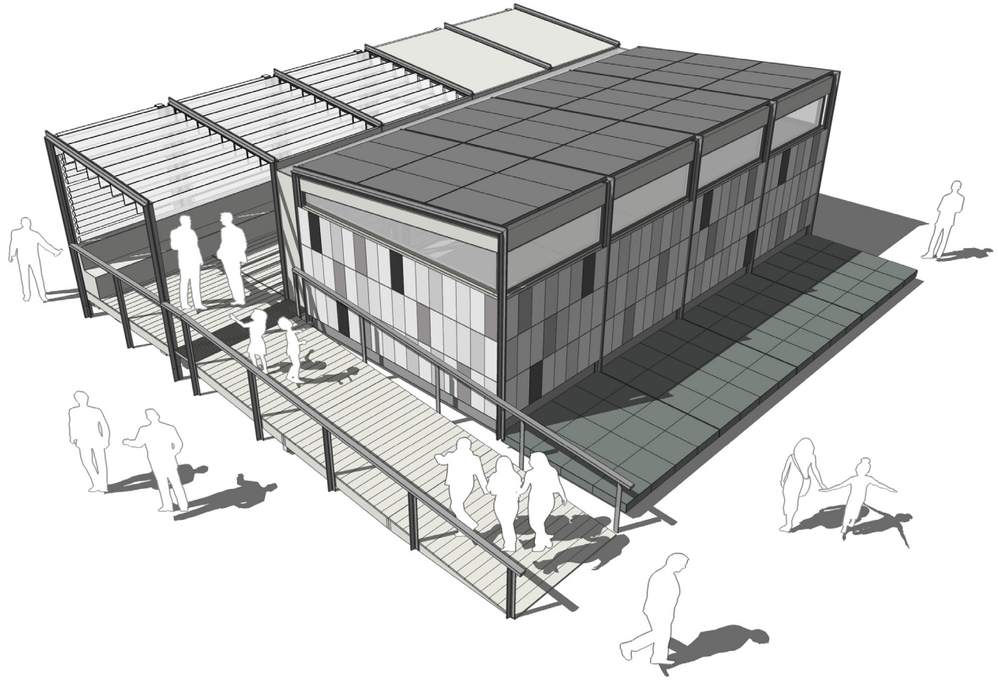
THE 2007 UNIVERSITY OF CINCINNATI
[re]FORM HOUSE

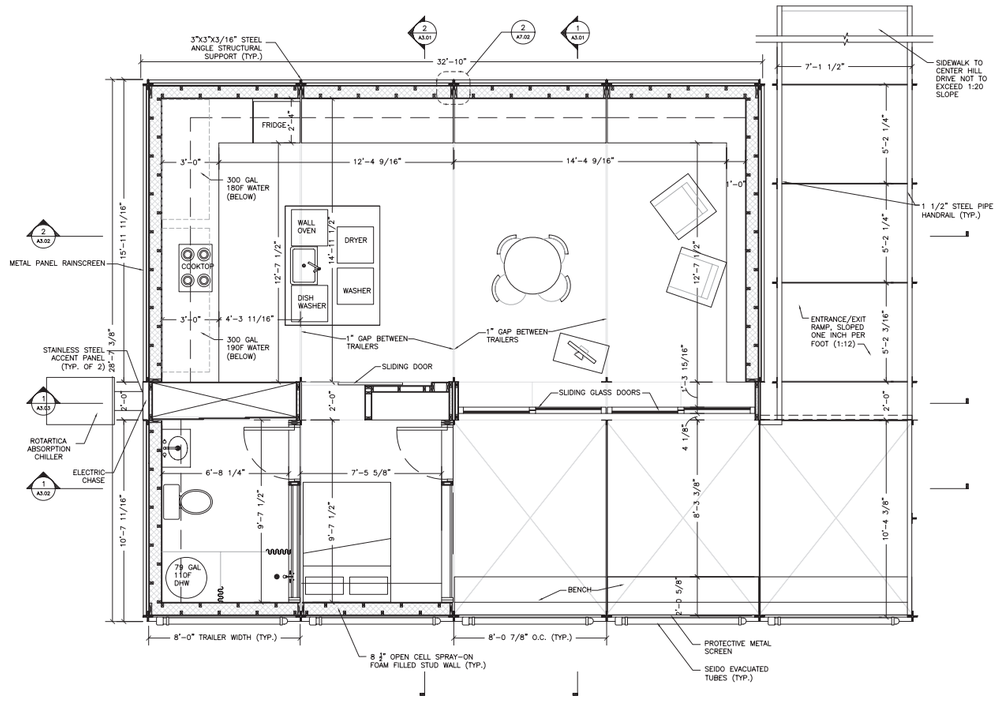
Our primary goal through this competition is the integration of innovative sustainable technologies into a well designed, contemporary home. In the approaching decades, energy will become an increasingly precious resource and our homes will need to adapt to the situation. Capturing and using energy wisely will become imperative, and today's younger generations will have to respond with innovative design solutions. The Solar Decathlon Competition provides a platform to present to the public the possibilities of these renewable energy strategies.

The 2007 University of Cincinnati [re]FORM house plays a didactic role in sustainable design. It educates the public by integrating new technology without sacrificing a visually appealing and user-friendly design. The Solar Decathlon Competition creates the opportunity to reach a large audience; providing physical, economic and informational access to sustainable ideas is key towards creating change in today's building market.

The [re]FORM house will present a holistic living experience. Powered completely through renewable energies, and gracefully integrating technology and architecture, the house is a model of livable sustainability.

To achieve this goal we have utilized intense collaboration between a large team of students and faculty from around the University. By working together (often side-by-side in the same room), our various team members have been able to integrate their respective ideas into the design. This interaction has yielded a design that truly represents our collective desire for a healthier, more sustainable tomorrow.





[reFORM
SOLAR DECATHLON 2007

UNIVERSITY OF CINCINNATI
CINCINNATI, OH
JANUARY 9, 2008

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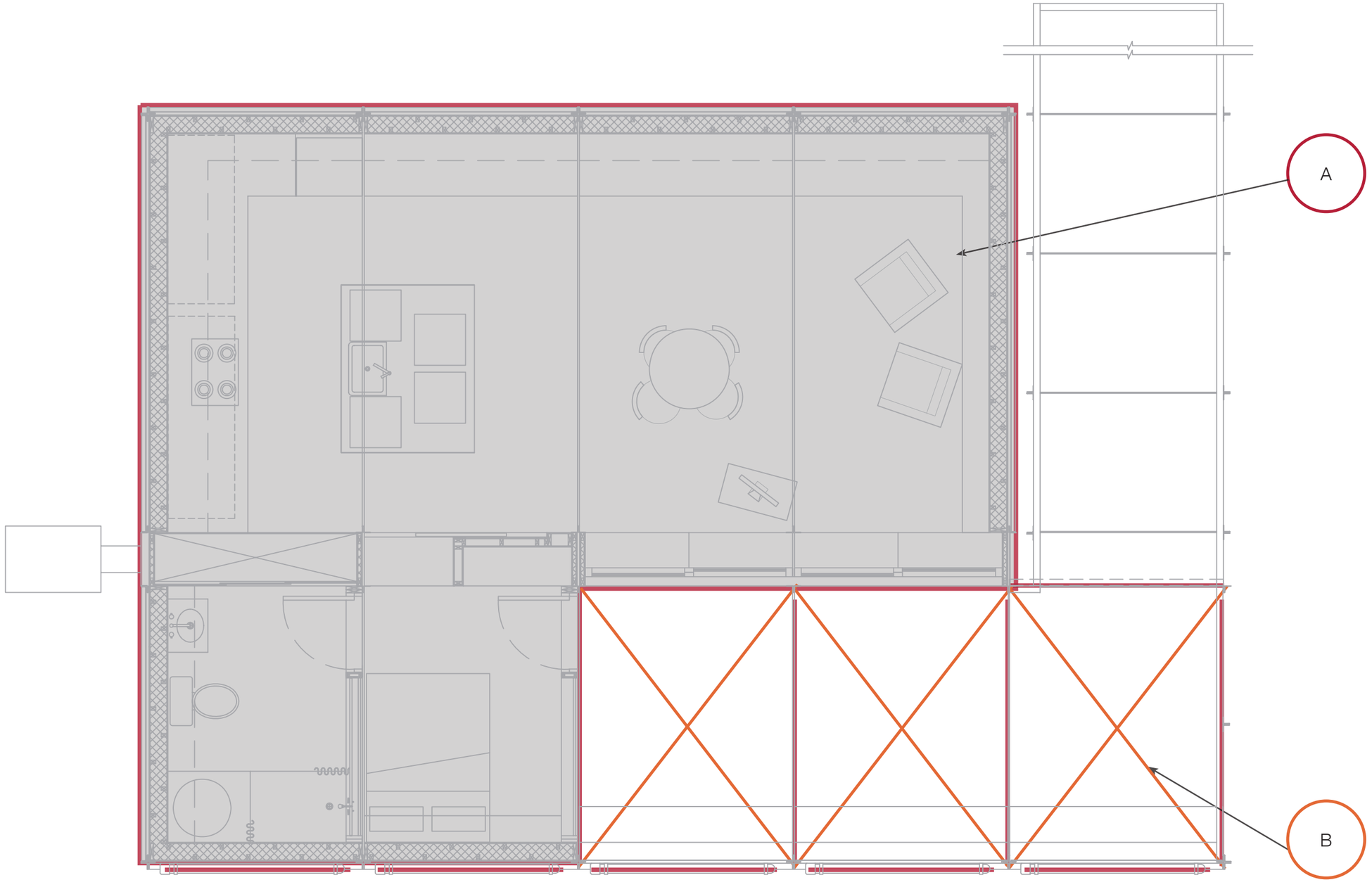

