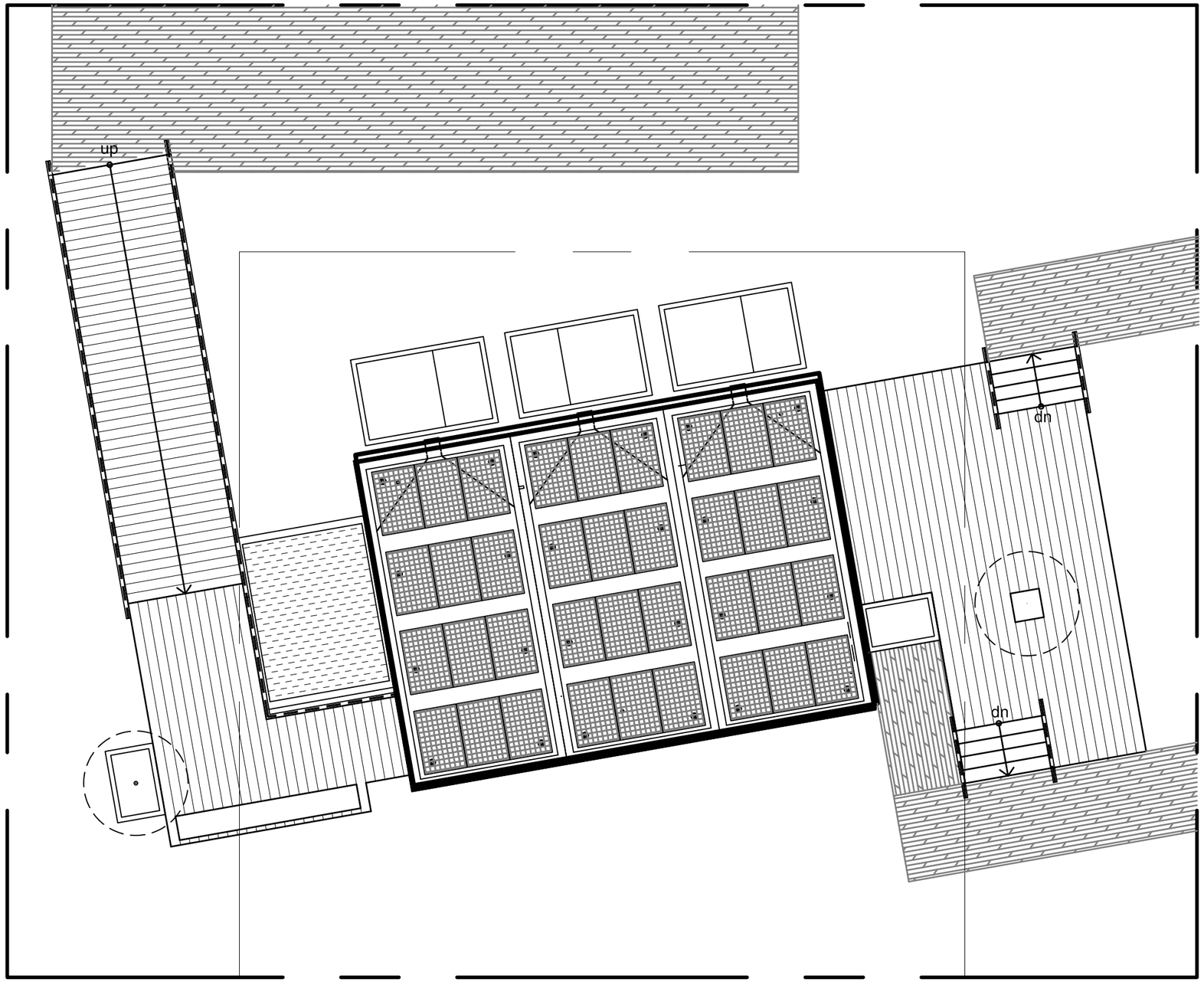
sheet name:

Architectural Notes and Symbols

scale:

n/a

A-001



notes

1. All decking to be supported w/ minimal load points above National Mall. See S1.07 for additional information.
2. Rollout walkway to be provided by NREL on site
3. All planter boxes, planter buckets, etc. to be supported above the site with minimal footprint impact. See site details for additional information.
4. All ramps to be 1/12" slope per code.
5. Handrails (shown dashed). See C1.10 for details.

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

Construction Documents
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2009 Solar Decathlon

revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

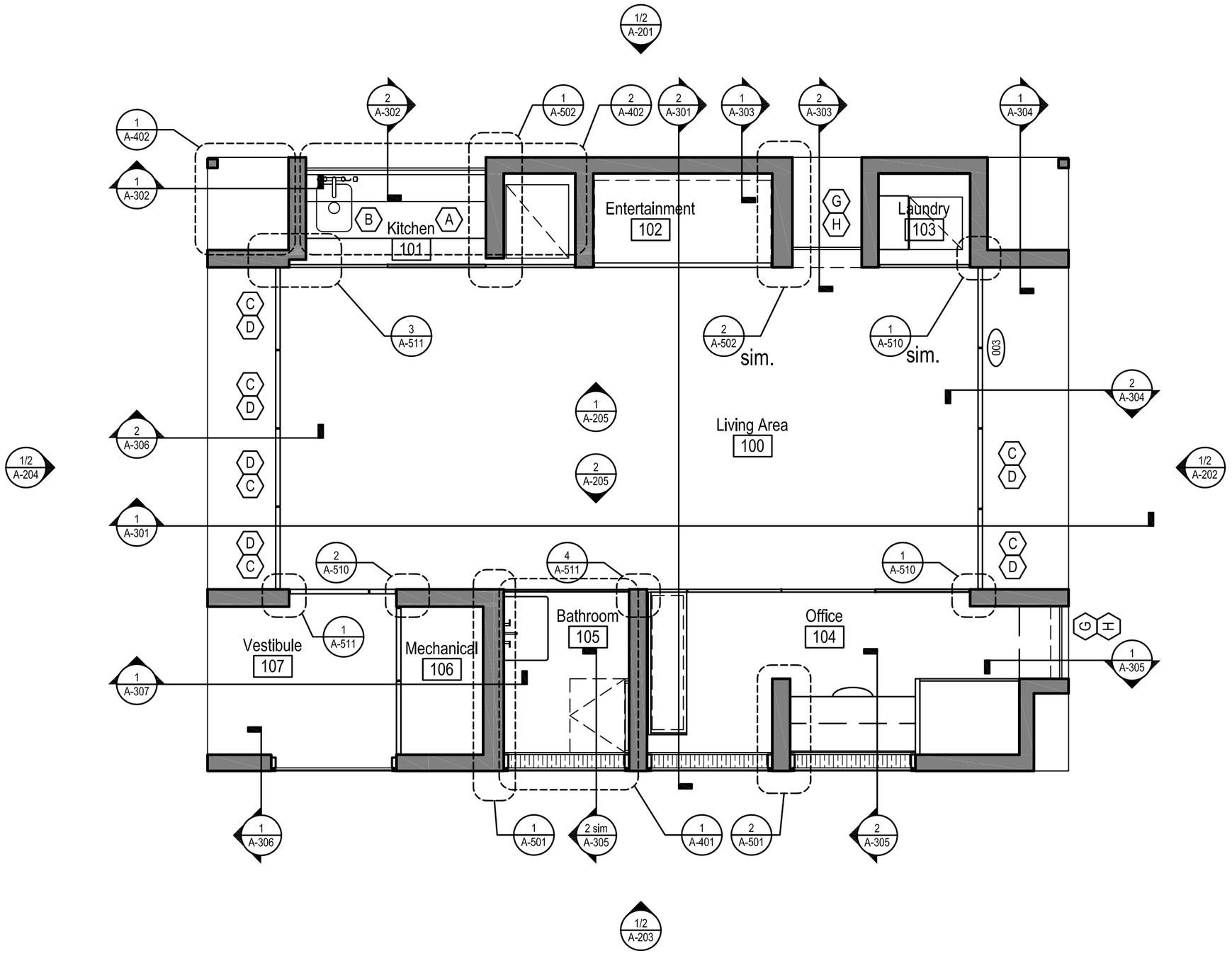
sheet name:

Architectural Site Plan

scale:

1/8" = 1'-0"

A-101



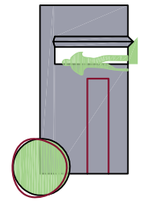
notes

1. See sheet A1.02 for dimension callouts.
2. See A3 series for building sections and wall sections.
3. See A2 series for building elevations with window indications.
4. See site plan for continuation of exterior decks.
5. Second Skin removed for clarity this sheet only.

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

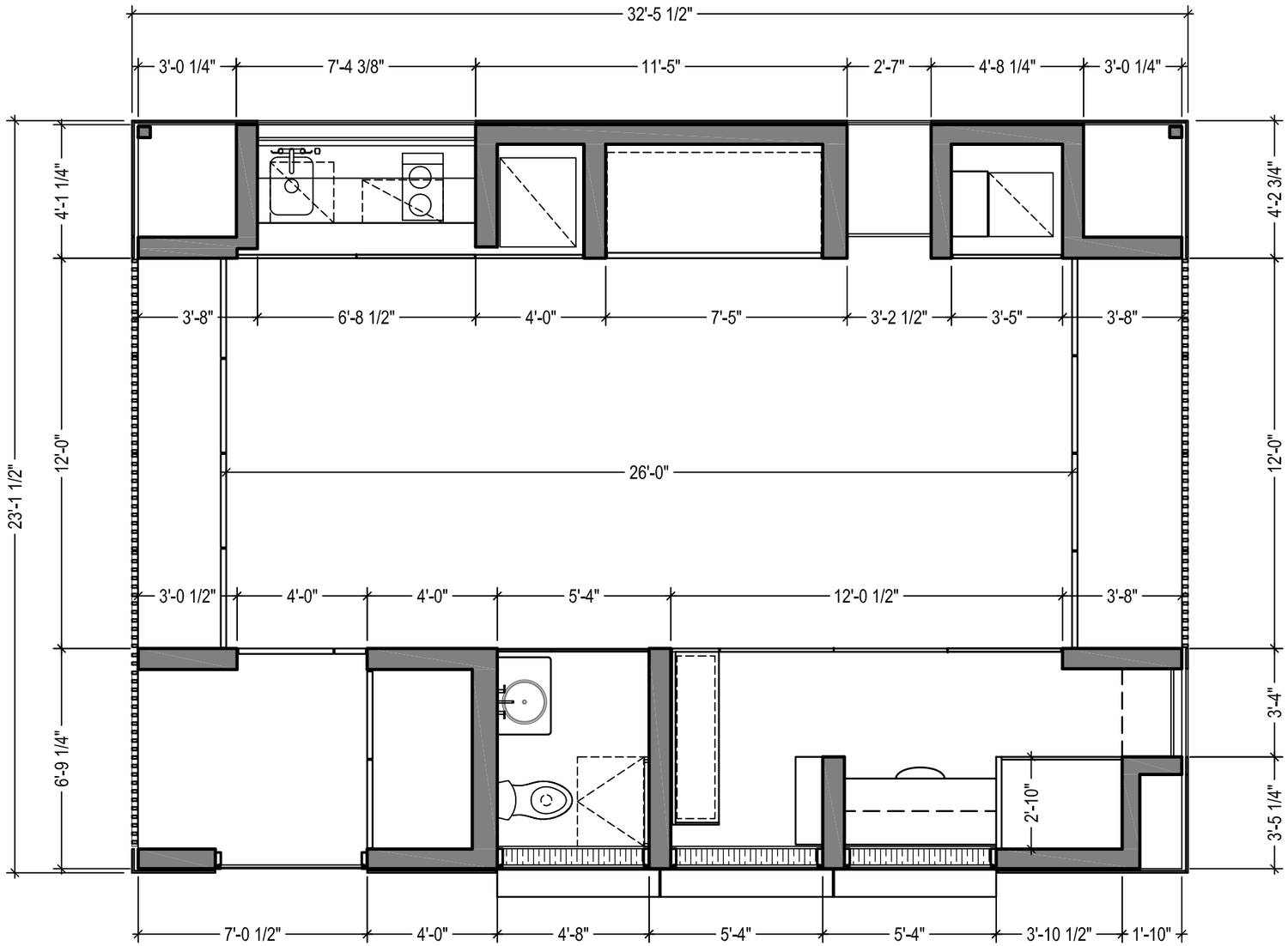
sheet name:

Floor Plan - Callouts

scale:

1/4"=1'-0"

A-102



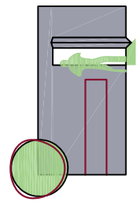
notes

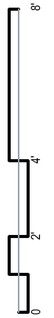
1. See S1.04 Wall Framing Plan for additional wall stud dimensions.
2. Dimensions are given from outside of finish surface to outside of finish surface.
3. Verify any dimensions shown here with respective enlarged plans and details called out on sheet A1.01.

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09





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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

Floor Plan - Dimensions

scale:

1/4"=1'-0"

A-103

Pop-off panel, not open for competition

Pop-off panel, not open for competition

Bi-fold

Swing & Pocket

Entertainment / Furniture Storage Drawer

Swing & Pocket

Pivot Louvers, Salvaged wood siding and aluminum frame

Pivot doors, salvaged wood siding and aluminum frame

Pivot Murphy Bed

Bi-fold

Pivot doors, salvaged wood siding and aluminum frame

Dual-swing

Equipment Access door, not open for competition

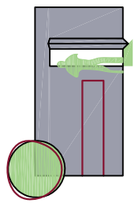
Pop-off panel, not open for competition

Pivot Entry Door, salvaged wood siding

north

notes

1. This plan demonstrates the operable features of the house, also known as the "activated interface".
2. The activated interface is a means of having the house serve multiple functions in one common space, thereby reducing the footprint of the house.



SOLAR HOUSE I

OSU SOLAR DECATHLON '09

0 2' 4' 8'

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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

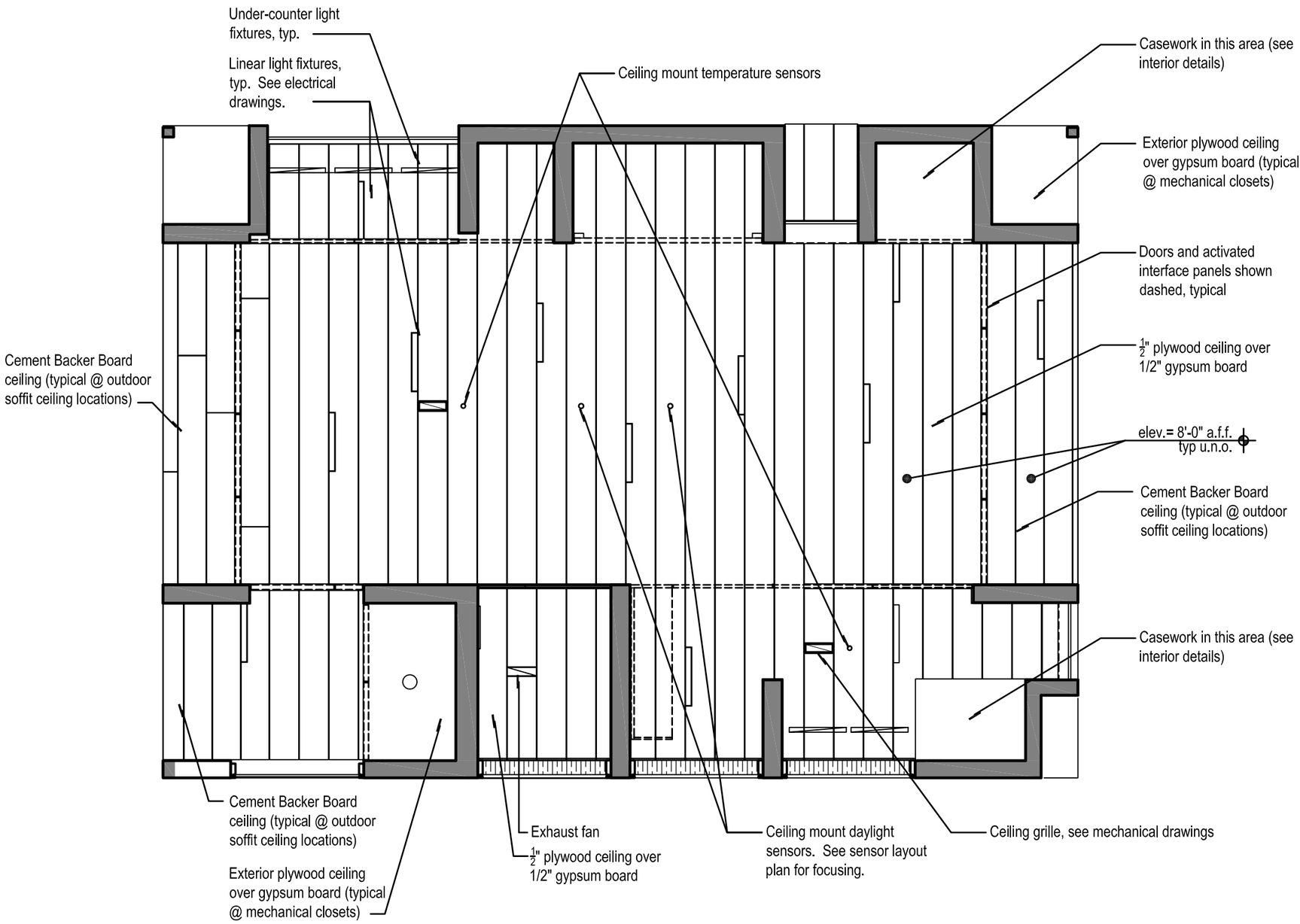
sheet name:

Operable Features Plan

scale:

1/4"=1'-0"

A-104



notes

1. See electrical drawings for additional information regarding light fixtures, sensors, etc.
2. See mechanical drawings for additional information regarding exhaust fans, louvers, etc.
3. Exterior ceilings shall use exterior grade plywood and exterior grade gypsum board.
4. All ceilings are 8'-0" a.f.f., typical unless noted otherwise.

specification notes

1. 06 20 00 - Finish Carpentry
2. 26 50 00 - Lighting

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

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revisions:

1. 12.16.08
2. 05.15.09 (engineering)
3. 06.02.09

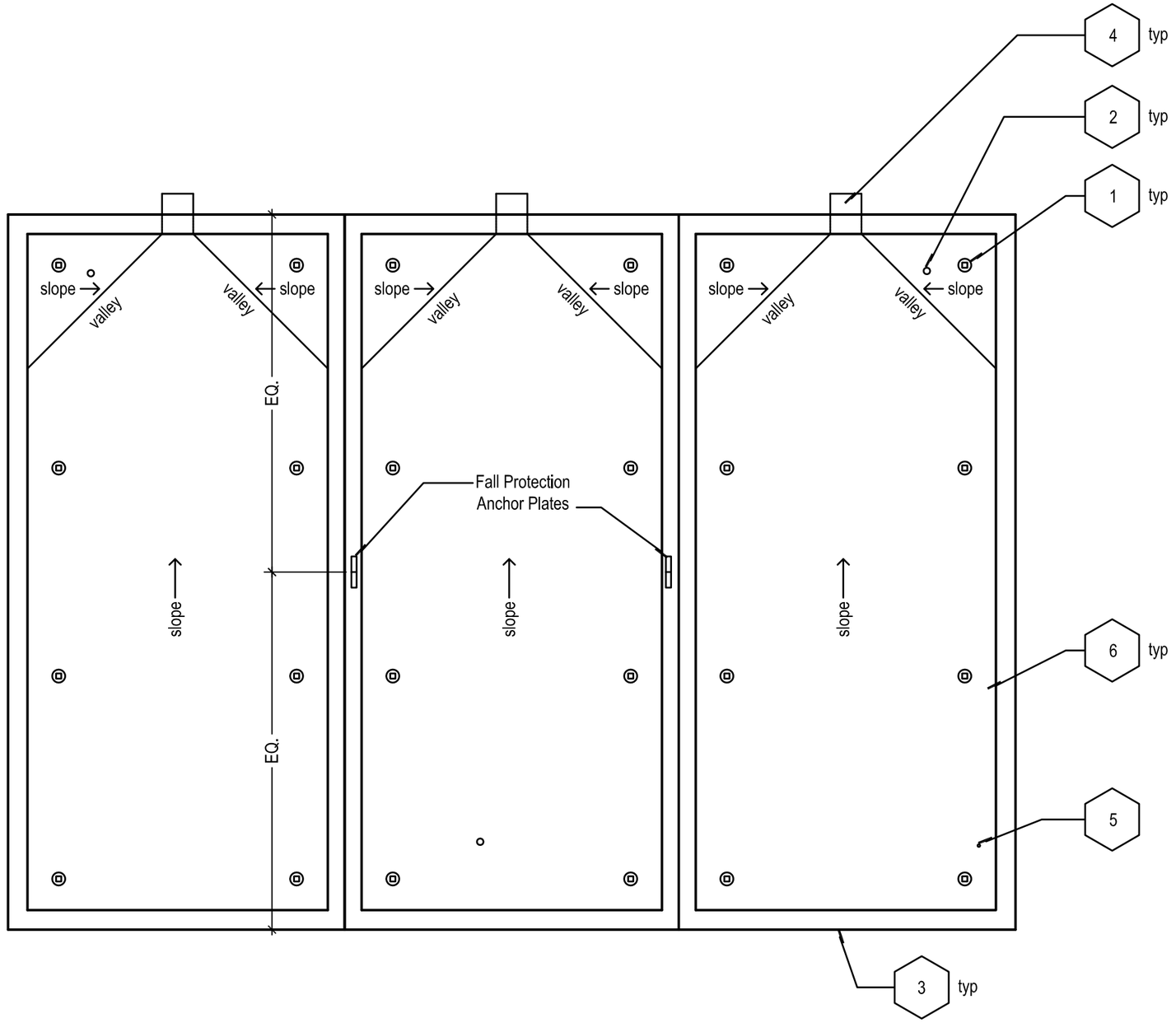
sheet name:

Reflected Ceiling Plan

scale:

1/4"=1'-0"

A-105



notes

1. See electrical drawings for additional PV system information. PV array is not shown on this drawing for clarity.
2. Roof system is a single-ply, fully adhered membrane over tapered rigid insulation. See project specifications for additional information.
3. Slope of tapered rigid insulation is 1/4" per foot.
4. Roof shall receive a 2" base layer of non-tapered rigid insulation before beginning installation of tapered pieces.
5. Membrane shall be installed per manufacturer's standard installation procedures and details.
6. See Roof Accessories Specification for fall protection.

key notes

1. Pitch pocket around roof penetration for PV array structure
2. Plumbing vent roof penetration. Seal with heat welded boot.
3. Parapet cap. See wall sections for additional information.
4. 12" wide x 4" high thru wall scupper
5. Electrical conduit roof penetration. Seal with heat welded boot.
6. PV array above (shown dashed)

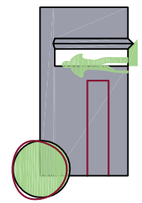
specification notes

1. 07 53 23 - KEE Roofing
2. 07 71 00 - Roof Specialties
3. 07 72 00 - Roof Accessories
4. 22 13 16 - Sanitary Waste and Vent Piping

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1 12.16.08
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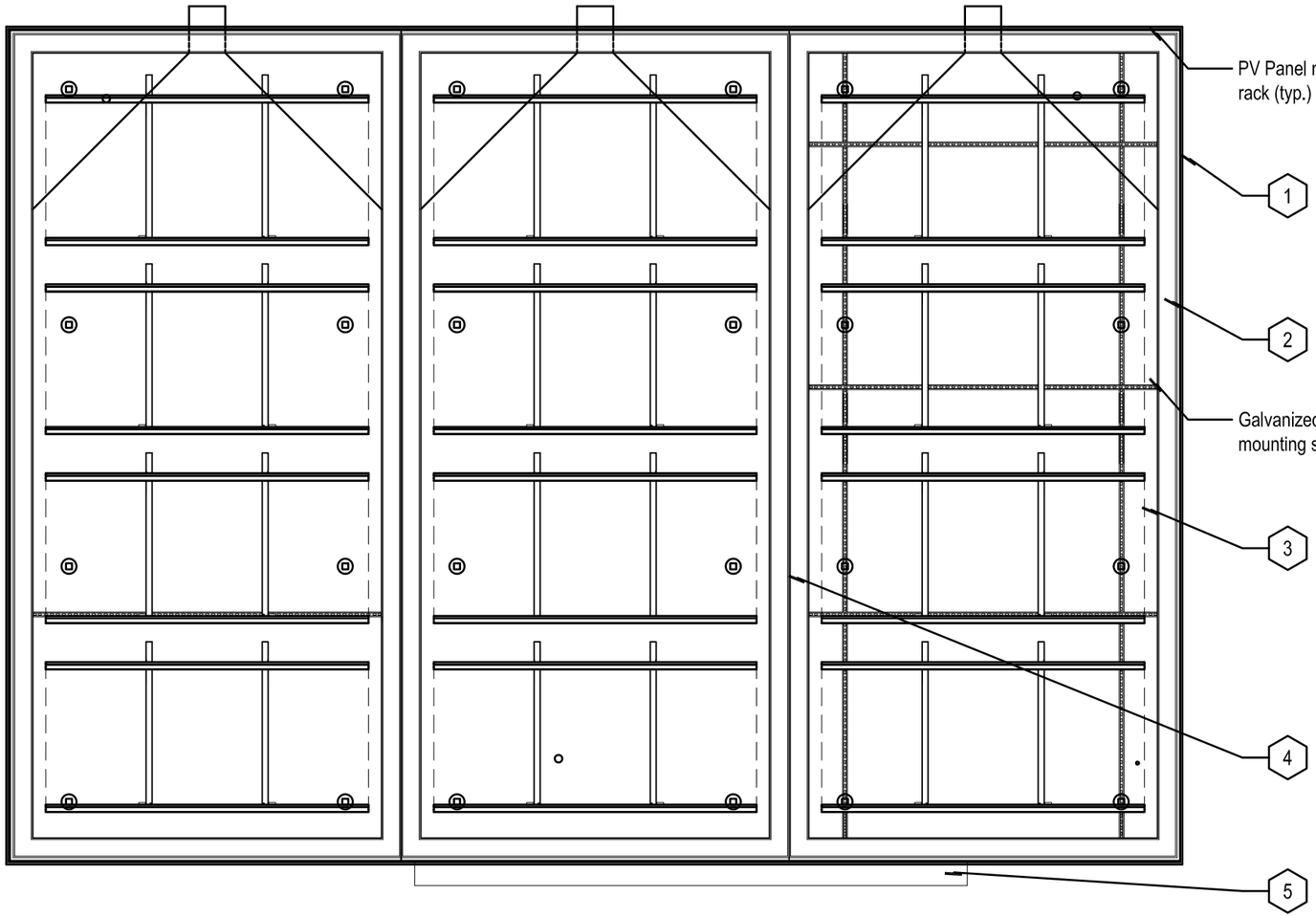
sheet name:

Roof Plan

scale:

1/4"=1'-0"

A-106



notes

1. See Electrical and PV drawings for additional information.
2. See Sheet A1.05 for photovoltaic panel layout.

key notes

1. "Second skin" above parapet
2. Top of parapet
3. Photovoltaic panels (above)
4. Joint between modules
5. Shading device (below)

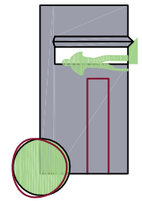
specification notes

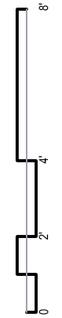
2. 07 72 00 - Roof Accessories
3. 26 31 00 - Photovoltaic Collectors

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09





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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

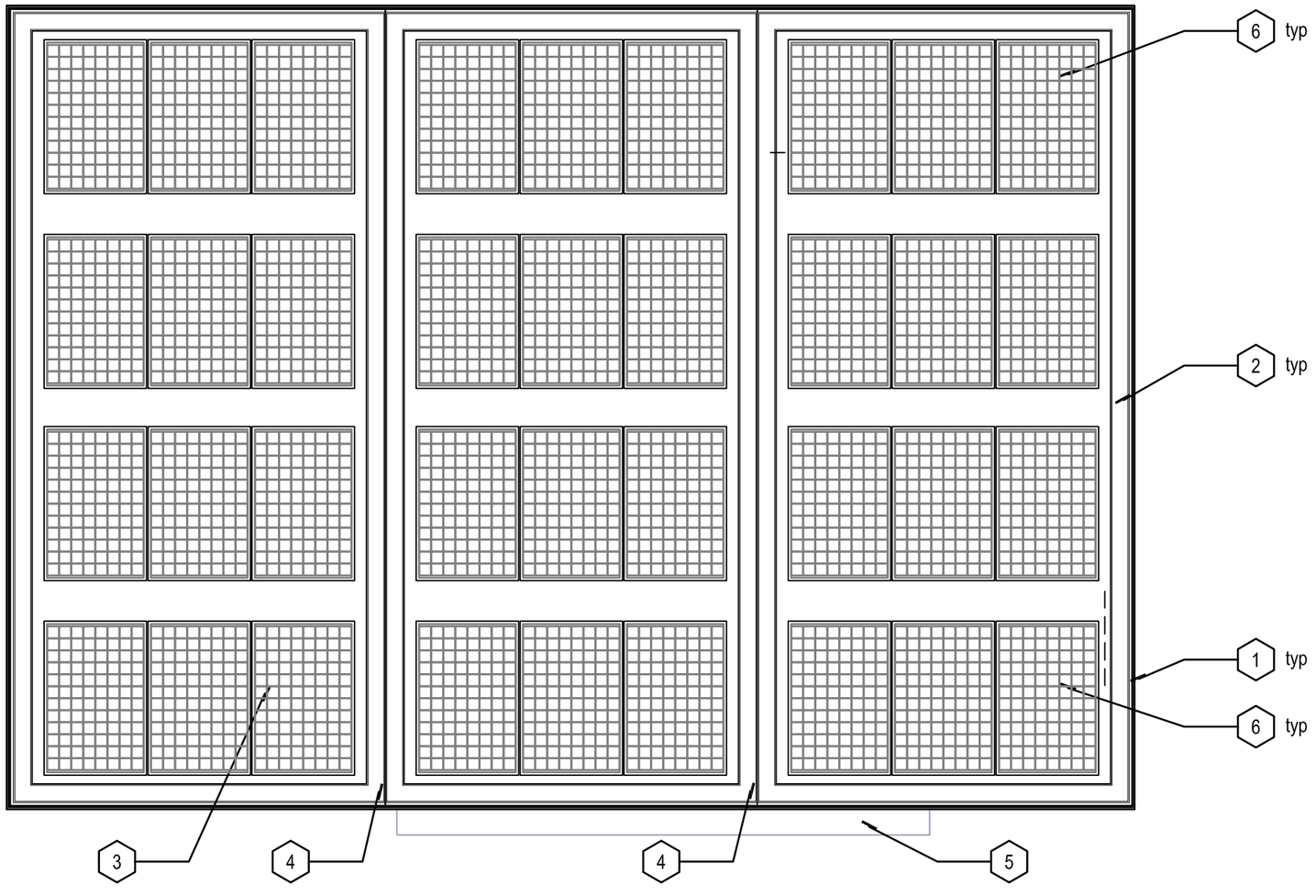
sheet name:

PV Mounting Plan

scale:

1/4"=1'-0"

A-107



notes

1. See Electrical and PV drawings for additional information.

key notes

1. "Second skin" above parapet
2. Top of parapet
3. Photovoltaic panel.
4. Joint between modules
5. Shading device (below)
6. Solar mounting rack supports (below).

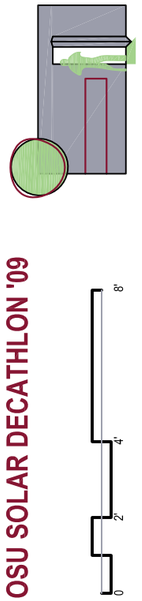
specification notes

1. 26 31 00 - Photovoltaic Collectors

north

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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revisions:

1 12.16.08
2 05.15.09 (engineering)
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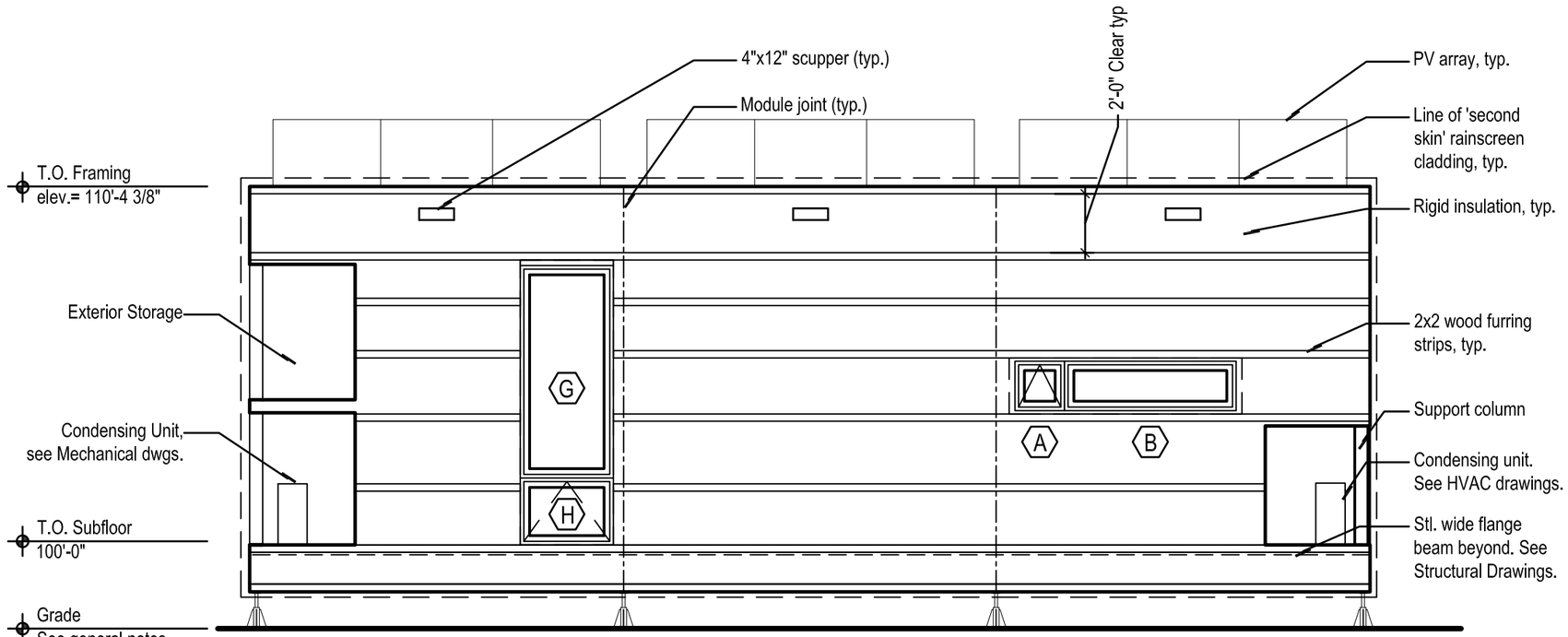
sheet name:

PV Array Plan

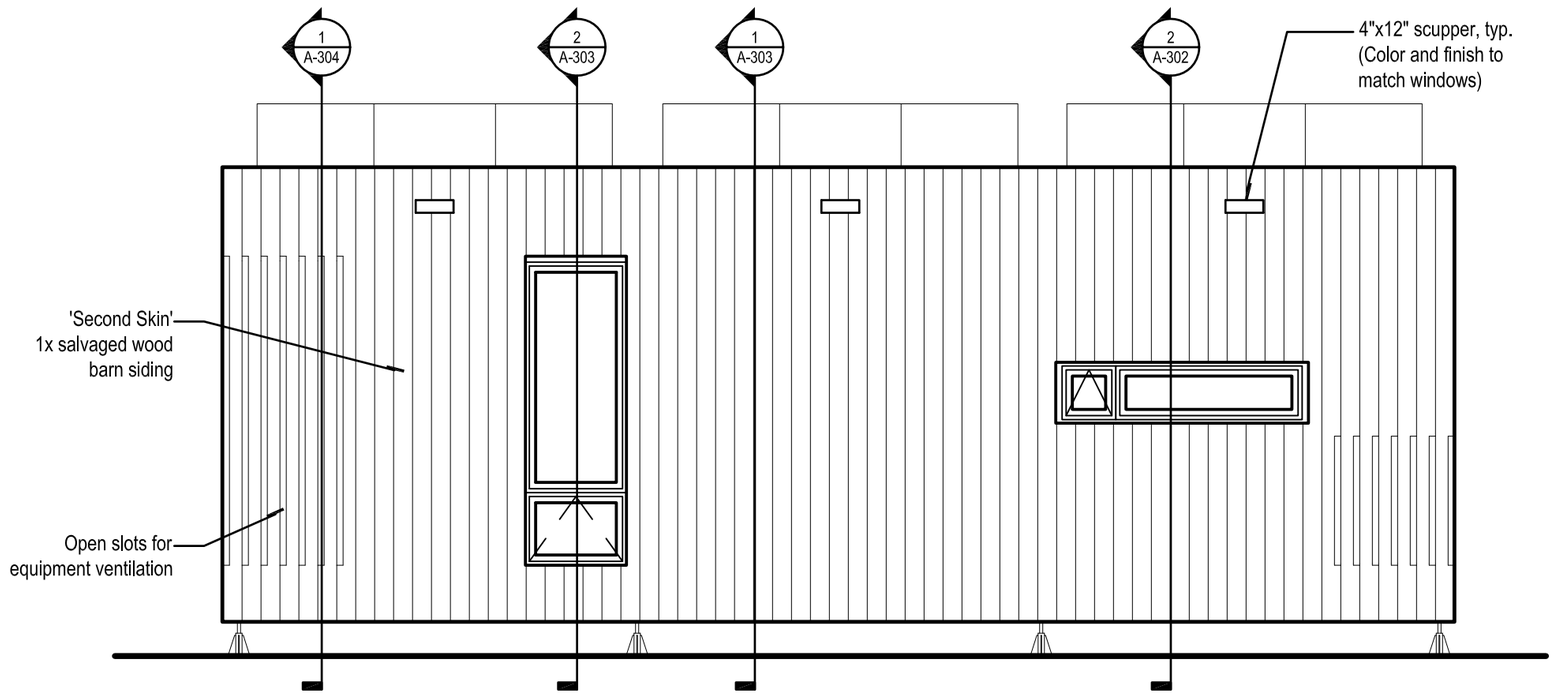
scale:

1/4"=1'-0"

A-108



2 North Elevation - w/o Second Skin
Scale: 1/4" = 1'-0"



1 North Elevation - w/ Second Skin
Scale: 1/4" = 1'-0"

b

notes

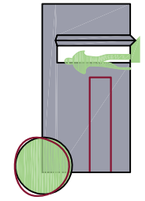
1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Elevation 1 shows the building minus the 'second skin' cladding for clarity.
4. Elevation 2 shows the building with the final 'second skin' cladding applied.
5. The 'second skin' 1x salvaged wood cladding is to be fastened to the 1x3 furring strips shown on Elevation 1.
6. See sheet A7.01 for window and door schedule.
7. 1x3 Furring strips shall be spaced maximum 2'-0" clear between members.

a

specification notes

1. 07 21 00 - Thermal Insulation
2. 07 25 00 - Weather Barriers
3. 07 46 00 - Siding
4. 08 52 00 - Wood Windows

SOLAR HOUSE I
OSU SOLAR DECATHLON '09



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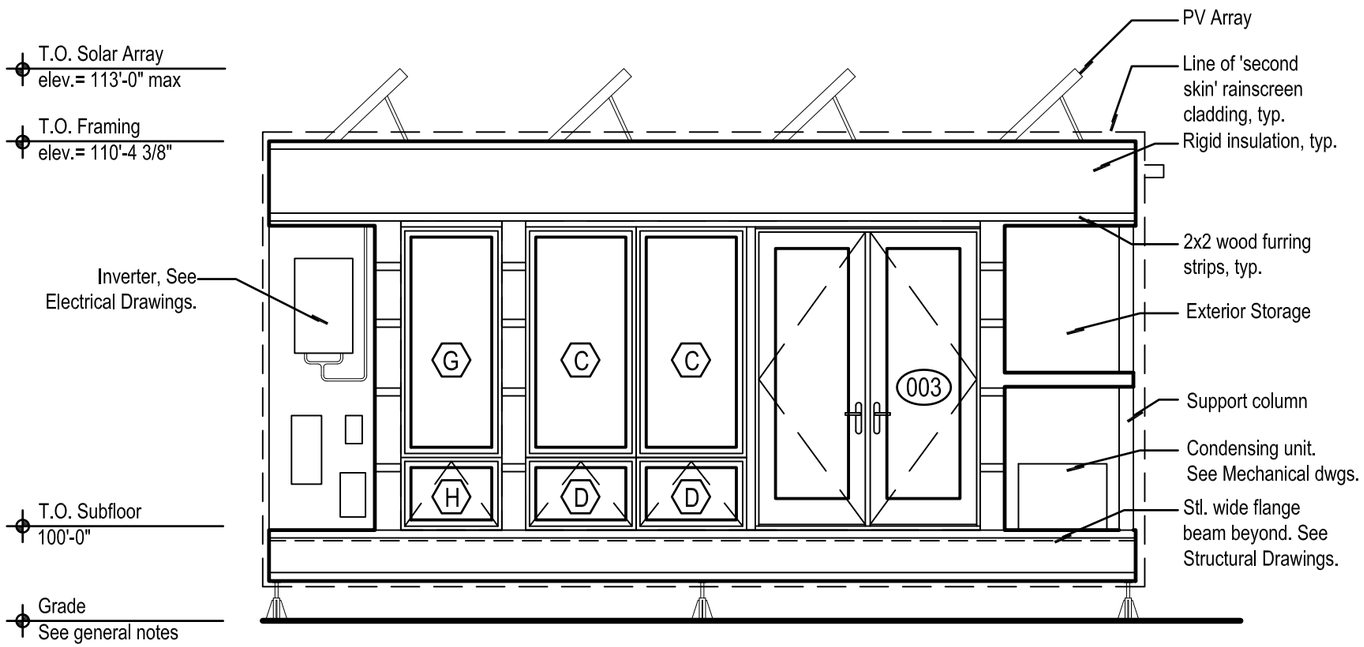
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

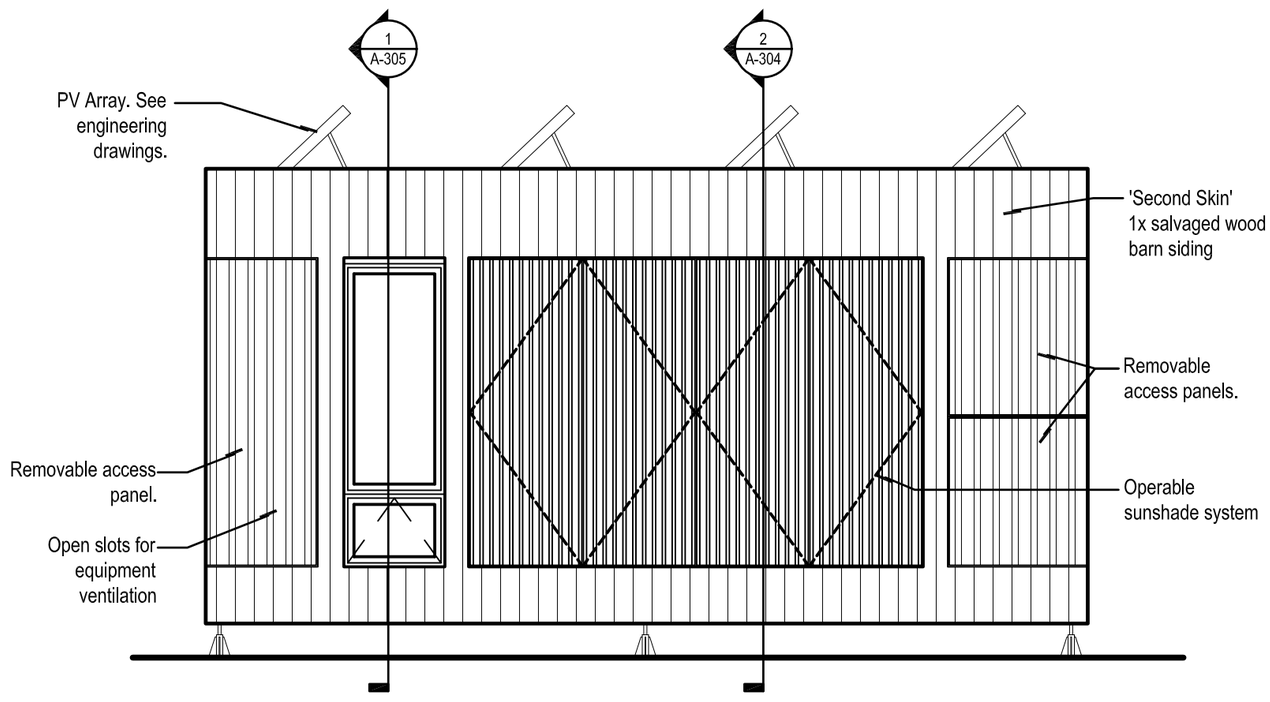
sheet name:
North Elevations

scale:
1/4" = 1'-0"

A-201



2 East Elevation - w/o Second Skin
Scale: 1/4" = 1'-0"



1 East Elevation - w/ Second Skin
Scale: 1/4" = 1'-0"

b

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
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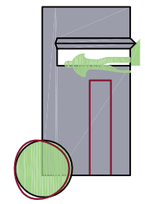
6. See sheet A7.01 for window and door schedule.
7. 1x3 Furring strips shall be spaced maximum 2'-0" clear between members.