A - MAIN HOUSE, PV'S AND EVT	795.17 sf
B - STRUCTURAL MEMBERS	1.13 sf
TOTAL:	796.52 sf

1 / A0.01 **SOLAR FOOTPRINT AREA CALCULATIONS**

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A0.01

AREA CALCULATIONS

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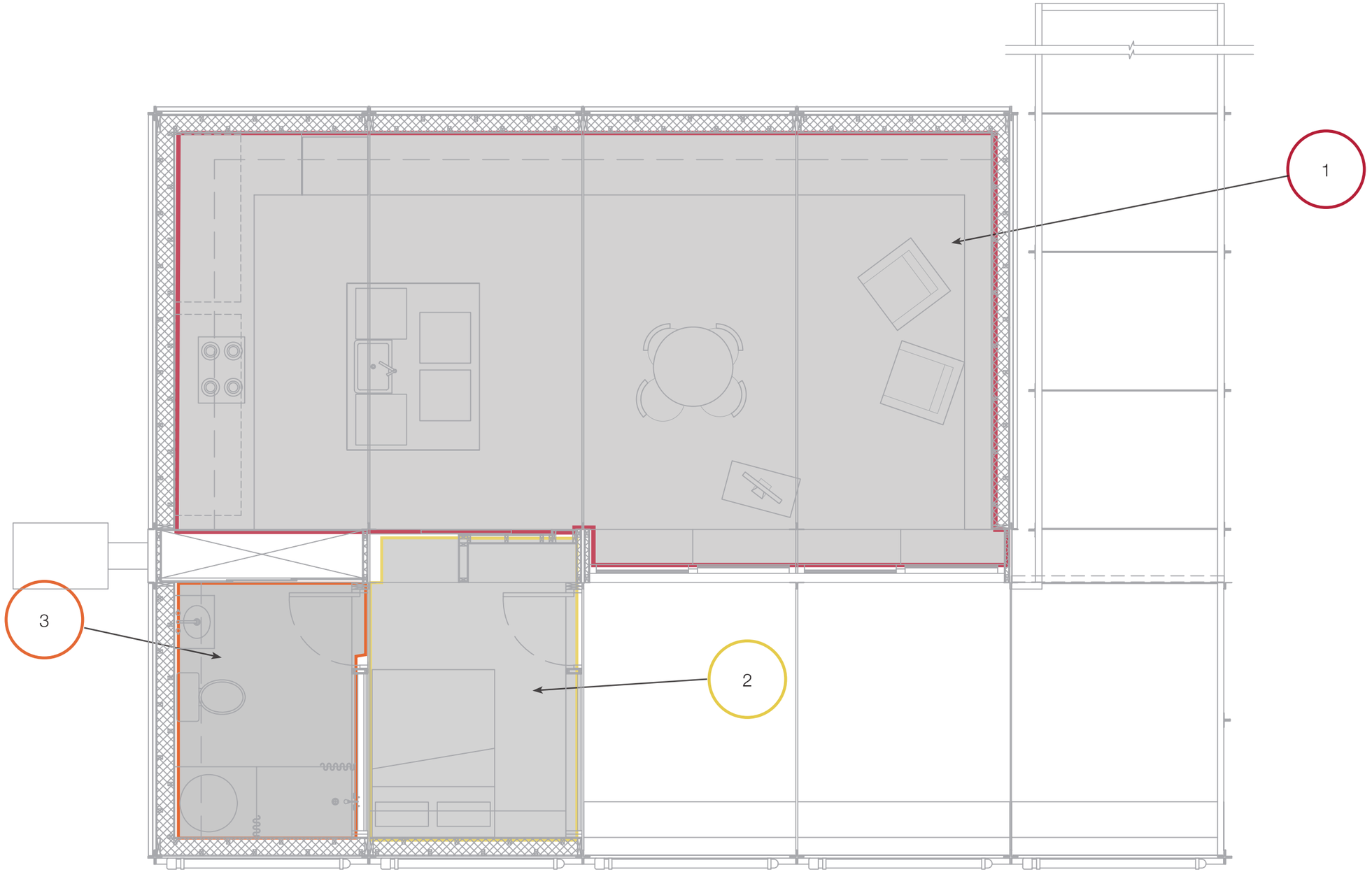

1 - LIVING/DINING	488.63 sf
2 - BEDROOM	81.93 sf
3 - BATHROOM	67.09 sf
TOTAL:	637.35 sf

1 / A0.02 **CONDITIONED AREA CALCULATIONS**

1/4" = 1'-0" 0 4 8

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A0.02

AREA CALCULATIONS

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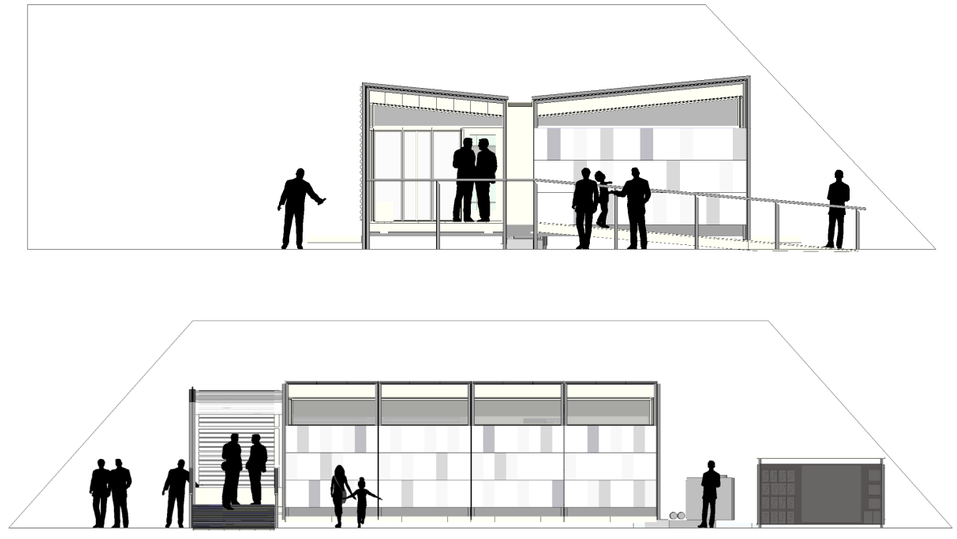
2
A0.02

SITE MAP

Center Hill, Cincinnati

NTS



1
A0.03

SOLAR ENVELOPE COMPLIANCE

NTS

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A0.03

SITE MAP &
SOLAR ENVELOPE

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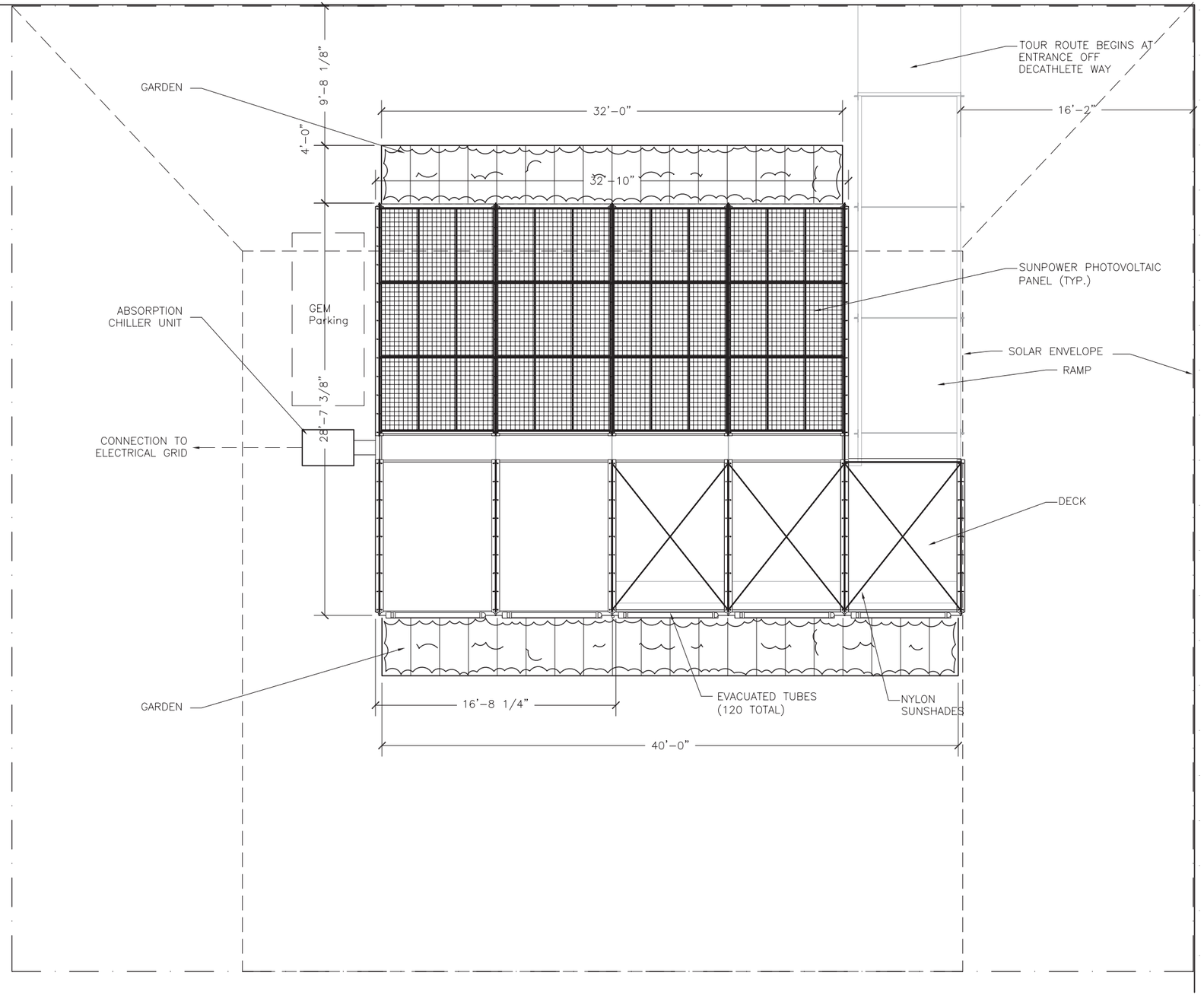
CENTER HILL ACCESS DRIVE



1 A0.04 **SITE PLAN**

1/8" = 1'-0" 0 8 16

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A0.04

SITE PLAN

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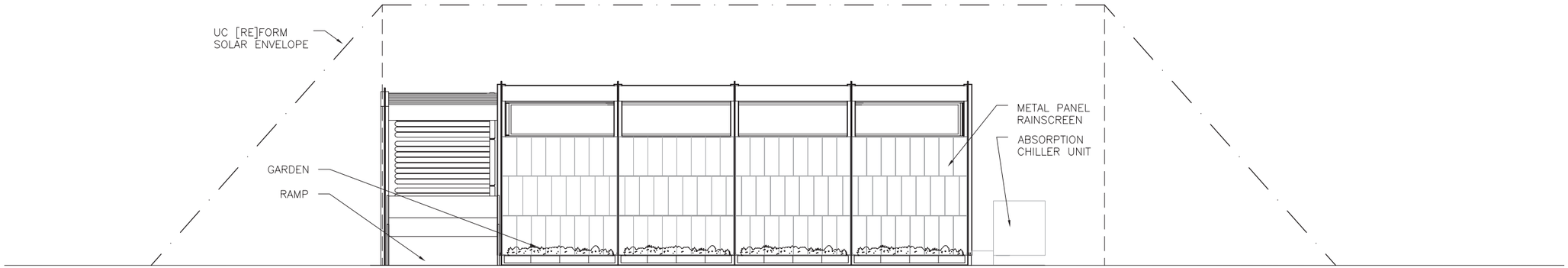
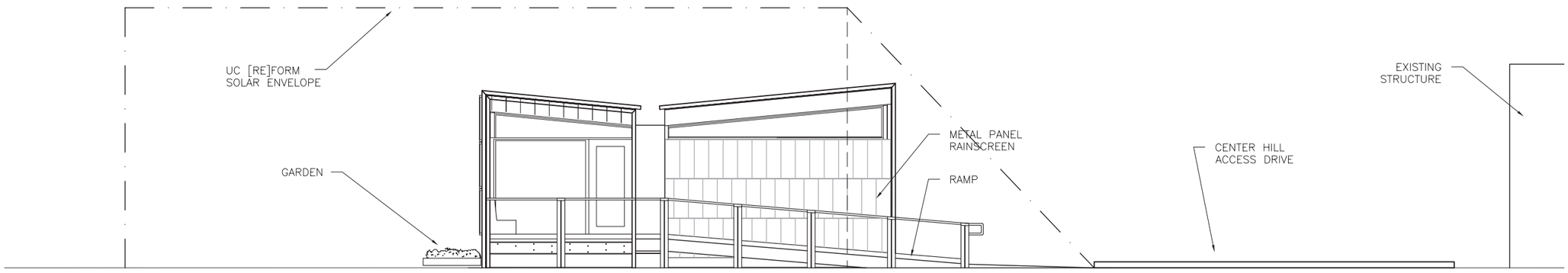


2 A0.05 **NORTH - SITE ELEVATION**

View from Decathlete Way

1/8" = 1'-0"

0 8 16



1 A0.05 **EAST - SITE ELEVATION**

View from Pedestrian Walkway

1/8" = 1'-0"