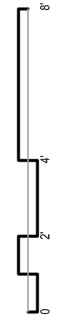
a

specification notes

1. 07 21 00 - Thermal Insulation
2. 07 25 00 - Weather Barriers
3. 07 46 00 - Siding
4. 08 52 00 - Wood Windows

SOLAR HOUSE I
OSU SOLAR DECATHLON '09





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1 12.16.08
2 05.15.09 (engineering)
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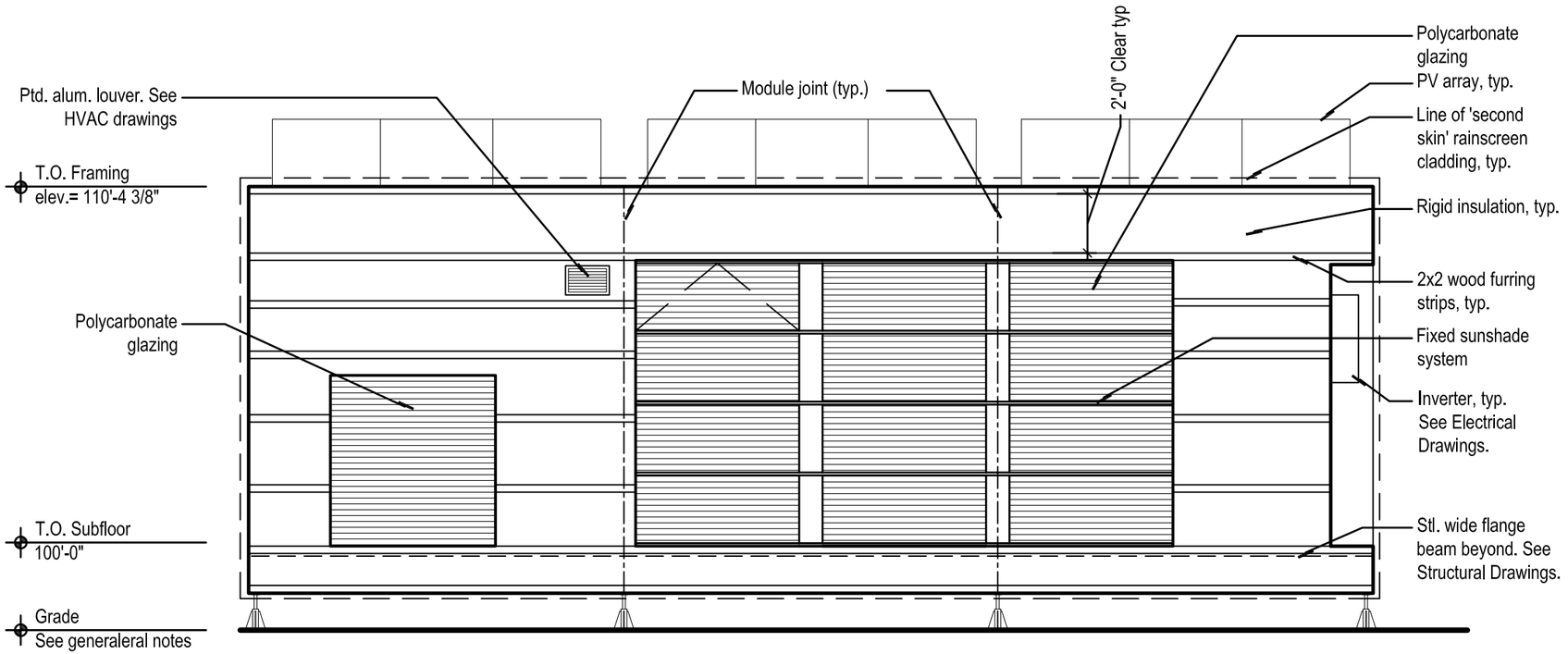
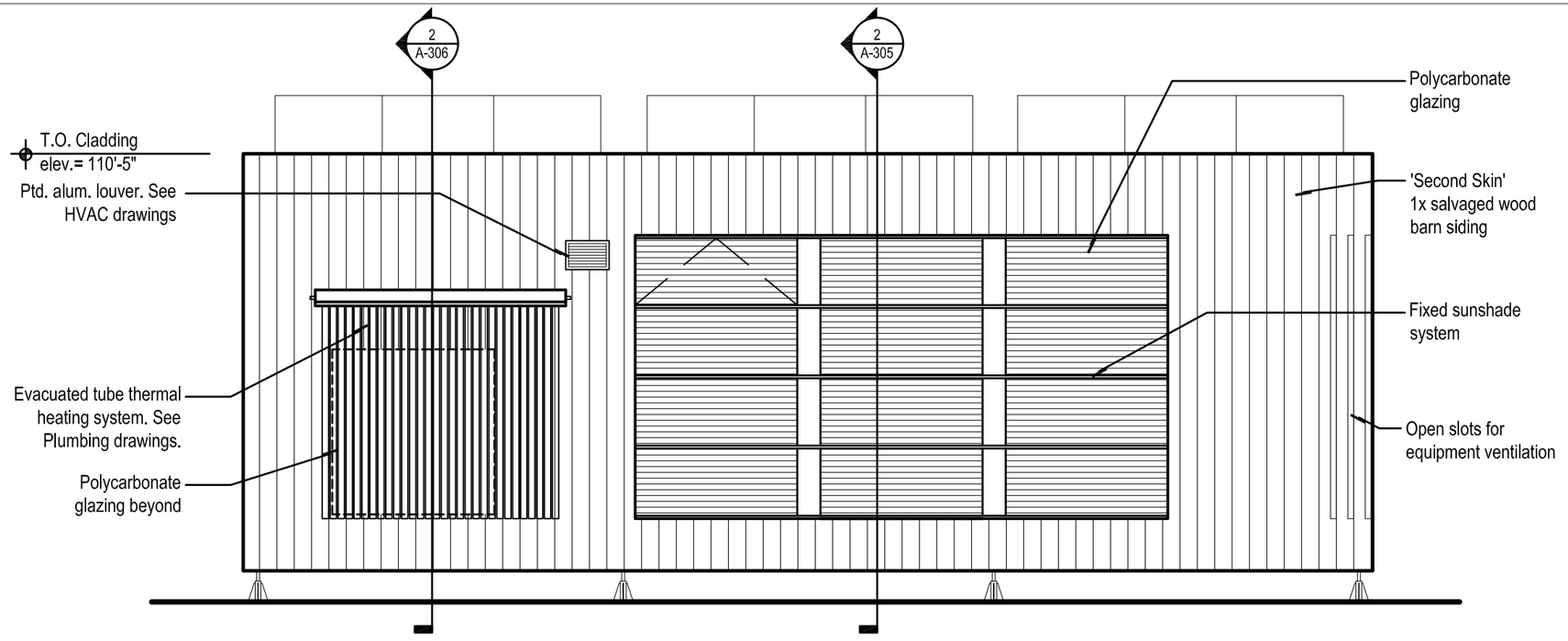
sheet name:
East Elevations

scale:
1/4" = 1'-0"

A-202



2 South Elevation - w/o Second Skin
Scale: 1/4" = 1'-0"



1 South Elevation - w/ Second Skin
Scale: 1/4" = 1'-0"

b

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Elevation 1 shows the building minus the 'second skin' cladding for clarity.
4. Elevation 2 shows the building with the final 'second skin' cladding applied.
5. The 'second skin' 1x salvaged wood cladding is to be fastened to the 1x3 furring strips shown on Elevation 1.
6. See sheet A7.01 for window and door schedule.
7. 1x3 Furring strips shall be spaced maximum 2'-0" clear between members.

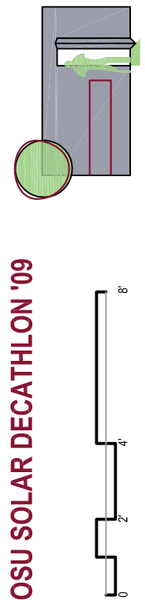
a

specification notes

1. 07 21 00 - Thermal Insulation
2. 07 25 00 - Weather Barriers
3. 07 46 00 - Siding
4. 08 41 13 - Aluminum Framed Entrances and Storefronts
5. 08 80 00 - Glazing

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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1 12.16.08
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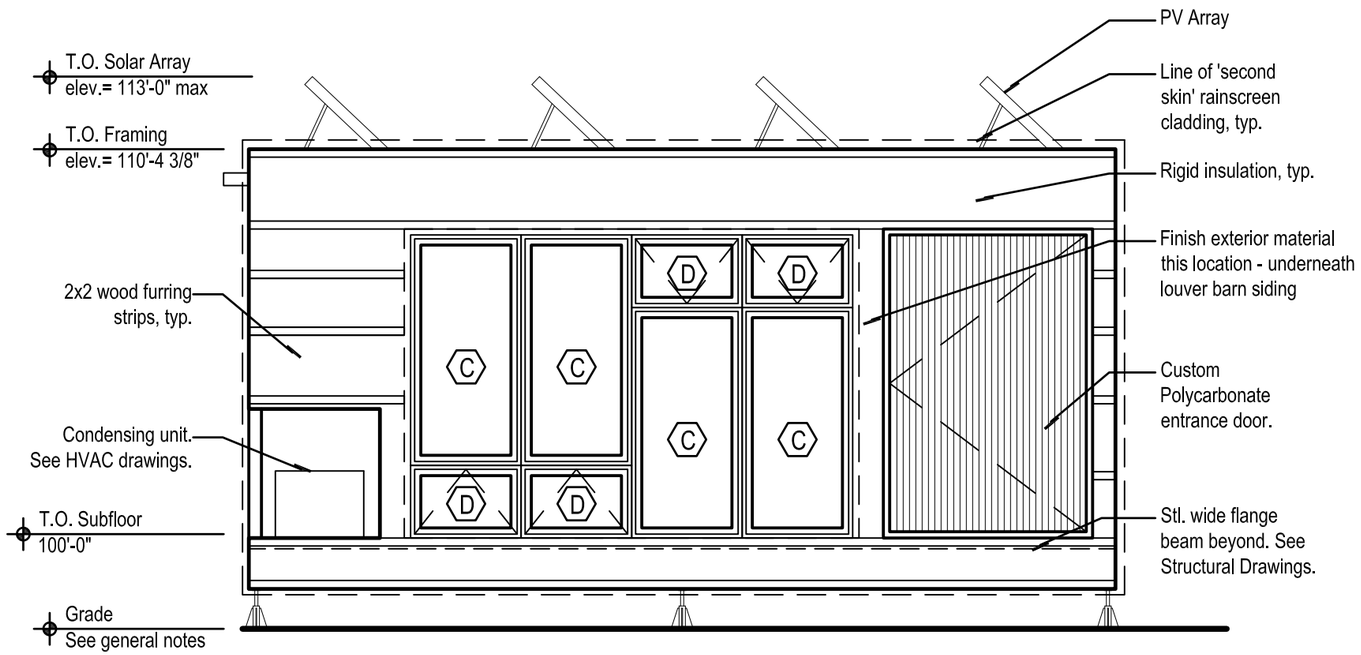
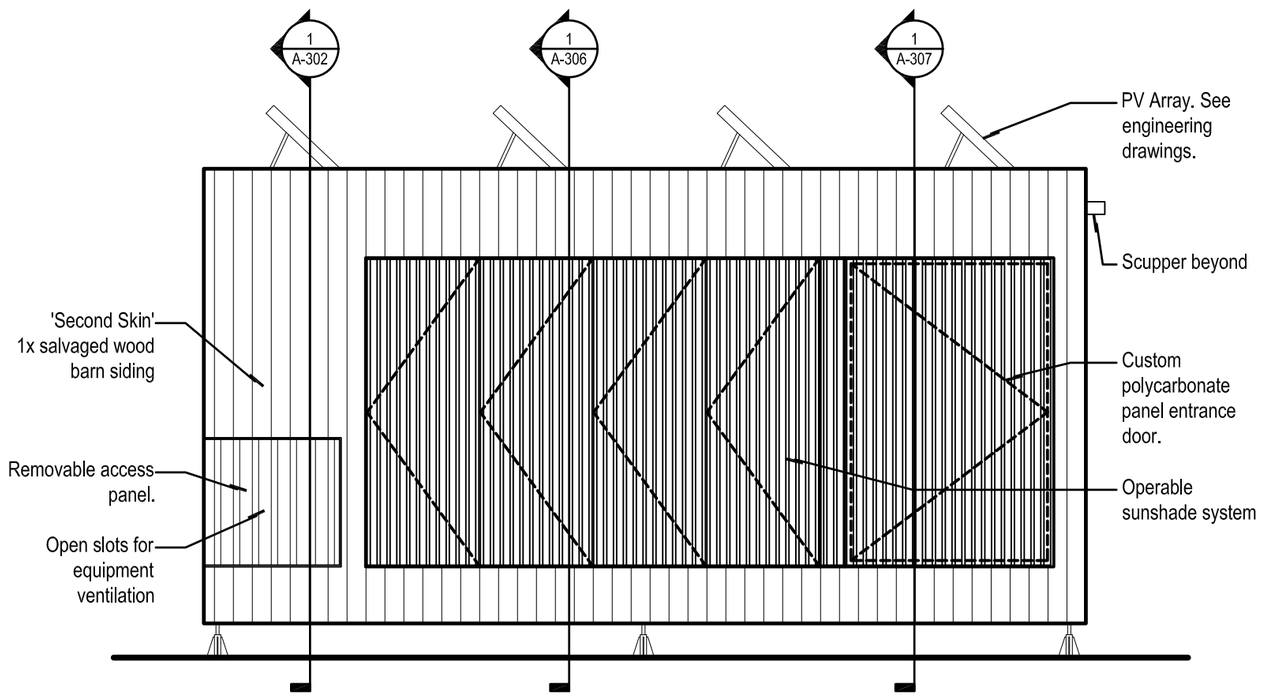
sheet name:
South Elevations

scale:
1/4" = 1'-0"

A-203



2 West Elevation - w/o Second Skin
Scale: 1/4" = 1'-0"



1 West Elevation - w/ Second Skin
Scale: 1/4" = 1'-0"

b

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
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5. The 'second skin' 1x salvaged wood cladding is to be fastened to the 1x3 furring strips shown on Elevation 1.
6. See sheet A7.01 for window and door schedule.
7. 1x3 Furring strips shall be spaced maximum 2'-0" clear between members.

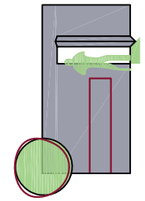
a

specification notes

1. 07 21 00 - Thermal Insulation
2. 07 25 00 - Weather Barriers
3. 07 46 00 - Siding
4. 08 52 00 - Wood Windows

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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1 12.16.08
2 05.15.09 (engineering)
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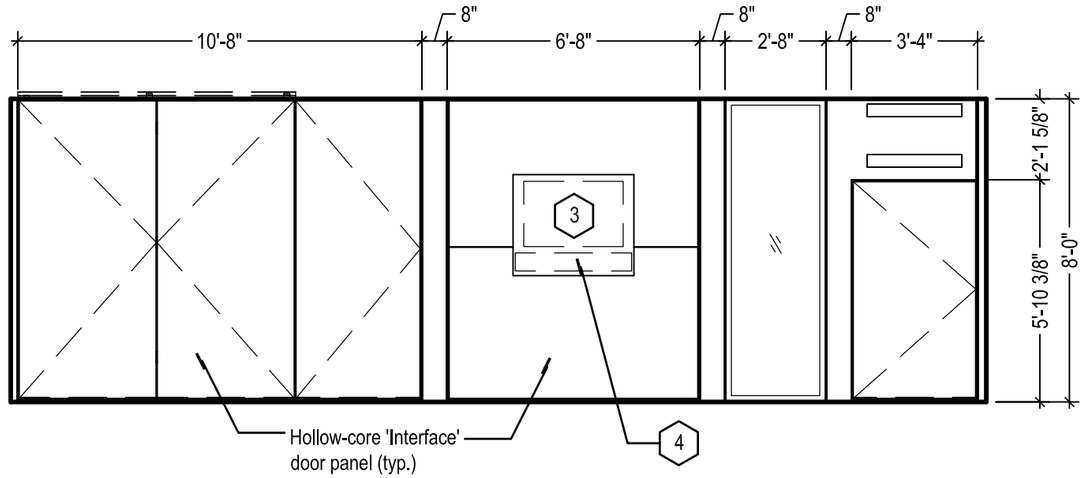
sheet name:
West Elevations

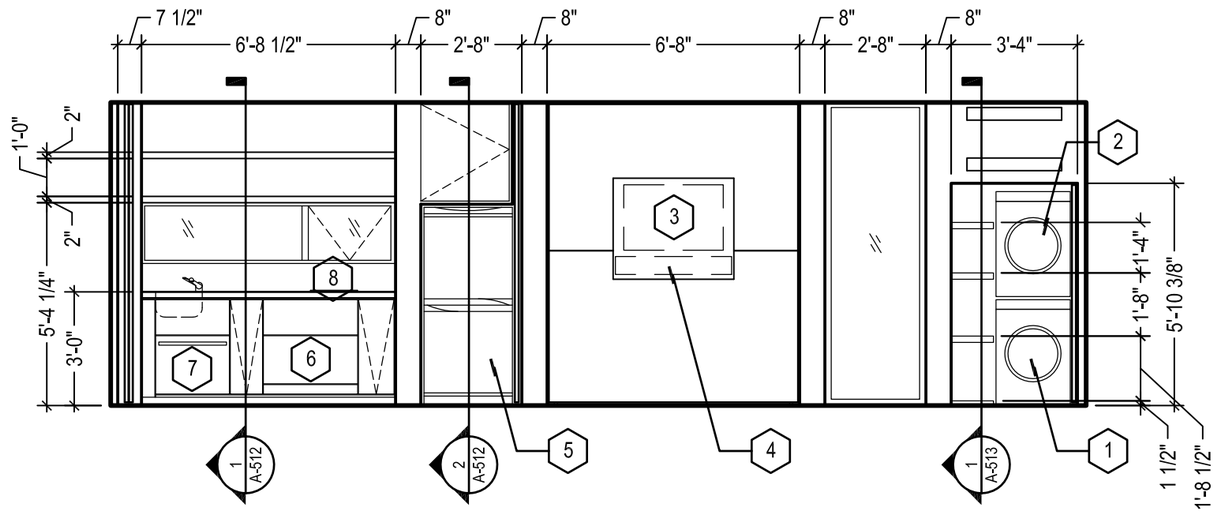
scale:
1/4" = 1'-0"

A-204



2 **Interior Elevation - Closed Interface**
Scale: 1/4" = 1'-0"

b



1 **Interior Elevation - Open Interface**
Scale: 1/4" = 1'-0"

a

notes

1. See schedule for appliance information

key notes

1. Washer
2. Dryer
3. 32" LCD TV
4. DVD / Soundbar
5. Refrigerator
6. Convection / Microwave Oven
7. Dishwasher Drawer
8. Heat Induction Cooktop

specification notes

1. 06 20 00 -Finish Carpentry
2. 06 40 23 - Interior Architectural Woodwork
3. 08 35 13 - Folding Doors
4. 11 31 00 - Residential Appliances
5. 11 52 00 - Audio-Visual Equipment
6. 12 35 30 - Residential Casework

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3 06.02.09

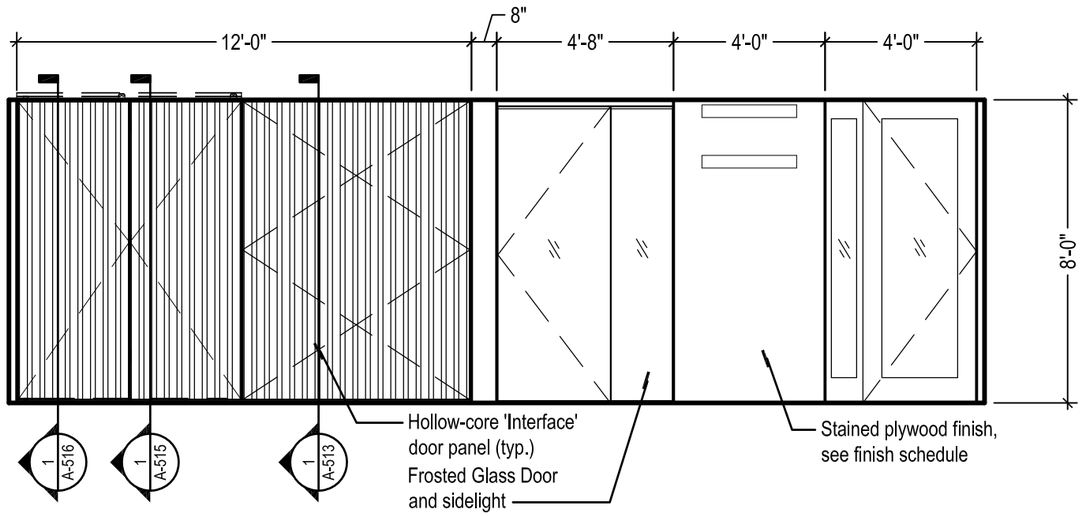
sheet name:

Interior Elevations

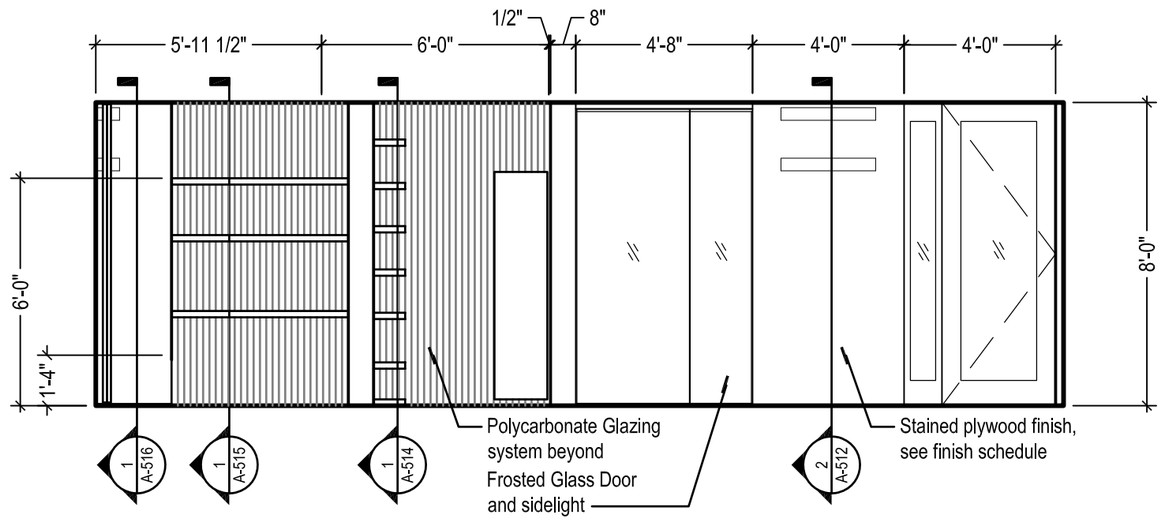
scale:

1/4"=1'-0"

A-205



2 Interior Elevation - Closed Interface
Scale: 1/4" = 1'-0"



1 Interior Elevation - Open Interface
Scale: 1/4" = 1'-0"

b

a

notes

specification notes

1. 06 20 00 - Finish Carpentry
2. 06 40 23 - Interior Architectural Woodwork
3. 08 14 16 - Flush Wood Doors
4. 08 80 00 - Glazing

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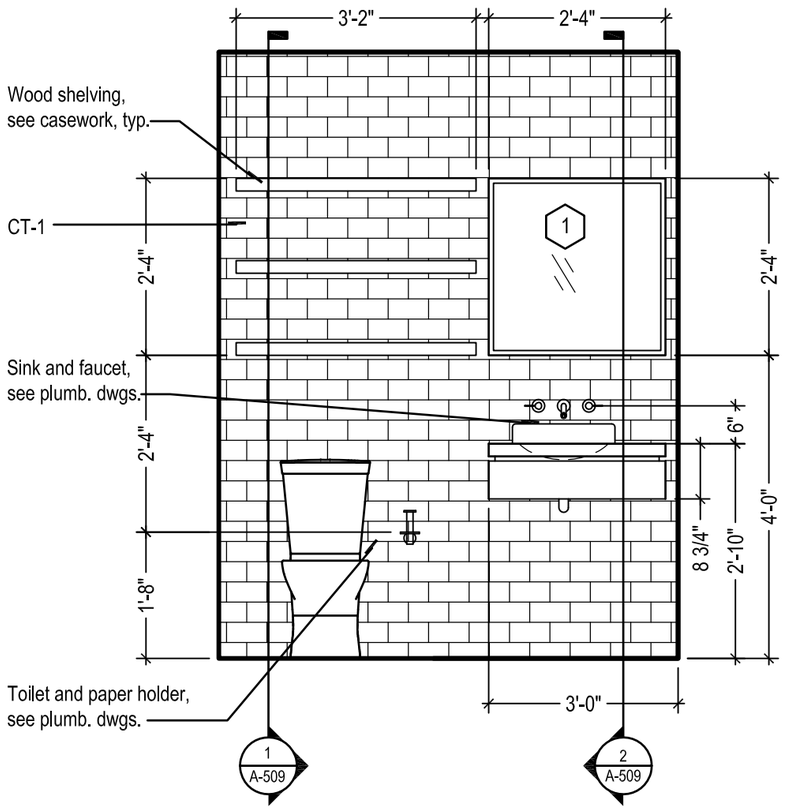
3 06.02.09

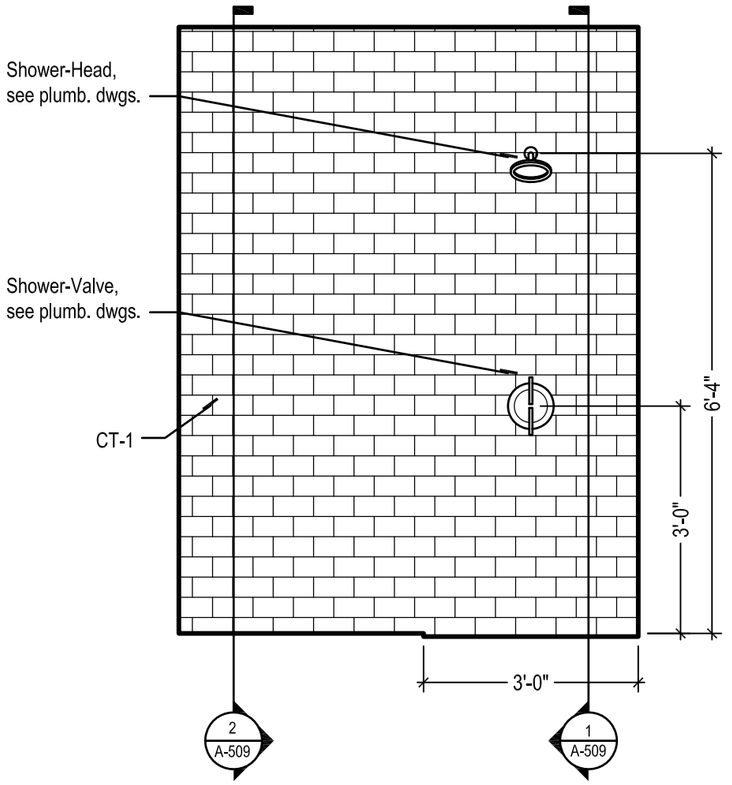
sheet name:
Interior Elevations

scale:
1/4"=1'-0"

A-206



2 **Interior Elevation - Open Interface**
Scale: 1/2" = 1'-0"



1 **Interior Elevation - Open Interface**
Scale: 1/2" = 1'-0"

notes

1. Center of sink to be mounted at 36" A.F.F.
2. Shower valve to be mounted at 36" A.F.F.
3. Shower Head to be mounted at 64" A.F.F.

directional notes

1. 28" x 28" Beveled edge mirror.

specification notes

1. 09 30 00 - Tiling
2. 10 28 00 - Toilet and Bath Accessories
3. 22 40 00 - Plumbing Fixtures

SOLAR HOUSE I

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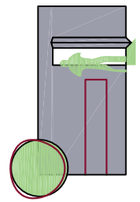

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

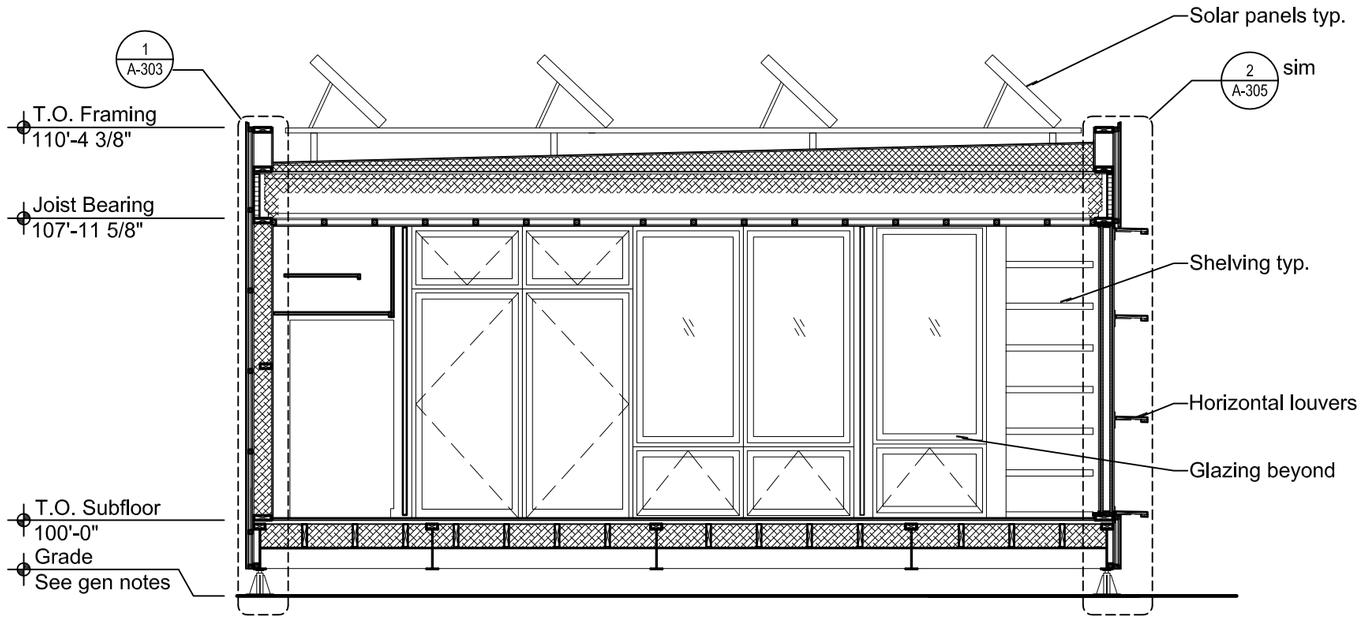
sheet name:

Interior Elevations

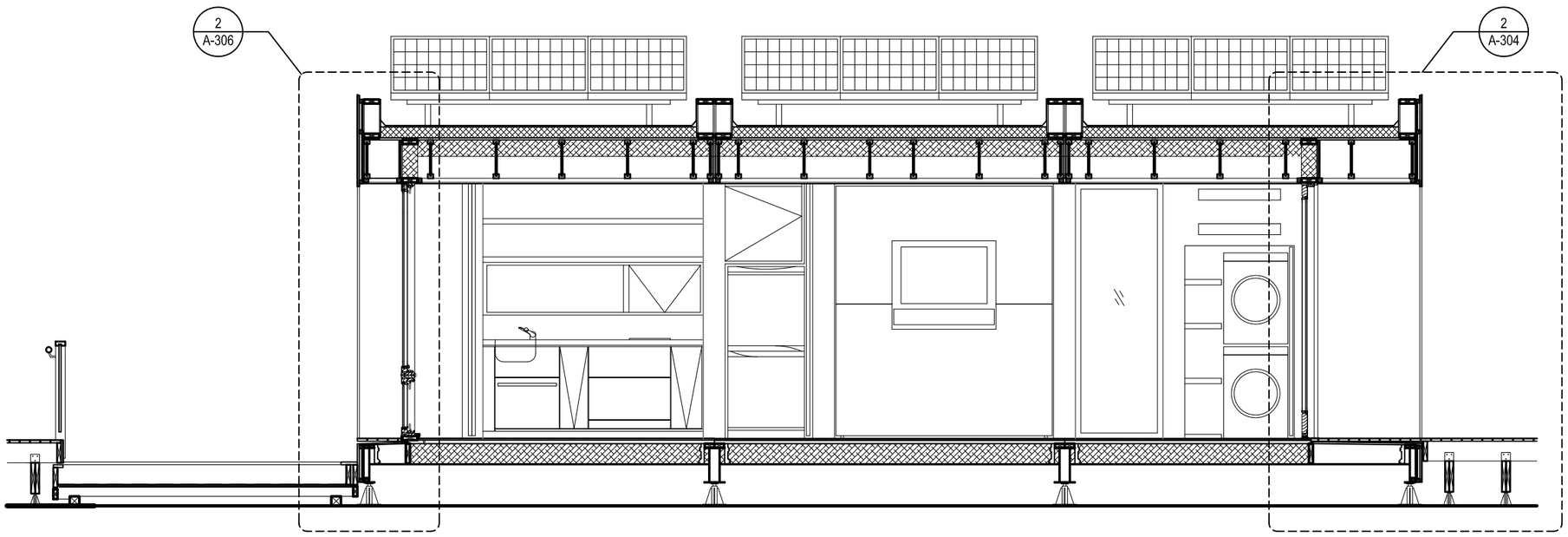
scale:

1/4"=1-0"

A-207



2 **Building Section**
Scale: 1/4" = 1'-0"



1 **Building Section**
Scale: 1/4" = 1'-0"

notes

b

a

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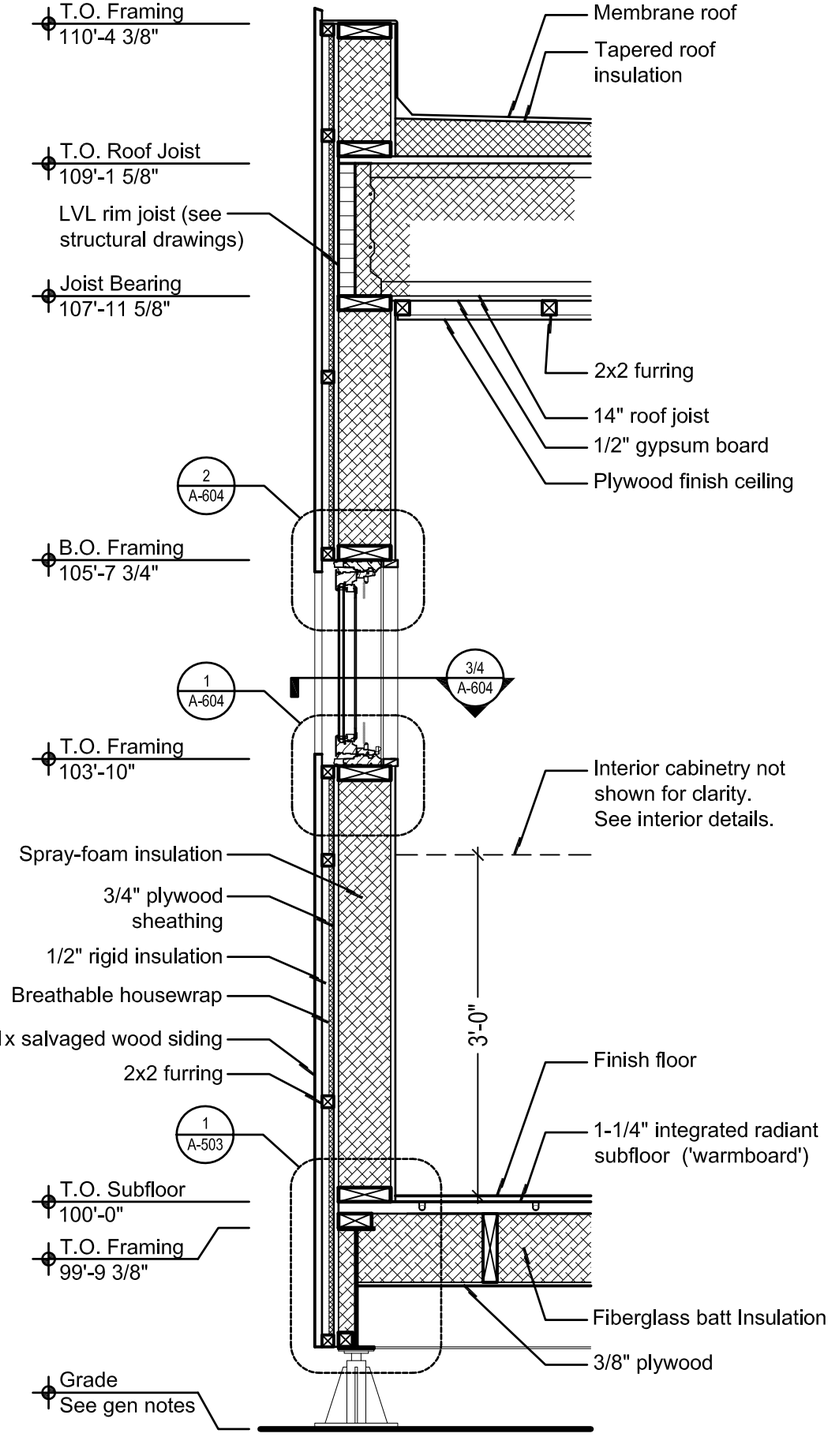
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

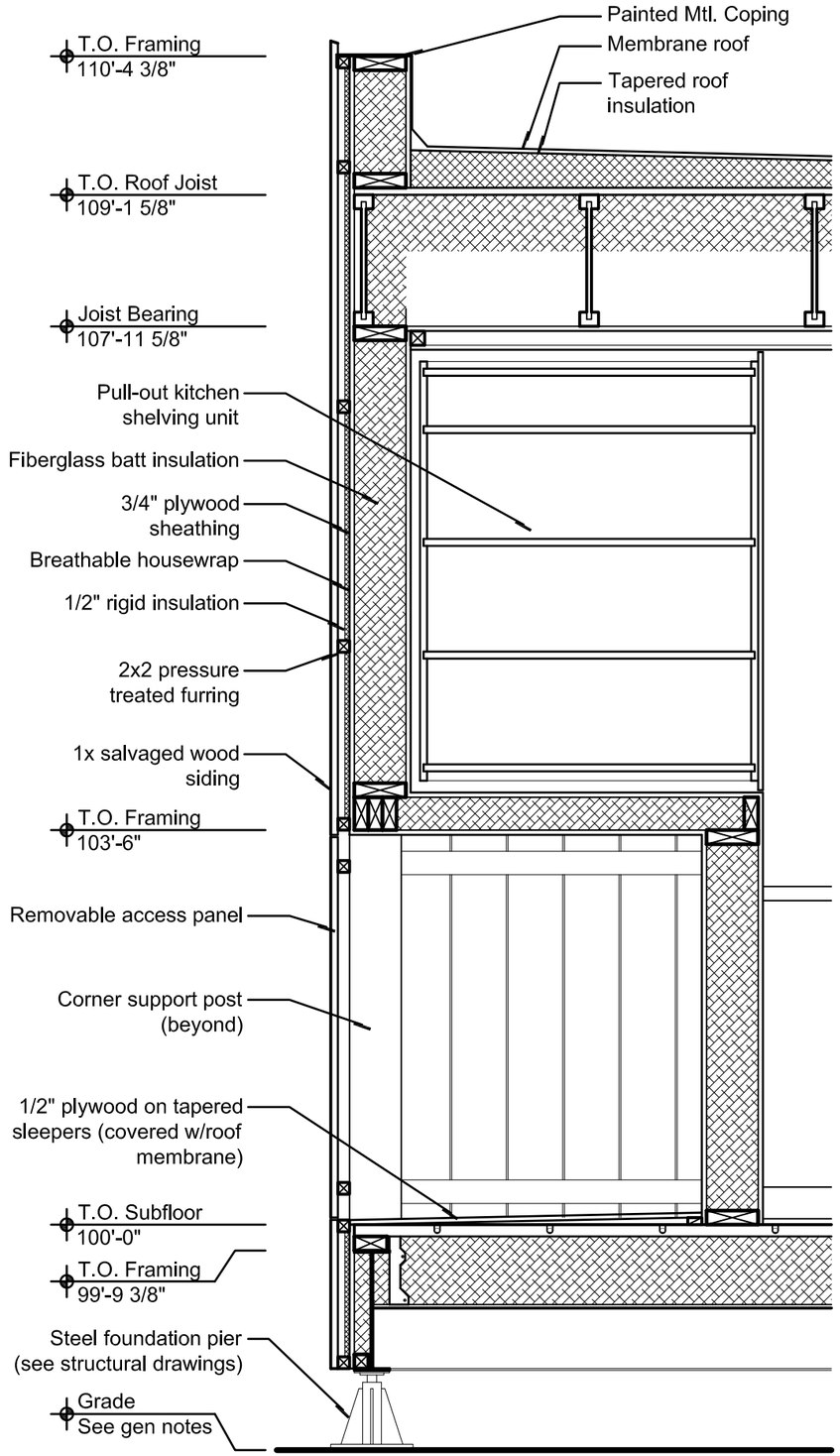
sheet name:
Building Sections

scale:
1/4" = 1'-0"

A-301



2 Wall Section
Scale: 3/4" = 1'-0"



1 Wall Section
Scale: 3/4" = 1'-0"

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Typical wall studs are 92-5/8" precut length.
4. All salvaged wood siding shall be consistent width of +/-6".
5. All exterior plywood wall sheathing shall be clad with Owens Corning ProPink breathable housewrap. Install with buttoncap fasteners and tape all seams per manufacturer's recommendations.
6. Seams and buttoncap penetrations on rigid insulation shall be sealed with manufacturer recommended seam tape.

specification notes

1. 07 21 00 - Thermal Insulation
2. 07 25 00 - Weather Barriers
3. 07 46 00 - Siding
4. 12 35 30 - Residential Casework

SOLAR HOUSE I

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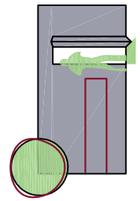

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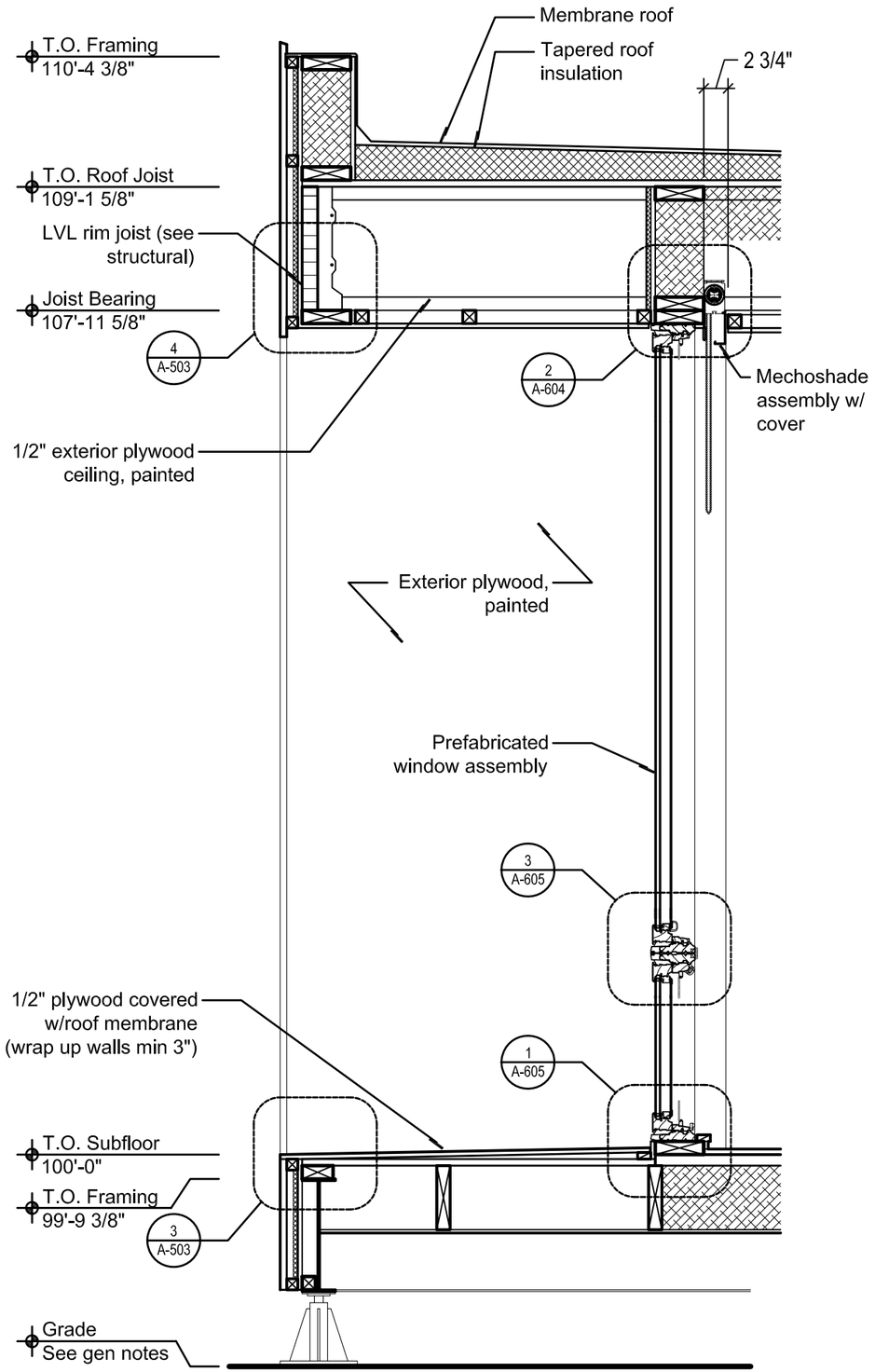
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

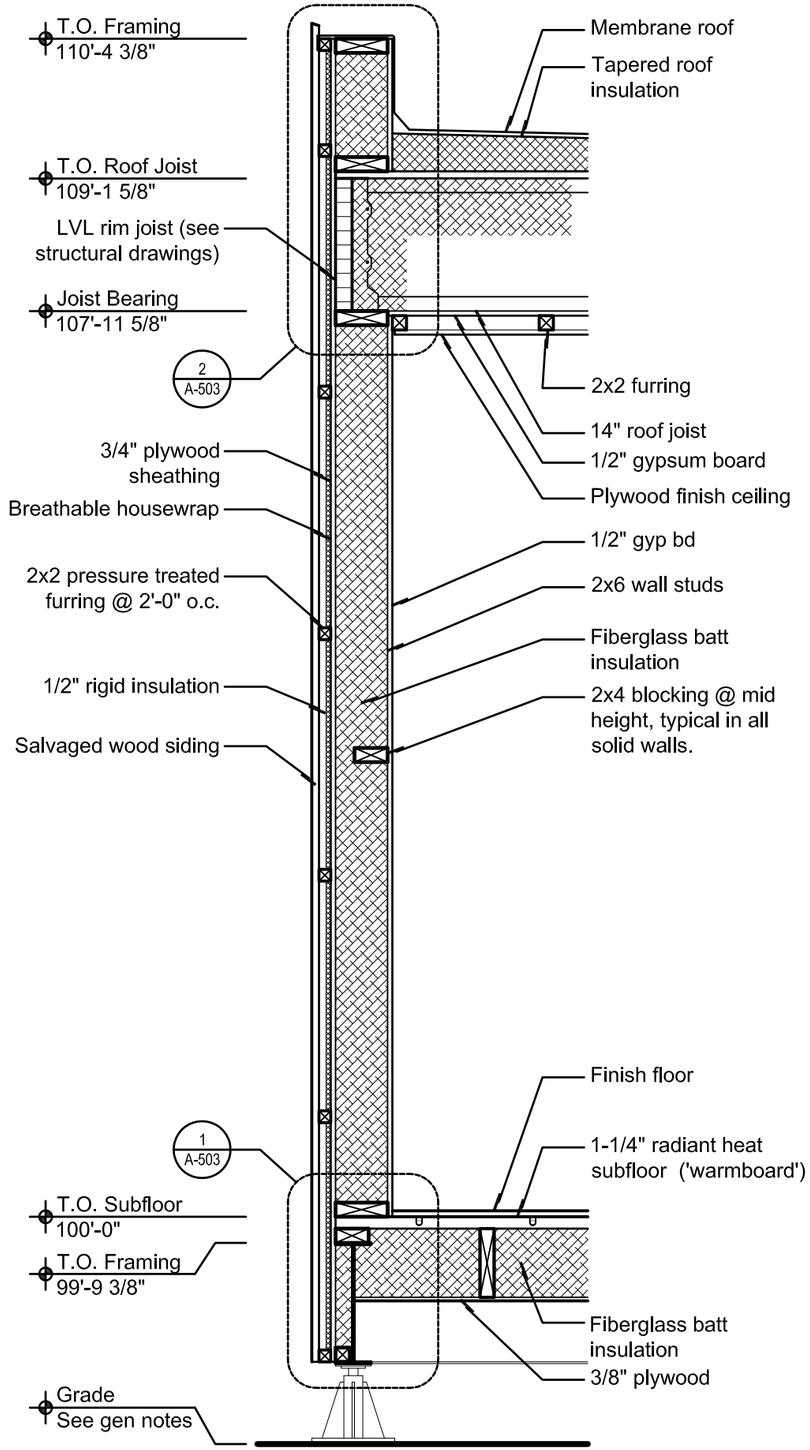
sheet name:
Wall Sections

scale:
3/4" = 1'-0"

A-302



2 Wall Section
Scale: 3/4" = 1'-0"



1 Wall Section
Scale: 3/4" = 1'-0"

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Typical wall studs are 92-5/8" precut length.
4. All salvaged wood siding shall be consistent width of +/-6".
5. All exterior plywood wall sheathing shall be clad with Owens Corning ProPink breathable housewrap. Install with buttoncap fasteners and tape all seams per manufacturer's recommendations.
6. Seams and buttoncap penetrations on rigid insulation shall be sealed with manufacturer recommended seam tape.

specification notes

1. 07 21 00 - Thermal Insulation
2. 07 25 00 - Weather Barriers
3. 07 46 00 - Siding
4. 08 41 13 - Aluminum Framed Entrances and Storefronts
5. 08 80 00 - Glazing