0 8 16

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A0.05

SITE ELEVATIONS

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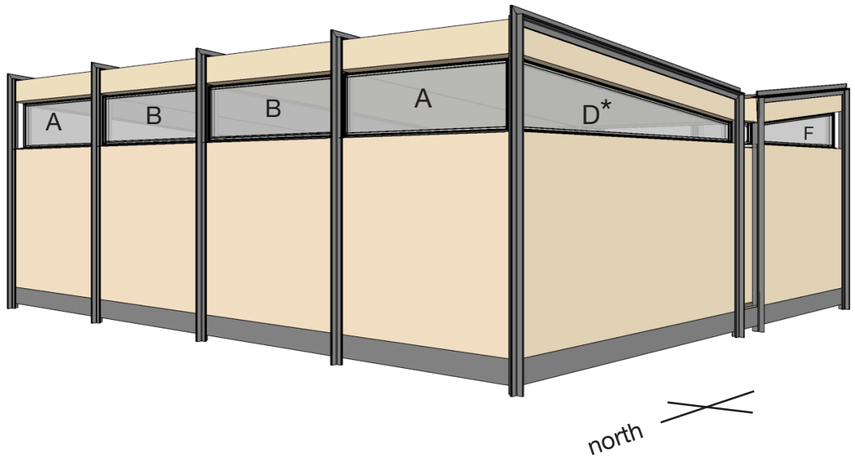
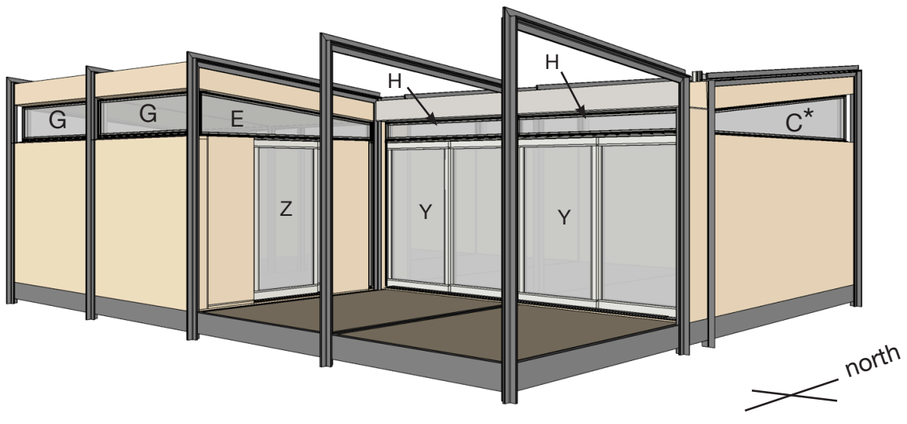
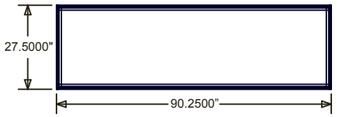




fixed frame direct set
w/ 1 5/8" Krypton-filled SuperGlass Quad TC 88

A (qty:2)



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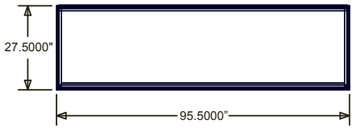

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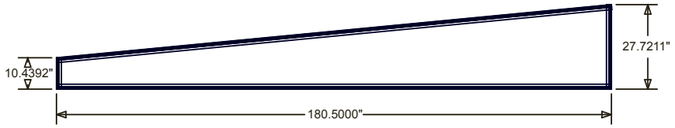

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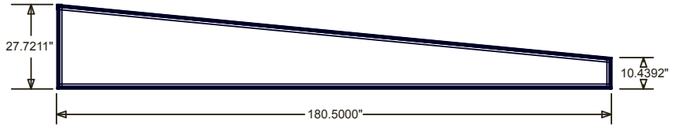

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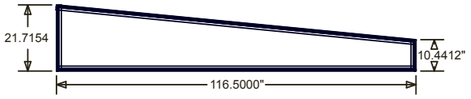

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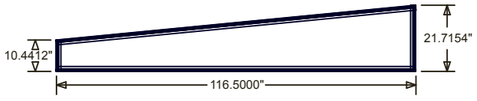

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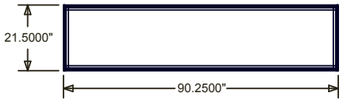

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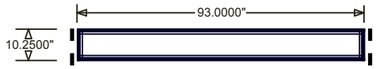
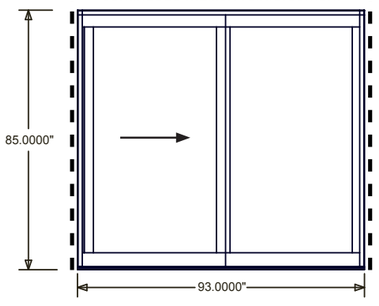


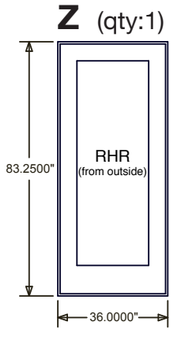
sliding contemporary
3-pane designer series

Y (qty:2)



outswinging french
3-pane designer series, ADA sill

Z (qty:1)



Notes:
- all dimensions are from outside of frame to outside of frame
- windows C & D will be split into two or three units

1
A0.10

WINDOW AND DOOR SCHEDULE

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A0.10

WINDOW & DOOR SCHEDULE

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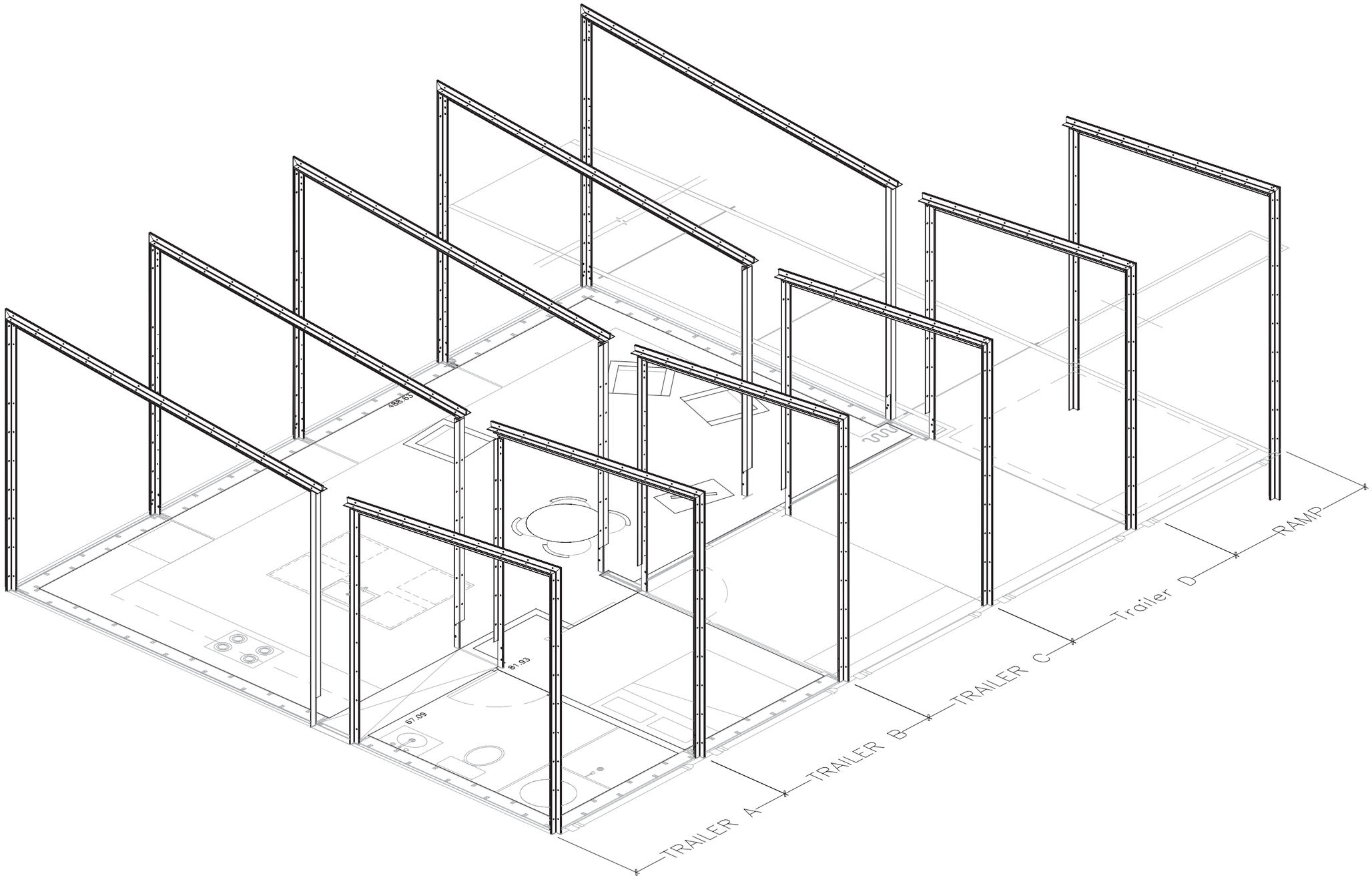