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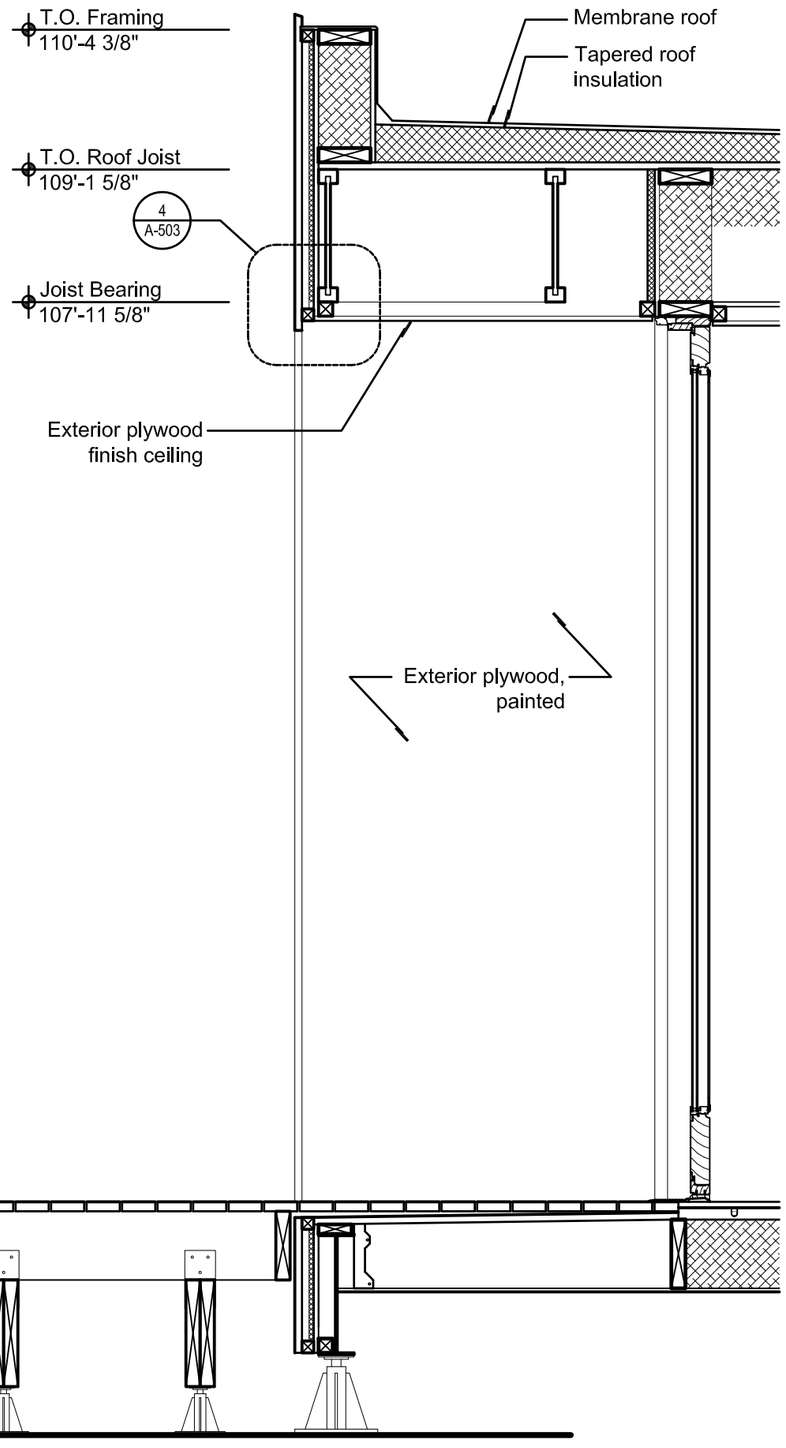
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

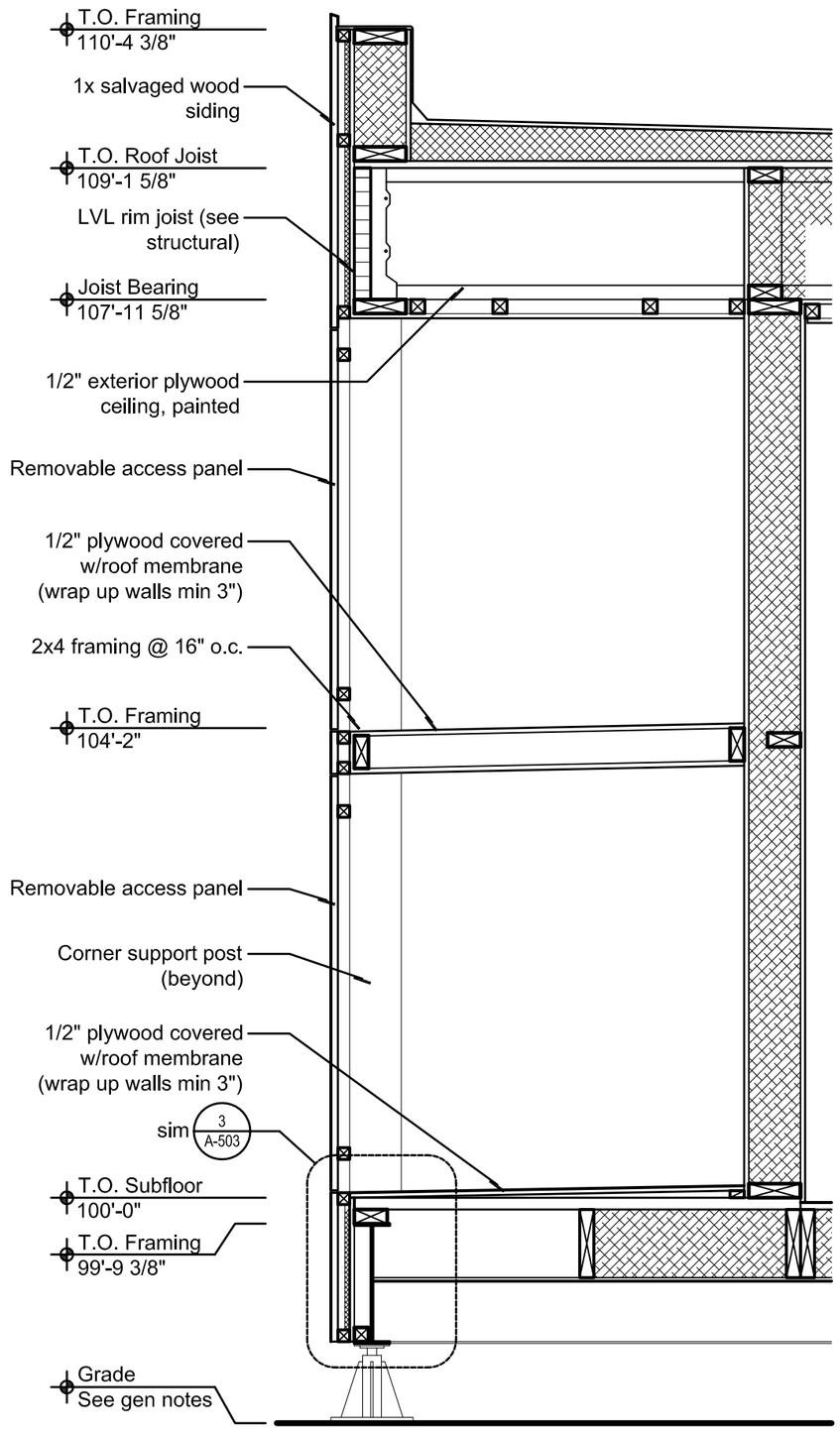
sheet name:
Wall Sections

scale:
3/4" = 1'-0"

A-303



2 Wall Section
Scale: 3/4" = 1'-0"



1 Wall Section
Scale: 3/4" = 1'-0"

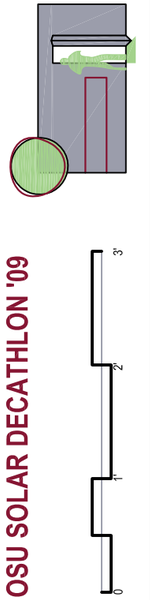
notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Typical wall studs are 92-5/8" precut length.
4. All salvaged wood siding shall be consistent width of +/-6".
5. All exterior plywood wall sheathing shall be clad with Owens Corning ProPink breathable housewrap. Install with buttoncap fasteners and tape all seams per manufacturer's recommendations.
6. Seams and buttoncap penetrations on rigid insulation shall be sealed with manufacturer recommended seam tape.

specification notes

1. 07 21 00 - Thermal Insulation
2. 07 25 00 - Weather Barriers
3. 07 46 00 - Siding
4. 08 52 00 - Wood Windows
5. 08 80 00 - Glazing

SOLAR HOUSE I
OSU SOLAR DECATHLON '09



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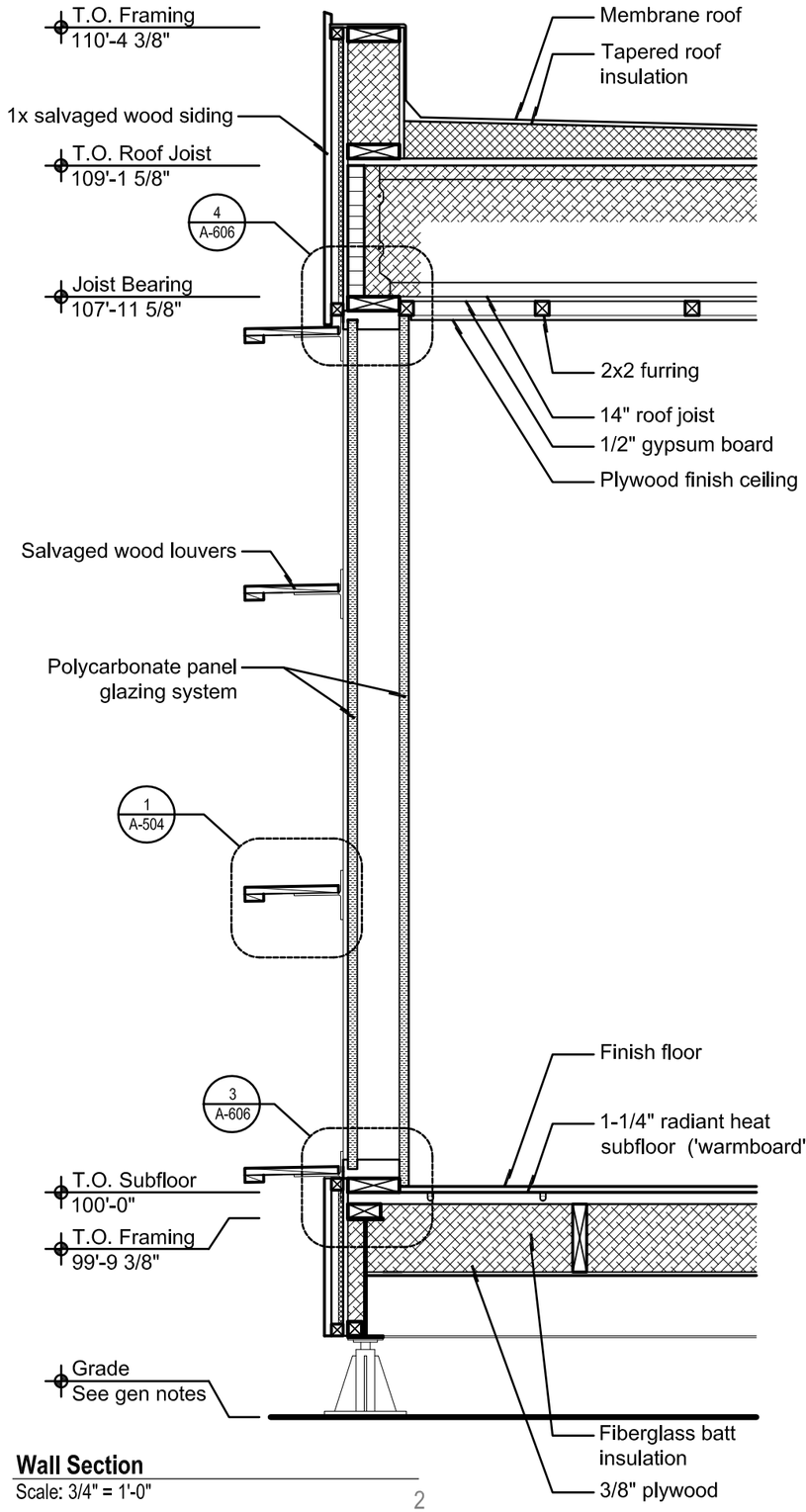
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

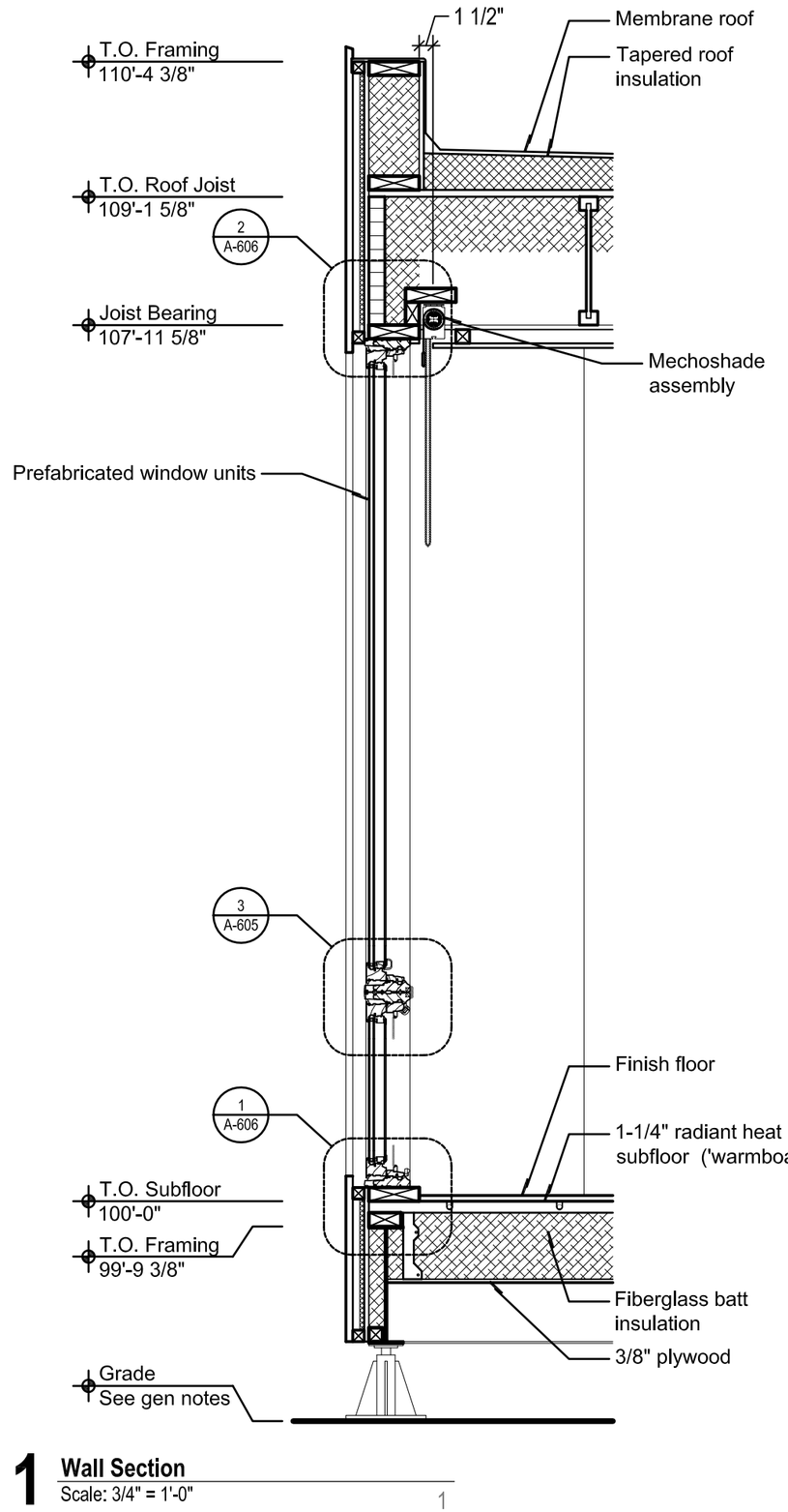
sheet name:
Wall Sections

scale:
3/4" = 1'-0"

A-304



2 Wall Section
Scale: 3/4" = 1'-0"



1 Wall Section
Scale: 3/4" = 1'-0"

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Typical wall studs are 92-5/8" precut length.
4. All salvaged wood siding shall be consistent width of +/-6".
5. All exterior plywood wall sheathing shall be clad with Owens Corning ProPink breathable housewrap. Install with buttoncap fasteners and tape all seams per manufacturer's recommendations.
6. Seams and buttoncap penetrations on rigid insulation shall be sealed with manufacturer recommended seam tape.

specification notes

1. 06 40 13 - Exterior Architectural Woodwork
2. 06 16 00 - Sheathing
3. 07 21 00 - Thermal Insulation
4. 07 25 00 - Weather Barriers
5. 08 52 00 - Wood Windows
6. 08 80 00 - Glazing

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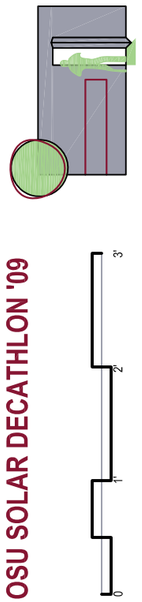

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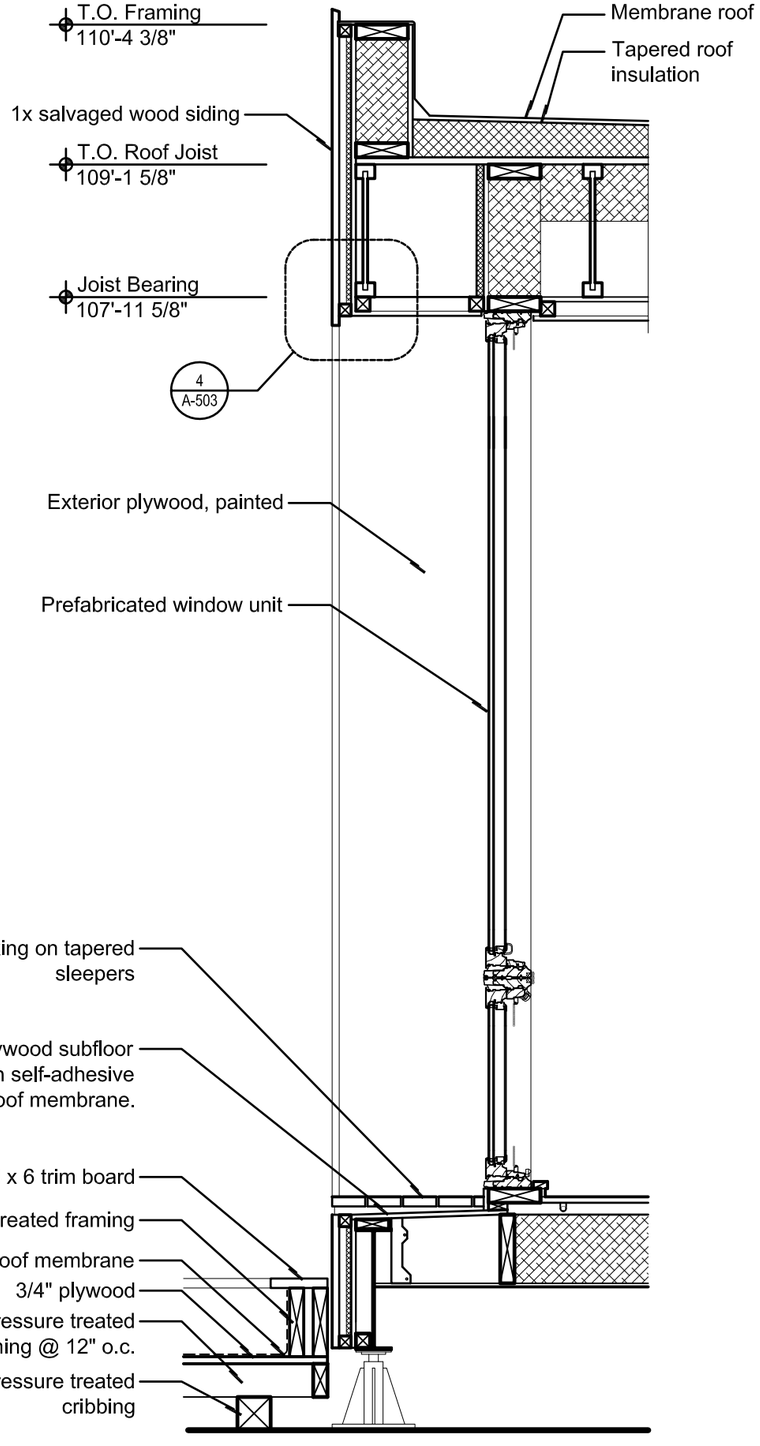
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

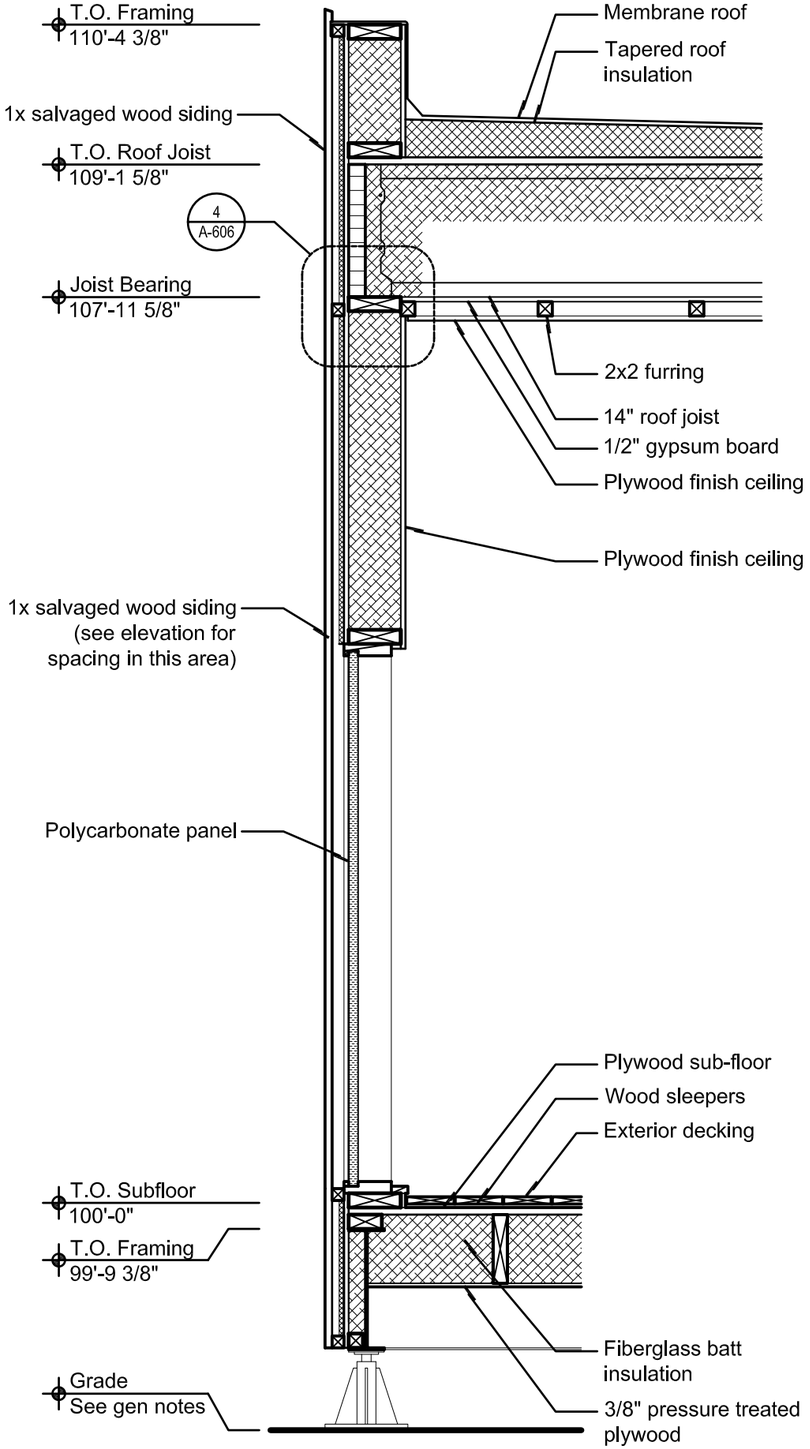
sheet name:
Wall Sections

scale:
3/4" = 1'-0"

A-305



2 **Wall Section**
Scale: 3/4" = 1'-0"



1 **Wall Section**
Scale: 3/4" = 1'-0"

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Typical wall studs are 92-5/8" precut length.
4. All salvaged wood siding shall be consistent width of +/-6".
5. All exterior plywood wall sheathing shall be clad with Owens Corning ProPink breathable housewrap. Install with buttoncap fasteners and tape all seams per manufacturer's recommendations.
6. Seams and buttoncap penetrations on rigid insulation shall be sealed with manufacturer recommended seam tape.

specification notes

1. 06 10 63 - Exterior Rough Carpentry
2. 06 16 00 - Sheathing
3. 07 21 00 - Thermal Insulation
4. 07 25 00 - Weather Barriers
5. 08 52 00 - Wood Windows
6. 08 80 00 - Glazing

SOLAR HOUSE I

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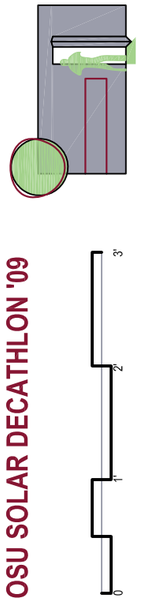

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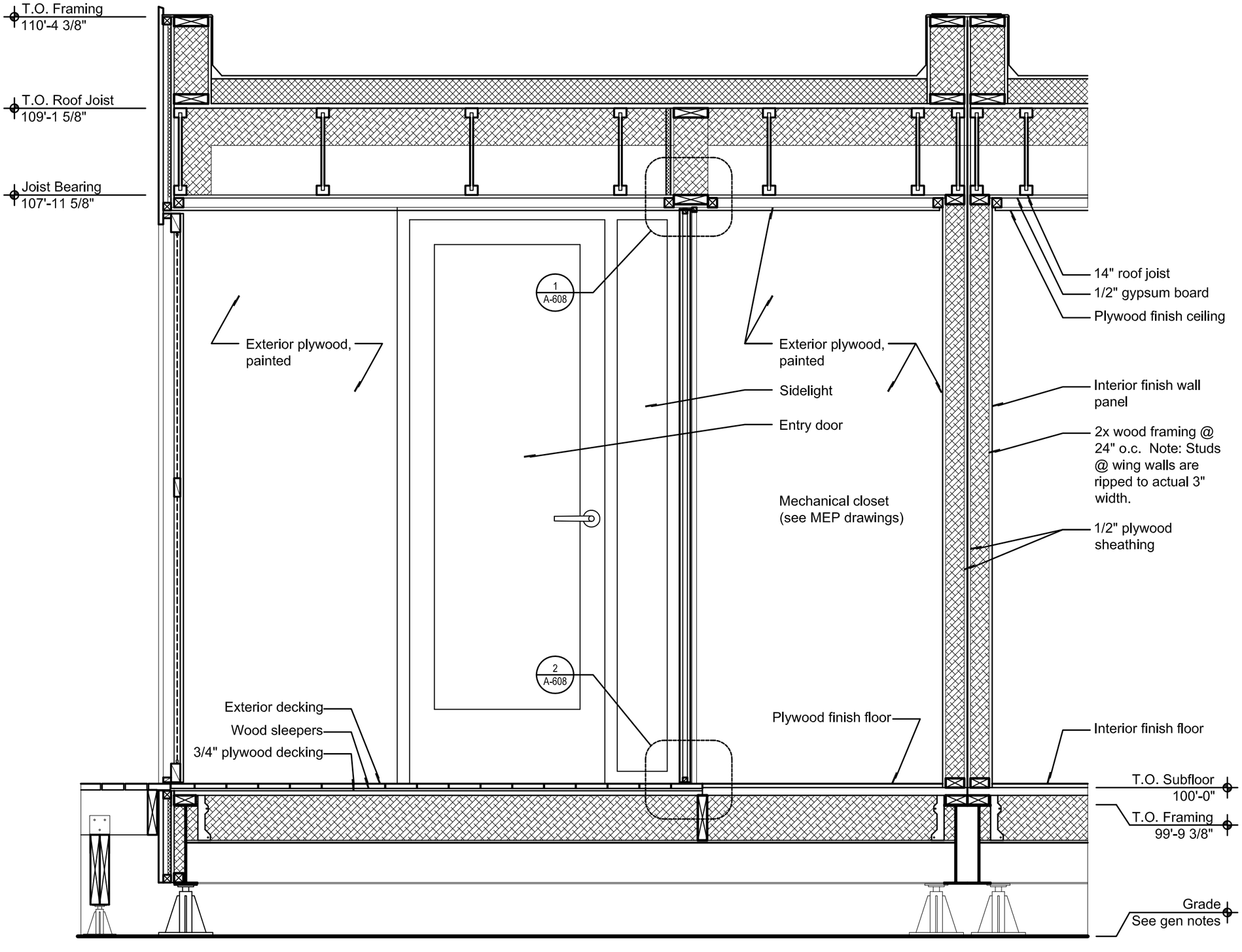
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Wall Sections

scale:
3/4" = 1'-0"

A-306



1 **Wall Section**
Scale: 3/4" = 1'-0"

notes

1. Grade at the competition site will be 2'-0" below top of subfloor:
   Grade = 98'-0"
   T.O. Subfloor = 100'-0"
2. During construction and transport, Grade will be 2'-11" below top of subfloor:
   Grade = 97'-1"
   T.O. Subfloor = 100'-0"
3. Typical wall studs are 92-5/8" precut length.
4. All salvaged wood siding shall be consistent width of +/-6".
5. All exterior plywood wall sheathing shall be clad with Owens Corning ProPink breathable housewrap. Install with buttoncap fasteners and tape all seams per manufacturer's recommendations.
6. Seams and buttoncap penetrations on rigid insulation shall be sealed with manufacturer recommended seam tape.

specification notes

1. 06 10 63 - Exterior Rough Carpentry
2. 06 16 00 - Sheathing
3. 07 21 00 - Thermal Insulation
4. 08 32 19 - Wood-Framed Glass Doors
5. 09 29 00 - Gypsum Board
6. 09 64 00 - Wood Flooring

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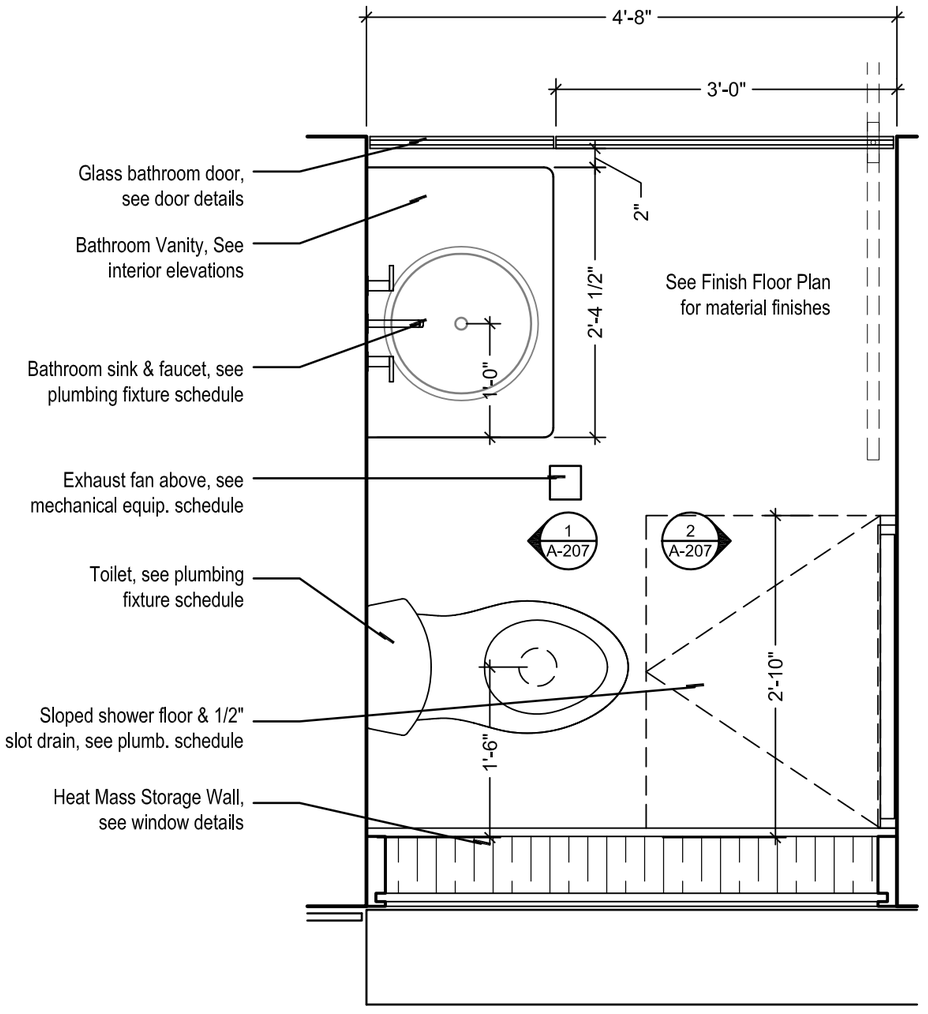
revisions:
1. 12.16.08
2. 05.15.09 (engineering)
3. 06.02.09

sheet name:
Wall Sections

scale:
3/4" = 1'-0"

A-307



1 **Enlarged Bathroom Plan**
Scale: 3/4" = 1'-0"

notes

specification notes

1. 10 28 00 - Toilet Bath and Laundry Accessories
2. 22 40 00 - Plumbing Fixtures

SOLAR HOUSE I

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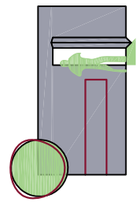

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

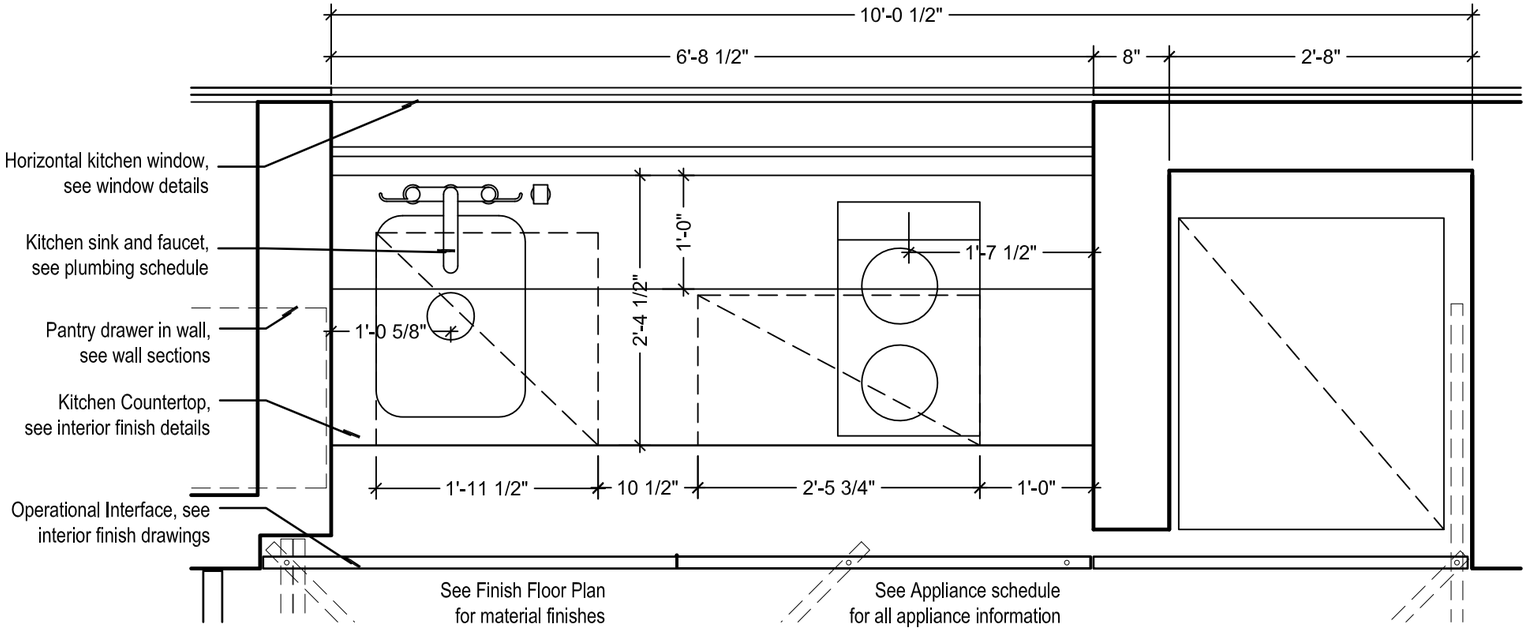
sheet name:

Enlarged Plans

scale:

as noted

A-401



1 Enlarged Kitchen Plan
Scale: 3/4" = 1'-0"

notes

b

a

specification notes

1. 11 31 00 - Residential Appliances
2. 12 36 40 - Stone Countertops

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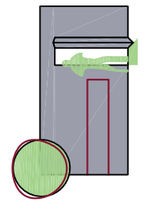

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

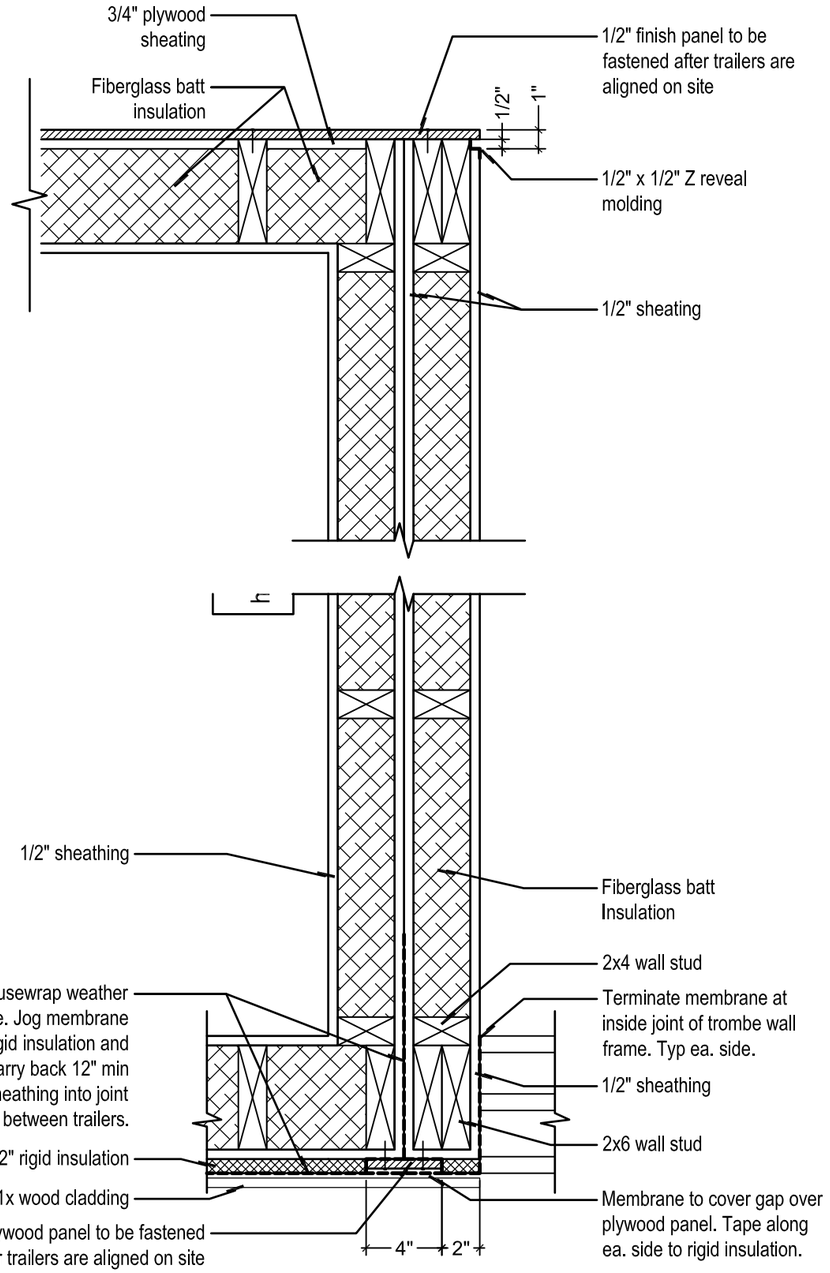
sheet name:

Enlarged Plans

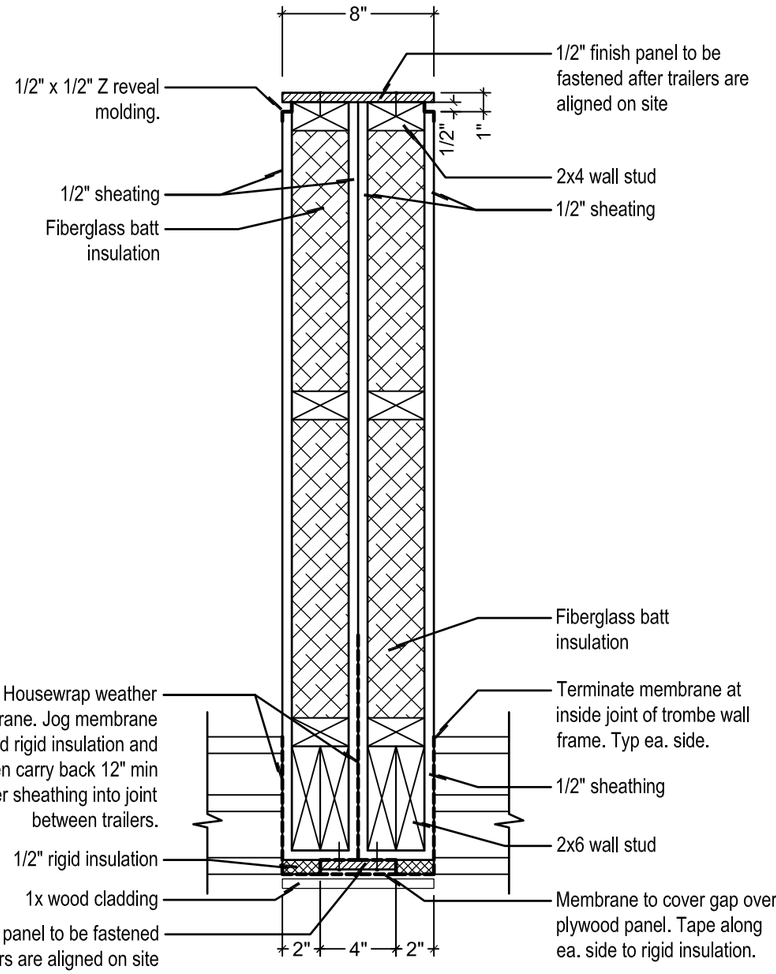
scale:

as noted

A-402



2 **Joint Detail**
Scale: 1 1/2" = 1'-0"



1 **Joint Detail**
Scale: 1 1/2" = 1'-0"

notes

1. 1/2" Plywood panels are to be installed after trailers are delivered to the National Mall and aligned in place.
2. The panels are to be installed with fasteners resistant to shearing.
3. After panels are fastened into place, stretch weather resistant membrane over exposed panel gap and tape to the adjacent rigid insulation, each side.
4. Upon disassembly and removal from the National Mall cut the membrane with a knife, remove the panels, and separate the trailers for transportation.

specification notes

1. 06 10 00 - Rough Carpentry
2. 07 21 00 - Thermal Insulation

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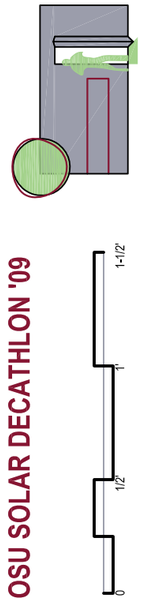

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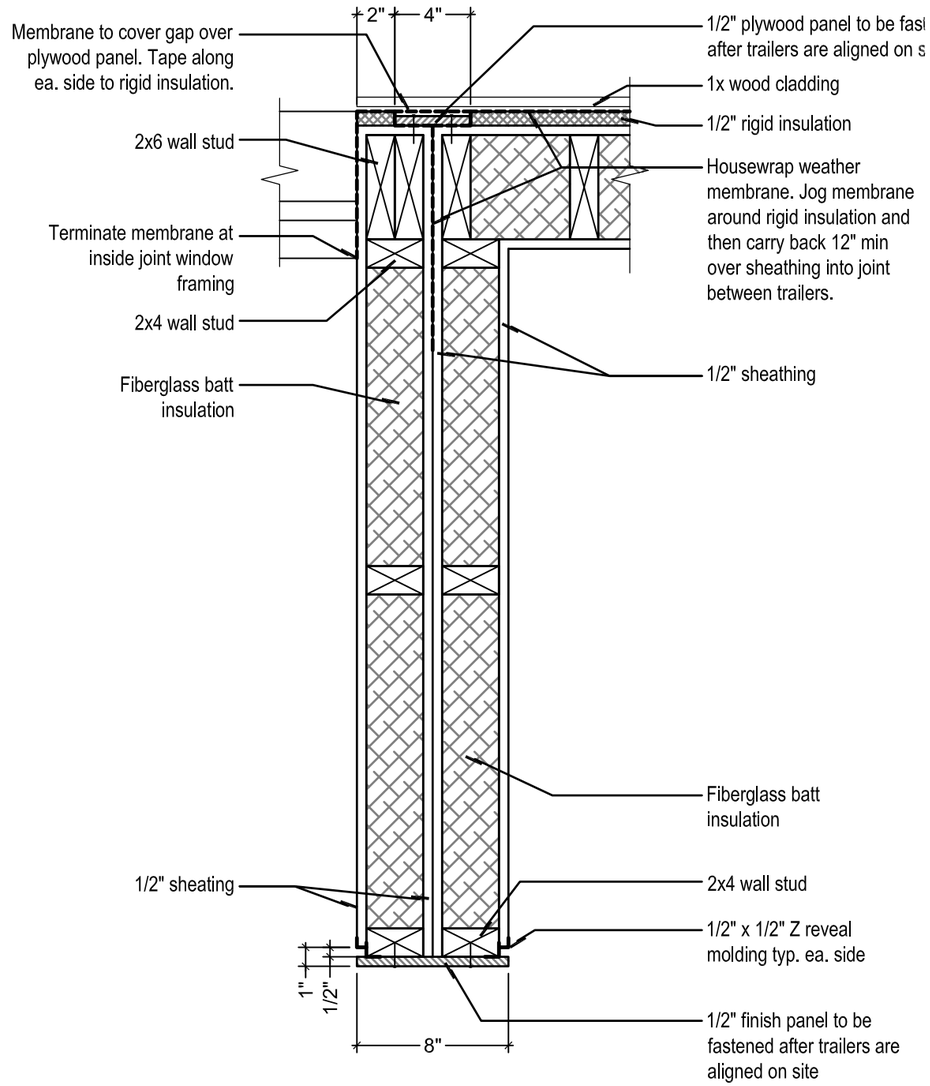
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

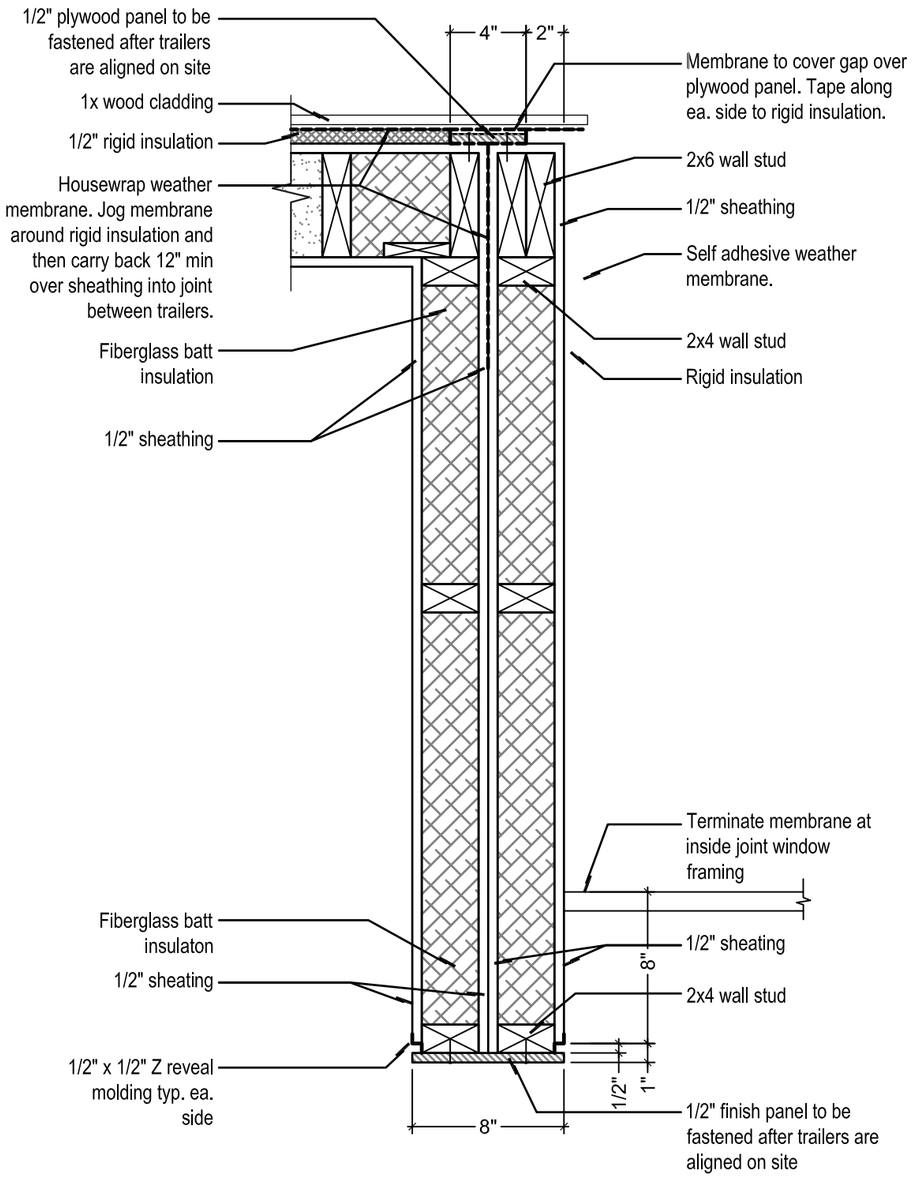
sheet name:
Module-Joint Details

scale:
as noted

A-501



2 **Joint Detail**
Scale: 1 1/2" = 1'-0"



1 **Joint Detail**
Scale: 1 1/2" = 1'-0"

notes

1. 1/2" Plywood panels are to be installed after trailers are delivered to the National Mall and aligned in place.
2. The panels are to be installed with fasteners resistant to shearing.
3. After panels are fastened into place, stretch weather resistant membrane over exposed panel gap and tape to the adjacent rigid insulation, each side.
4. Upon disassembly and removal from the National Mall cut the membrane with a knife, remove the panels, and separate the trailers for transportation.

specification notes

1. 06 10 00 - Rough Carpentry
2. 07 21 00 - Thermal Insulation

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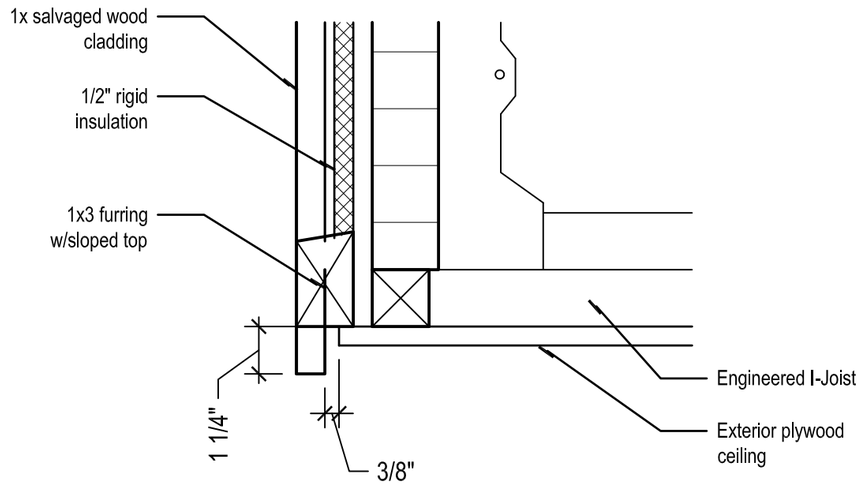
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

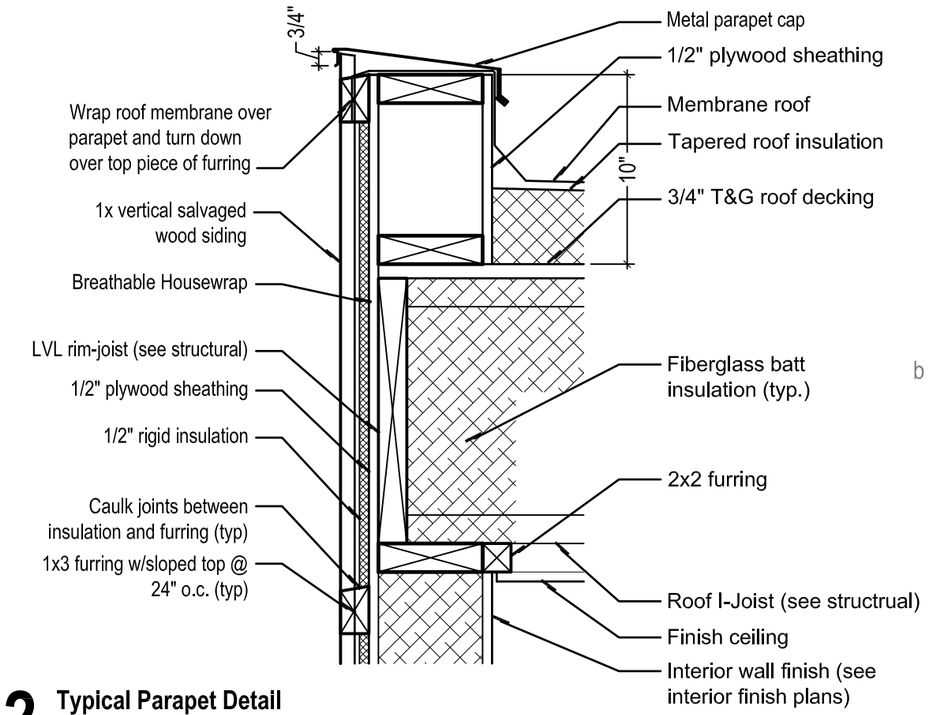
sheet name:
Module-Joint Details

scale:
as noted

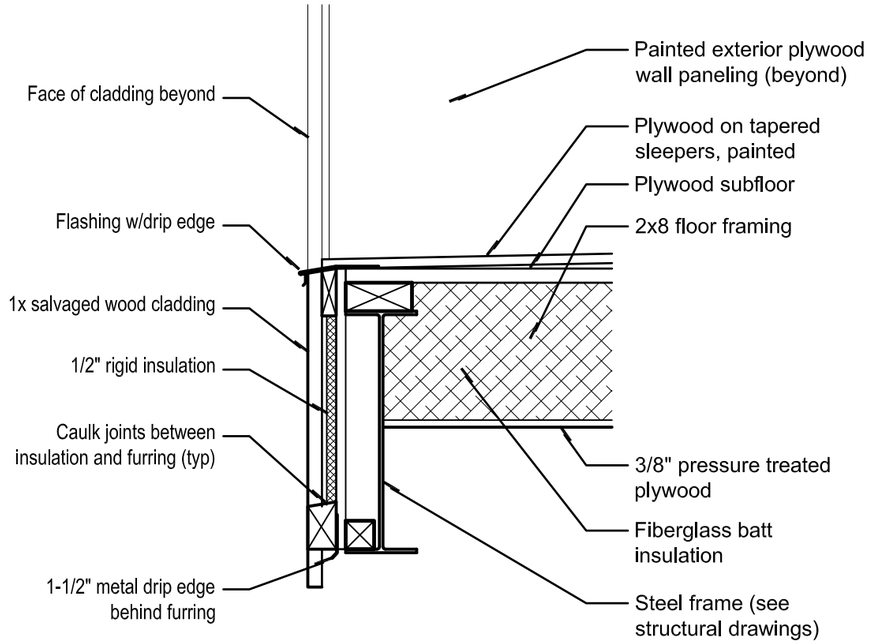
A-502



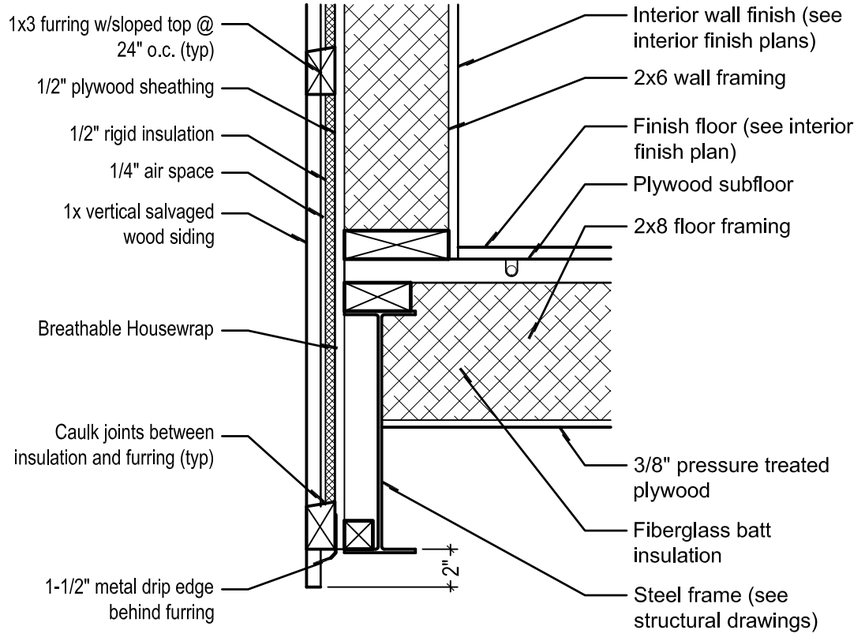
4 Soffit Detail
Scale: 3" = 1'-0"



2 Typical Parapet Detail
Scale: 1-1/2" = 1'-0"



3 Sill Detail
Scale: 1-1/2" = 1'-0"



1 Typical Sill Detail
Scale: 1-1/2" = 1'-0"

notes

b

a

specification notes

1. 06 10 00 - Rough Carpentry
2. 07 21 00 - Thermal Insulation
3. 07 25 00 - Weather Barriers
4. 07 46 00 - Siding

SOLAR HOUSE I

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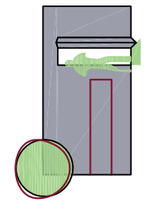

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

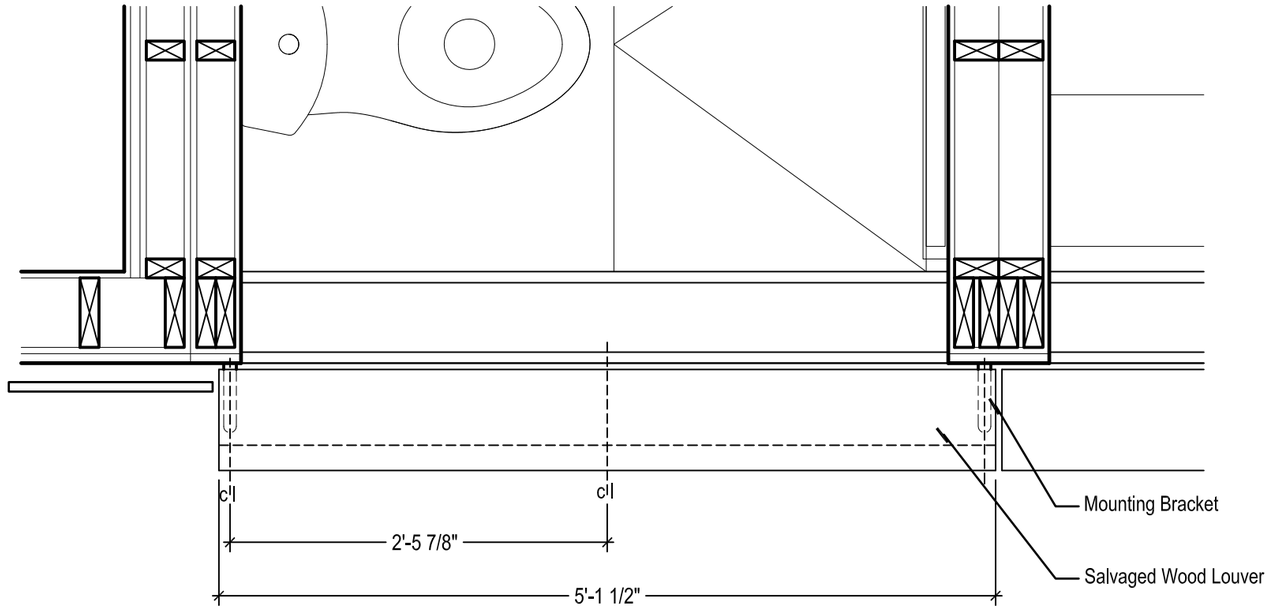
sheet name:

Exterior Details

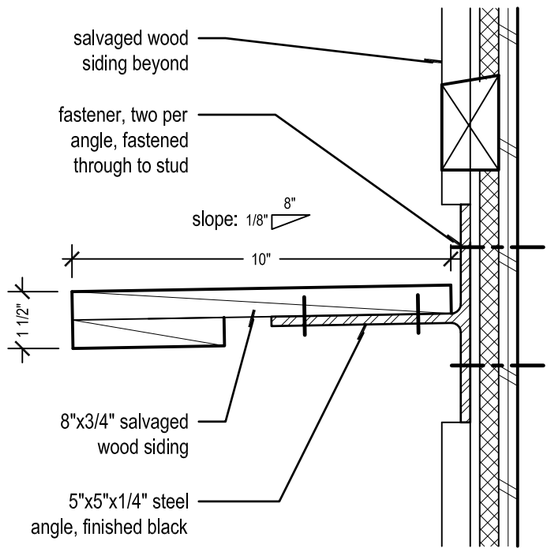
scale:

as noted

A-503



2 South Facade Louver Plan - Bracket Placement
Scale: 1" = 1'-0"



1 South Facade - Louver Detail
Scale: 3" = 1'-0"

b

a

notes

specification notes

1. 06 40 13 - Exterior Architectural Woodwork

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1 12.16.08
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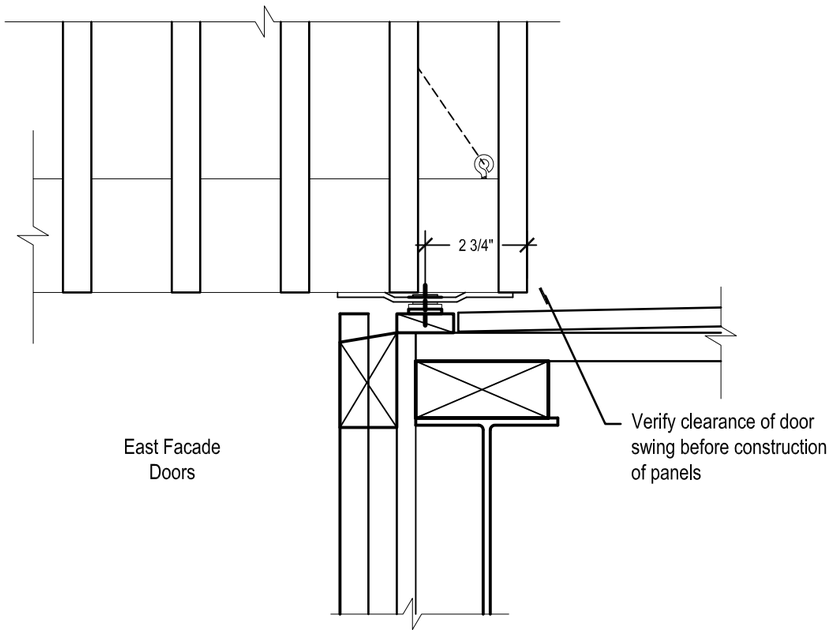
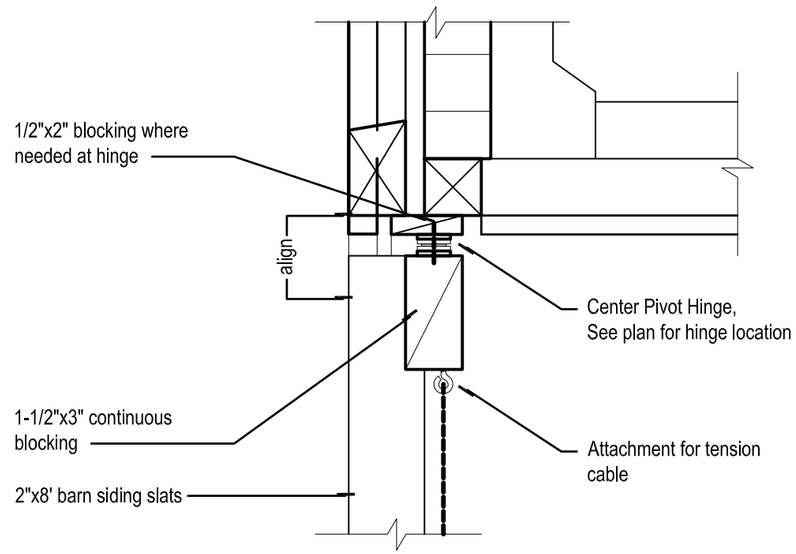
scale:
as noted

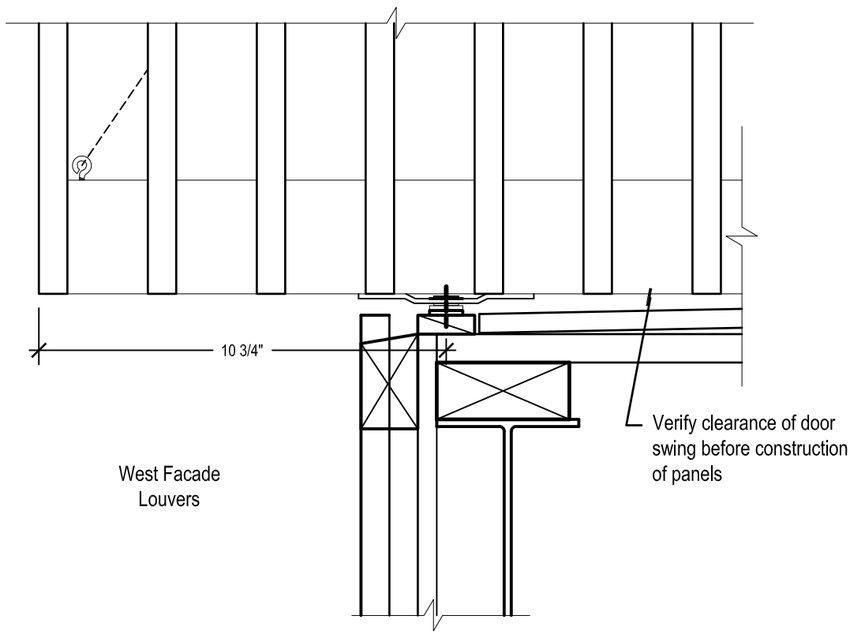
A-504



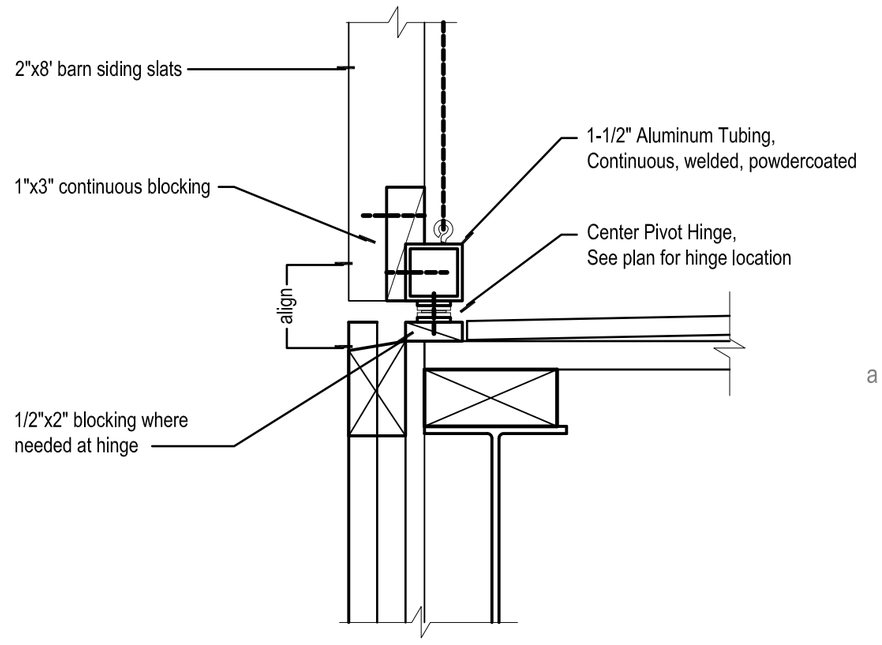
4 **Second Skin Door Hardware (Open) @ Sill**
Scale: 3" = 1'-0"



2 **Second Skin Door Hardware @ Head**
Scale: 3" = 1'-0"



3 **Second Skin Louver Hardware (Open) @ Sill**
Scale: 3" = 1'-0"



1 **Second Skin Door Hardware @ Sill**
Scale: 3" = 1'-0"

notes

b

a

specification notes

1. 06 40 13 - Exterior Architectural Woodwork

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sheet name:
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scale:
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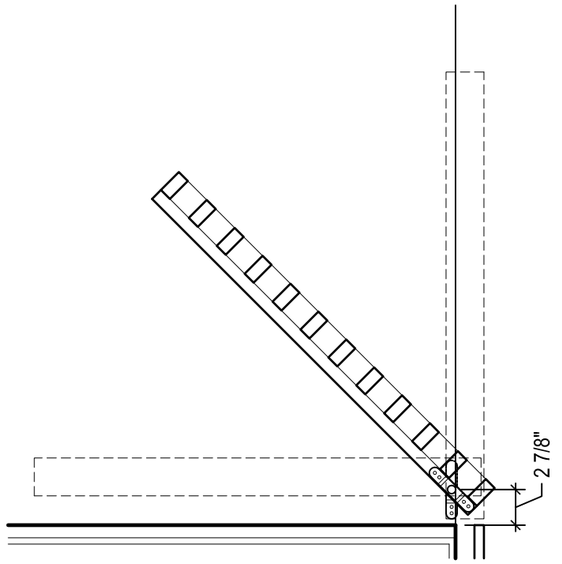
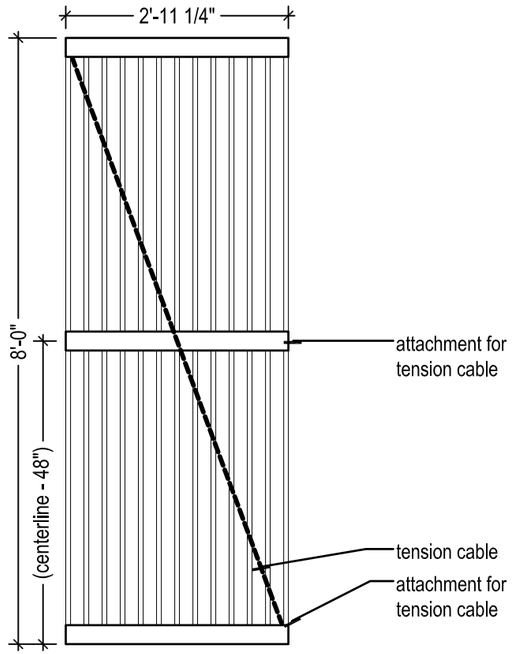
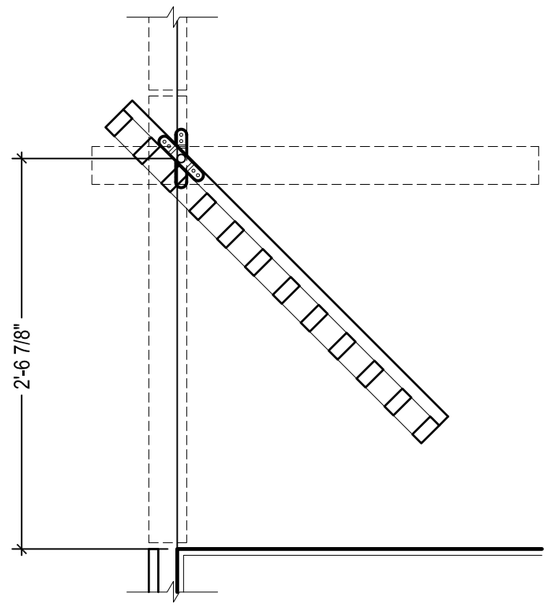


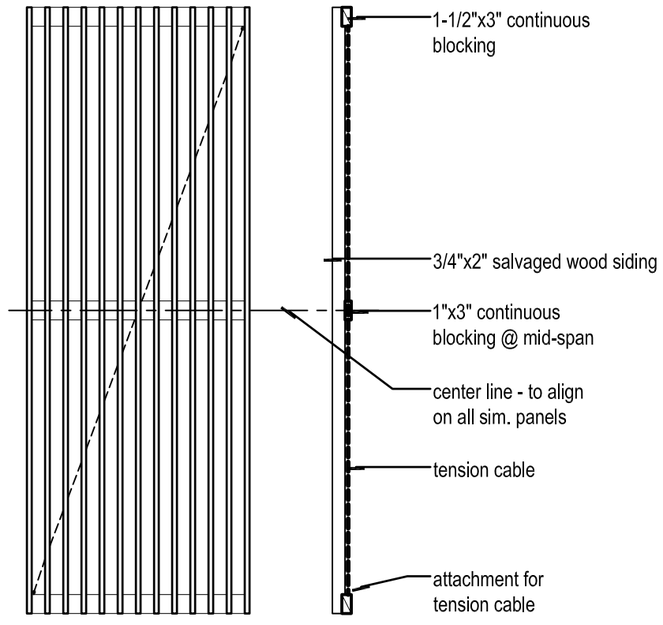
4 **East Louver Placement**
Scale: 1" = 1'-0"



2 **Second Skin Operable Door (back)**
Scale: 1/2" = 1'-0"



3 **West Louver Placement**
Scale: 1" = 1'-0"



1 **Second Skin Operable Door**
Scale: 1/2" = 1'-0"

notes

b

a

specification notes

1. 06 40 13 - Exterior Architectural Woodwork

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sheet name:
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scale:
as noted

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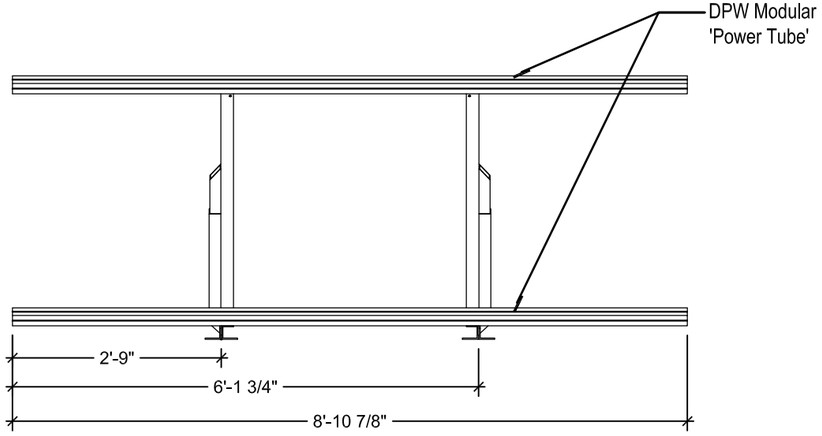
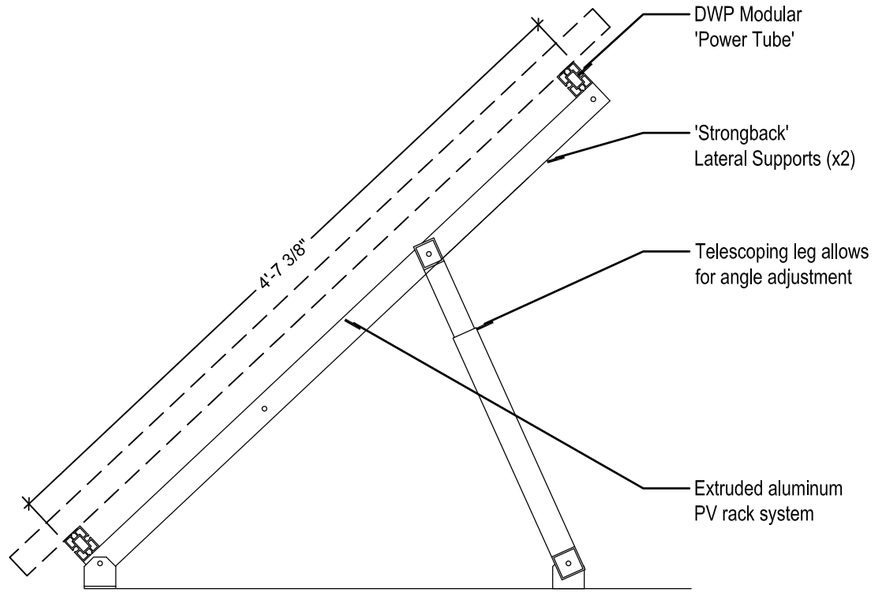


2 **Mounting Detail**
Scale: 1/2" = 1'-0"



1 **Panel Connection Detail**
Scale: 1" = 1'-0"

b

a

notes

1. PV mounting details shown on this sheet are for reference only.
2. Install all mounting supports per manufacturer's installation guide and specifications.
3. Rack can be adjusted from 0-90 degrees with rear support telescoping legs.
4. All joints and connections utilize $\frac{3}{8}$" bolts and nuts.
5. Panel is mounted with manufacturers provided clips secured with T-bolts.

specification notes

1. 26 31 00 - Photovoltaic Collectors

2

1

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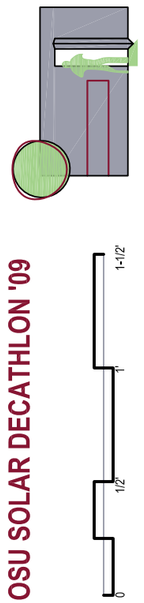

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sheet name:

Exterior Details
PV Mounting

scale:

as noted

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notes

NOT USED

2 **Casework Detail**
Scale: 3/4" = 1'-0"

1 **Casework Detail**
Scale: 3/4" = 1'-0"

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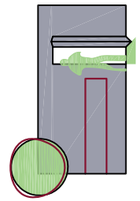

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revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Interior Details

scale:
as noted

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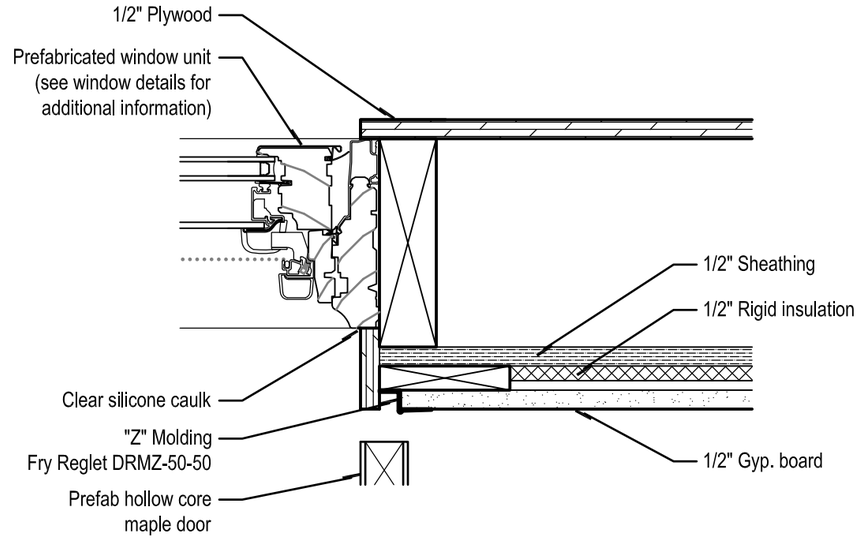
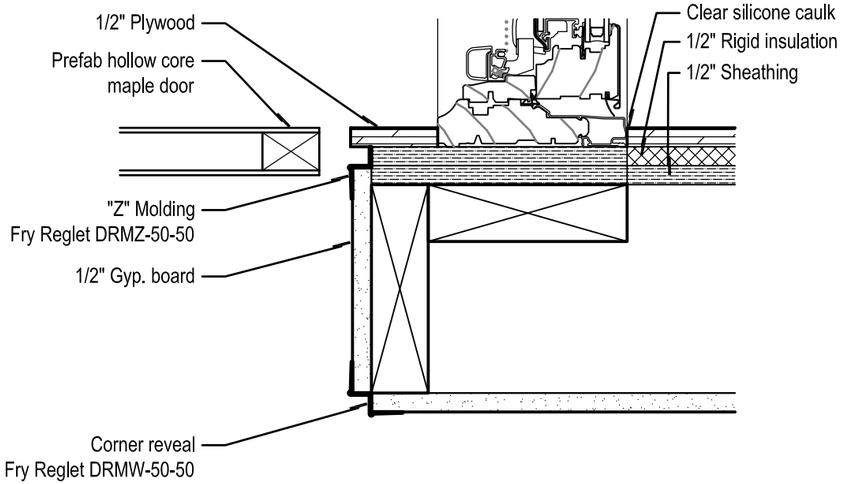


2 **Plan Detail**
Scale: 3" = 1'-0"



1 **Plan Detail**
Scale: 3" = 1'-0"

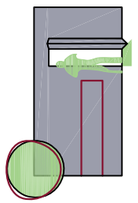
b

a

notes

specification notes

1. 06 10 00 - Rough Carpentry
2. 08 14 16 - Flush Wood Doors
3. 08 52 00 - Wood Windows
4. 09 29 00 - Gypsum Board



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revisions:
1. 12.16.08
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sheet name:
Interior Details

scale:
as noted

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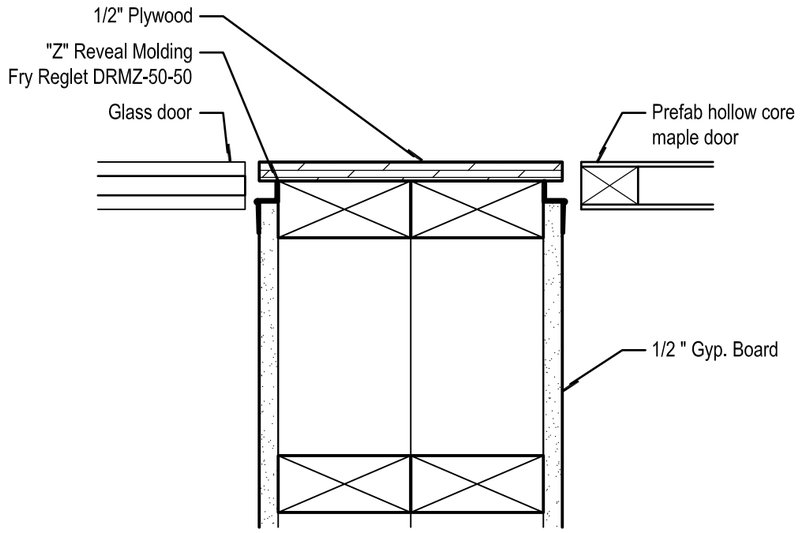
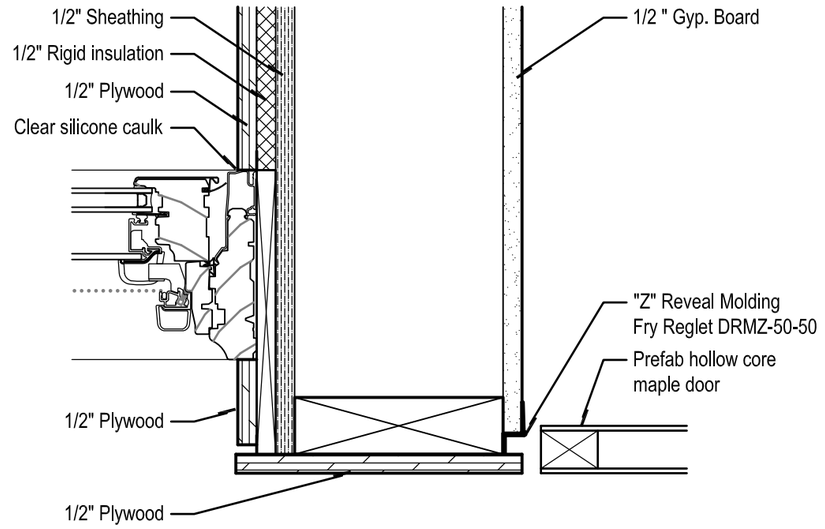
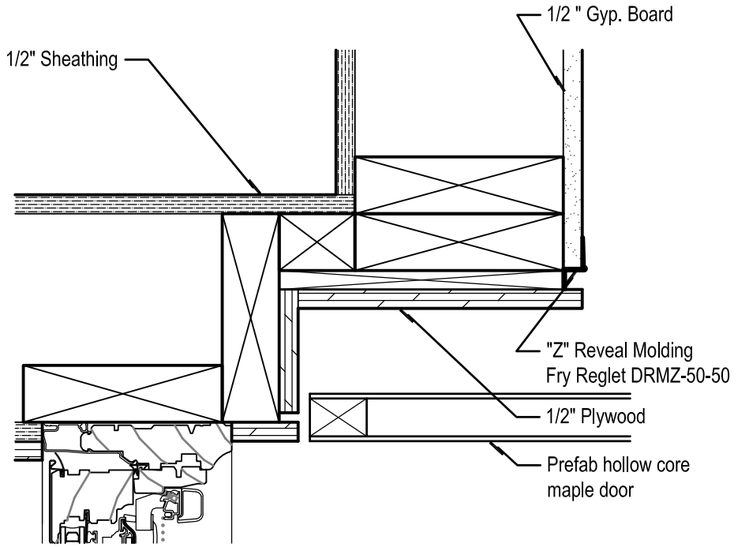


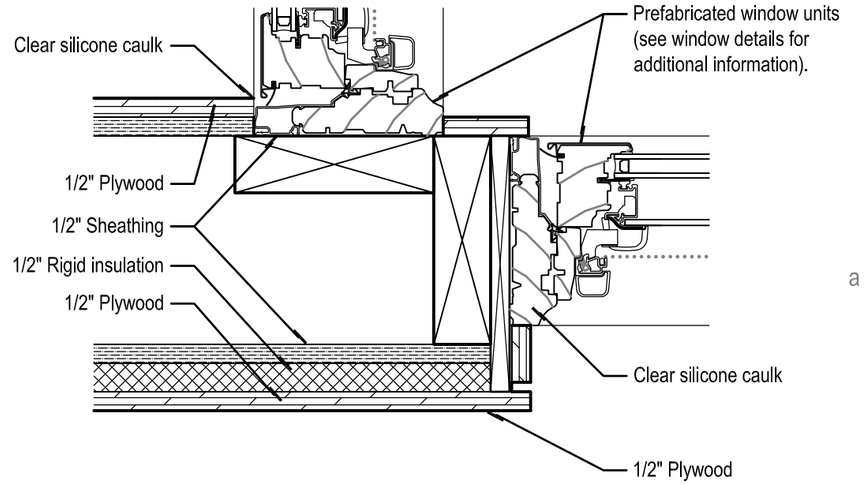
4 **Plan Detail**
Scale: 3" = 1'-0"



2 **Plan Detail**
Scale: 3" = 1'-0"



3 **Plan Detail**
Scale: 3" = 1'-0"



1 **Plan Detail**
Scale: 3" = 1'-0"

notes

b

a

specification notes

1. 06 10 00 - Rough Carpentry
2. 08 14 16 - Flush Wood Doors
3. 08 52 00 - Wood Windows
4. 09 29 00 - Gypsum Board

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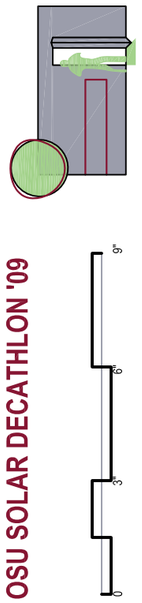

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sheet name:

Interior Details

scale:

as noted

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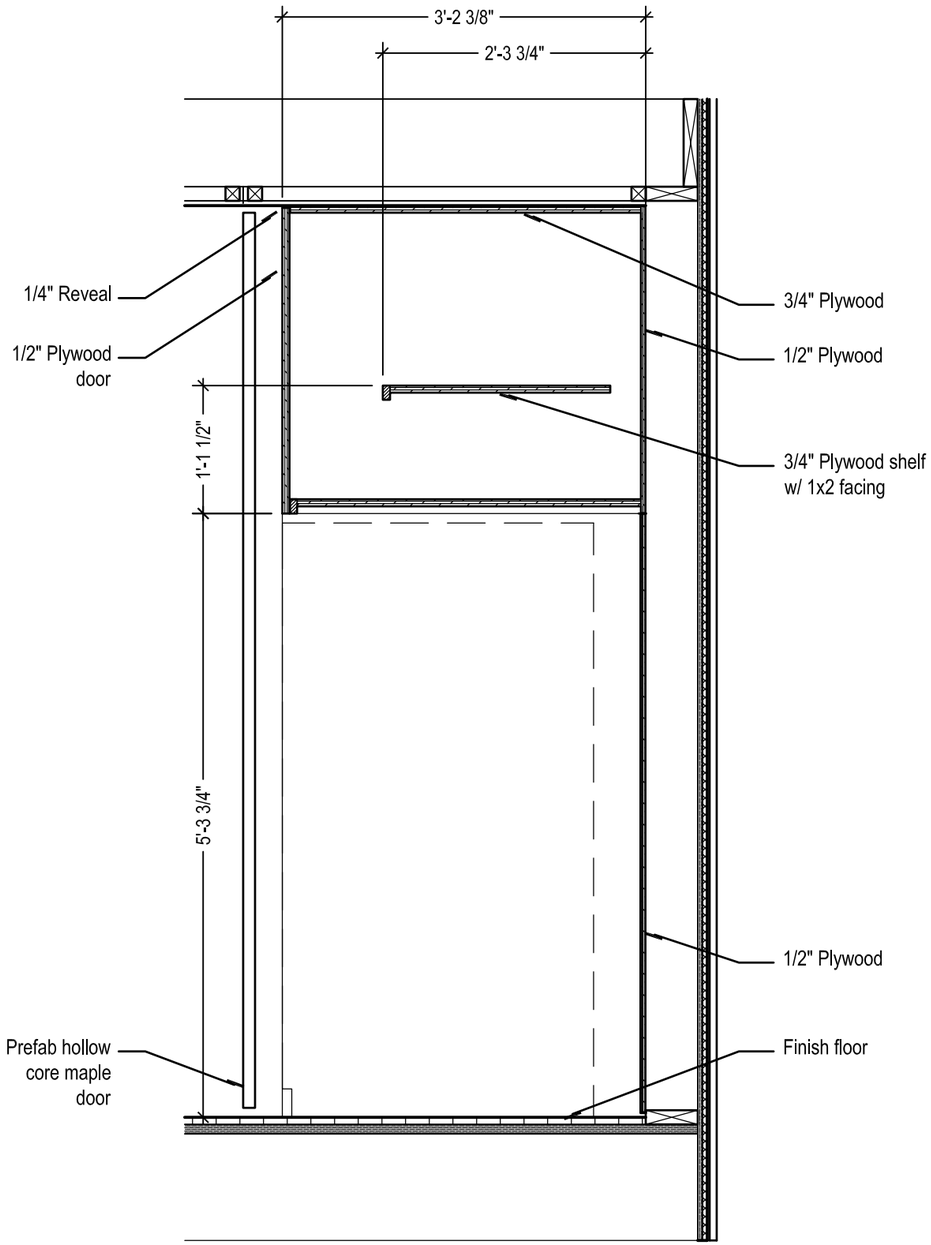
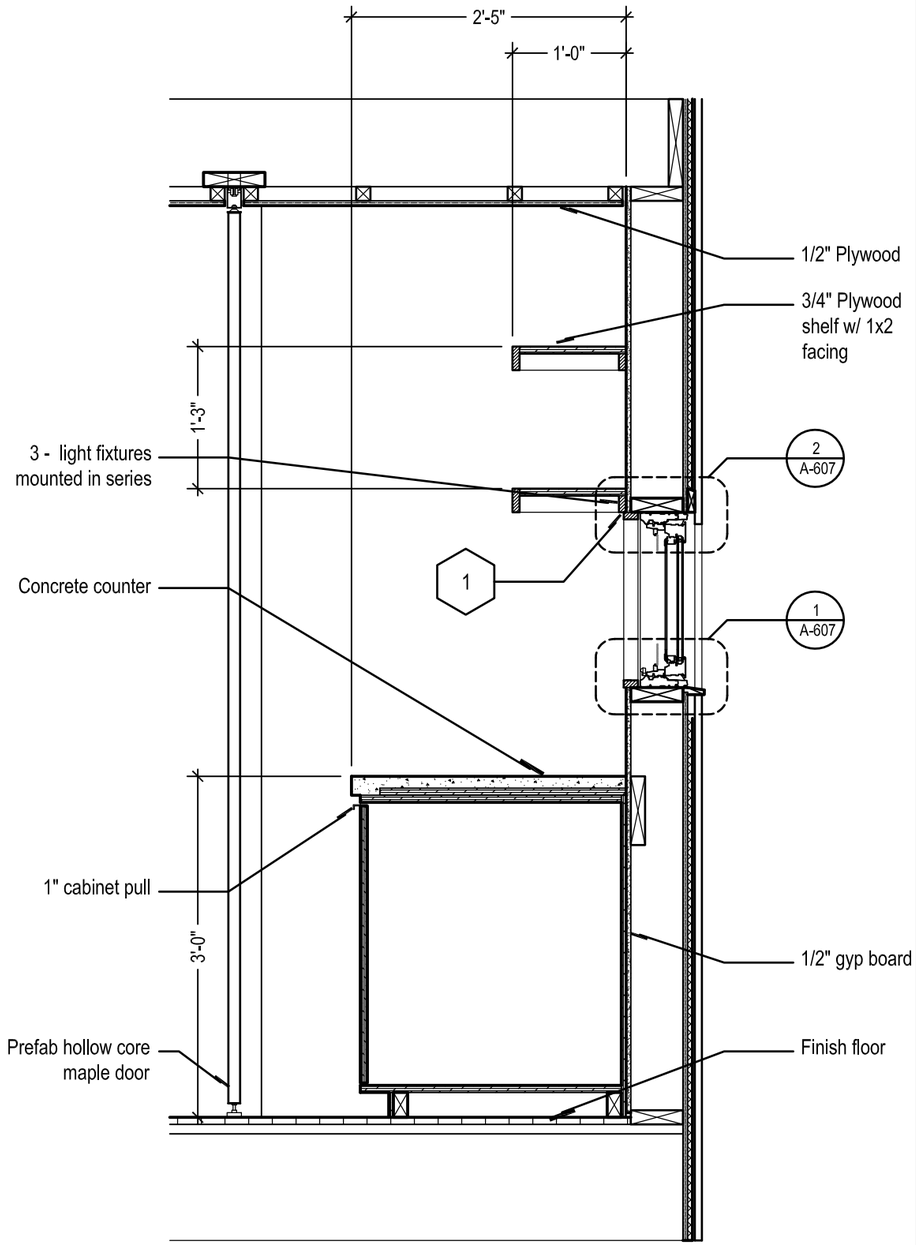


2 **Casework Detail**
Scale: 3/4" = 1'-0"



1 **Casework Detail**
Scale: 3/4" = 1'-0"

notes

directional notes

1. Shelf to be mounted at top edge of interior window trim.

specification notes

1. 08 14 16 - Flush Wood Doors
2. 08 52 00 - Wood Windows
3. 09 64 00 - Wood Flooring
4. 12 35 30 - Residential Casework
5. 12 36 40 - Stone Countertops