1 A0.11 **STEEL PREFABRICATION DIAGRAM**
Axonometric View
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A0.11

STEEL
PREFABRICATION

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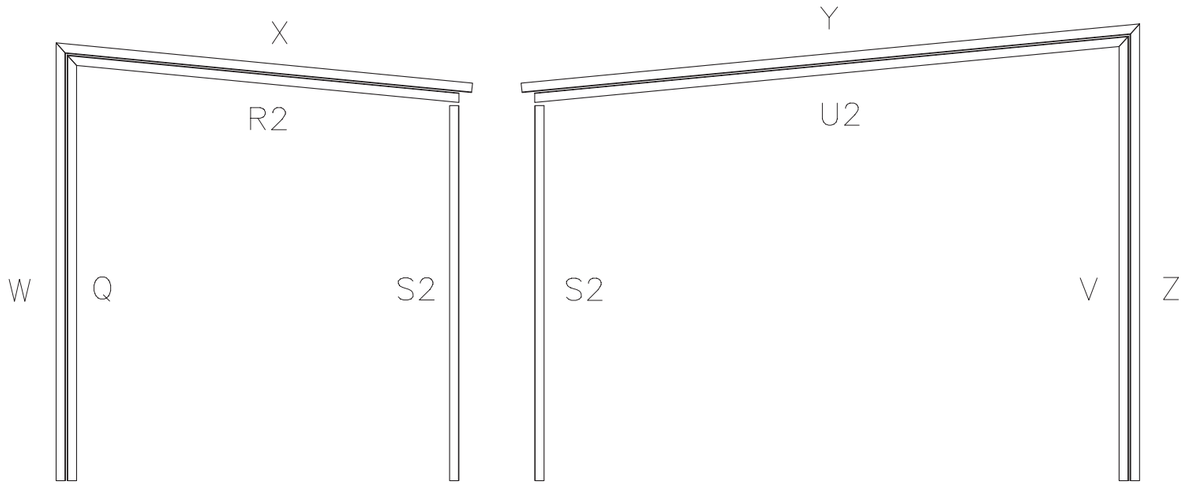

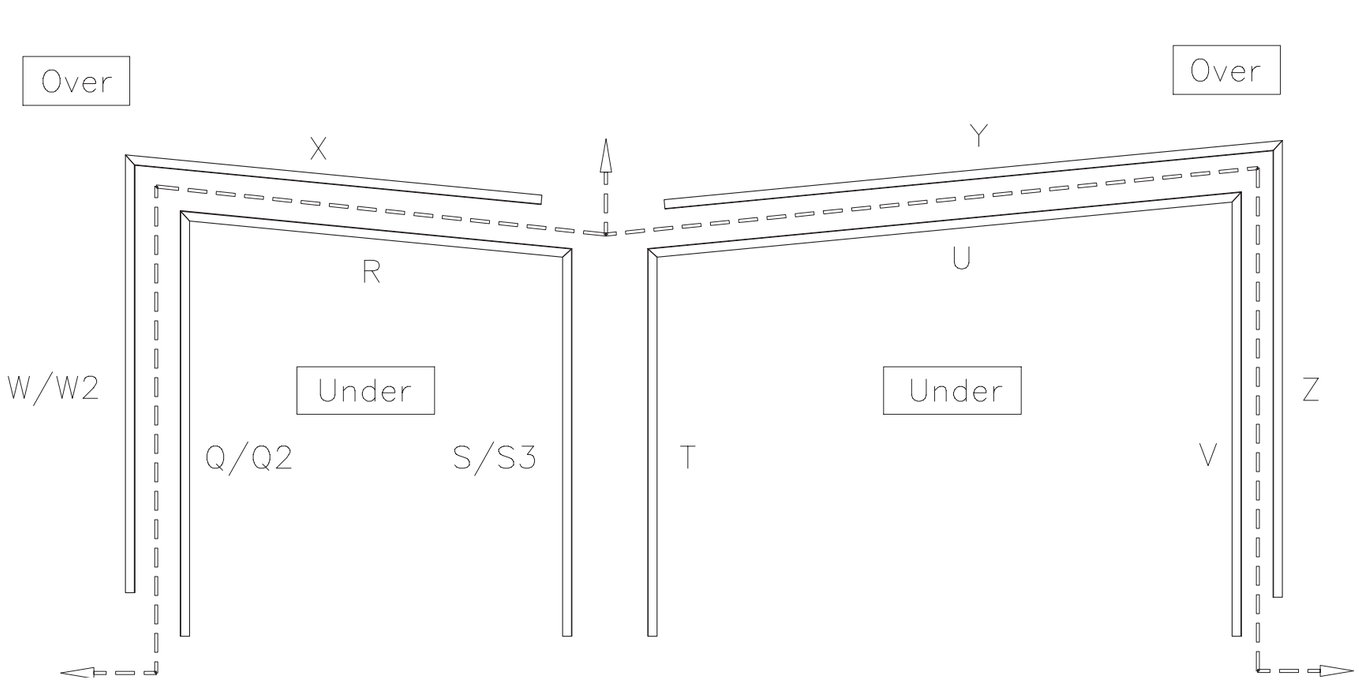

Under (Q – V)	
Q–	5
Q+	5
Q2–	1
Q2+	1
R–	5
R+	5
R2–	1
R2+	1
S–	4
S+	4
S2	8
S3–	1
S3+	1
T–	2
T+	2
U–	2
U+	2
U2–	3
U2+	3
V–	5
V+	5
21 Different Lengths	66 Total Pieces

Over (W – Z)	
W–	5
W+	5
W2–	1
W2+	1
X–	6
X+	6
Y–	5
Y+	5
Z–	5
Z+	5
10 Different Lengths	44 Total Pieces

1
A0.12

STEEL PREFABRICATION KEY

NTS

[reFORM
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A0.12

STEEL
PREFABRICATION

JANUARY 9, 2008

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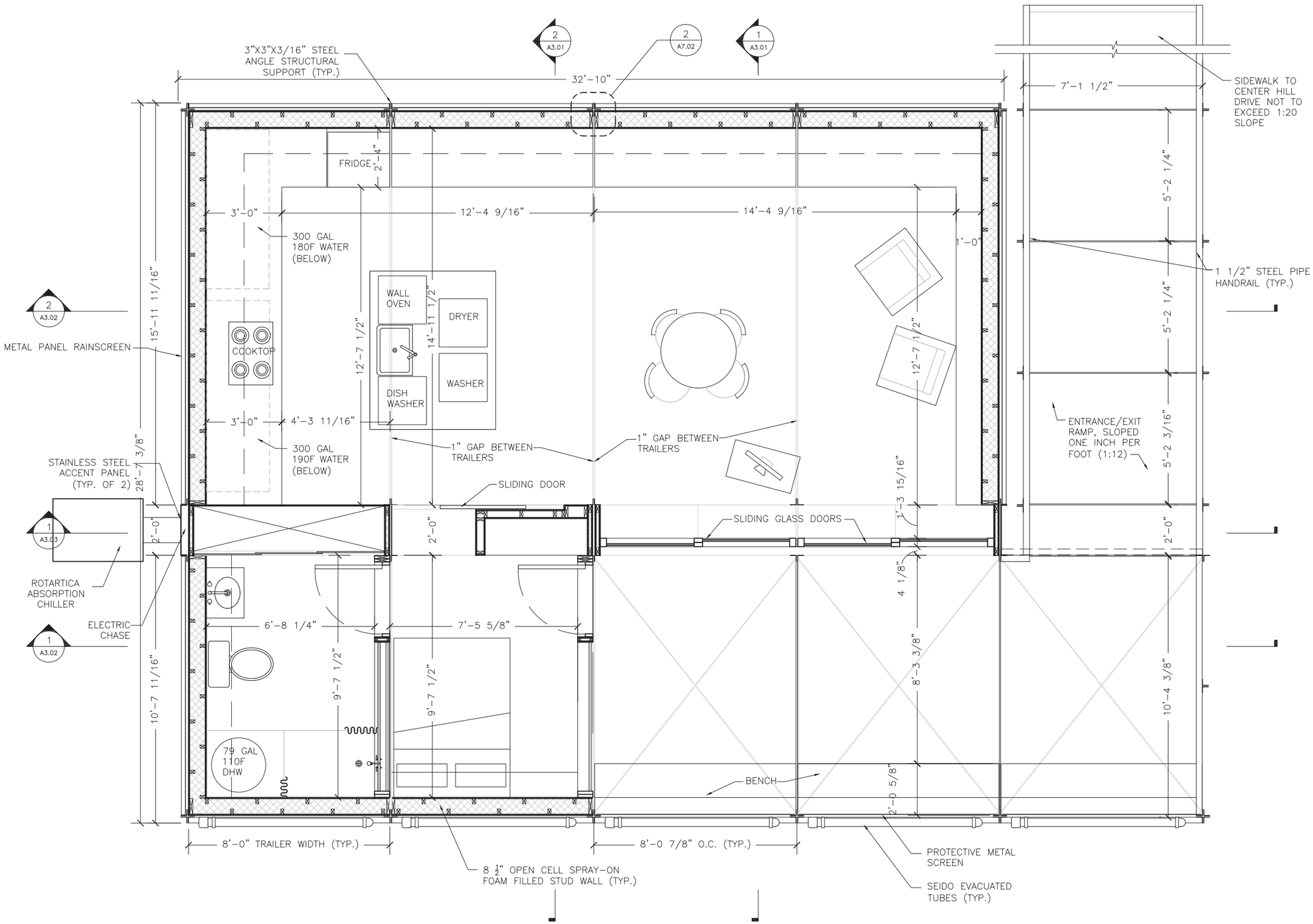

1 A1.01 **FIRST FLOOR PLAN**

1/4" = 1'-0" 0 4 8

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A1.01

FLOOR PLAN

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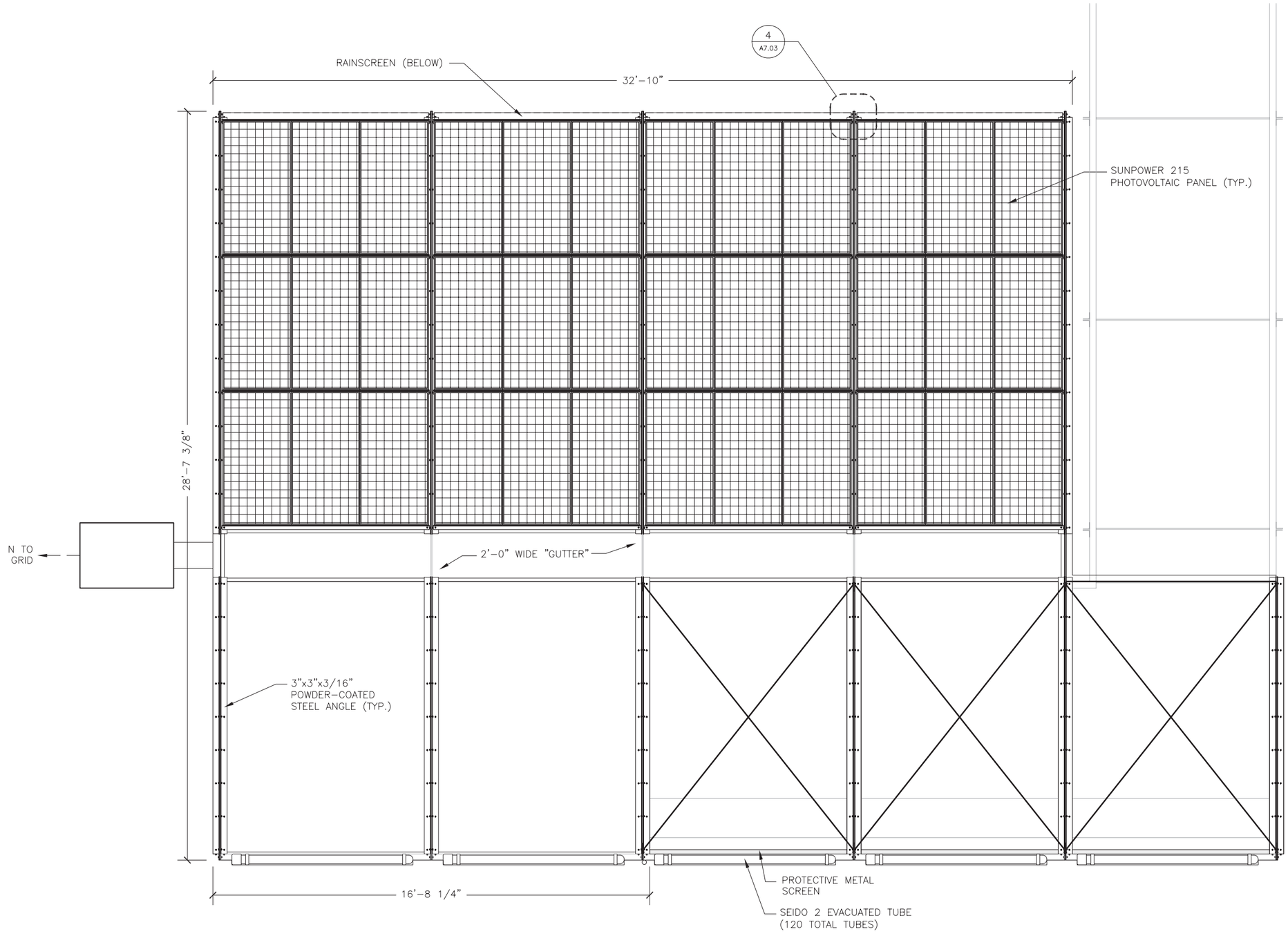

1 A1.02 **ROOF PLAN**

1/4" = 1'-0"