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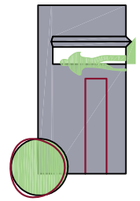

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revisions:

1 12.16.08
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sheet name:

Interior Details

scale:

as noted

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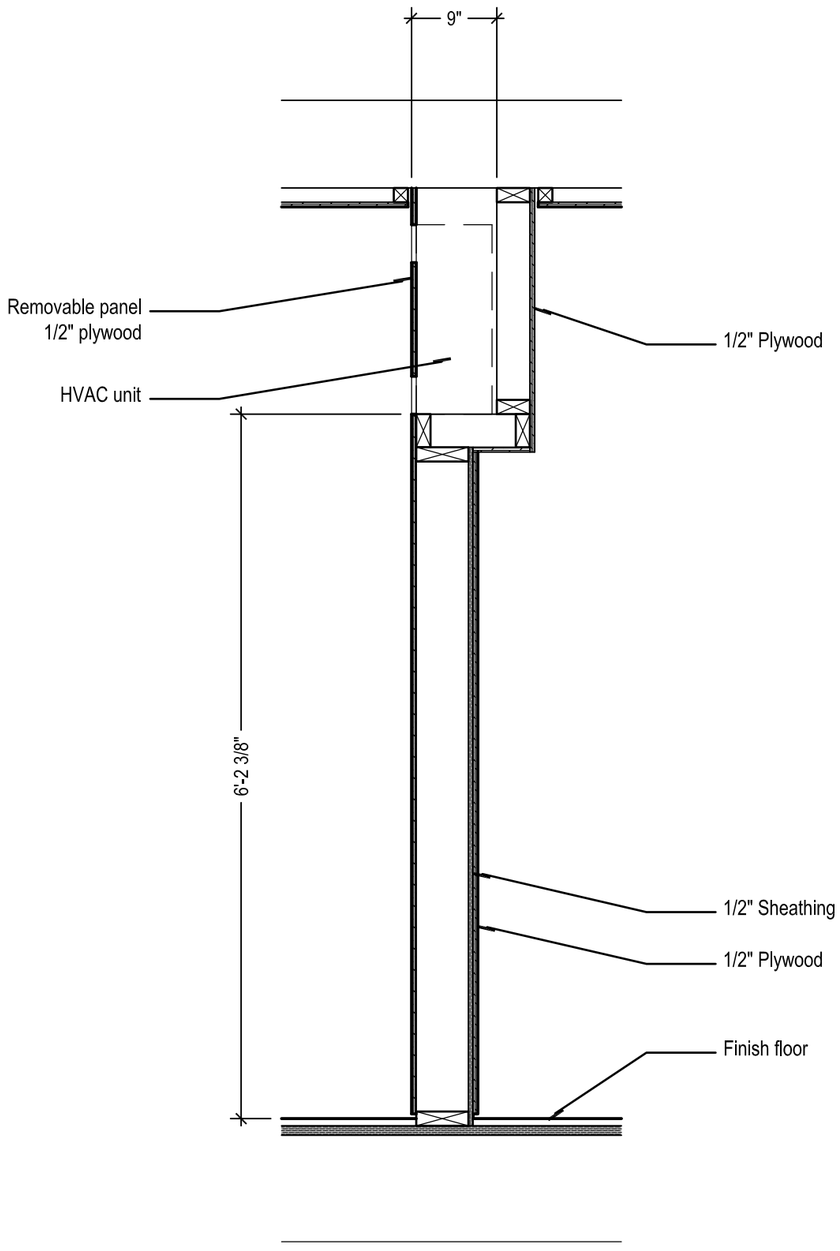
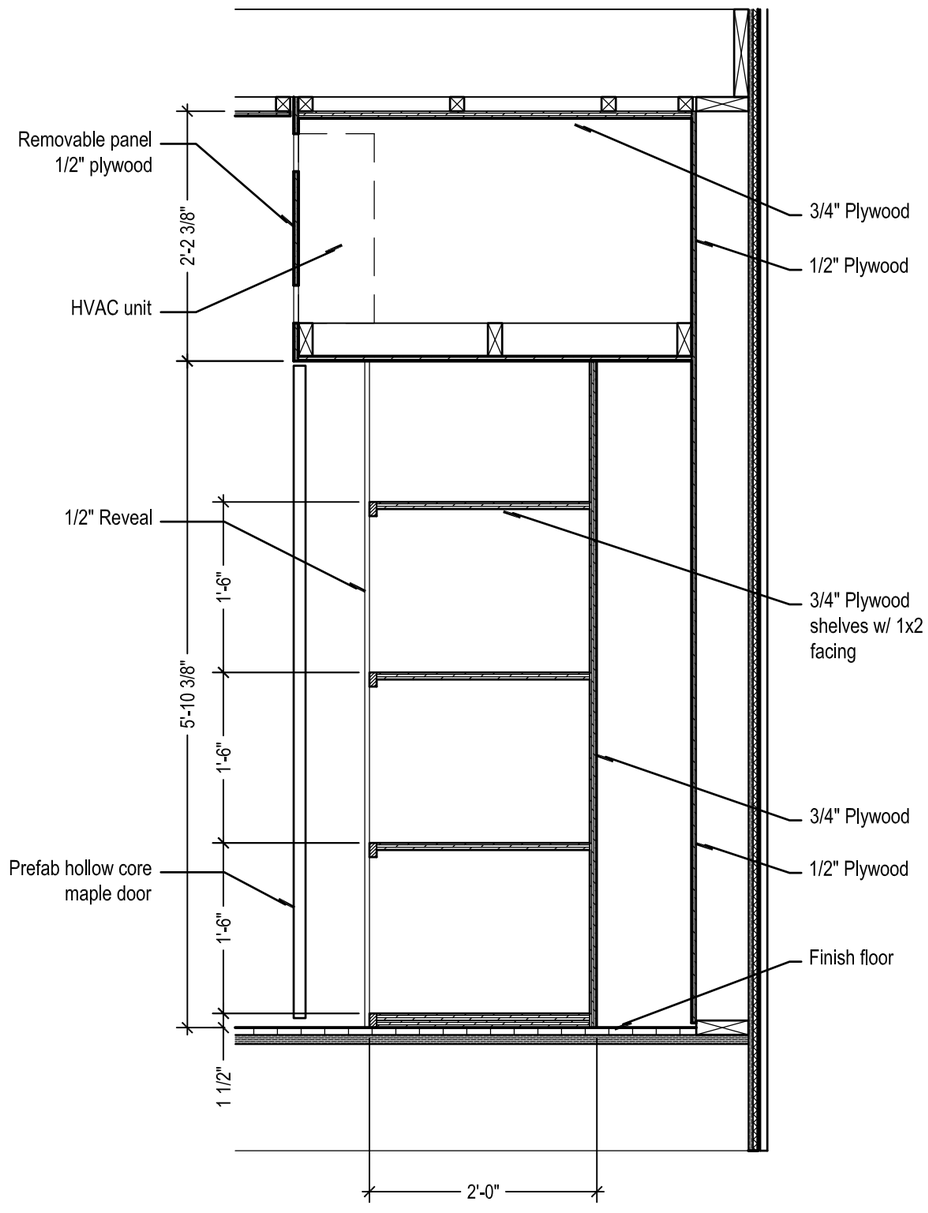


2 **Casework Detail**
Scale: 3/4" = 1'-0"



1 **Casework Detail**
Scale: 3/4" = 1'-0"

notes

specification notes

1. 08 14 16 - Flush Wood Doors
2. 09 64 00 - Wood Flooring
3. 12 35 30 - Residential Casework

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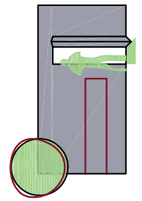

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3 06.02.09

sheet name:
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scale:
as noted

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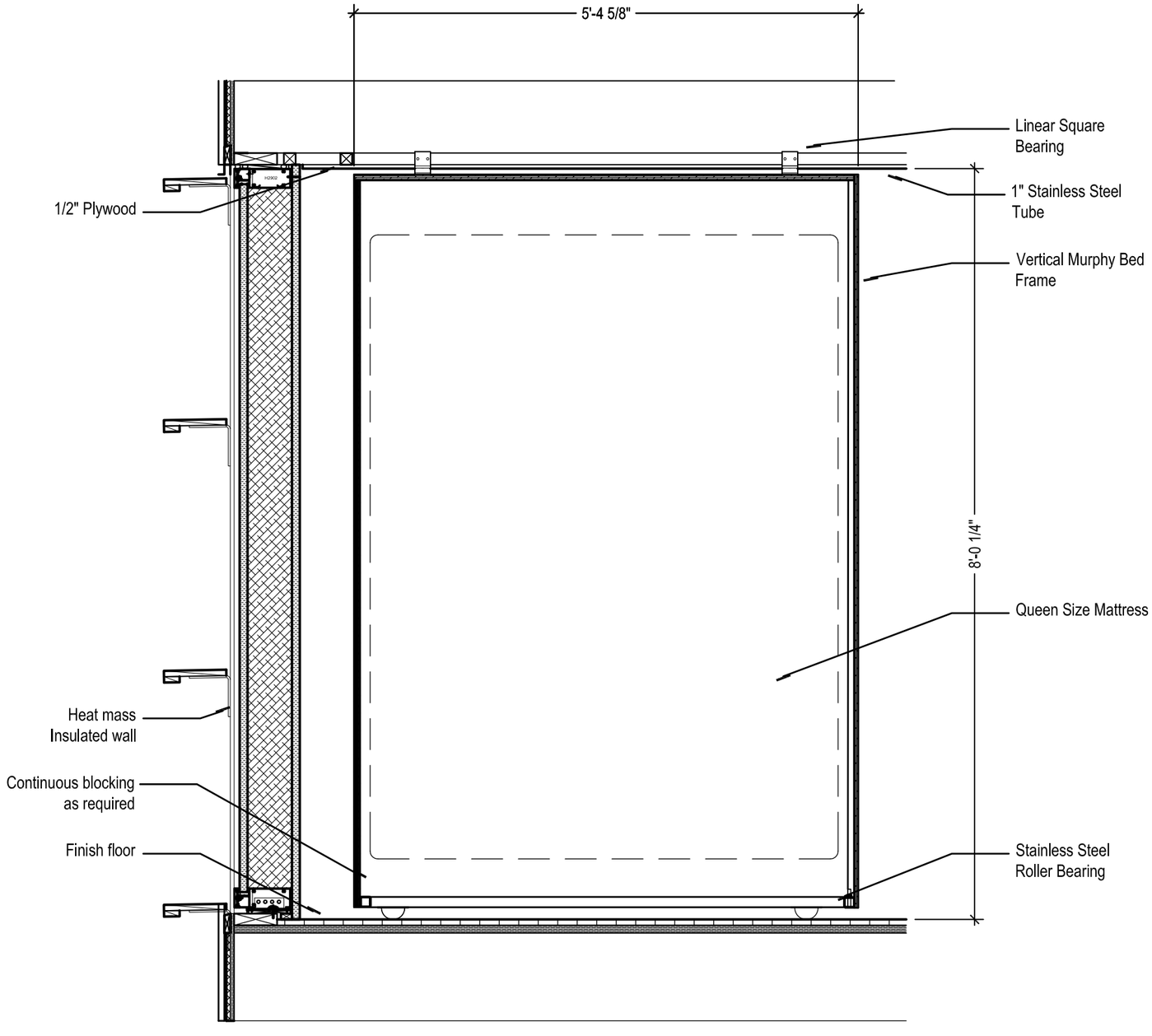
notes



1 Casework Detail @ Bed
Scale: 3/4" = 1'-0"

specification notes

1. 06 20 00 - Finish Carpentry
2. 08 80 00 - Glazing
3. 09 64 00 - Wood Flooring
4. 12 35 30 - Residential Casework

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sheet name:
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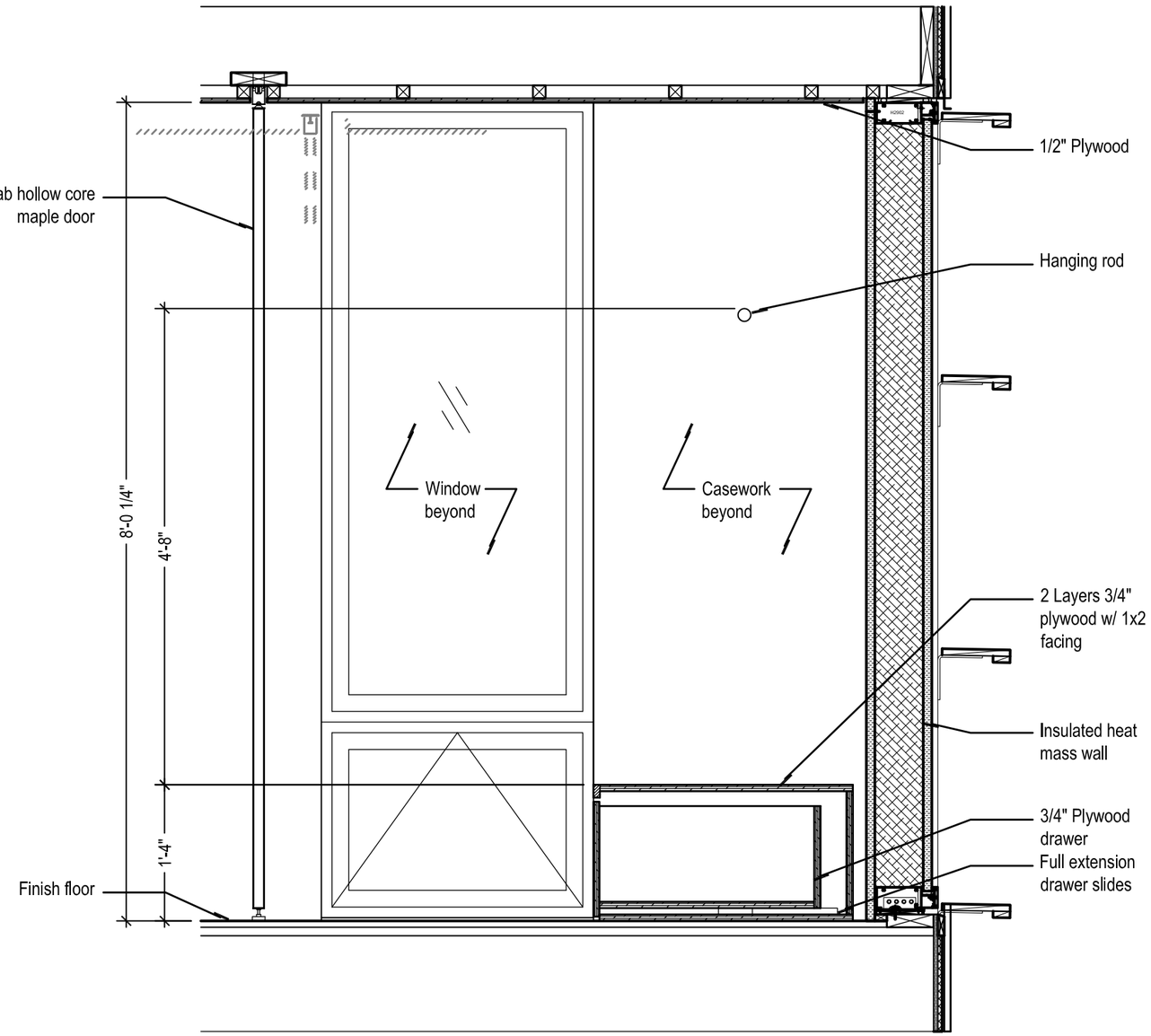
notes



specification notes

1. 08 35 13 - Folding Doors
2. 08 41 13 - Aluminum Framed Entrances and Storefronts
3. 08 52 00 - Wood Windows
4. 09 64 00 - Wood Flooring
5. 12 35 30 - Residential Casework

SOLAR HOUSE I

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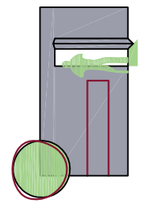

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1. 12.16.08
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sheet name:

Interior Details

scale:

as noted

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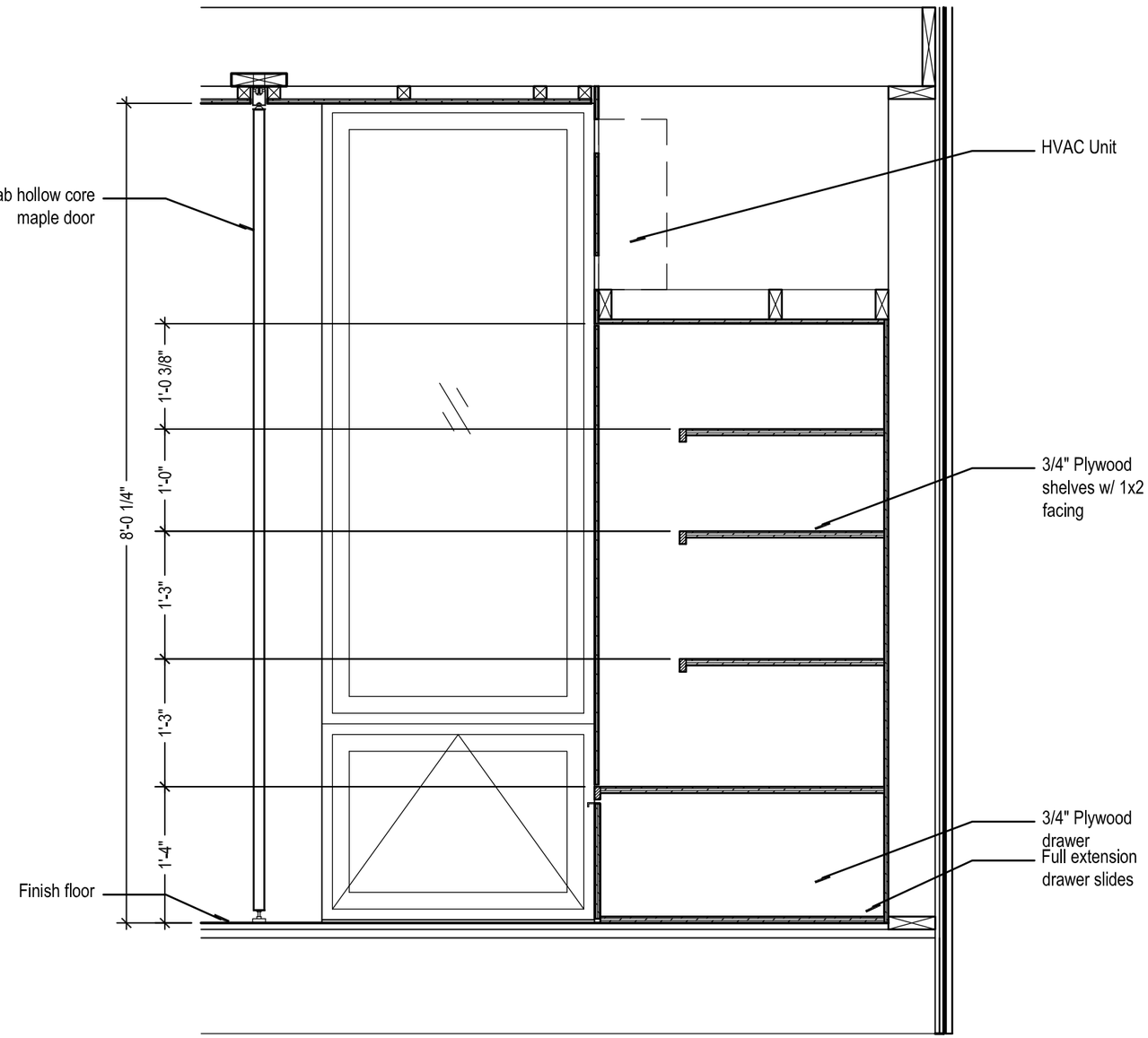
notes



1 **Casework Detail**
Scale: 3/4" = 1'-0"

specification notes

1. 08 35 13 - Folding Wood Doors
2. 08 52 00 - Wood Windows
3. 09 64 00 - Wood Flooring
4. 12 35 30 - Residential Casework

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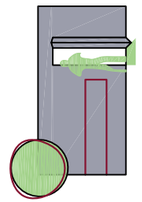

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sheet name:

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scale:

as noted

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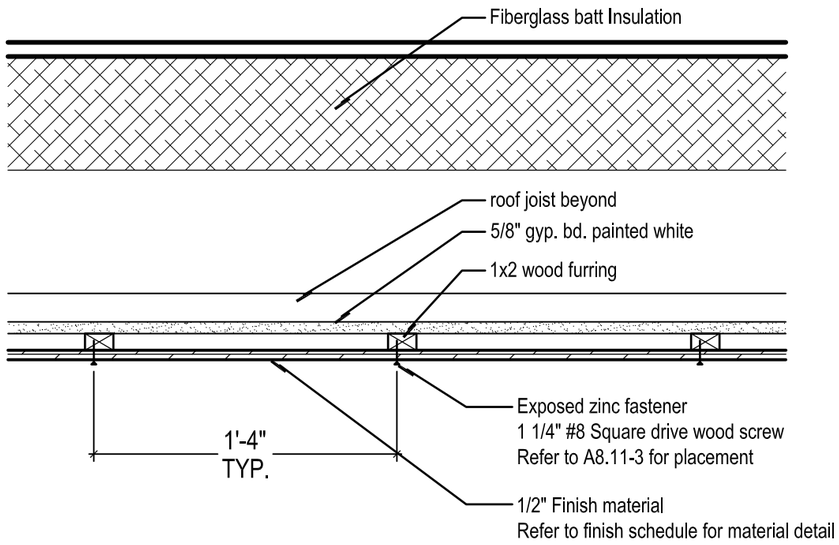
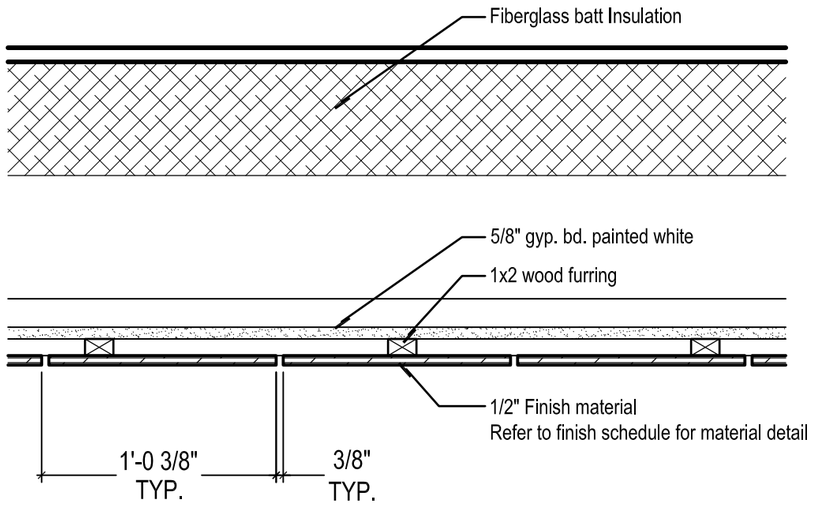


4 **Plywood Ceiling Detail**
Scale: 1 1/2" = 1'-0"

Detail not used

notes



3 **Plywood Ceiling Detail**
Scale: 1 1/2" = 1'-0"

Detail not used

b

a

specification notes

1. 06 20 00 - Finish Carpentry
2. 07 25 00 - Thermal Insulation
3. 09 29 00 - Gypsum Board

2

1

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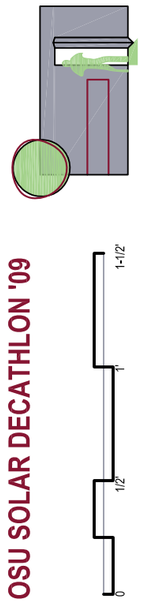

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1 12.16.08
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sheet name:
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scale:
as noted

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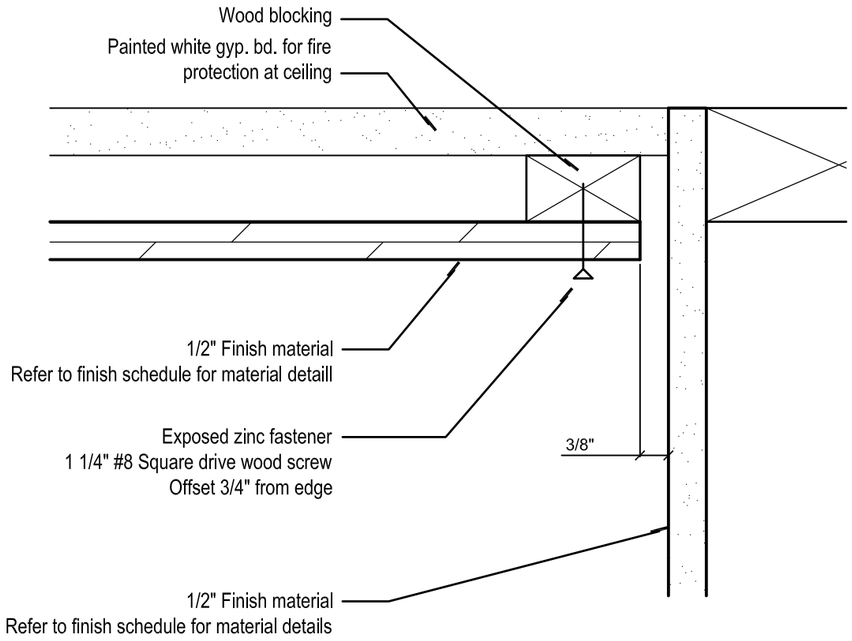
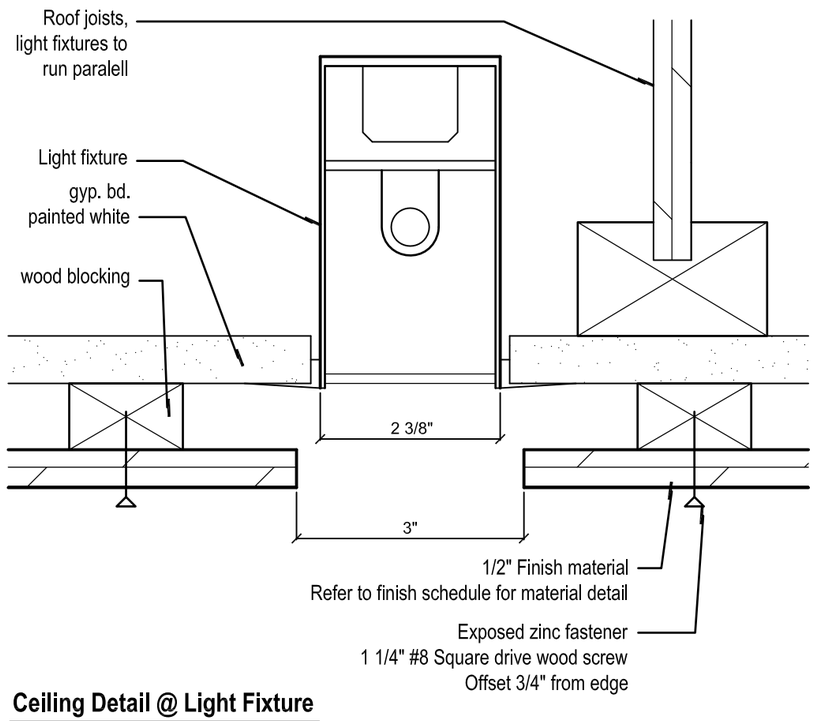
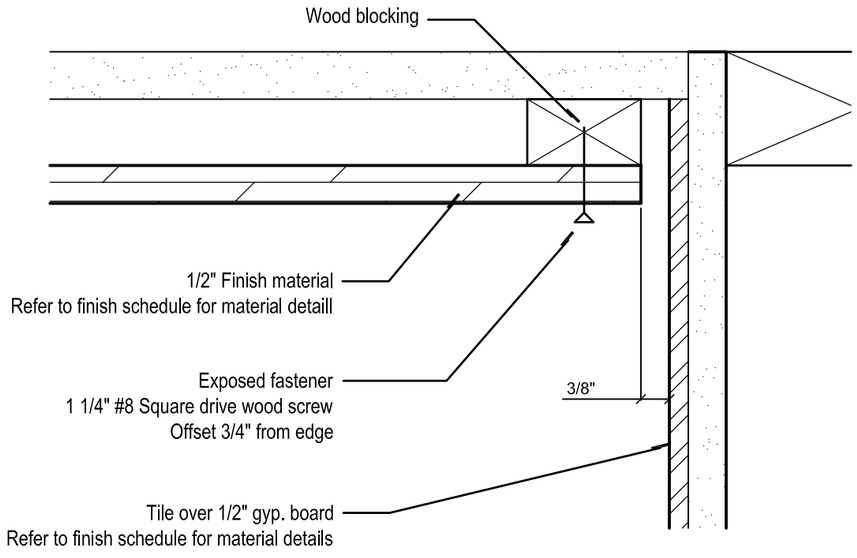


2 Plywood Ceiling Edge Detail
Scale: 6" = 1'-0"



3 Ceiling Detail @ Light Fixture
Scale: 6" = 1'-0"



1 Drywall Ceiling Edge Detail @ bathroom
Scale: 6" = 1'-0"

notes

b

a

specification notes

1. 06 20 00 - Finish Carpentry
2. 07 25 00 - Thermal Insulation
3. 09 29 00 - Gypsum Board

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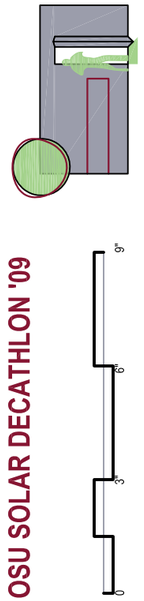

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2009 Solar Decathlon

revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Interior Details

scale:
as noted

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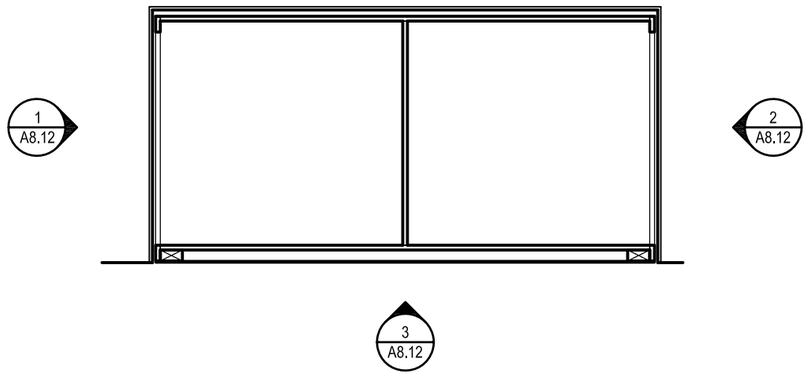
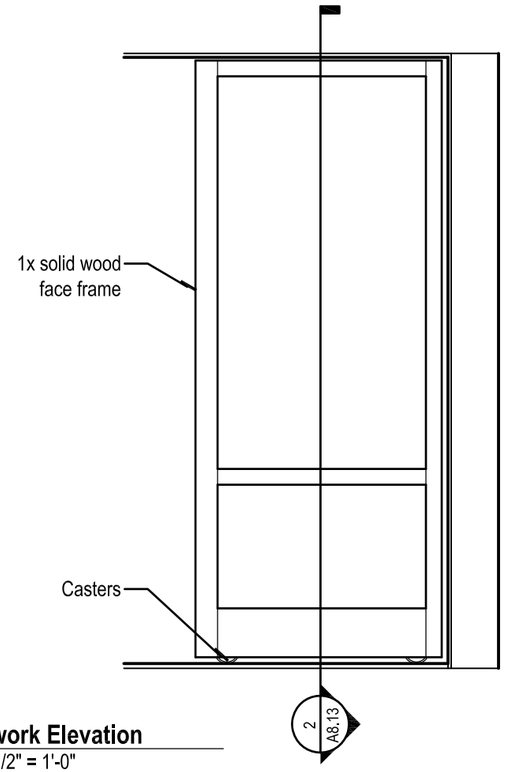
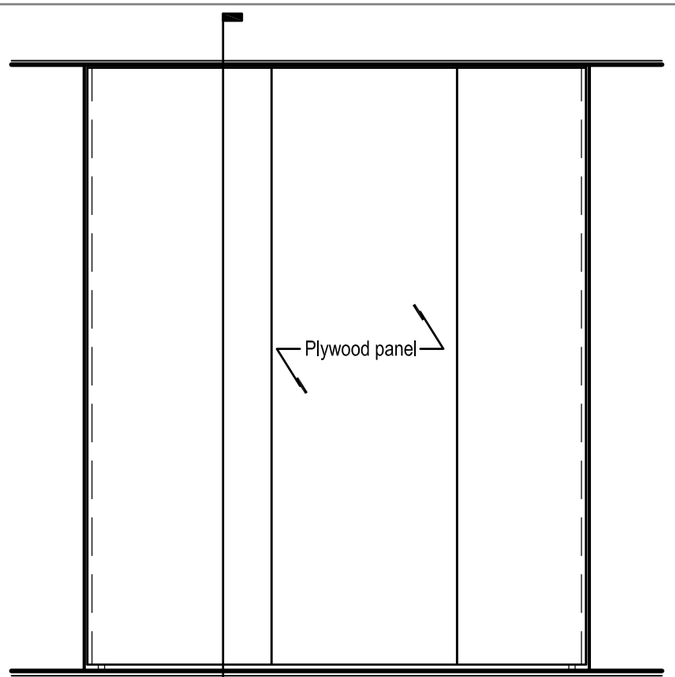


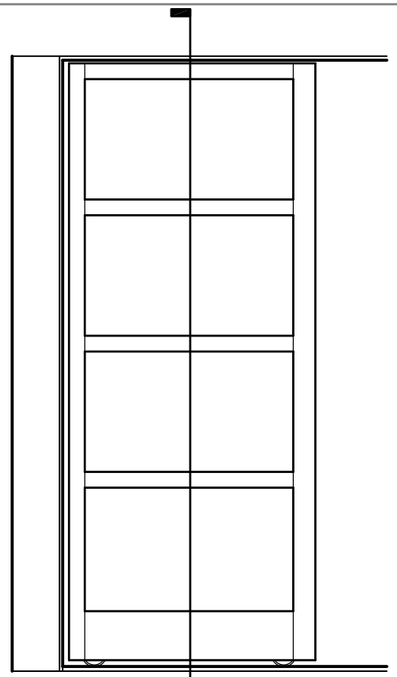
4 Plan Detail
Scale: 1/2" = 1'-0"



2 Casework Elevation
Scale: 1/2" = 1'-0"



3 Casework Elevation
Scale: 1/2" = 1'-0"



1 Casework Elevation
Scale: 1/2" = 1'-0"

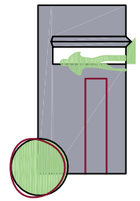
notes

b

a

specification notes

1. 06 20 00 - Finish Carpentry
2. 11 52 00 - Audio Visual Equipment
3. 12 35 30 - Residential Casework



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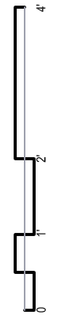

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revisions:

1 12.16.08
2 05.15.09 (engineering)
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sheet name:

Casework Details

scale:

as noted

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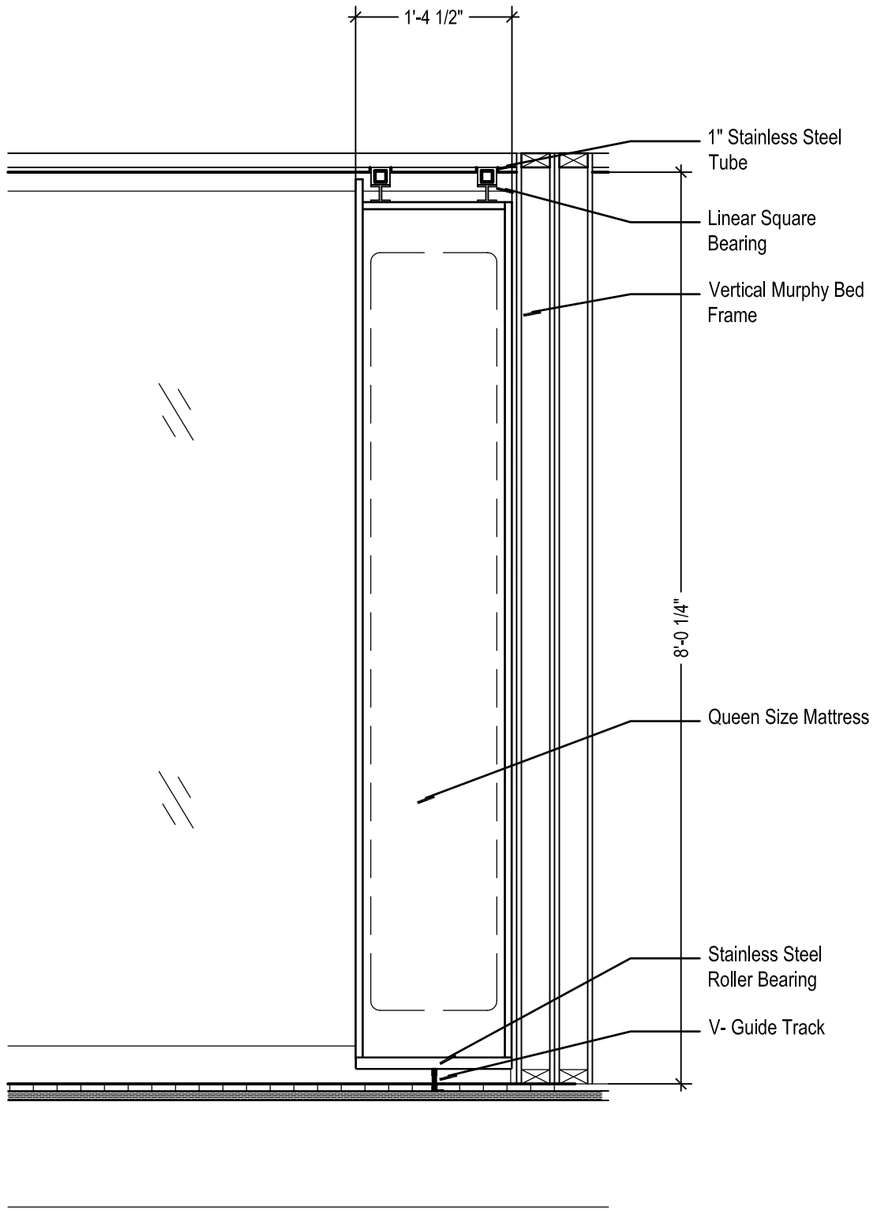
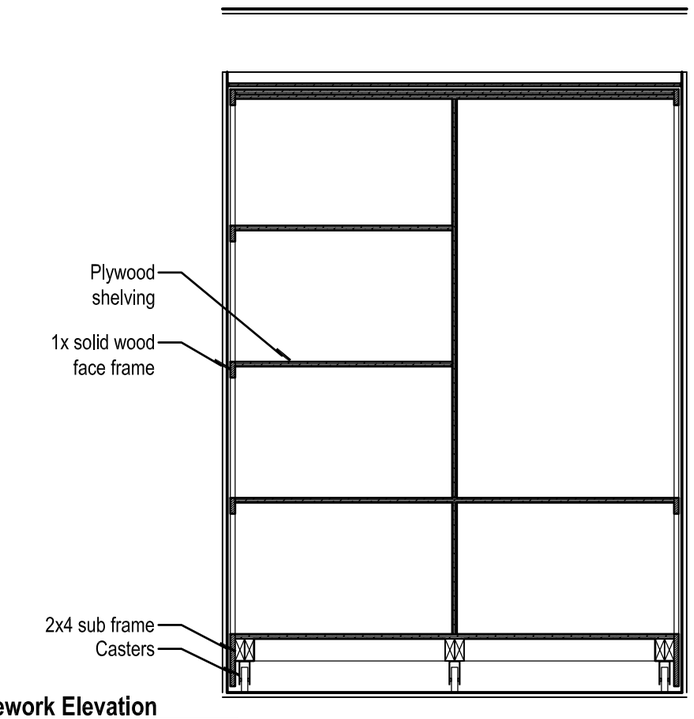
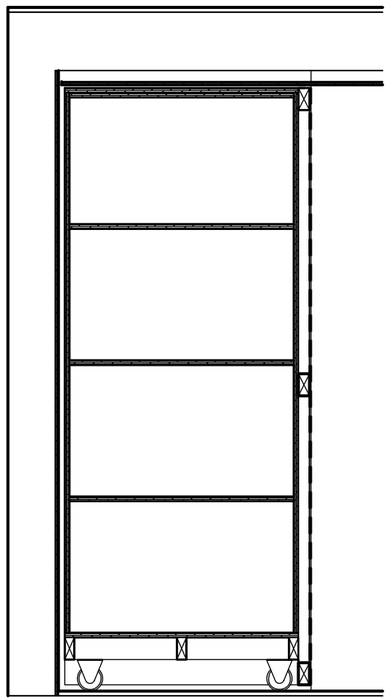


3 **Casework Elevation @ Bed**
Scale: 1/2" = 1'-0"



2 **Casework Elevation**
Scale: 1/2" = 1'-0"



1 **Casework Elevation**
Scale: 1/2" = 1'-0"

notes

specification notes

1. 06 20 00 - Finish Carpentry
2. 11 52 00 - Audio Visual Equipment
3. 12 35 30 - Residential Casework

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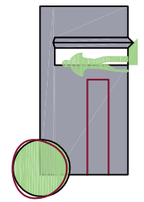

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revisions:

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sheet name:

Casework Details

scale:

as noted

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notes

Window Schedule

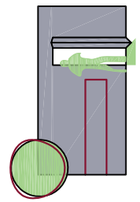
Tag	Description (h x w)	Rough Opening	Glazing	Finish	Quantity	Vent Area	Visible Glass Area	U-Value	SHGC	VLT%	Remarks
A	Pella Designer Series Awning 1'-9" x 1'-9" 2121	1'-9 3/4" x 1'-9 3/4"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		1						All Tempered
B	Pella Designer Series Fixed Awning 1'-9" x 4'-11" 5921	1'-9 3/4" x 4'-11 3/4"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		1						
C	Pella Designer Series Fixed Awning 5'-11" x 2'-11" 3571	5'-11 3/4" x 2'-11 3/4"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		5						3 Tempered
D	Pella Designer Series Awning 1'-9" x 2'-11" 3521	1'-9 3/4" x 2'-11 3/4"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		5						All Tempered
E	Pella Designer Series Fixed Awning 5'-11" x 2'-9" Custom	5'-11 3/4" x 2'-9 3/4"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		2						1 Tempered
F	Pella Designer Series Awning 1'-9" x 2'-9" Custom	1'-9 3/4" x 2'-9 3/4"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		2						All Tempered
G											
H	Aluminum Storefront System 4'-9" x 7'-10" Custom	4'-9" x 7'-10"	Polygal Thermogal 1" Milk - Dual Layer		3						
I	Aluminum Storefront Operable Vent 4'-9" x 1'-10" Custom	4'-9" x 1'-10"	Polygal Thermogal 1" Milk - Single Layer		1						
J	Aluminum Storefront System 4'-8" x 4'-10" Custom	4'-8" x 4'-10"	Polygal Thermogal 1" Milk - Dual Layer		1						

Door Schedule

Tag	Description	Finished Opening	Glazing	Finish	Hardware Set	Vent Area	Visible Glass Area	U-Value	SHGC	VLT%	Remarks
001	-	-	-	-	-	-	-	-	-	-	
002	-	-	-	-	-	-	-	-	-	-	
003	PellaDesigner Series Out-Swing French 5' 11-1/4" x 7' 11-1/2" Active-Inactive 7296	6'-0" x 8'-0"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		3	23.0 s.f.	13.7 s.f.	.26	.21	33	(1) Tempered
004	Blumecraft 1301 SM-1 Display Door	3' 0" x 8' 0"	1/2" Tempered Glass	Etched Glass	4	-	-	-	-	-	Use Channel C-7500
005	Blumecraft 1301 SM-2 Display Sidlight	1' 8" x 8' 0"	1/2" Tempered Glass	Etched Glass	-	-	-	-	-	-	
006	Mechanical Closet Custom Double Door	5' 6-1/4" x 8' 0"	T.B.S.		5	-	-	-	-	-	
007	PellaDesigner Series Out-Swing French 7'-11-1/2" x 2'-9 1/2" Active 3496	8'-0" x 2'-10 1/4"	5/8" Low-E IG w/ argon w/ 3mm Low-E HGP		7						(2) Tempered

specification notes

1. 08 14 16 - Flush Wood Doors
2. 08 32 19 - Wood Framed Glass Doors
3. 08 35 13 - Folding Doors
4. 08 52 00 - Wood Windows
5. 08 80 00 - Glazing



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sheet name:

Door and Window Schedules

scale:

n/a

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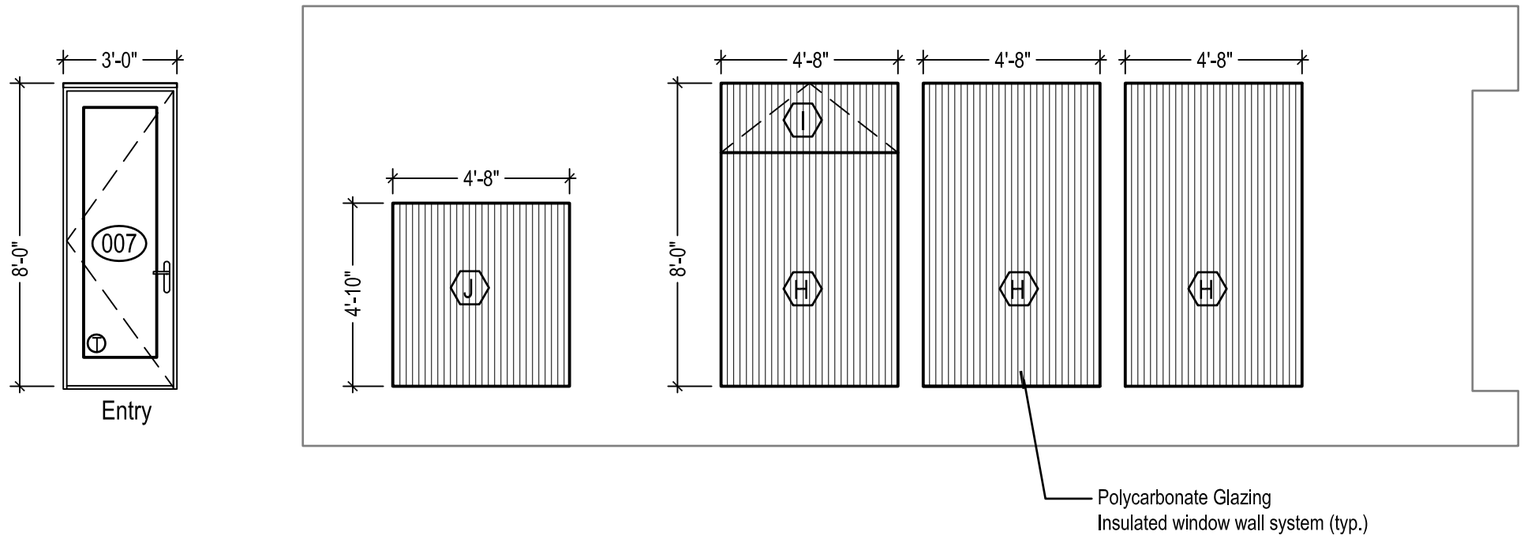
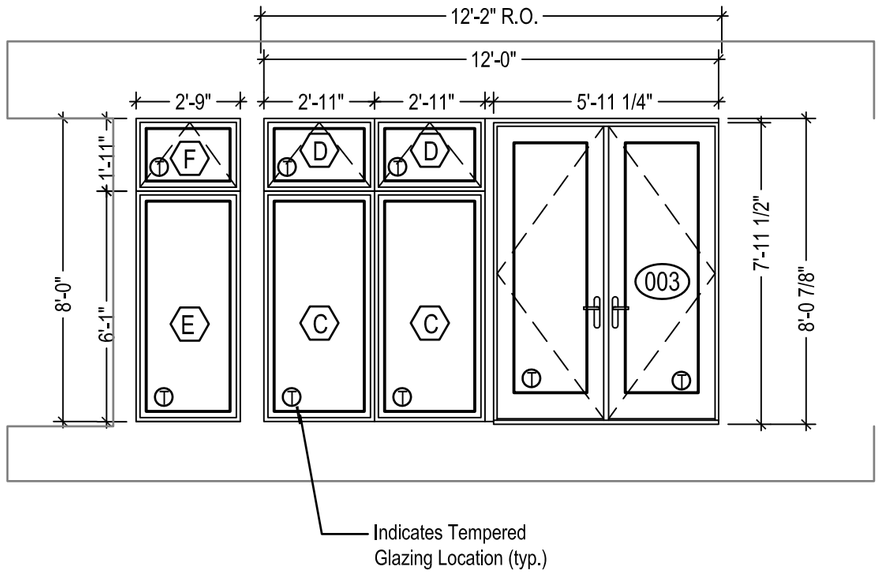