0 4 8

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SOLAR DECATHLON 2007

A1.02

ROOF PLAN

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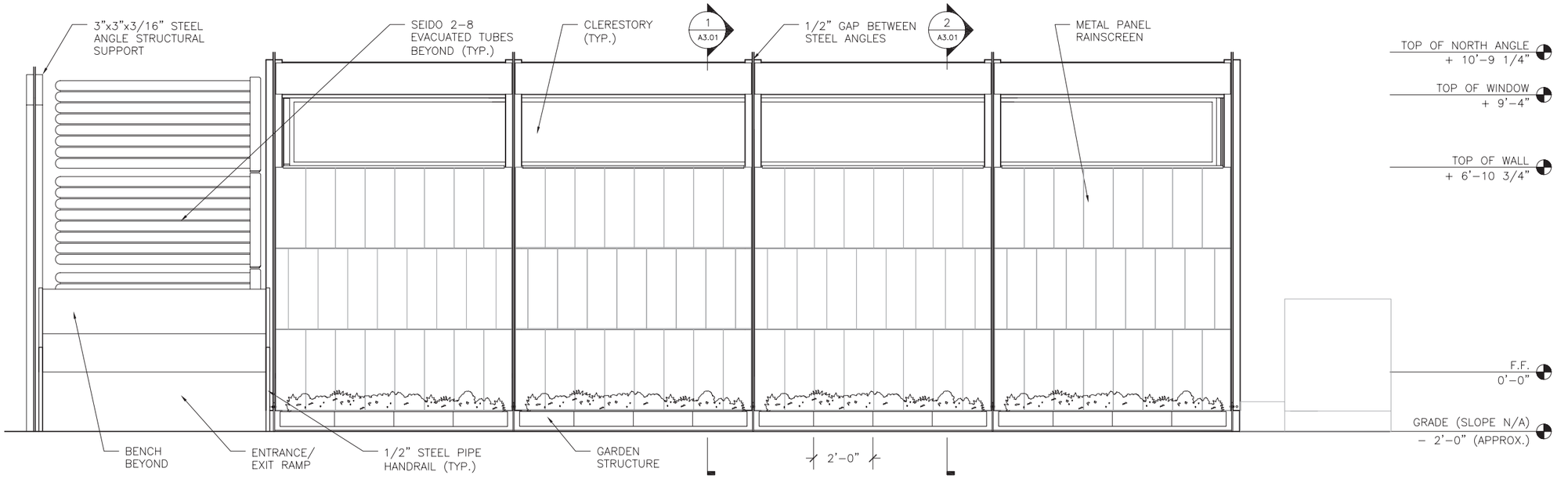
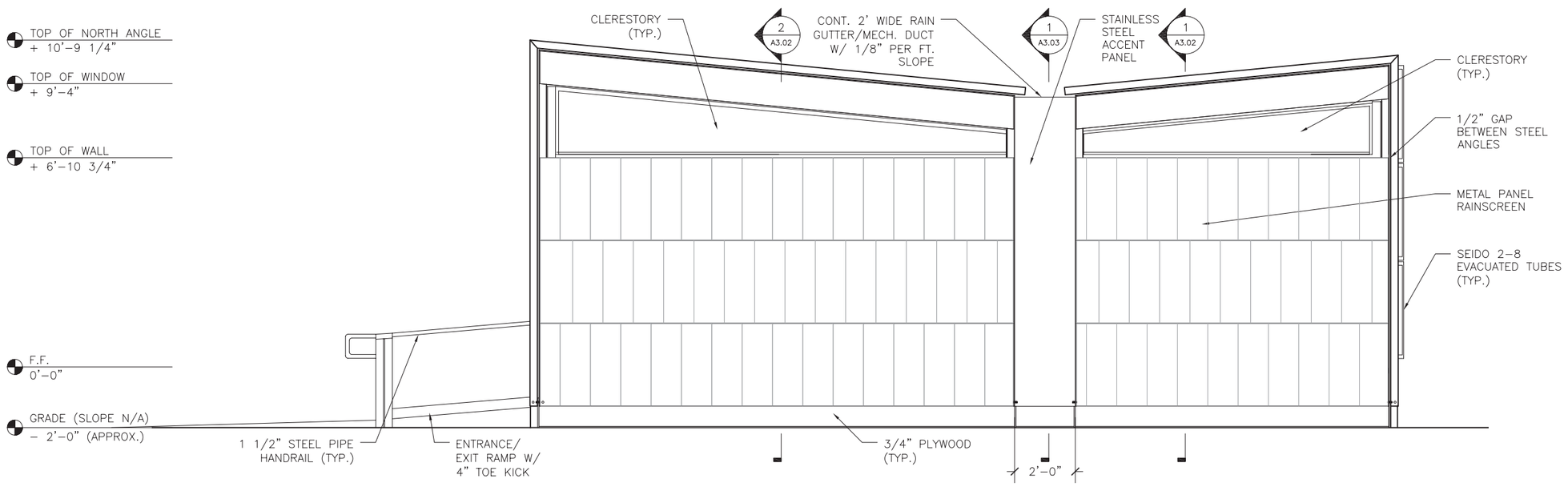
Cincinnati, OH



2 A2.01 **NORTH ELEVATION**

1/4" = 1'-0" 0 4 8



1 A2.01 **WEST ELEVATION**

1/4" = 1'-0" 0 4 8

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A2.01

BUILDING ELEVATIONS

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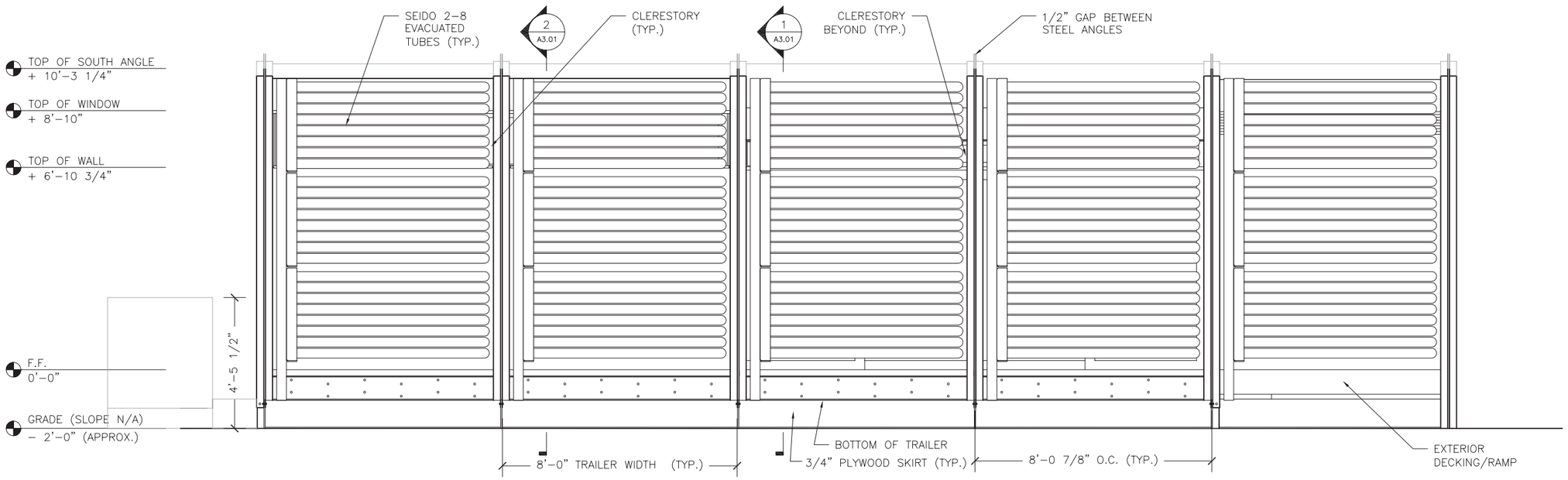
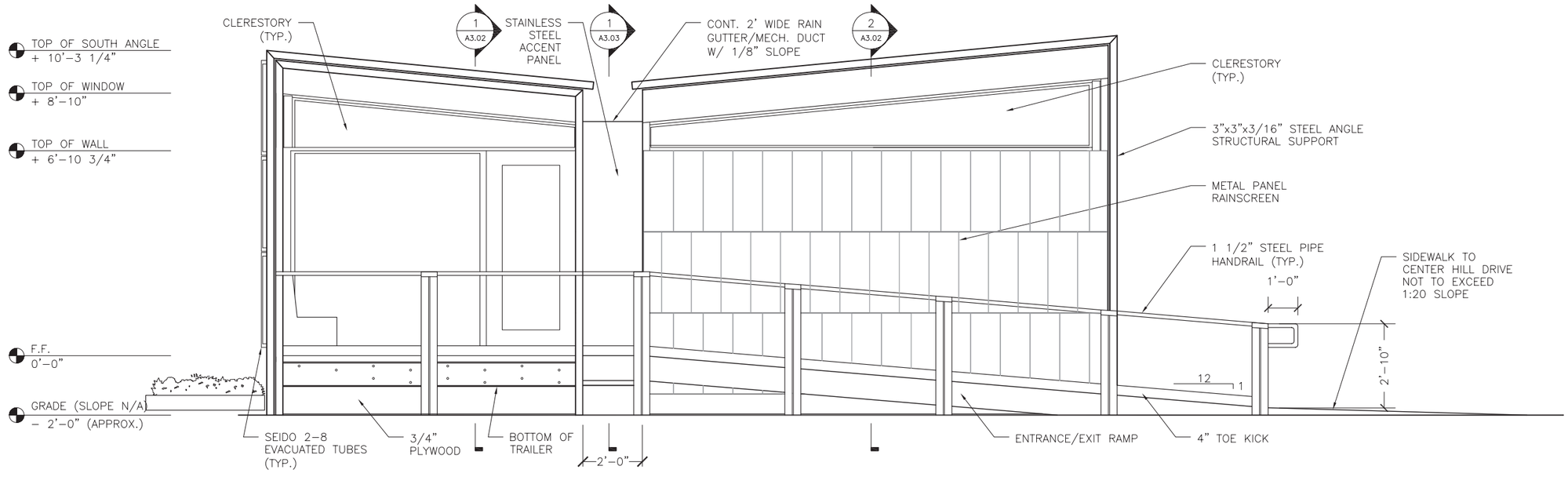