2 South Windows
Scale: 1/4" = 1'-0"



1 East Windows
Scale: 1/4" = 1'-0"

notes

b

a

specification notes

1. 08 14 16 - Flush Wood Doors
2. 08 32 19 - Wood Framed Glass Doors
3. 08 35 13 - Folding Doors
4. 08 41 13 - Aluminum Framed Entrances and Storefronts
5. 08 52 00 - Wood Windows
6. 08 80 00 - Glazing

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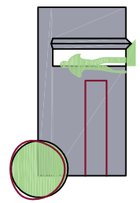

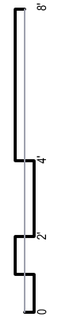

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sheet name:
Door and Window Elevations

scale:
1/4"=1'-0"

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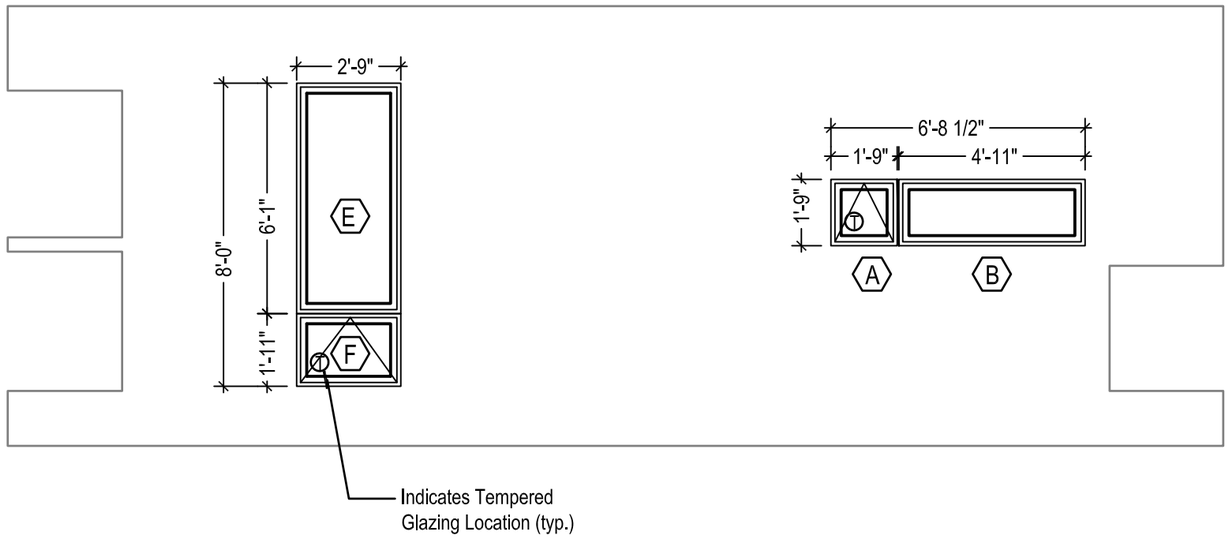
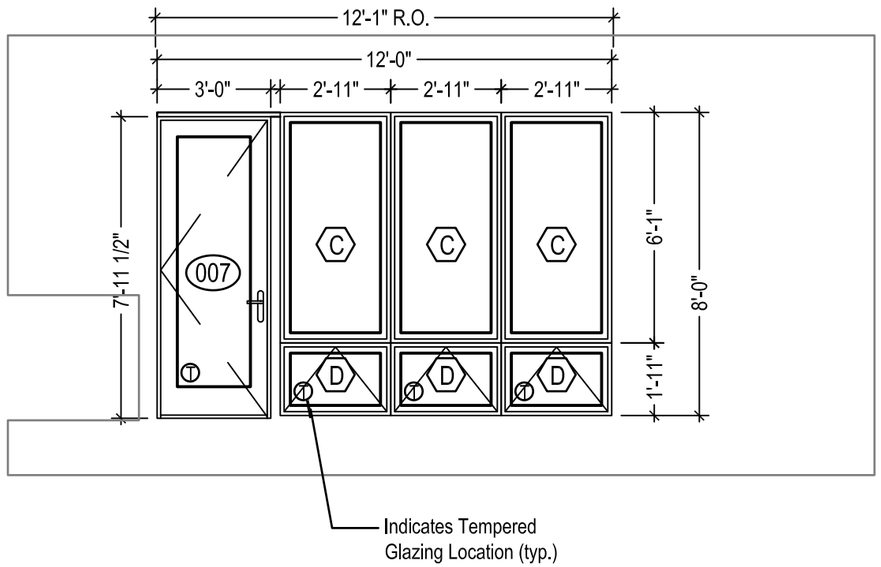


2 **North Windows**
Scale: 1/4" = 1'-0"



1 **West Windows**
Scale: 1/4" = 1'-0"

notes

b

a

specification notes

1. 08 32 19 - Wood Framed Glass Doors
2. 08 52 00 - Wood Windows

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sheet name:

Door and Window Elevations

scale:

1/4"=1'-0"

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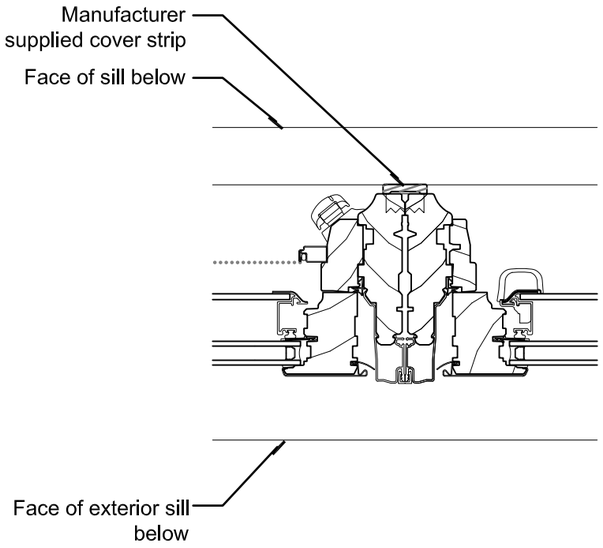
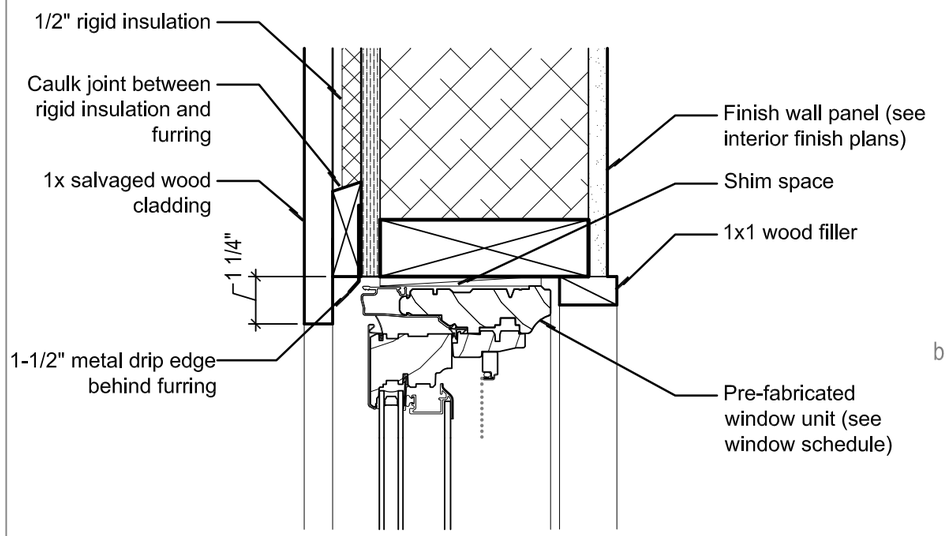
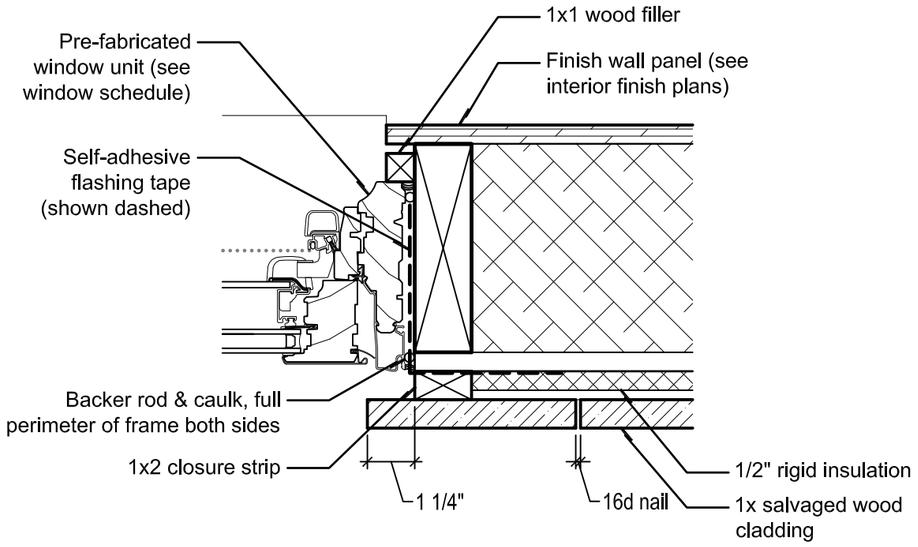


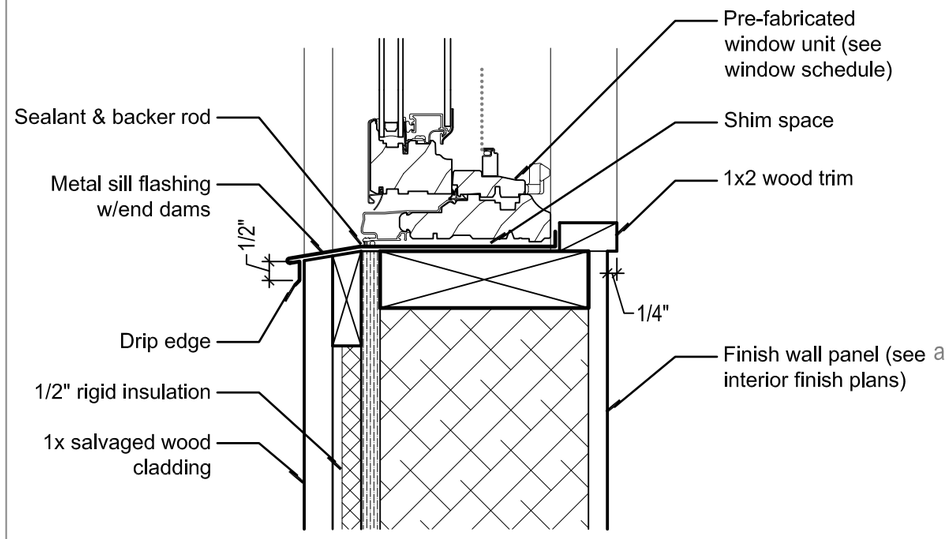
4 Typical Window Joint Detail
Scale: 3" = 1'-0"



2 Kitchen Window Head Detail
Scale: 3" = 1'-0"



3 Typical Window Jamb Detail
Scale: 3" = 1'-0"



1 Kitchen Window Sill Detail
Scale: 3" = 1'-0"

notes

1. All vertical exterior plywood sheathing shall be coated with fluid applied air barrier prior to installation of any rigid insulation, furring, or second skin.
2. All window openings shall receive self adhesive flashing tape prior to window installation.
3. All gaps between window rough opening and window unit shall be filled with low-expanding insulation foam.
4. All window frames shall receive backer rod and caulk, full perimeter of frame on both sides.
5. Exterior face of window frame shall align with exterior face of plywood sheathing, typical unless noted otherwise.

specification notes

1. 08 52 00 - Wood Windows

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sheet name:
Window Details

scale:
as noted

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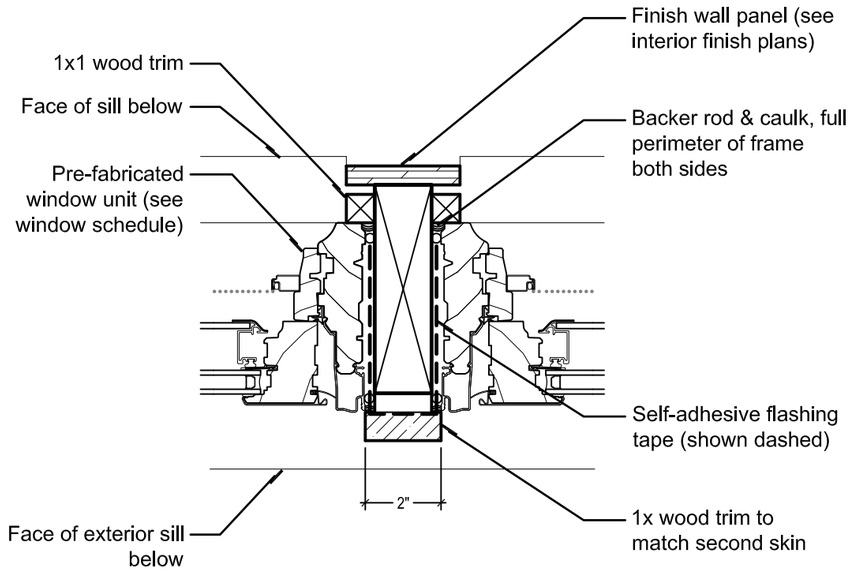
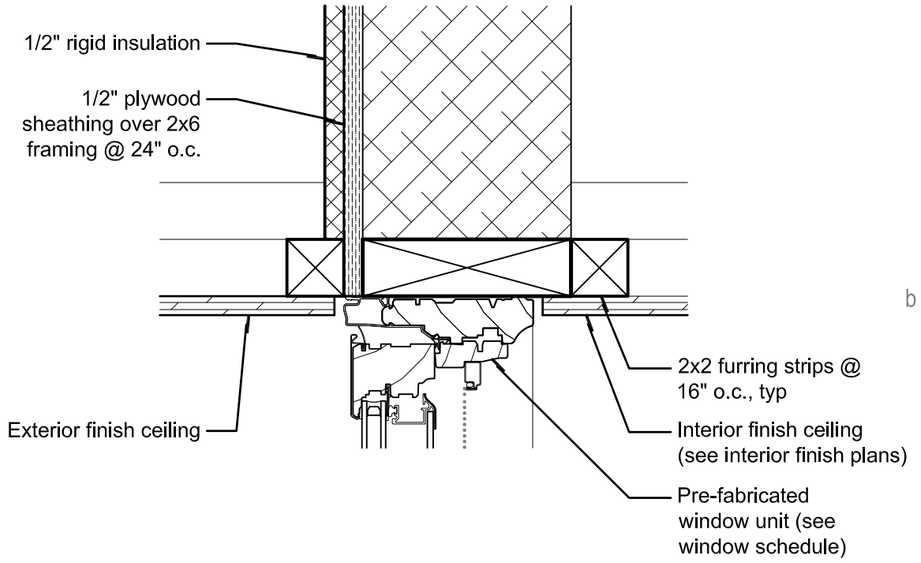


4 Joint Detail
Scale: 3" = 1'-0"

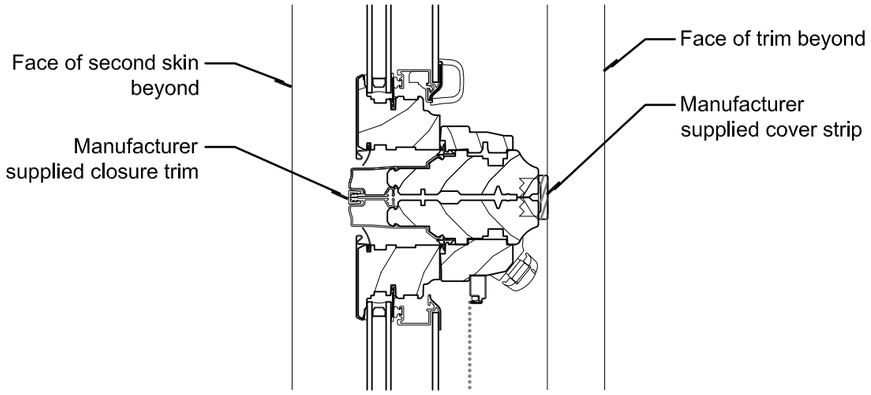


2 Head Detail
Scale: 3" = 1'-0"

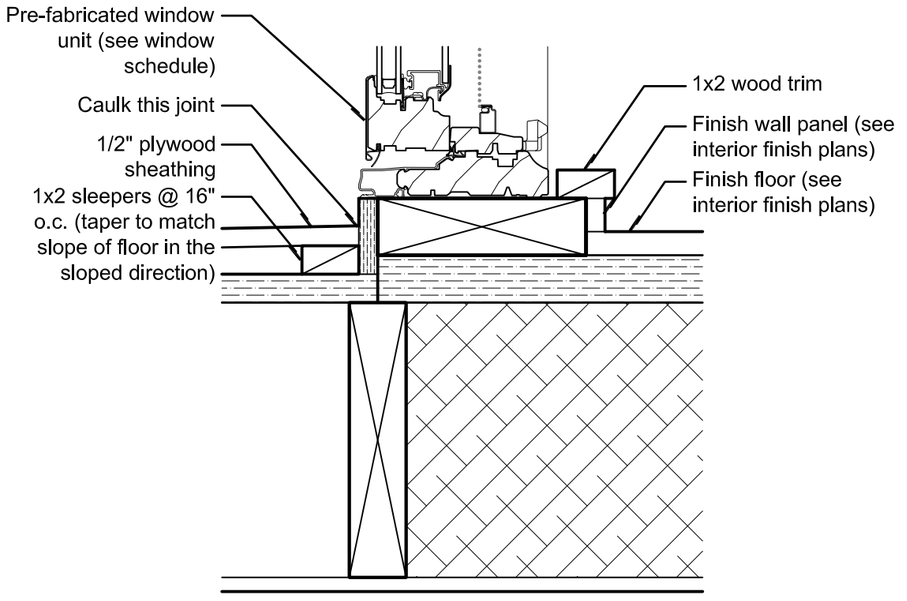
b

notes

1. All vertical exterior plywood sheathing shall be coated with fluid applied air barrier prior to installation of any rigid insulation, furring, or second skin.
2. All window openings shall receive self adhesive flashing tape prior to window installation.
3. All gaps between window rough opening and window unit shall be filled with low-expanding insulation foam.
4. All window frames shall receive backer rod and caulk, full perimeter of frame on both sides.
5. Exterior face of window frame shall align with exterior face of plywood sheathing, typical unless noted otherwise.



3 Horizontal Window Joint Detail
Scale: 3" = 1'-0"



1 Sill Detail
Scale: 3" = 1'-0"

a

specification notes

1. 08 52 00 - Wood Windows

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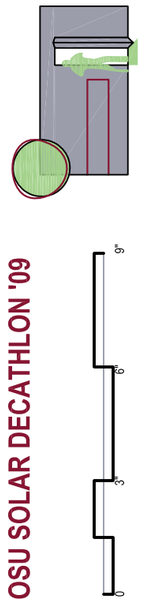

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sheet name:
Window Details

scale:
as noted

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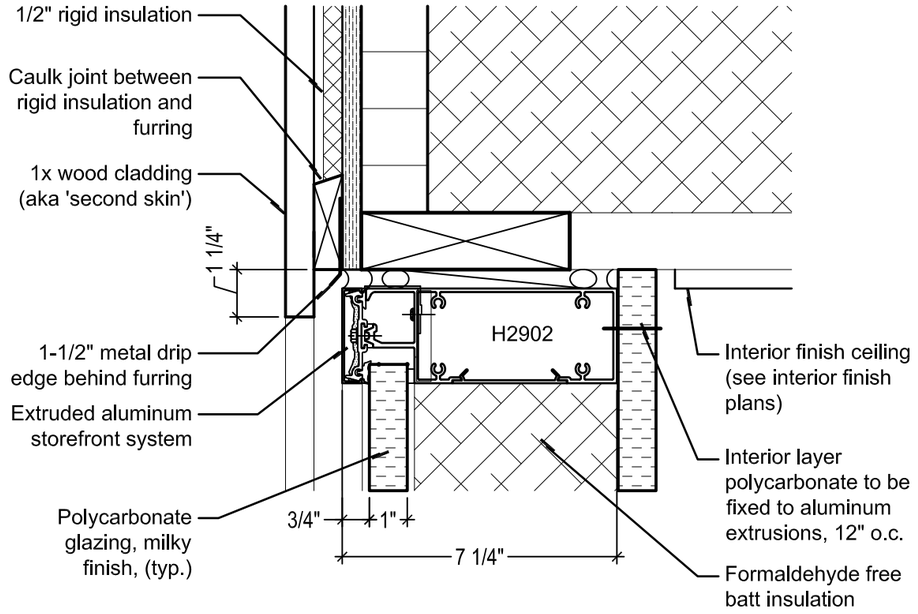
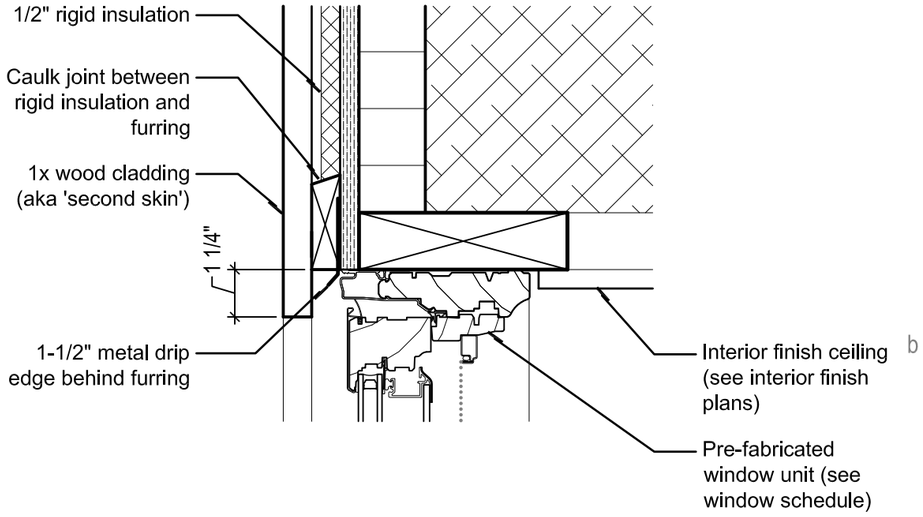
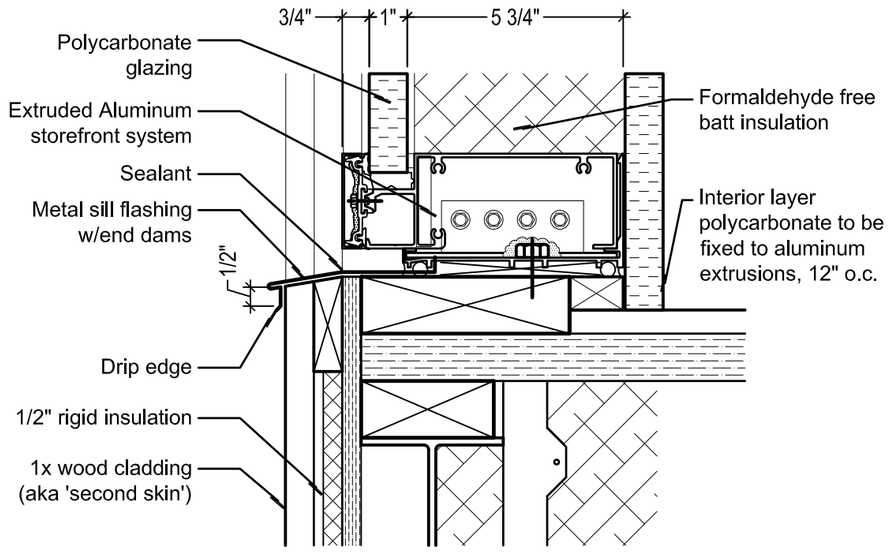


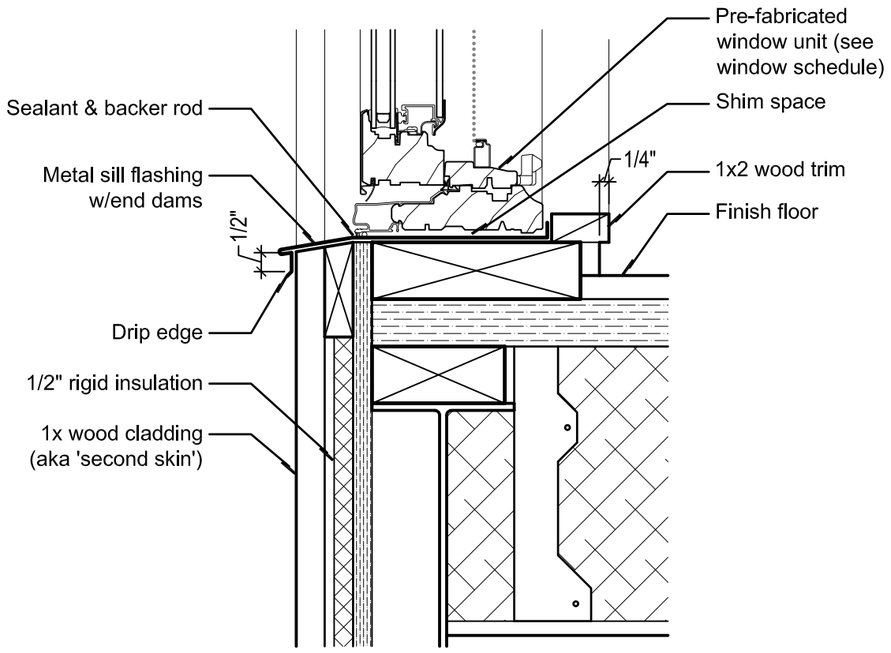
4 Head Detail @ Heat Mass Wall
Scale: 3" = 1'-0"



2 Head Detail
Scale: 3" = 1'-0"



3 Horizontal Window Joint Detail
Scale: 3" = 1'-0"



1 Sill Detail
Scale: 3" = 1'-0"

notes

1. All vertical exterior plywood sheathing shall be coated with fluid applied air barrier prior to installation of any rigid insulation, furring, or second skin.
2. All window openings shall receive self adhesive flashing tape prior to window installation.
3. All gaps between window rough opening and window unit shall be filled with low-expanding insulation foam.
4. All window frames shall receive backer rod and caulk, full perimeter of frame on both sides.
5. Exterior face of window frame shall align with exterior face of plywood sheathing, typical unless noted otherwise.

specification notes

1. 08 41 13 - Aluminum-Framed Entrances and Storefronts
2. 08 52 00 - Wood Windows
3. 08 80 00 - Glazing

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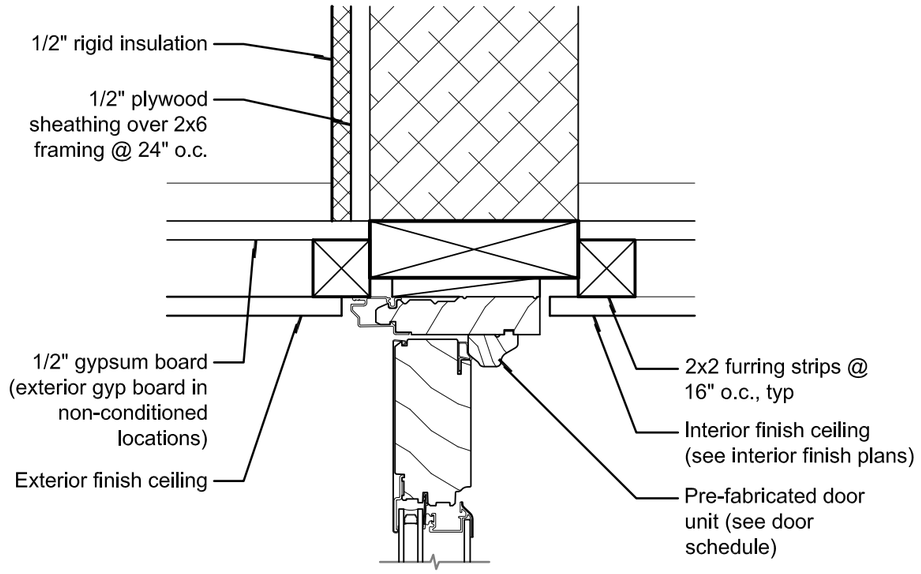
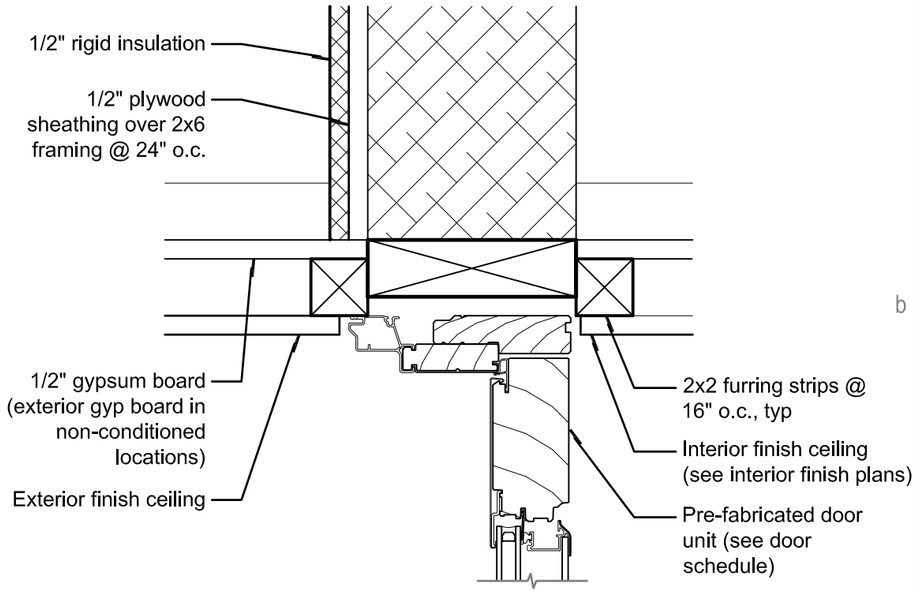
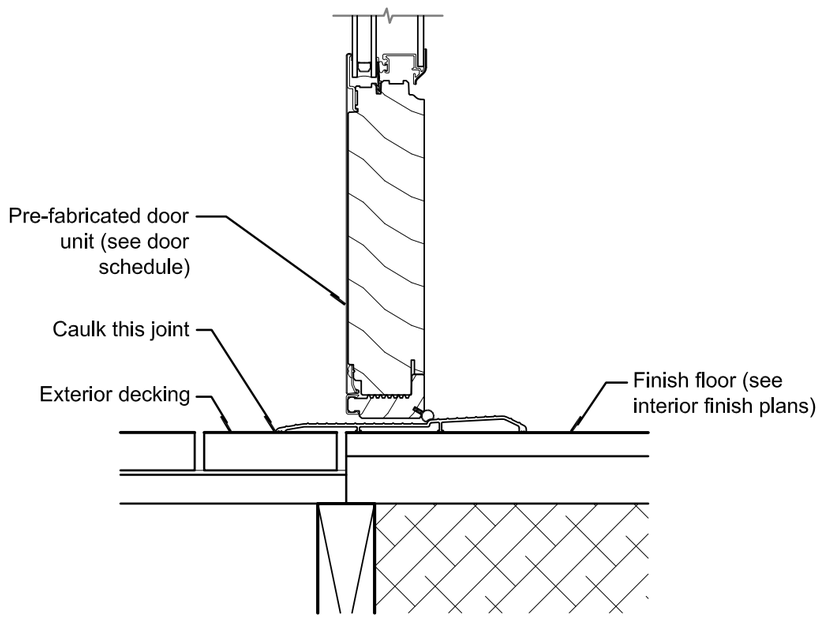


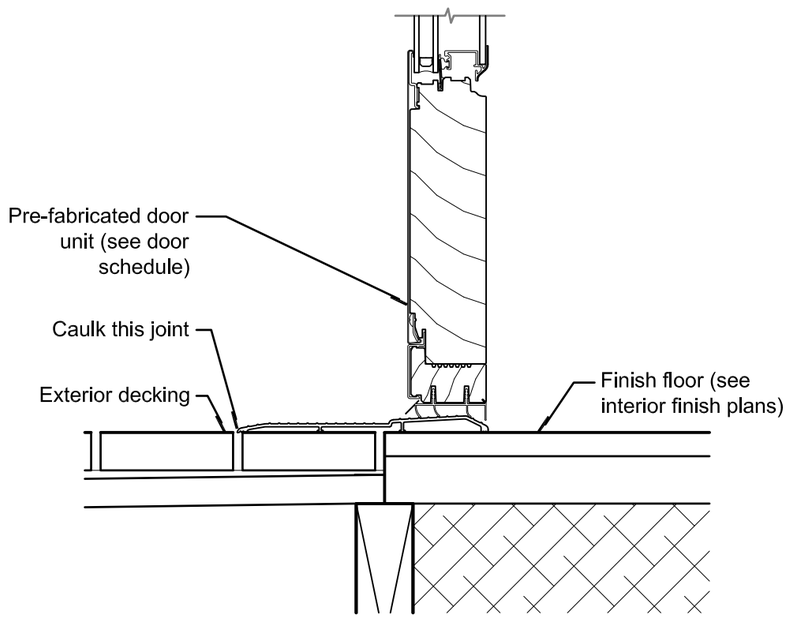
4 Typical Out-Swing Door Head Detail
Scale: 3" = 1'-0"



2 Typical In-Swing Door Head Detail
Scale: 3" = 1'-0"



3 Typical Out-Swing Door Threshold Detail
Scale: 3" = 1'-0"



1 Typical In-Swing Door Threshold Detail
Scale: 3" = 1'-0"

notes

b

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2

1

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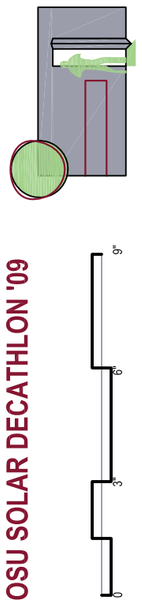

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sheet name:
Door Details

scale:
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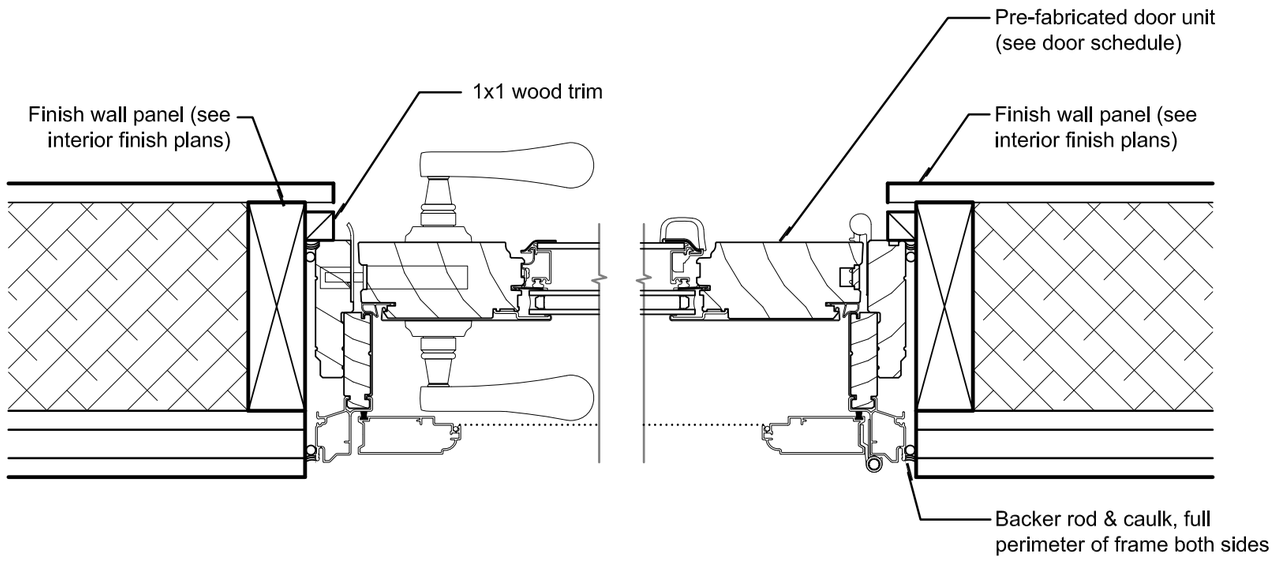
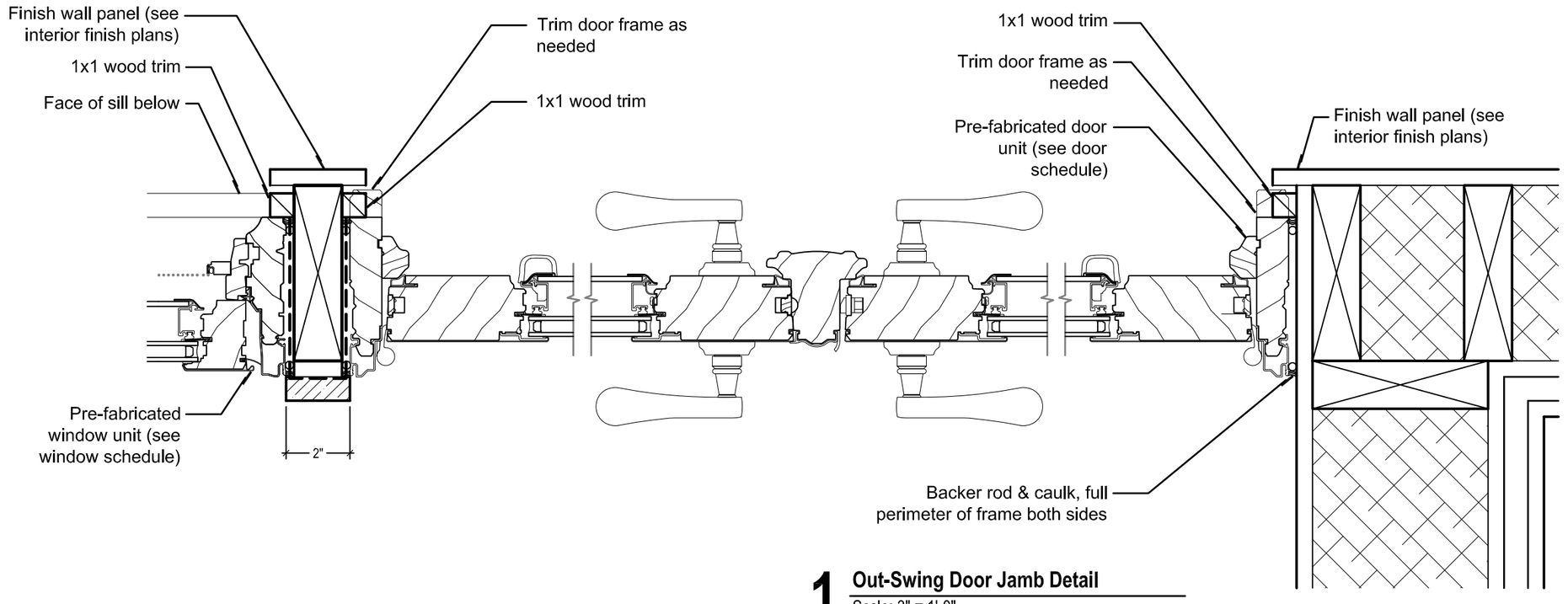


2 In-Swing Door Jamb Detail
Scale: 3" = 1'-0"



1 Out-Swing Door Jamb Detail
Scale: 3" = 1'-0"

notes

b

a

specification notes

1. 08 32 19 - Wood Framed Glass Doors

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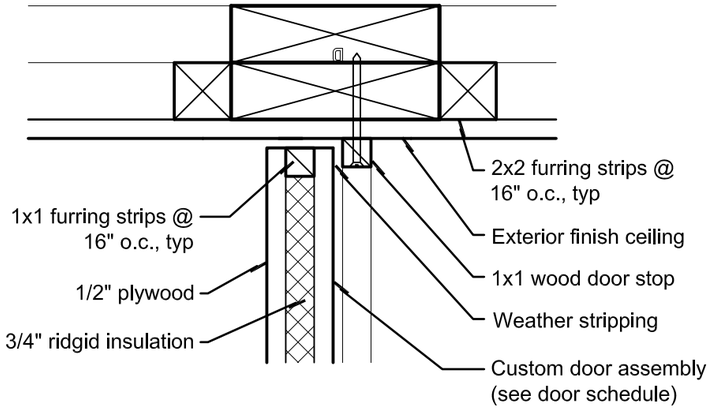
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

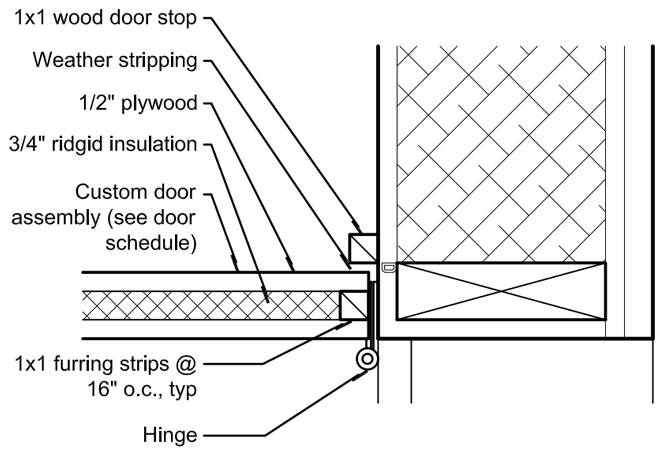
sheet name:
Door Details

scale:
as noted

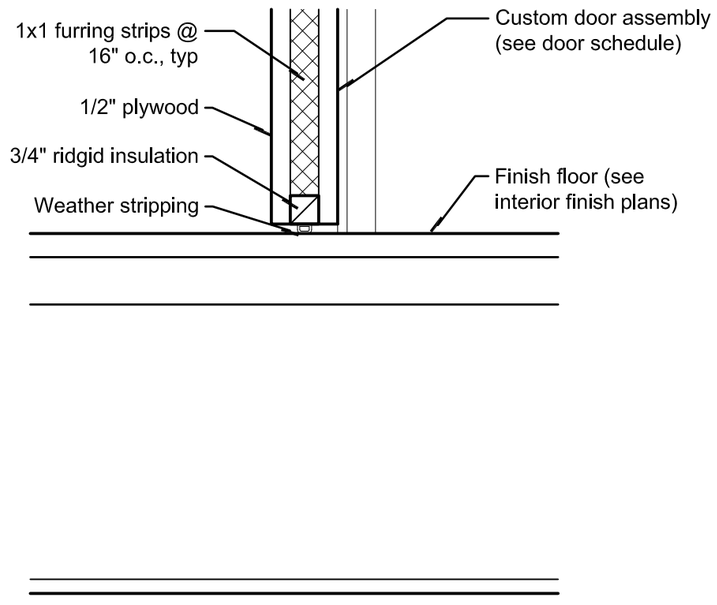
A-608



2 **Mechanical Room Door Head Detail**
Scale: 3" = 1'-0"



3 **Mechanical Room Door Jamb Detail**
Scale: 3" = 1'-0"



1 **Mechanical Room Door Threshold Detail**
Scale: 3" = 1'-0"

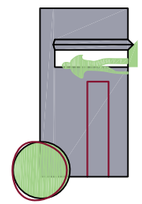
notes

b

a

specification notes

1. 08 14 16 - Flush Wood Doors



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

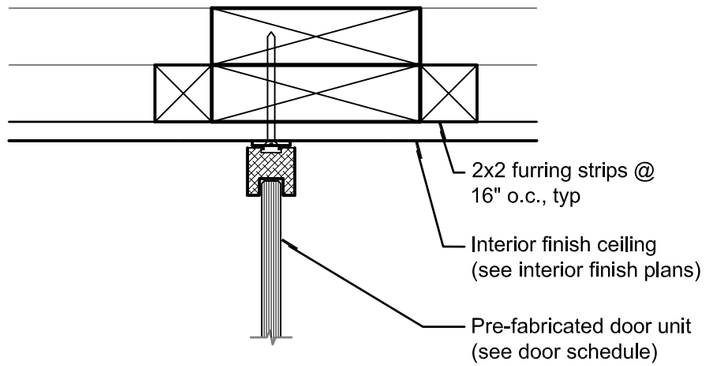
sheet name:

Door Details

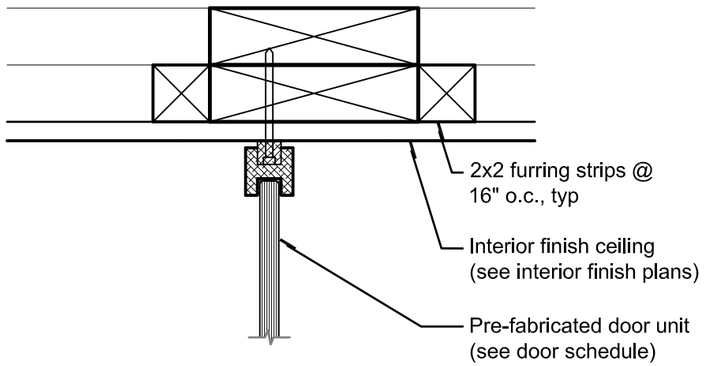
scale:

as noted

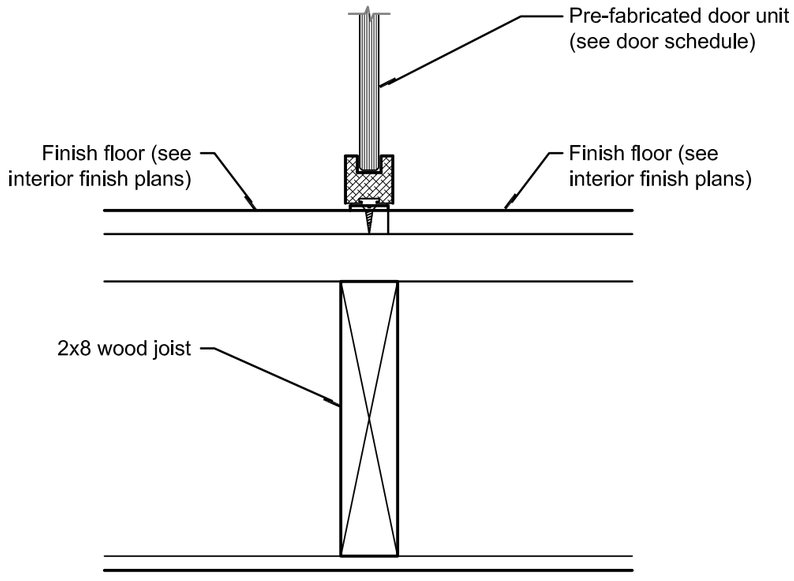
A-609



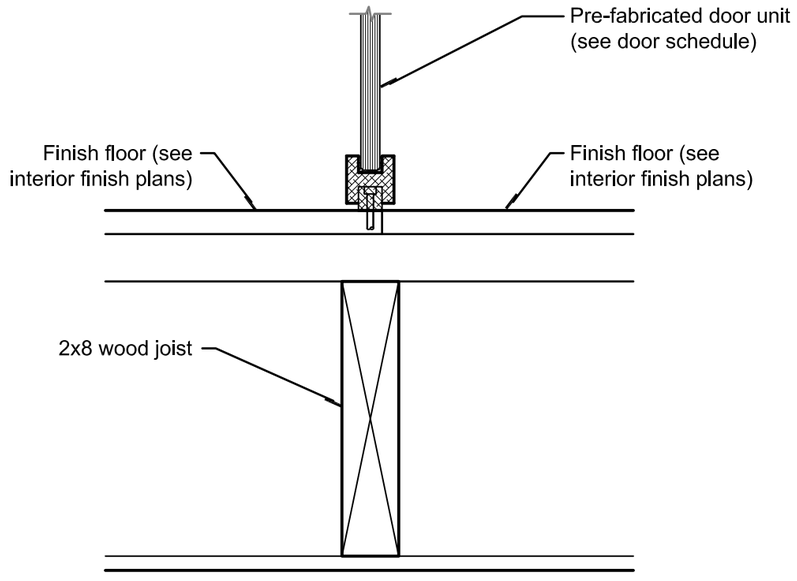
4 **Bathroom Door Head Detail**
Scale: 3" = 1'-0"



2 **Bathroom Sidelight Head Detail**
Scale: 3" = 1'-0"



3 **Bathroom Door Threshold Detail**
Scale: 3" = 1'-0"



1 **Bathroom Sidelight Threshold Detail**
Scale: 3" = 1'-0"

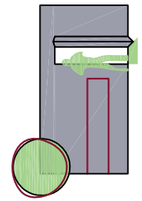
notes

b

a

specification notes

1. 08 32 19 - Wood Framed Glass Doors



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1 12.16.08
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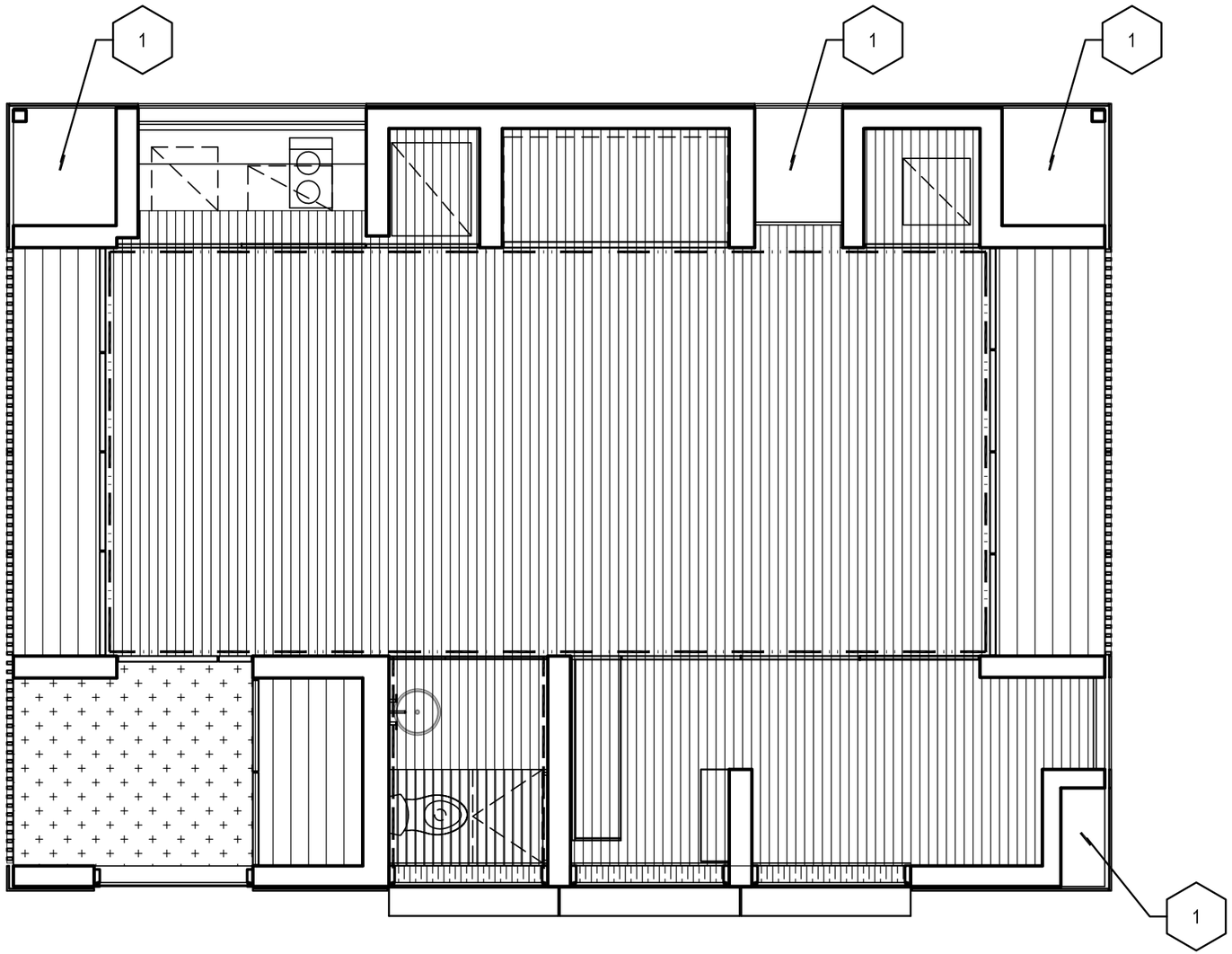
sheet name:

Door Details

scale:

as noted

A-610



notes

1. See C series drawings for continuation of exterior decks.
2. Wood flooring is nail-down installation. In areas where nails will interfere with radiant tubes, nails are to be omitted. Omission not to occur more than every fourth board.
3. All walls & ceilings PT-2 U.N.O.

key notes

1. All exposed wood surfaces to be PT-4. See wall sections for additional information.

material key - see finish schedule for additional information

WD-1: Wood Shower Floor

HW-1: Hardwood flooring

D-1: Exterior decking

CPT-1: Walkoff mat

PT-1

PT-3

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3 06.02.09

sheet name:

Interior Finish Plan

scale:

1/4"=1'-0"

A-701

notes

Finish Schedule

Tag	Manufacturer	Description	Model #	Color	Remarks
CPT-1	Colonial Mills	Earthtone Collection		Jute Braided	1
CT-1	Hamilton Parker	Ceramic Subway Tile	U081	White Ice Bright	1
D-1	Requarth Lumber Co.	Weather Resistant Lumber			1
HW-1	Lumber Liquidators	Rustic Oak	OA4U	OA4U	1
WD-1	Lumber Liquidators	Rustic Oak	OA4U	OA4U	1
PT-1	Sherwin Williams	Duration Home / Glaze	Pure White	SW7005	1
PT-2	Sherwin Williams	Duration Home - Matte	Pure White	SW7005	1
PT-3	Sherwin Williams	Duration Home - Semi	Pure White	SW7005	1
PT-4	Sherwin Williams	Resilience - Exterior Latex	Pure White	SW7005	1
WD-1		Maple			1,2
WD-2		Oak			1,2

Remarks

1. Refer to finish floor plan for more information
2. Refer to elevations for more information.

specification notes

1. 06 20 22 - Finish Carpentry
2. 09 91 00 - Painting

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

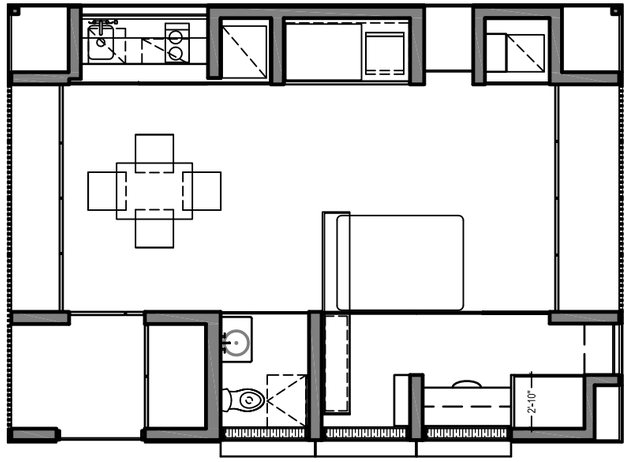
sheet name:

Finish Schedule

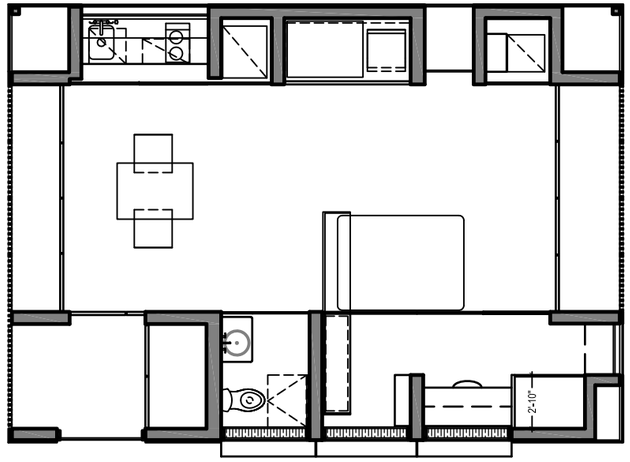
scale:

n/a

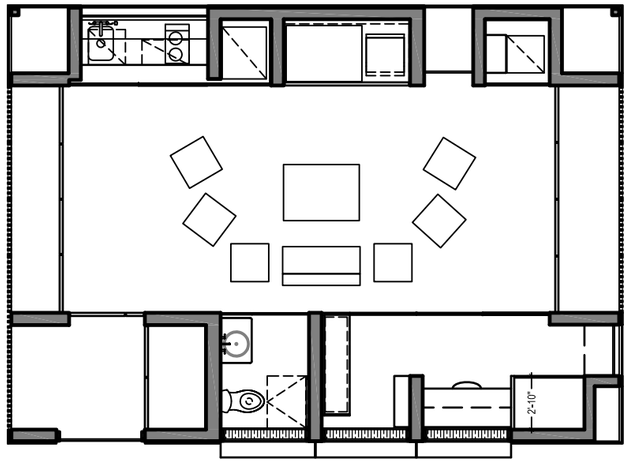
A-702



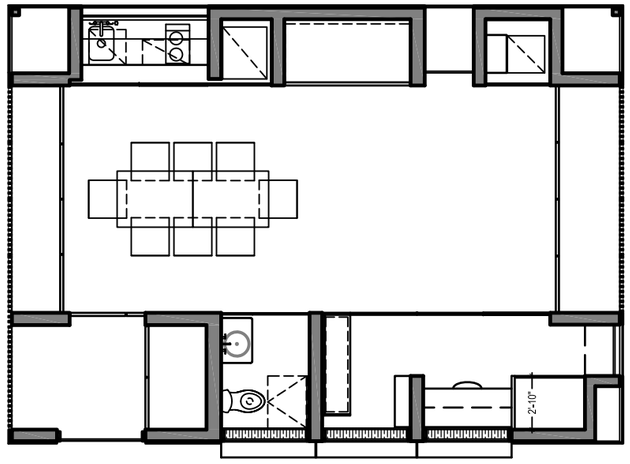
4 Informal Entertaining
Scale: 1/8" = 1'-0"



2 Daily Routine
Scale: 1/8" = 1'-0"



3 Formal Entertaining
Scale: 1/8" = 1'-0"



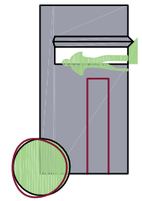
1 Dining Plan
Scale: 1/8" = 1'-0"

b

a

notes

1. See S1.04 Wall Framing Plan for additional wall stud dimensions.
2. Dimensions are given from outside of finish surface to outside of finish surface.
3. Verify any dimensions shown here with respective enlarged plans and details called out on sheet A1.01.



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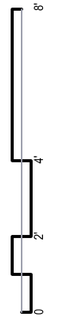

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revisions:
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sheet name:
Interior Furnishings Plan

scale:
1/4"=1'-0"

I-101

north

2

1

notes

1. All supply piping is to be pex tubing. All waste piping and venting is to be schedule 40 PVC.

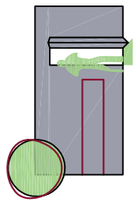
Plumbing System

Plumbing Equipment / Fixture Schedule

Tag	Manufacturer	Description	Model #
HW-1	Rotex	80 gal. Hot Water Tank	Mini
ST-1	Go-To Tanks	500 gal. Potable Water Pillow Tank	950-250510
WT-1	Go-To Tanks	500 gal. Waste Water Pillow Tank	950-250500
P-1	Grundfos	1 hp Pressure Booster Pump	MQ3-45-115V
SP-1	Grundfos	Solar Pump	115v - 1.1amp
SK-1	Kohler	Undertone Stainless Undercounter	K-3334
SK-2	Kohler	Inscribe Wading Pool Lavatory	K-2388
DW-1	Kitchenaid	Single Drawer Dishwasher	KUDD03ST
W-1	Whirpool	Washing Machine Frontload	WFC7500V
T-1	Kohler	Dual Flush Toilet	K-3654
F-1	Kohler	Kitchen Faucet	K-6227
F-2	Kohler	Wall-Mount Bathroom Faucet	K-T14412
SH-1	Kohler	Showerhead	K-995
TV-1	Kohler	Thermo valve	K-680-KS

Symbol Legend

Symbol	Description
	Shut-Off Valve
	Plumbing Drop
	Plumbing Rise
	Connection at Trailers
C/O	Clean-Out location



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

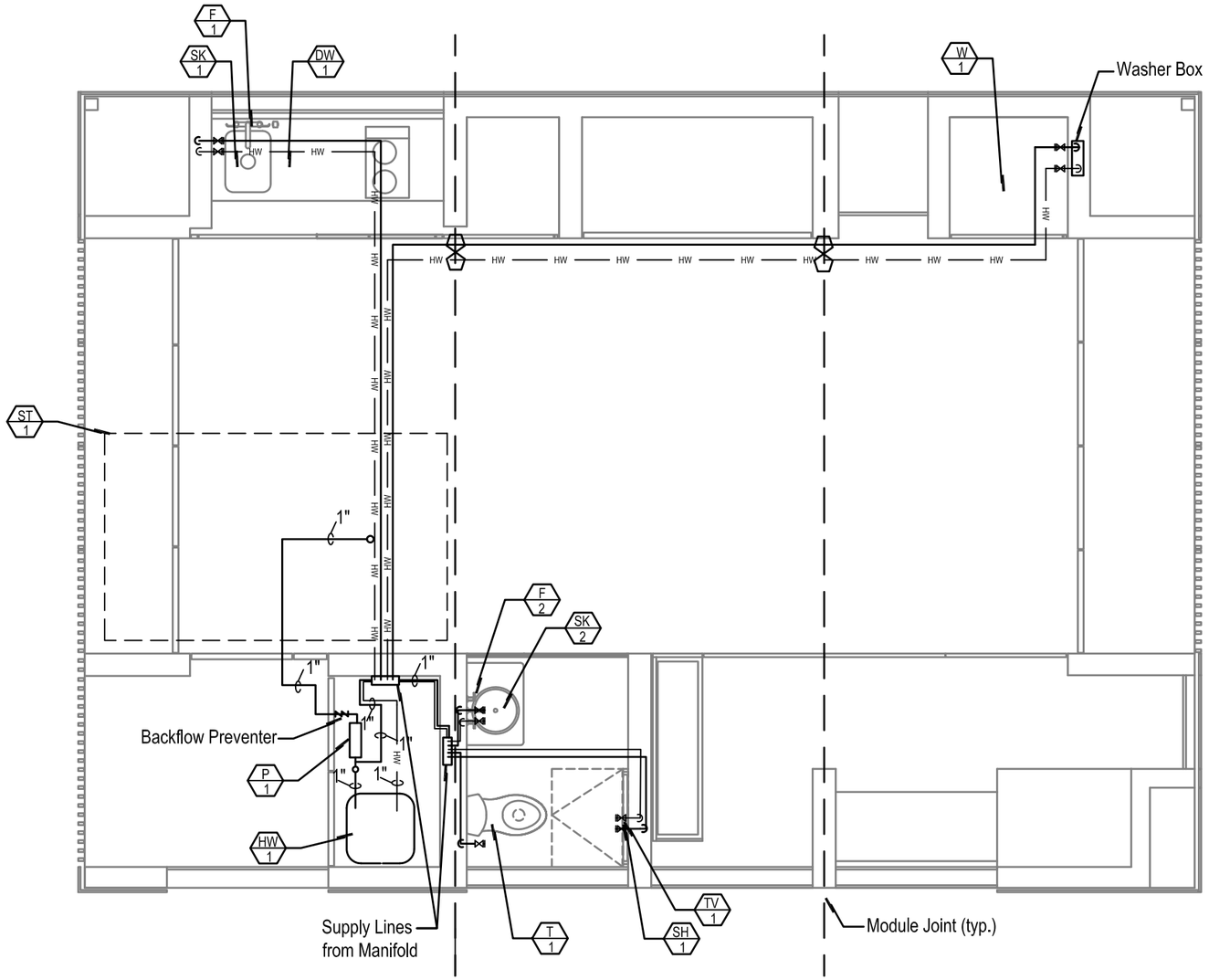
sheet name:

Plumbing System

scale:

n/a

P-001



notes

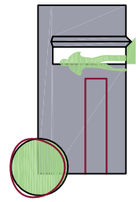
1. All supply piping is 1/2" pex unless noted otherwise.
2. All supply piping shown in plan is routed in the ceiling.
3. Secure piping every 24" to joists with plastic clips.
4. All PEX tubing shall not bend in a radius less than manufacturer's recommended bending radius.
5. Supply Tank mounted below house.
6. At joints between modules, join the piping with removable compression union fittings on either side of the joint.

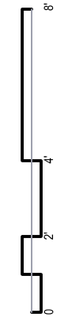
specification notes

1. 22 05 00 - Common Work Results for Plumbing
2. 22 05 23 - General Duty Valves for Plumbing Piping
4. 22 11 16 - Domestic Water Piping
5. 22 11 19 - Plumbing Specialties
6. 22 11 23 - Domestic Water Pumps

SOLAR HOUSE I

OSU SOLAR DECATHLON '09





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1 12.16.08
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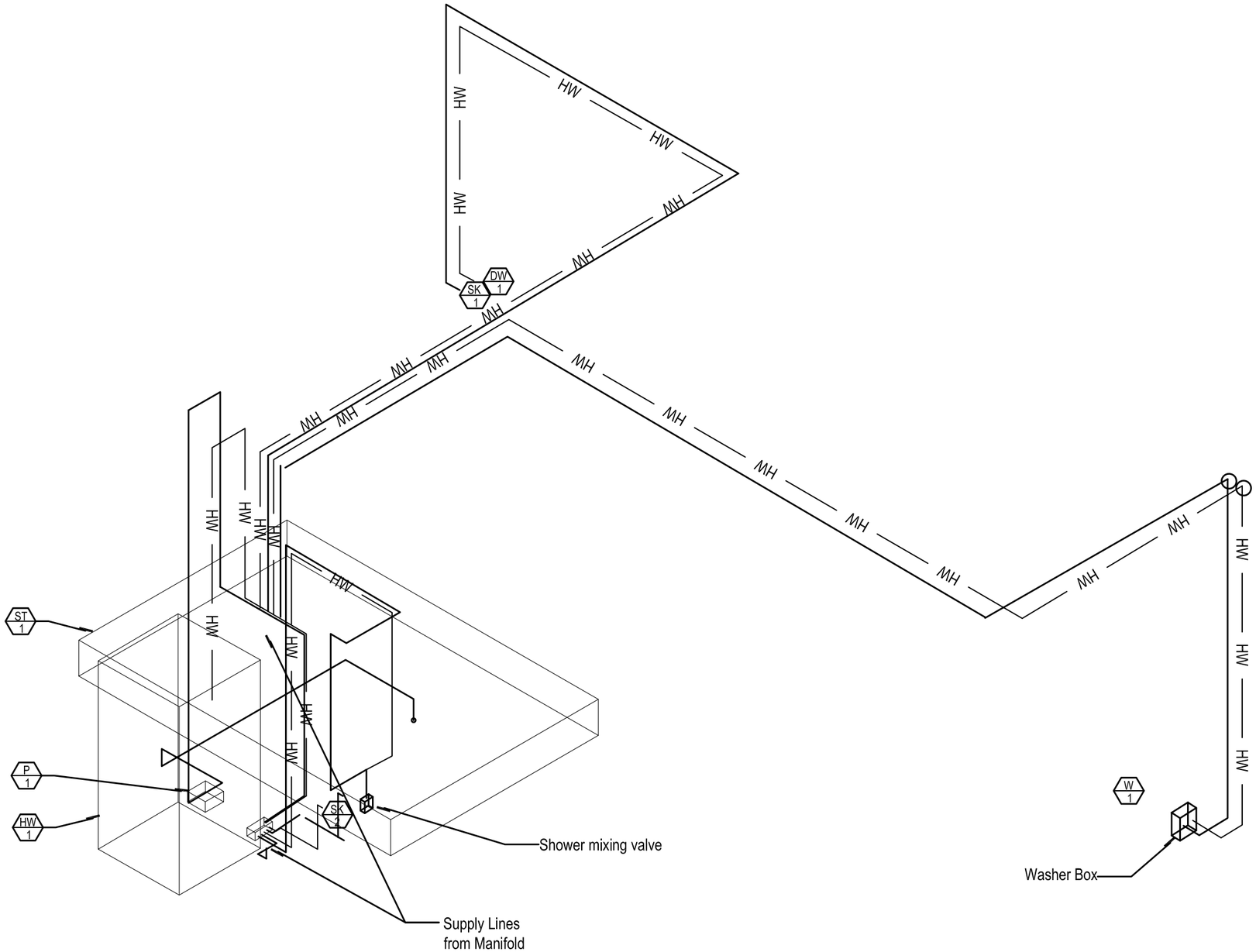
sheet name:

Plumbing Supply Piping Plan

scale:

1/4"=1'-0"

P-101



1 Plumbing Supply Isometric
Scale: 1/4" = 1'-0"

notes

1. All main supply piping to manifolds is 1" pex
2. All branch supply piping from manifolds is 1/2" pex unless noted otherwise.
3. All supply piping shown in plan is routed in the ceiling.
4. Secure piping every 24" to joists with plastic clips.
5. All PEX tubing shall not bend in a radius less than manifolds recommended bending radius.

specification notes

1. 22 05 00 - Common Work Results for Plumbing
2. 22 05 23 - General Duty Valves for Plumbing Piping
4. 22 11 16 - Domestic Water Piping
5. 22 11 19 - Plumbing Specialties
6. 22 11 23 - Domestic Water Pumps

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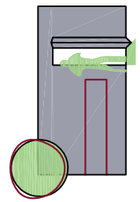

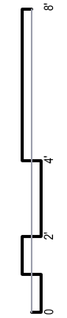

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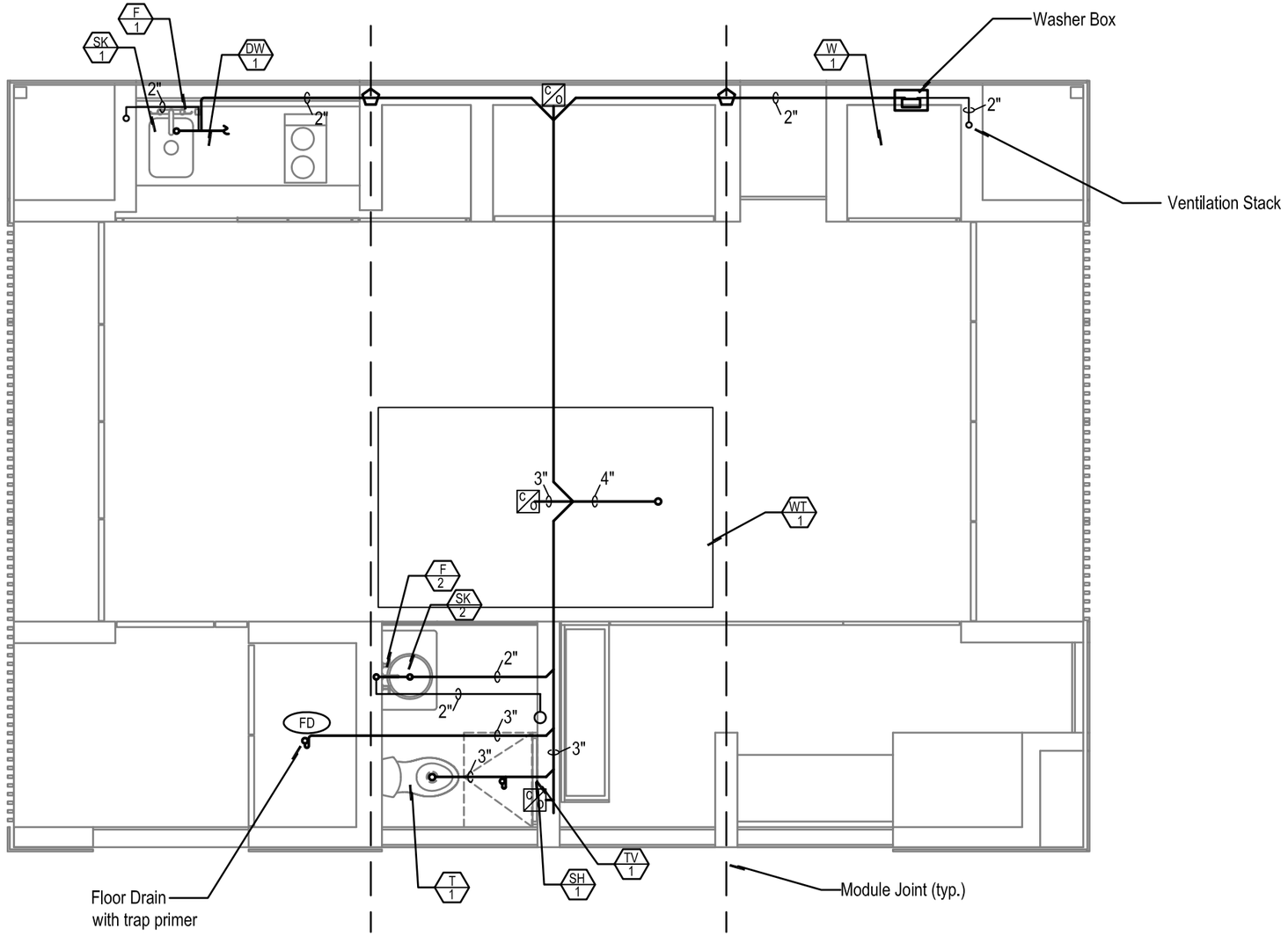
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Plumbing Supply Isometric

scale:
1/4"=1'-0"

P-102



notes

1. All Waste Piping and venting is to be schedule 40 PVC.
2. Provide a cleanout at every 90 degree bend in waste piping.
3. All waste piping must slope a minimum of 1/4" per 1'.
4. Ventilation Stacks (transition to 3" diameter pipe)
5. 2" PVC union for transition between modules.
6. Dishwasher shares trap with sink drain.
7. Water closet drain stubbed off for competition.
8. Horizontal Clean-out located below subfloor.
9. Waste Tank connects to waste pipe by 4" x 2" PVC reducer coupling.

specification notes

1. 22 05 00 - Common Work Results for Plumbing
2. 22 05 23 - General Duty Valves for Plumbing Piping
4. 22 13 16 - Sanitary Waste and Vent Piping
5. Valves for Piping
6. 22 13 53 - Facility Septic Tanks

SOLAR HOUSE I

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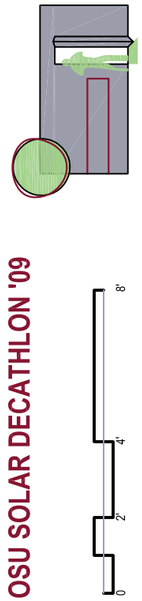

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

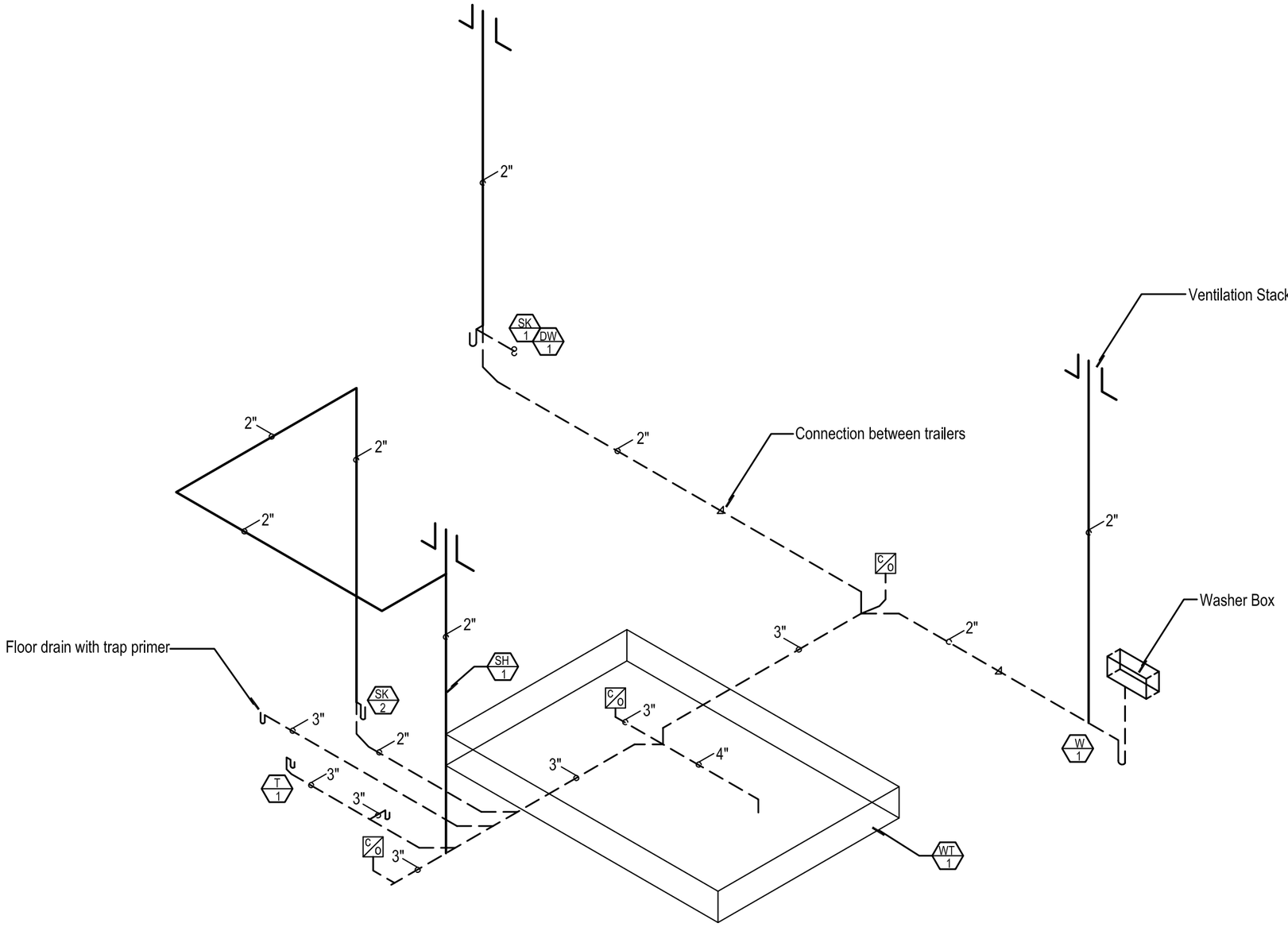
sheet name:

Plumbing Waste Piping Plan

scale:

1/4"=1'-0"

P-103



notes

1. Ventilation Stacks (transition to 3" diameter pipe)
2. 2" PVC union for transition between modules.
3. Dishwasher shares trap with sink drain.
4. Water closet drain stubbed off for competition.
5. Horizontal Clean-outs located below subfloor, typ.
6. 4" x 2" reducing coupling for connection to waste tank for competition.

specification notes

1. 22 05 00 - Common Work Results for Plumbing
2. 22 05 23 - General Duty Valves for Plumbing Piping
4. 22 13 16 - Sanitary Waste and Vent Piping
5. Valves for Piping
6. 22 13 53 - Facility Septic Tanks

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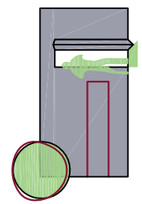

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1 12.16.08
2 05.15.09 (engineering)
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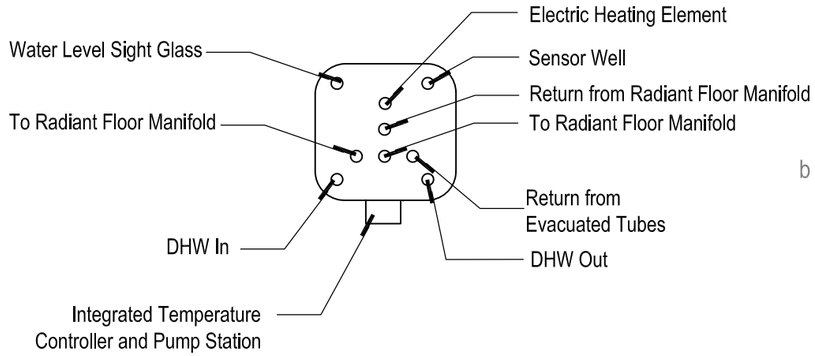
sheet name:

Plumbing Waste Isometric

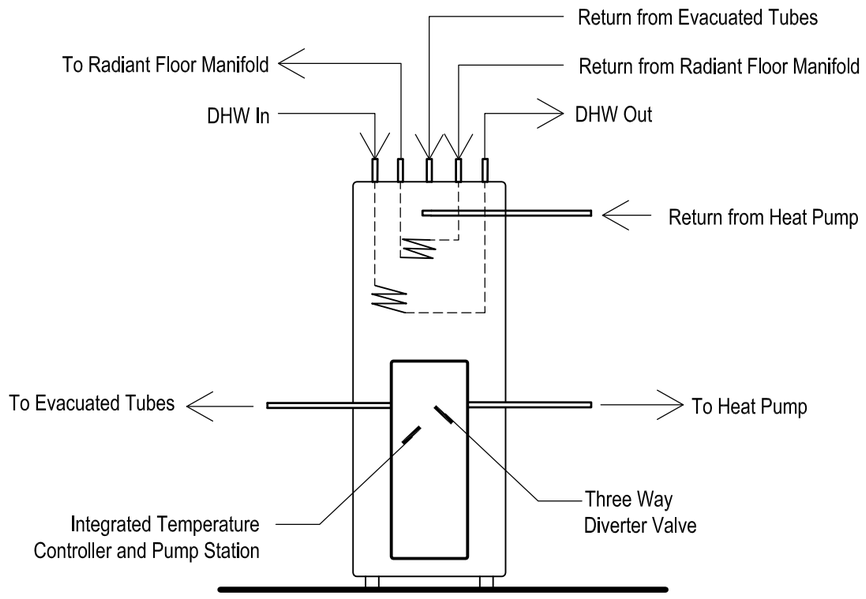
scale:

1/4"=1'-0"

P-104



2 **Hot Water Tank Schematic Plan**
Scale = nts



1 **Hot Water Tank Schematic Elevation**
Scale = nts

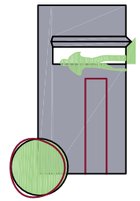
1. All Tank Connections are 1"
2. Tank is non-pressurized

b

a

specification notes

1. 22 05 00 - Common Work Results for Plumbing
2. 22 05 23 - General Duty Valves for Piping
3. 22 33 00 - Electric Domestic Water Heaters
4. 22 33 01 - Solar Thermal



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revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

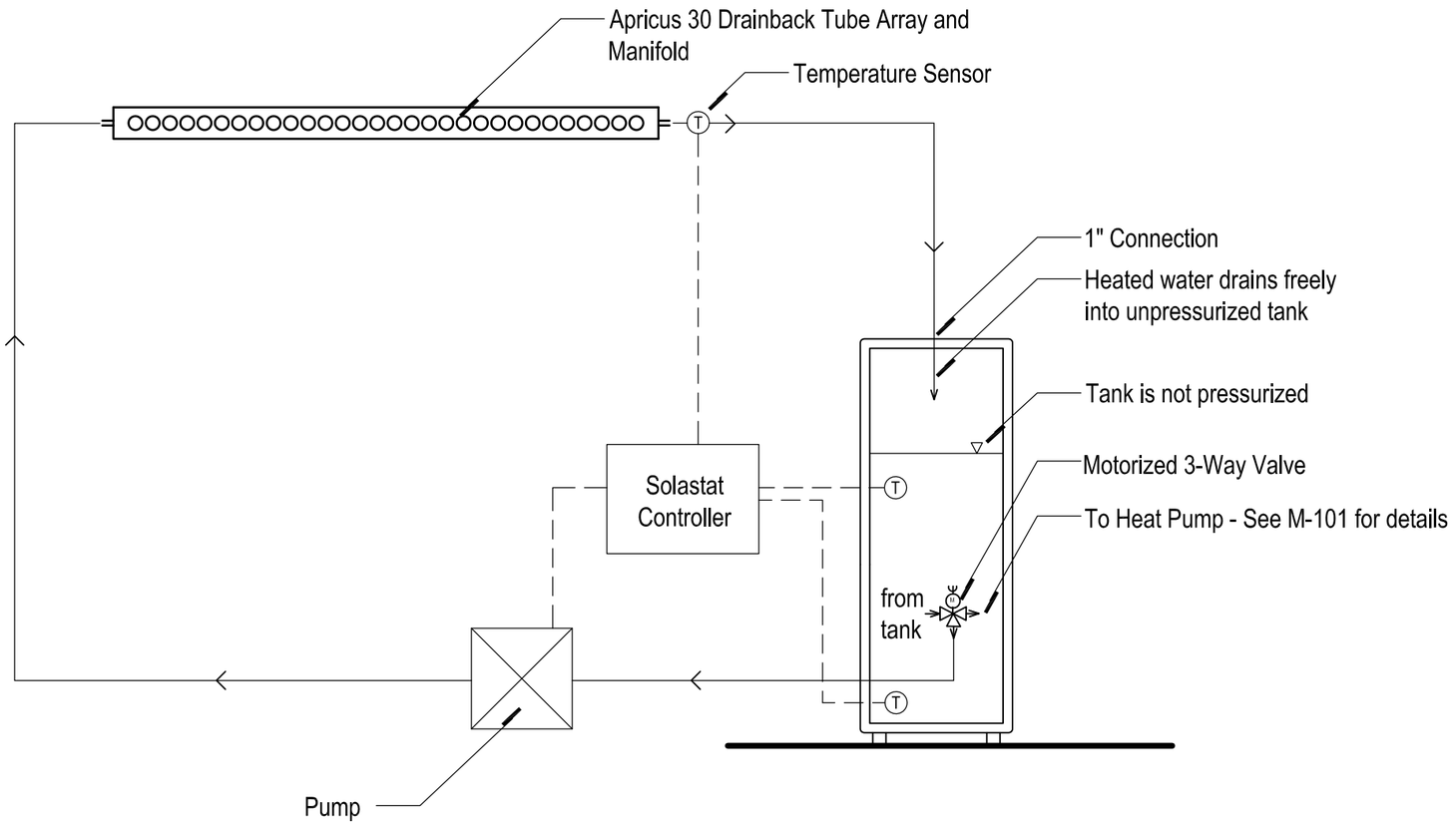
sheet name:
Hot Water Tank Schematic

scale:
n/a

P-105

notes

1. Solar Thermal system to be installed by licensed contractor approved by manufacturer.



specification notes

1. 22 05 00 - Common Work Results for Plumbing
2. 22 05 23 - General Duty Valves for Piping
3. 22 33 00 - Electric Domestic Water Heaters
4. 22 33 01 - Solar Thermal

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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

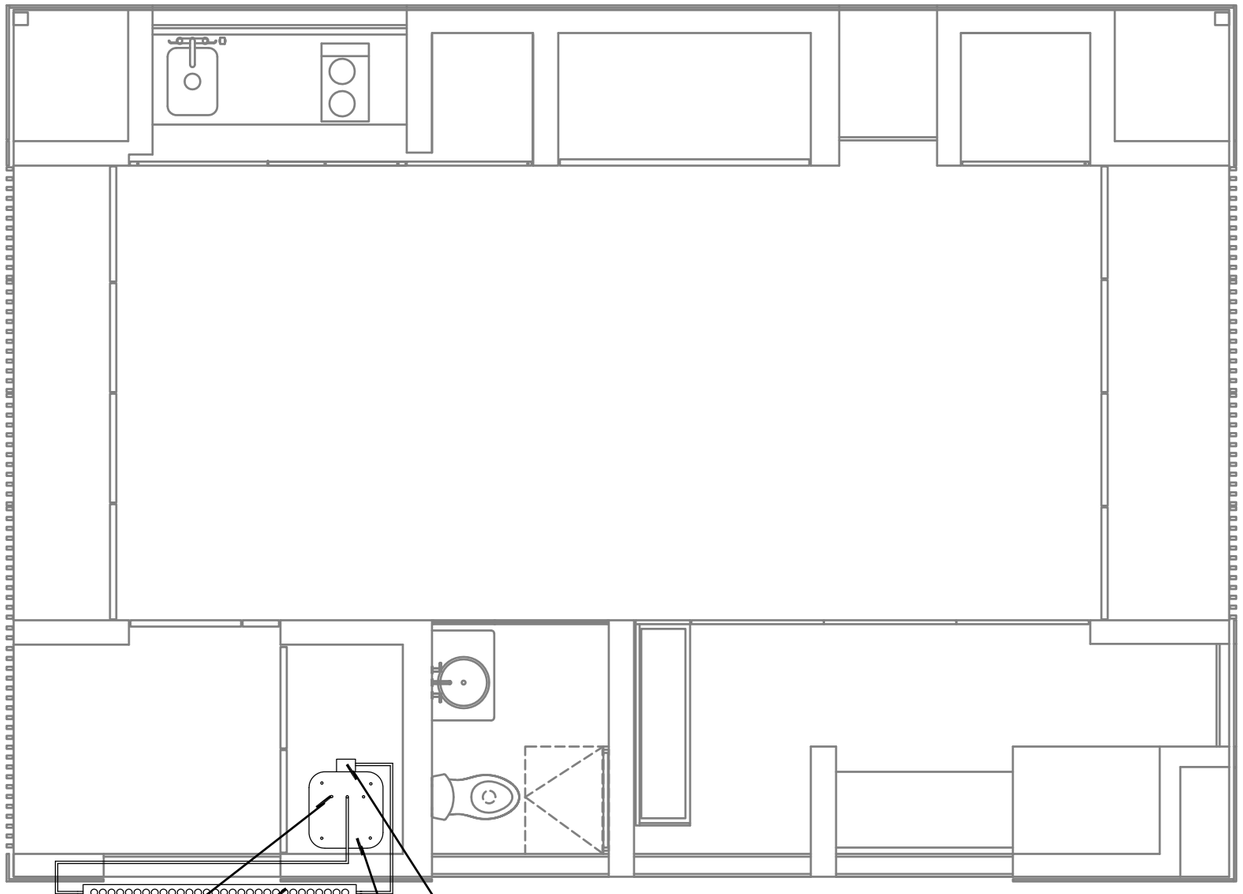
Solar Thermal System Schematic

scale:

n/a

P-201

notes

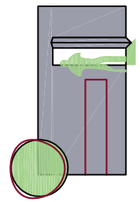


specification notes

1. 22 05 00 - Common Work Results for Plumbing
2. 22 05 23 - General Duty Valves for Piping
3. 22 33 00 - Electric Domestic Water Heaters
4. 22 33 01 - Solar Thermal

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

Solar Thermal Equipment Plan

scale:

1/4"=1'-0"

P-202

Mechanical System

Equipment Key

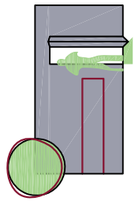
Symbol Name	Description	Product Name
HP - 1	Mini-Split Outdoor Unit	Mitsubishi - MUZ-FD09NA
HP - 2	Mini-Split Outdoor Unit	Mitsubishi - MUZ-FD09NA
HP - 3	Mini-Split Outdoor Unit	Mitsubishi - MUZ-FD09NA
MS - 1	Mini-Split Indoor Unit	Mitsubishi - MSZ-FD09NA
MS - 2	Mini-Split Indoor Unit	Mitsubishi - MSZ-FD09NA
MS - 3	Mini-Split Indoor Unit	Mitsubishi - MSZ-FD09NA
HP - 4	Domestic Water Heat Pump	E-tech RO60
HRV - 1	Heat Recovery Ventilator	UltimateAir Recouperator 200 DX
RF - 1	Radiant Floor Manifold	Zurn - Preassembled Heating
CP-3	Radiant Floor Circulating Pump	M-ALPHA15-55F
LVR - 1	Exterior Wall Mount Exhaust Louver	Ruskin Thin Line Louver - ELF15J
LVR - 2	Ceiling Mount Supply Diffuser	Titus - Linear Supply - ML-39
DMP - 1	Directional Damper - 4" clear	Ruskin Zone Control Damper - ZMDRS25
EXH - 1	Exhaust Fan	Broan - Model 670 ceiling mount fan
CP-1	Grundfos 3-Speed Pump	UPS-1558-FC
CP-2	Grundfos 3-Speed Pump	UPS-1558-FC
PS-1	EEmax Tankless Water Heater	EX-48-SL

Symbol Legend

Symbol	Description
	Directional Damper
	Surface Mount Exterior Louver
	Exhaust Fan
	Supply Register
	Return Register
	4" Insulated Flexible Ducting
	Indicated Forced Air Direction
	Check Valve
	Circulating Pump
FM	Flow Meter
	Thermowell
	Pressure Relief Valve
	Radiant Floor Zone
	Internal Closed Loop Coil
sn	Temperature sensor
	Damper

notes

1. Duct layout is schematic, provide all fittings and transitions etc. necessary to install duct system.
2. Duct sizes are shown as net clear inside dimensions.
3. Piping layout is schematic, provide all fittings and transitions etc. necessary to install piping systems.
4. All ducts to be continuously insulated.
5. Exterior condensing/heat pump units to be mounted on pad as noted by manufacturer, see manufacturer specifications.
6. Exhaust from mechanical room, or bathroom fan, are located a minimum of 10' from the outdoor air intake for the heat recovery ventilator.
7. Appropriate clearances are given in the layout of equipment in the mechanical room according to equipment manufacturer specifications, and per code.
8. Due to small scale of mechanical drawings it is not possible to indicate all offsets fittings and accessories.
9. Follow SMACNA guidelines for ductwork.



SOLAR HOUSE I

OSU SOLAR DECATHLON '09

Construction Documents
June 2, 2009

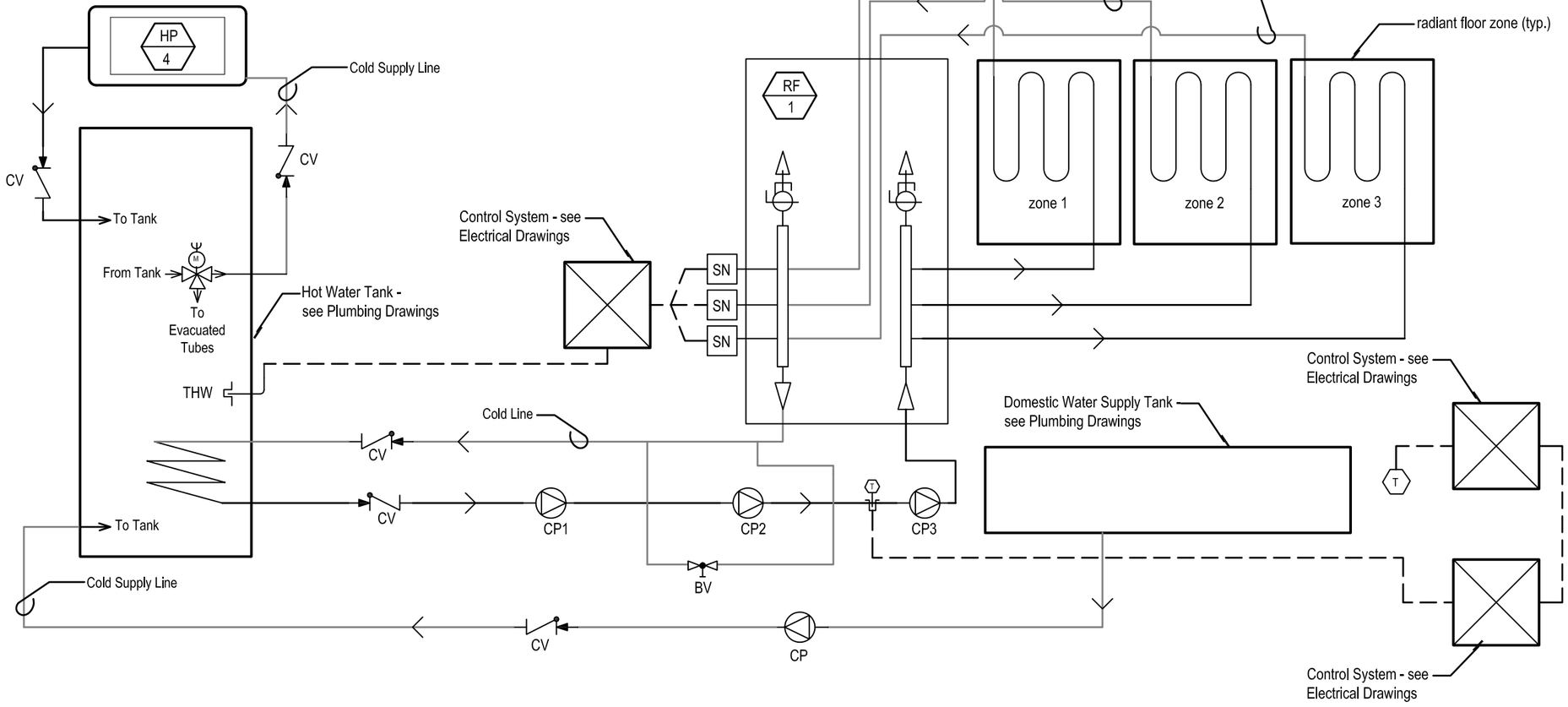
U.S. Department of Energy
2009 Solar Decathlon

revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Mechanical System

scale:
n/a

M-001



Symbol Key		
Symbol	Description	Notes
	Check Valve	CV
	Circulating Pump	CP
	Temperature Sensor	Outside
	Thermowell	THW
	Motorized 3-Way Valve	

Symbol Key		
Symbol	Description	Notes
	Pressure Relief Valve	PRV
	Radiant Floor Zone	
	Internal Closed Loop Coil	
sn	Temperature sensor	
	Balancing Valve	BV

Symbol Key	
Symbol	Description
	Cold Water Line
	Hot Water Line
	Direction Fluid Movement
	Electrical Connection

general notes

1. Radiant floor system and supporting equipment subject to change per radiant floor installer.
2. Radiant Floor supporting equipment to be installed by licensed contractor, approved by Apricus.
3. Refer to P-105,P-201,P-202 for Tank Connection and Solar Thermal System Information
4. Refrigerant liquid lines are internal to each unit, insulated where exposed exterior of unit.
5. Air vents shall be located at highest point of piping circuit.

specification notes

1. Divisions 22, 23 and 26

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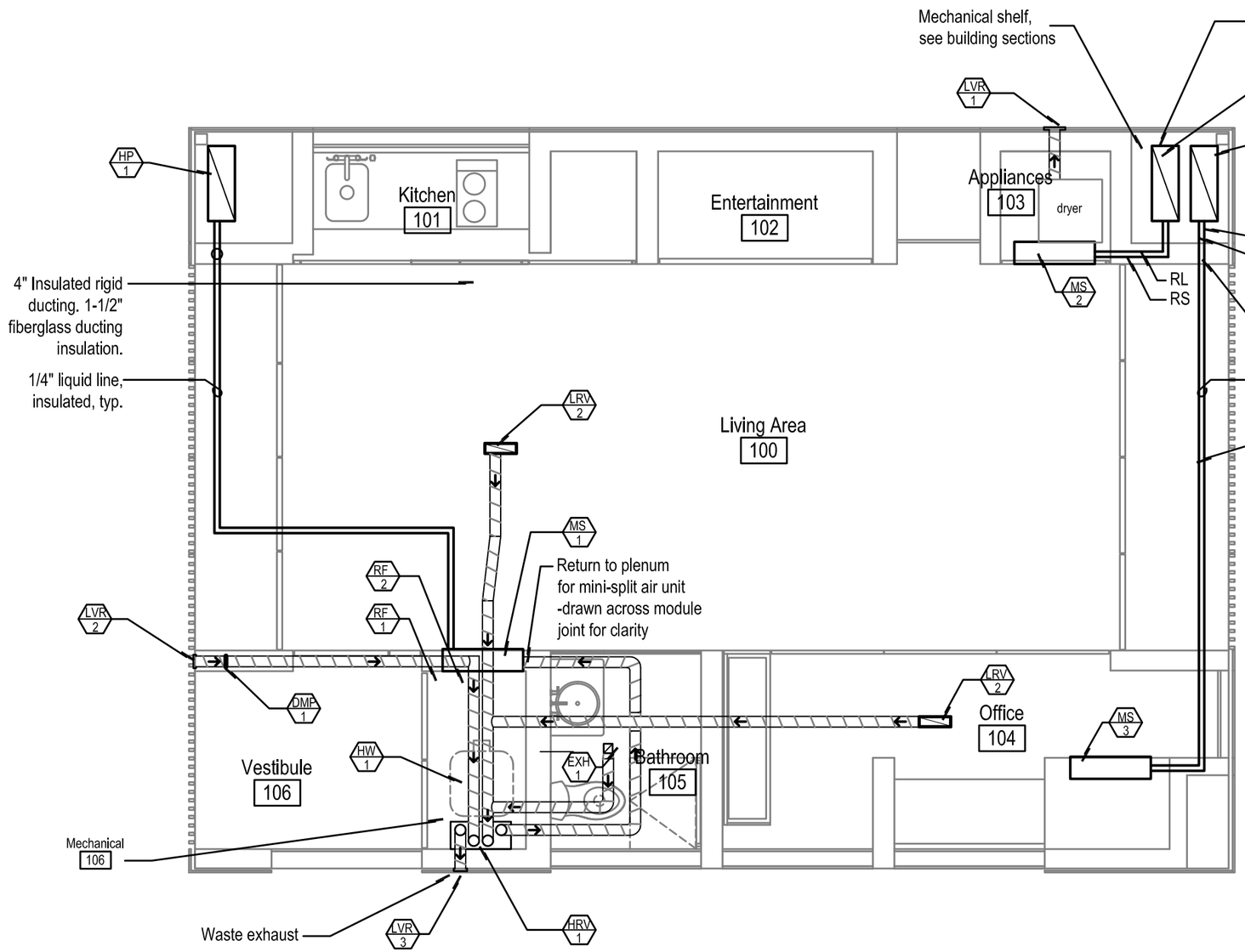
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Mechanical Hydronic Schematic

scale:
n/a

M-101



notes

1. LRV-1 to be surface mounted flush with "First" skin material, see exterior elevations.
2. LRV-2 to be ceiling mounted flush with ceiling material, see reflected ceiling drawings.
3. MS-(1-3) to be recess mounted within interior walls, flush with interior surface material, see interior elevations.

specification notes

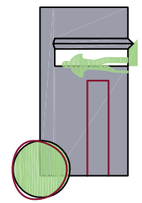
1. Divisions 22, 23 and 26

Notation Key	
	Directional Damper
	Surface Mount Exterior Louver
	Exhaust Fan
	Supply Register

Notation Key	
	Return Register
	4" Insulated Rigid Ducting
	Indicated Forced Air Direction
	Vertical rise/drop of Refrigerant lines

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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June 2, 2009

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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

Mechanical Plan

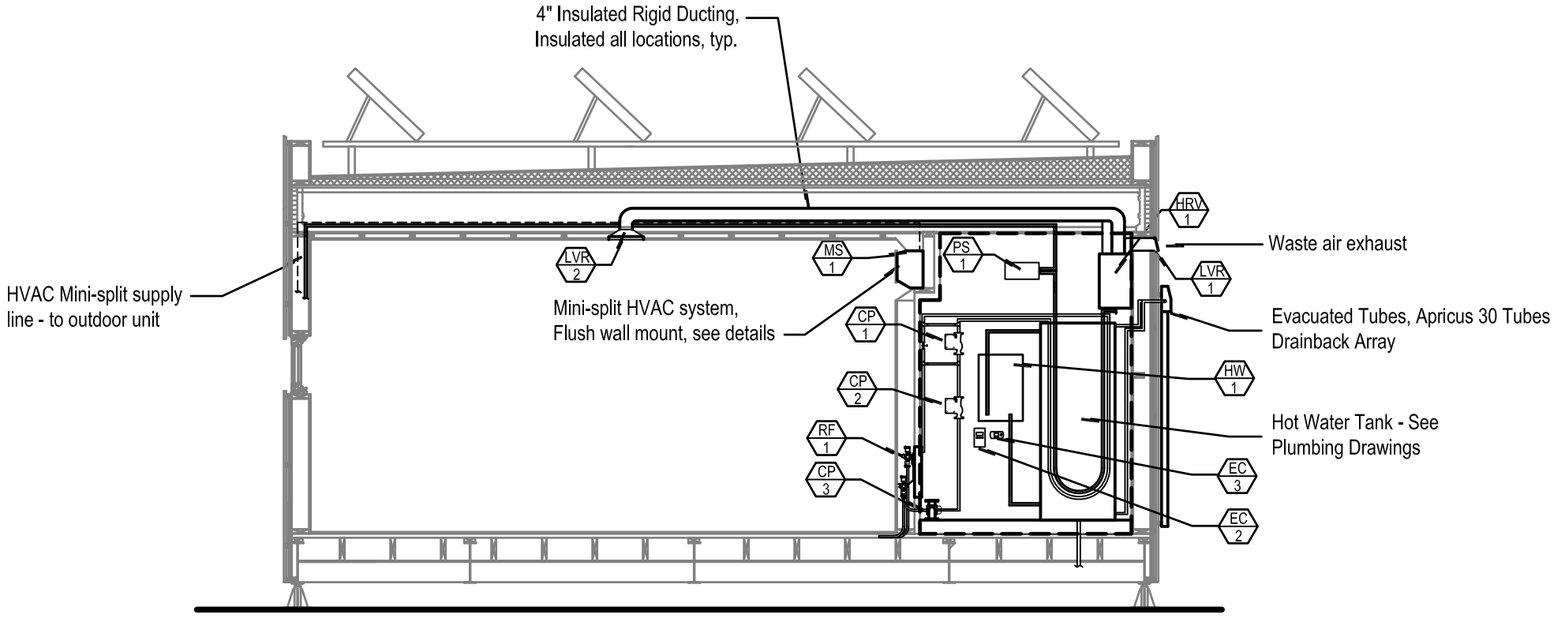
scale:

1/4"=1'-0"

M-102

notes

1. Mechanical Room to be fully insulated on interior face.
2. All equipment located in mechanical room to be fully compliant with manufacturers specifications regarding operational clearances.
3. All exposed duct runs to HRV to be fully insulated in mechanical closet.



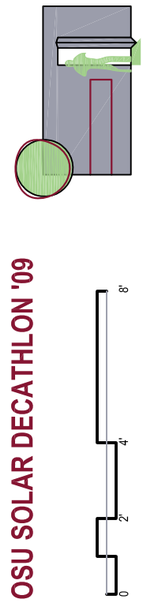
1 Mechanical Elevation
Scale: 1/4" = 1'-0"

specification notes

1. Divisions 22, 23 and 26

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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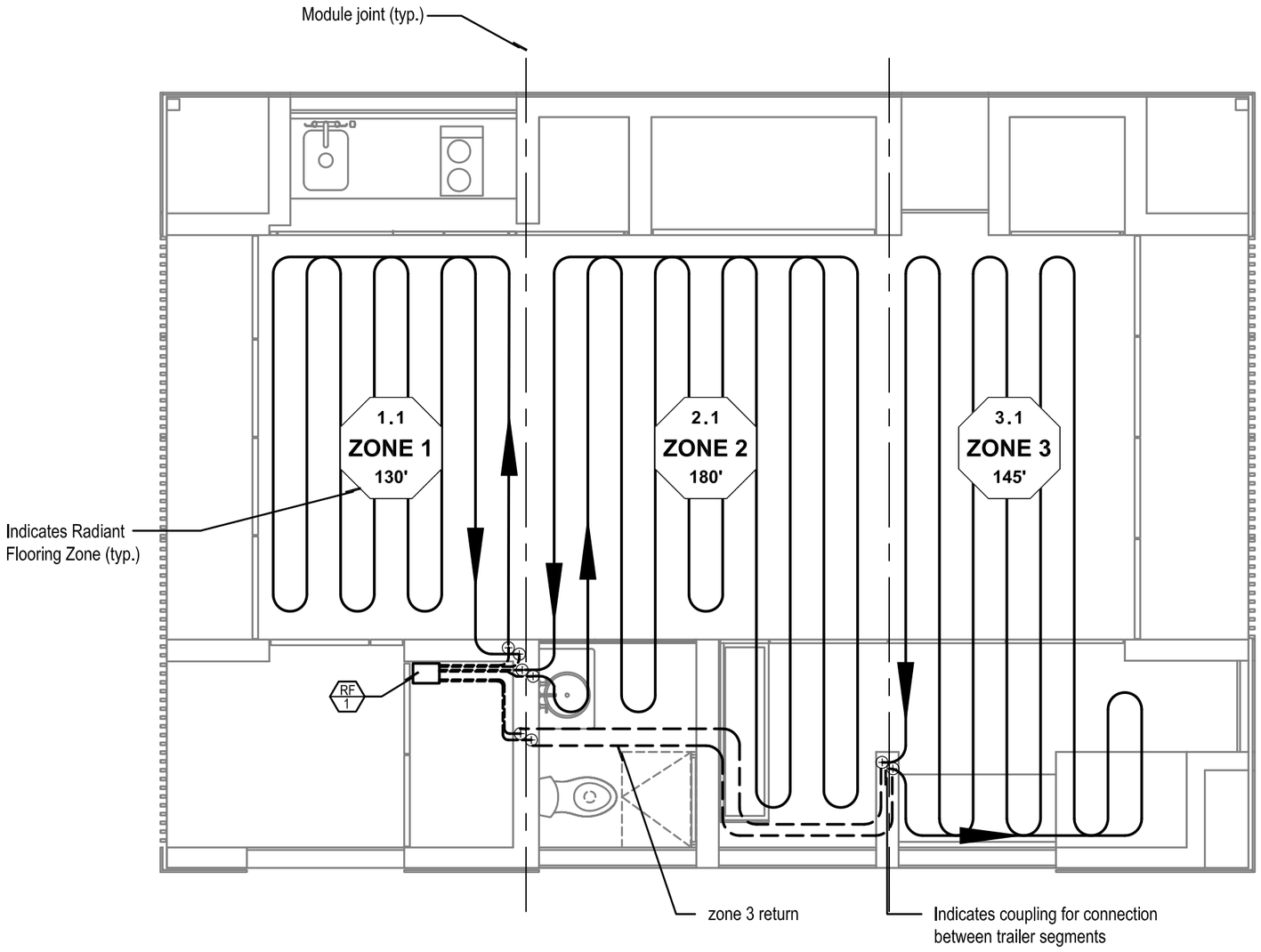
revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Mechanical Elevation

scale:
1/4"=1'-0"

M-201

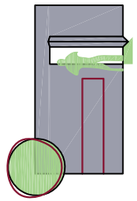


notes

1. Installation of radiant floor "Pex" tubing to be installed per manufacturers specifications, see Warmboard drawings.
2. Radiant Floor supporting equipment to be installed by licensed contractor approved by Apricus.
3. Layout of Warmboard provided by manufacturer, see structural sub-floor drawings for layout.

specification notes

1. 23 05 23 - General Duty Valves for HVAC Piping
2. 23 21 23 - Hydronic Pumps
4. 23 83 16 - Radiant Heating Hydronic Piping



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

Radiant Floor System

scale:

1/4"=1'-0"

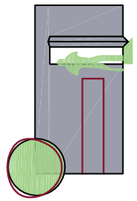
M-301

notes

Electrical System

Electrical Symbol Legend	
Symbol	Description
S	Switch
S3	3-way Switch
SD	Smoke Detector
	Duplex Outlet 15A or 20A
	Quad Outlet 15A or 20A
GFCI	GFCI Floor Outlet 15A or 20A
GFCI	GFCI Outlet 15A or 20A
20A	Dedicated Outlet 15A or 20A
240	240 Volt Outlet
AFCI	AFCI Outlet 15A or 20A
WP	Weather-Proof w/ Cord in Place
WP	Weather-Proof D/C Switch

Controls Symbol Legend	
Symbol	Description
RADIANT	Radiant Temperature Sensor
THERMAL TANK	Hot Water Tank Temperature
L	Lighting Sensor
TL	Task Light Sensor
TS	Touch Screen
	Thermocouple
CT	Current Transducer
Router	Wireless Router



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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

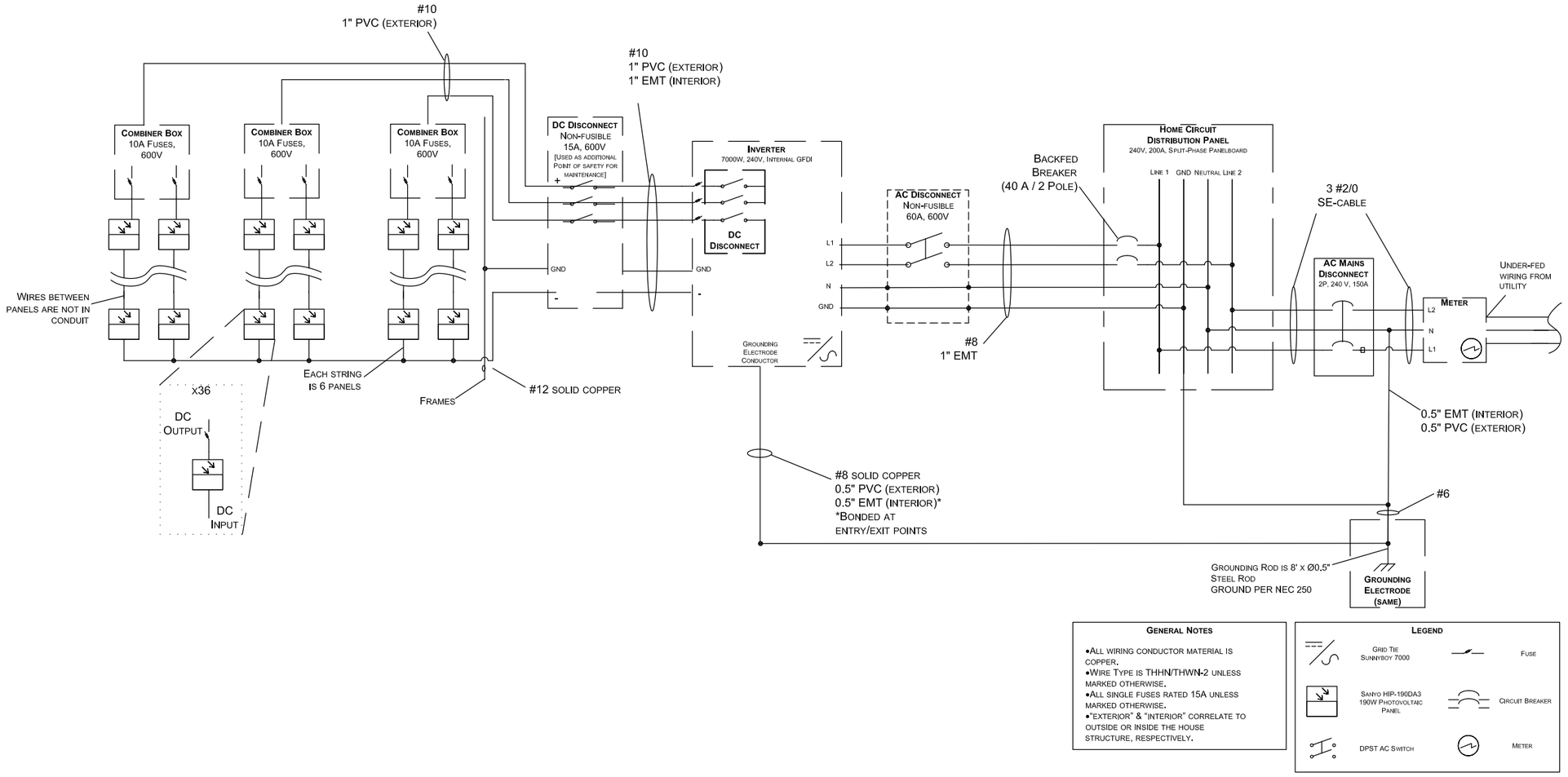
sheet name:
Electrical System

scale:
n/a

E-001

notes

1. All wiring conductor material is copper
2. All single fuses rated 15A
3. "Exterior" and "Interior" correlate to outside or inside the house structure, respectively



GENERAL NOTES

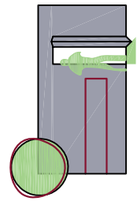
- ALL WIRING CONDUCTOR MATERIAL IS COPPER.
- WIRE TYPE IS THHN/THWN-2 UNLESS MARKED OTHERWISE.
- ALL SINGLE FUSES RATED 15A UNLESS MARKED OTHERWISE.
- "EXTERIOR" & "INTERIOR" CORRELATE TO OUTSIDE OR INSIDE THE HOUSE STRUCTURE, RESPECTIVELY.

LEGEND

- GRID TIE SUNNYBOY 7000
- SANYO HIP-190DA3 190W PHOTOVOLTAIC PANEL
- DPST AC SWITCH
- FUSE
- CIRCUIT BREAKER
- METER

specification notes

1. 26 05 00 - Common Work Results for Electrical
2. 26 24 16 - Panelboards
3. 26 27 13 - Electricity Metering
4. 26 28 13 - Fuses
5. 26 31 00 - Photovoltaic Collectors



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revisions:

1. 12.16.08
2. 05.15.09 (engineering)
3. 06.02.09

sheet name:

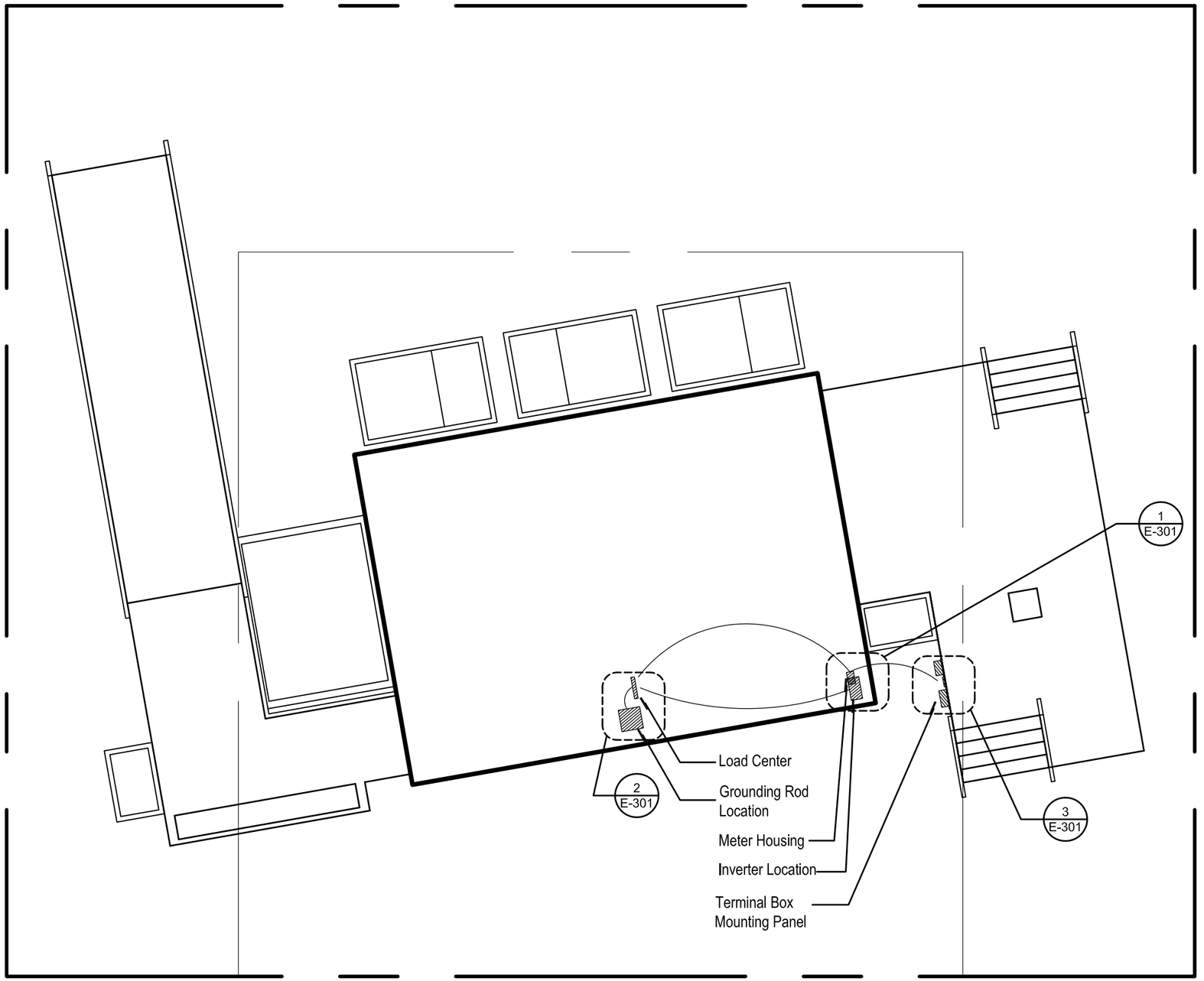
Electrical Schematic

scale:

n/a

E-101

notes

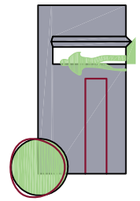


specification notes

1. 26 05 00 - Common Work Results for Electrical
2. 26 24 16 - Panelboards
3. 26 27 13 - Electricity Metering
4. 26 31 00 - Photovoltaic Collectors
5. 26 50 00 - Lightning Protection for Structures

SOLAR HOUSE I

OSU SOLAR DECATHLON '09



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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

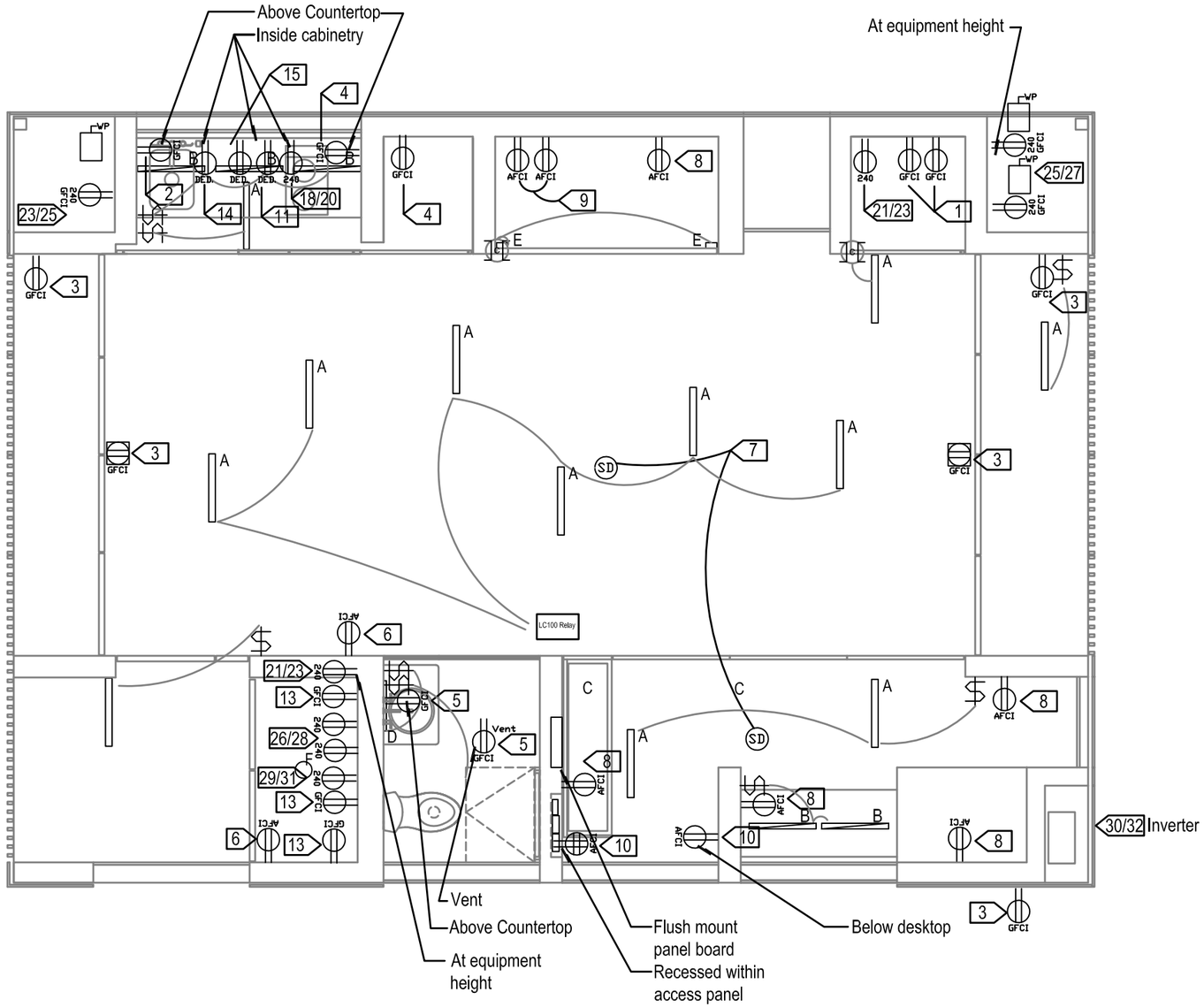
sheet name:

Site Metering Locations

scale:

1/8" = 1'-0"

E-102



notes

1. All outlets to be placed at 18" above the floor unless otherwise noted
2. All switches to be placed at 42" above the floor unless otherwise noted
3. See interior finish detail for all outlet / switch plate and access panel applications
4. All smoke detectors are hardwired with battery back-up.
5. Light fixtures on Circuit 7.
6. All wiring is standard/common Romex insulated copper or similar

Lighting Fixture Schedule

Fixture		Total Qty.	Mount Type	Manufacturer	Lamps Qty	Volt	Lamp	Notes
A	24" Fluorescent	12	recessed	Mark Lighting	1	120	8W T5	
B	24" Fluorescent	5	under shelf	Kenall	1	120	17W T8	
C	bending lamp	2	wall mount	LED Inc.	1	120	LED	amber
D	Mirror / light	1	wall mount	Tech Tigris	8	12	20W halogen	
E	12" task light	2	wall mount	WAC lighting	1	120	25W xenon pins	
F	6" diameter can	1	recessed	Pegasus	1	120	75PAR/R30	

specification notes

1. 26 05 00 - Common Work Results for Electrical
2. 26 09 23 - Lighting Control Devices
3. 26 27 26 - Wiring Devices
4. 26 50 00 - Lighting

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1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Electrical Plan

scale:
1/4"=1'-0"

E-103

Load Center Distribution Schedule

Voltage: 120/240 V Single (Split) Phase, 3-Wire
Mains: 200A Breaker
Note: Service Entrance Rated

Wire	Protect	Description	VA	Rating/P	Circuit	Phase	Circuit	Rating/P	VA	Description	Protect	Wire
#12	GFCI	Laundry Outlets	1500	20/1	1	1	2	20/1	1500	Kitchen Appl. Circuit 1	GFCI	#12
#14	GFCI	Outdoor Outlets	1260	15/1	3	2	4	20/1	1500	Kitchen Appl. Circuit 2	GFCI	#12
#14	GFCI	Bathroom Outlet & Vent	360	20/1	5	1	6	15/1	360	Indoor Outlets 1	AFCI	#14
#12	AFCI	Lighting + Smoke Det.	600	15/1	7	2	8	15/1	1260	Indoor Outlets 2	AFCI	#14
#14	AFCI	TV & Audio	300	15/1	9	1	10	15/1	300	Sensors, Computers	AFCI	#14
#12		Microwave Oven	1350	20/1	11	2	12	15/1	10	Power Meter		#14
#14	GFCI	Circ. Pump, Vents	700	15/1	13	1	14	20/1	1450	Dishwasher		#12
#12		Kitchen Hood	1000	20/1	15	2	16	15/1	370	Washer		#14
#10		Dryer	3500	20/2	17	1	18	30/2	3600	Cooktop		#10
					19	2	20					
#6		Water Heater	4800	30/2	21	1	22	40/2	6200	Split A/C 1 + 2	GFCI	#6
					23	2	24					
#10	GFCI	Split A/C 3	3100	20/2	25	1	26	30/2	2350	Hot Water Heat Pump, ERV		#12
					27	2	28					
#6		Pressure Booster Pump	6000	40/2	29	1	30	40/2	7000	Inverter (Backfed)*		#6
					31	2	32					

Phase 1 VA Sum:* 18245
Phase 2 VA Sum:* 19125
Unbalanced:* 2.35% *Backfed Inverter not Included

Total*: 37370 VA
Total / 240 V*: 155.708 A
X 1.25*: 194.635 A

Feeder Conductor Calculations		VA	Demand VA	NEC Section
General Loads				
General Lighting Load	(3 VA / ft²) * (757 ft²)	2271		220.12
Small Appliance Branch Circuit	(1500 VA) * (2 circuits)	3000		220.52(A)
Laundry Branch Circuit		1500		220.52(B)
Demand Factor	(First 3000 VA) * (100%)	3000	3000	220.42
	(Remaining VA) * (35%)	3771	1320	
Water Heaters/Pumps				220.20
Sum of Various Equipment Ratings		12662		
Demand Factor	60%		7597.2	
HVAC				220.51
Sum of Various Equipment Ratings		10222		
Demand Factor	100.00%		10222	
Fastened Appliance Loads				220.53
Rating of Appliaces	(Wshr + Dishwsh + Micr)	3153		
Demand Factor	75%		2365	
Major Appliance Loads				
Dryer	5000 VA	5000		220.54
Demand Factor	100%		5000	
Cooktop	(Cooktop)	3600		220.55
Demand Factor	80%		2880	
		Net VA:	32384	
		Voltage:	240	
		Current:	134.9	

Feeder Neutral Calculations		VA	Demand VA	NEC Section
General Load, HVAC, Fastened Appl.				
As Calculated for Feeder Conductor			24504	
Major Appliance Loads				220.61
Dryer	5000 VA	5000		
Demand Factor	100% * 70%		3500	
Cooktop	(Cooktop)	3600		
Demand Factor	80% * 70%		2016	
		Net VA:	30020	
		Voltage	240	
		Current	125.1	

PV/Inverter Wiring & Breaker Sizing Calculations

Maximum Current Calculation	Current (A)	Safety Rating Factor		PV Safety Factor	Maximum Possible Current (A)	
PV Panel Array [75º]	4.84	1.25		1.25	7.56	
Ground Fault (Fuse+Panels)	14.84	1.25		1	18.55	Fuse Rating of 10 A
Inverter Max AC Output [Listed]	29	1.25		1	36.25	

Conductor	Wire Size	Wire Type	# of Conductors	Total # of Conduit Conductors (See E1.01)	Nominal Wire Current (A, 75º)	Temperature Derating	Conduit Derating	Derated Current Rating (A)	Projected Maximum Current (A)
PV Equipment Ground [75º]	#12	THHN/THWN-2	1	9	30	1	0.7	21	18.55
PV Array Inverter DC Input	#10	THHN/THWN-2	8	9	40	0.58	0.7	16.24	15.13
PV Inter-Panel Wiring [75º]	#10	THHN/THWN-2	1	1	40	0.58	1	23.2	18.55
Inverter Equipment Ground [65º]	#8	THHN/THWN-2	1	2	75	1	1	75	7.56
Inverter-Mains [40º] (L1, L2, N, GND)	#8	THHN/THWN-2	4	4	75	0.91	0.8	54.6	36.25

Breaker Sizing	Max. Input Current (A)	Breaker Rating (A/Poles)
Inverter Input Breaker (Backfed)	36.25	40/2

Load Center Sizing	Service Feed (A)	Inverter Breaker Rating (A)	Load Rating Sum (A)	Rating Factor	Rated Load Center (A)
Load Center (200 A)	150	40	190	1.2	240

notes

specification notes

1. 26 24 16 - Panelboards
2. 26 27 13 - Electricity Metering
3. 26 31 00 - Photovoltaic Collectors

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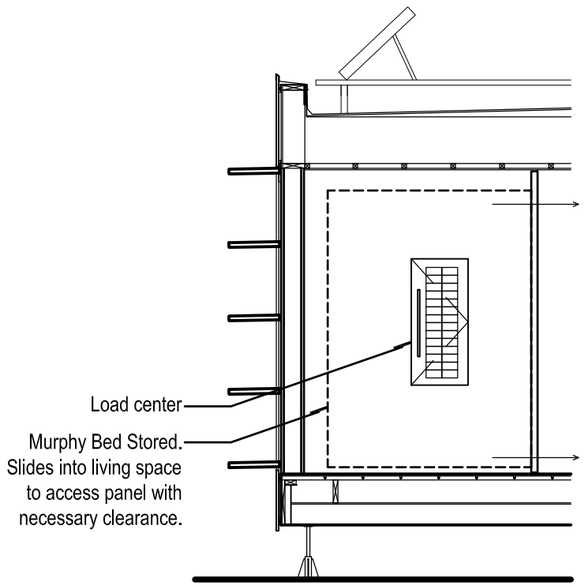
revisions:
1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

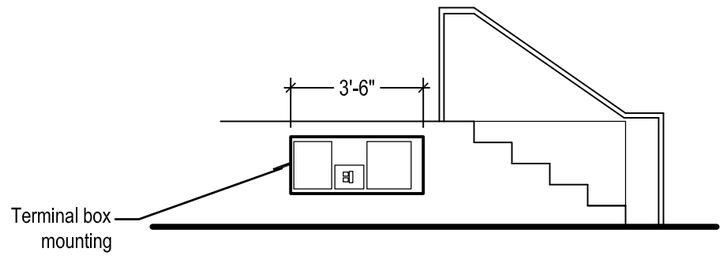
sheet name:
Load Center Distribution

scale:
n/a

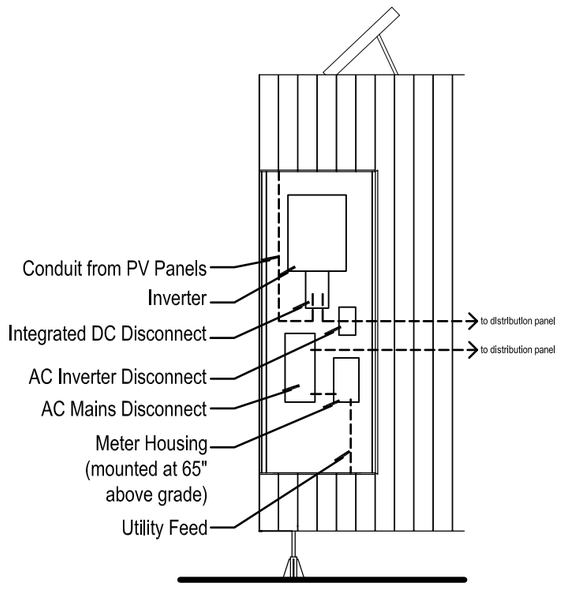
E-201



2 Load Center Elevation
Scale: 1/4" = 1'-0"



3 Terminal Box Mounting Panel
Scale: 1/4" = 1'-0"



1 Inverter and Meter Housing Elevation
Scale: 1/4" = 1'-0"

b

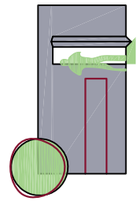
a

notes

1. Meter and Meter Housing to be visible during the competition.

specification notes

1. 26 05 00 - Common Work Results for Electrical
2. 26 24 16 - Panelboards
3. 26 27 13 - Electricity Metering
4. 26 31 00 - Photovoltaic Collectors



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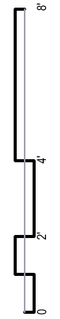

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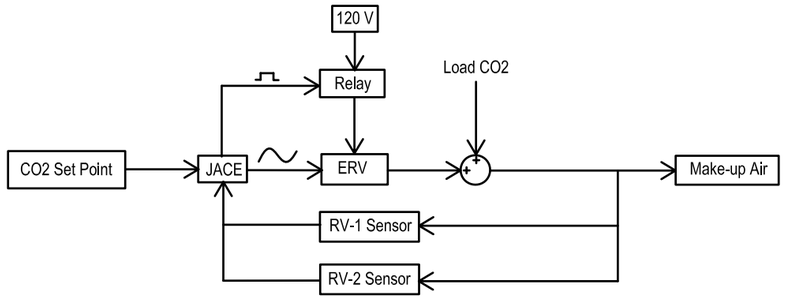
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Electrical Elevations

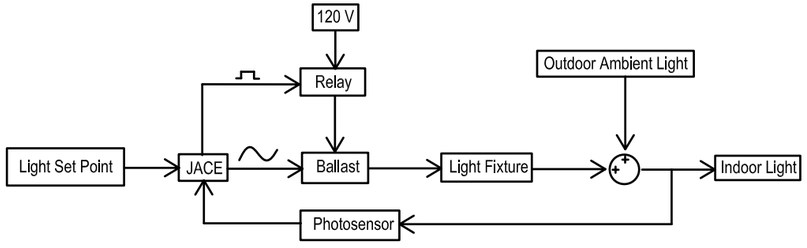
scale:
1/4"=1'-0"

E-301

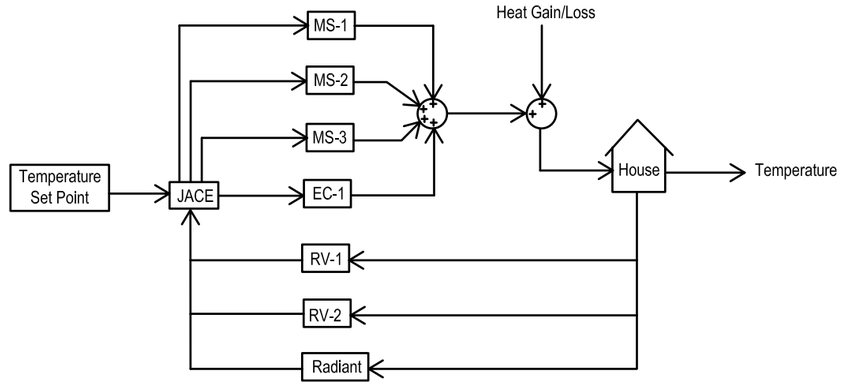
Controls Schematic Symbol Legend	
Symbol	Description
JACE	JAVA Application Control Engine
Relay	Electrical Signal Relay
ERV	Energy Recovery Ventilator
RV-1	Return Vent Temp/Hum/CO2 Sensor
RV-2	Return Vent Temp/Hum/CO2 Sensor
MS-1	Mitsubishi Heat Pump 1
MS-2	Mitsubishi Heat Pump 2
MS-3	Mitsubishi Heat Pump 3
EC-1	Solostat Radiant Floor Controller
Radiant	Radiant Temperature Sensor
	Digital Signal
	Analog Signal



2 Mechanical Ventilation Controls Schematic
N.T.S.



3 Lighting Controls Schematic
N.T.S.



1 Temperature Controls Schematic
N.T.S.

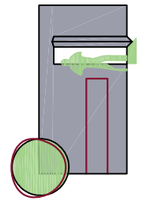
notes

b

a

specification notes

1. 25 11 13 - Home Automation and Controls System



SOLAR HOUSE I

OSU SOLAR DECATHLON '09

Construction Documents
June 2, 2009

U.S. Department of Energy
2009 Solar Decathlon

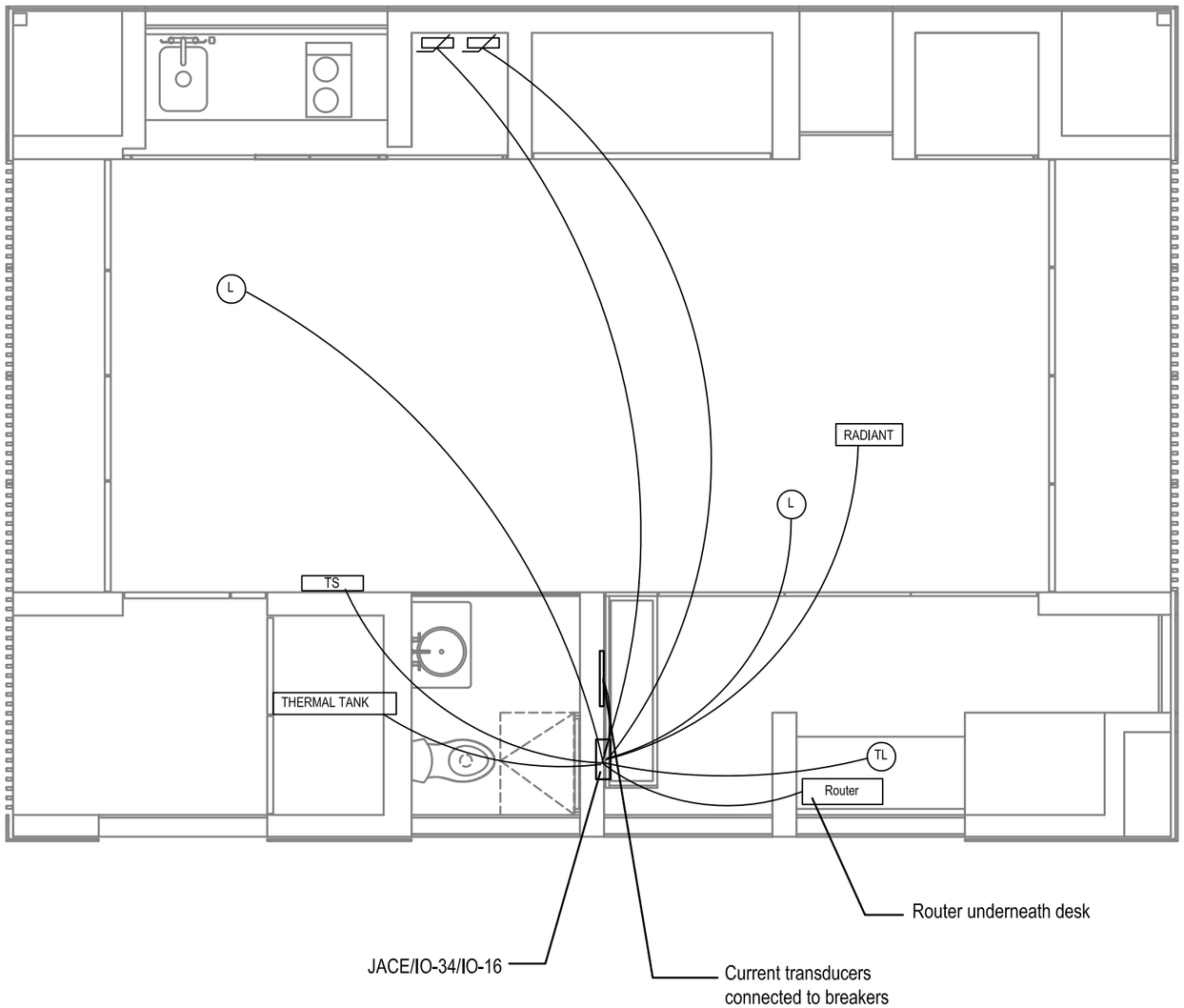
revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:
Controls Schematic

scale:
n/a

E-401



notes

1. The JACE will be recieving additional user commands via the internet.
2. A temperature,humidity and CO2 sensor will be located in each return vent (see A-105 Reflected Ceiling Plan for locations of return vents).
3. The Sensorbox, located on the roof, will be connected to the Webbox. The Webbox is located with the inverter and connected to the JACE.

specification notes

1. 25 11 13 - Home Automation and Controls System

SOLAR HOUSE I

OSU SOLAR DECATHLON '09

0 2' 4' 8'

Construction Documents
June 2, 2009
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revisions:

1 12.16.08
2 05.15.09 (engineering)
3 06.02.09

sheet name:

Controls Plan

scale:

1/4"=1'-0"

E-402