2 A2.02 **SOUTH ELEVATION**

1/4" = 1'-0" 0 4 8



1 A2.02 **EAST ELEVATION**

1/4" = 1'-0" 0 4 8

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A2.02

BUILDINGS ELEVATIONS

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University of Cincinnati
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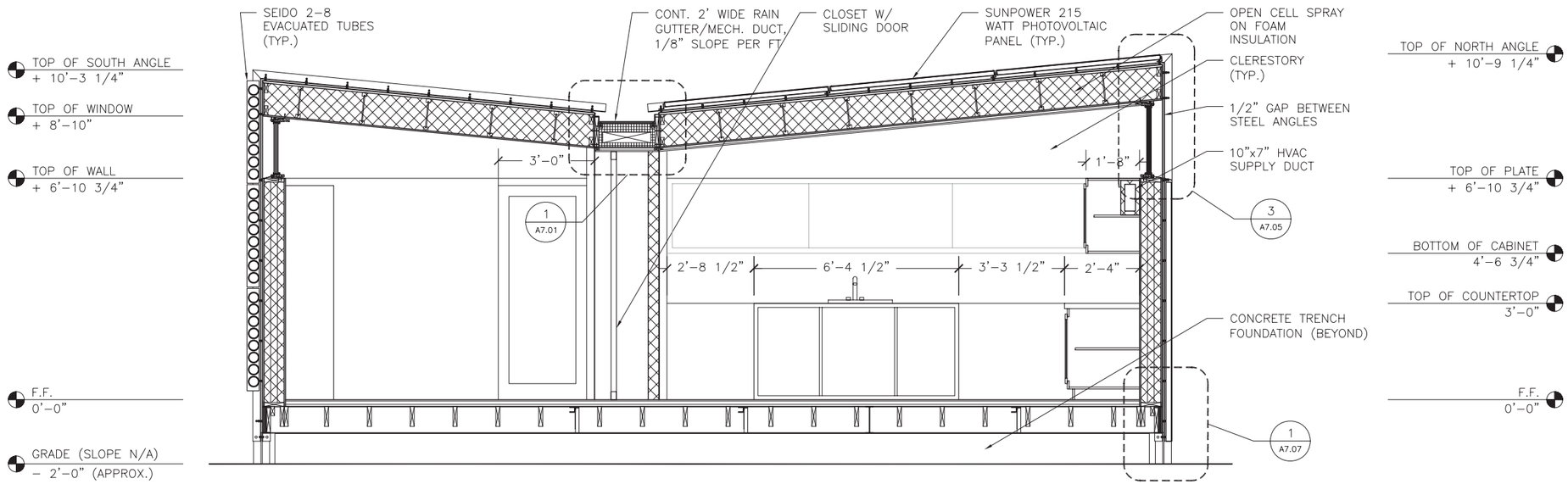
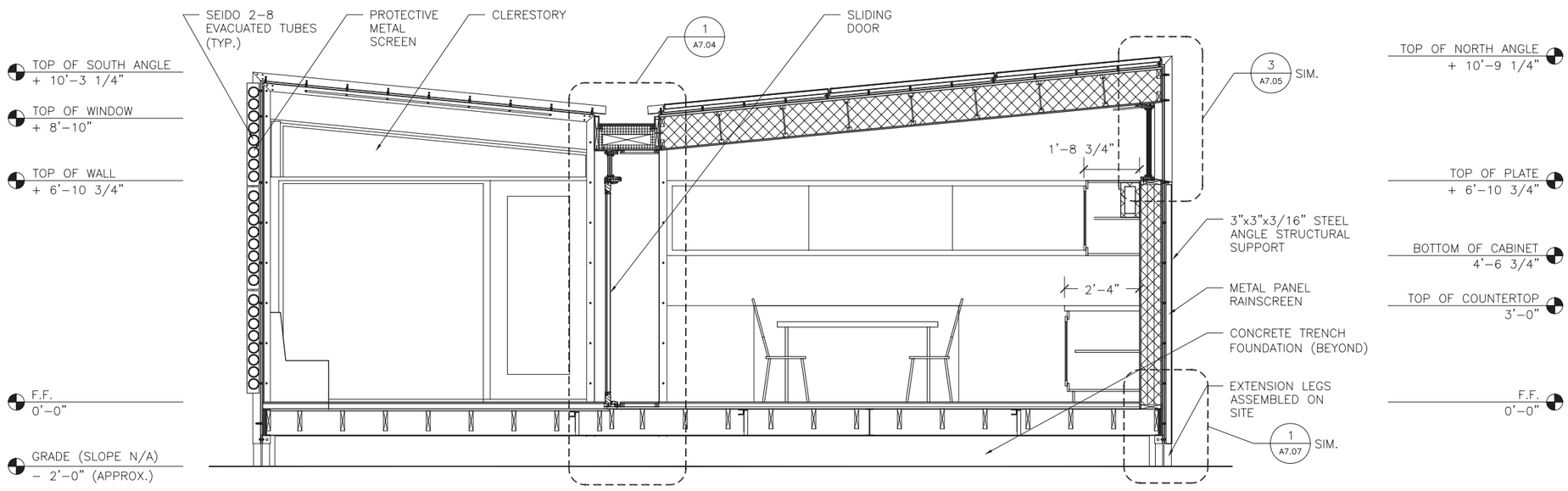


2 A3.01 **SOUTH-NORTH SECTION LOOKING WEST**

Through Kitchen

1/4" = 1'-0" 0 4 8



1 A3.01 **SOUTH-NORTH SECTION LOOKING WEST**

Through Deck

1/4" = 1'-0" 0 4 8

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A3.01

BUILDING SECTIONS

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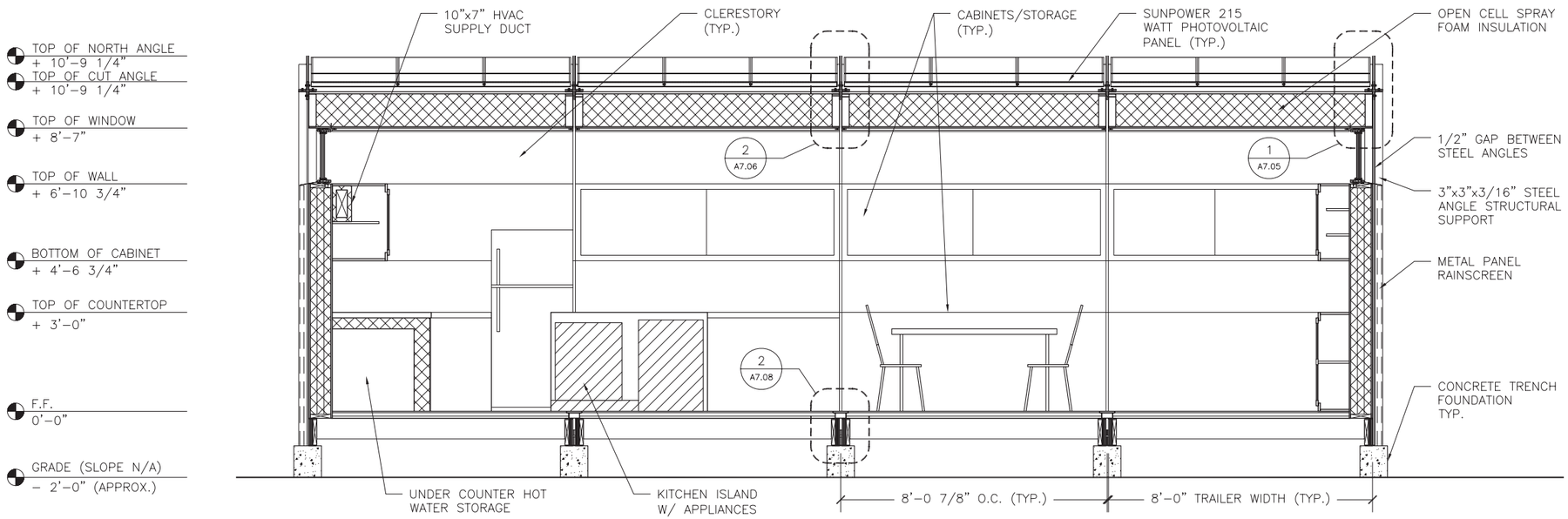
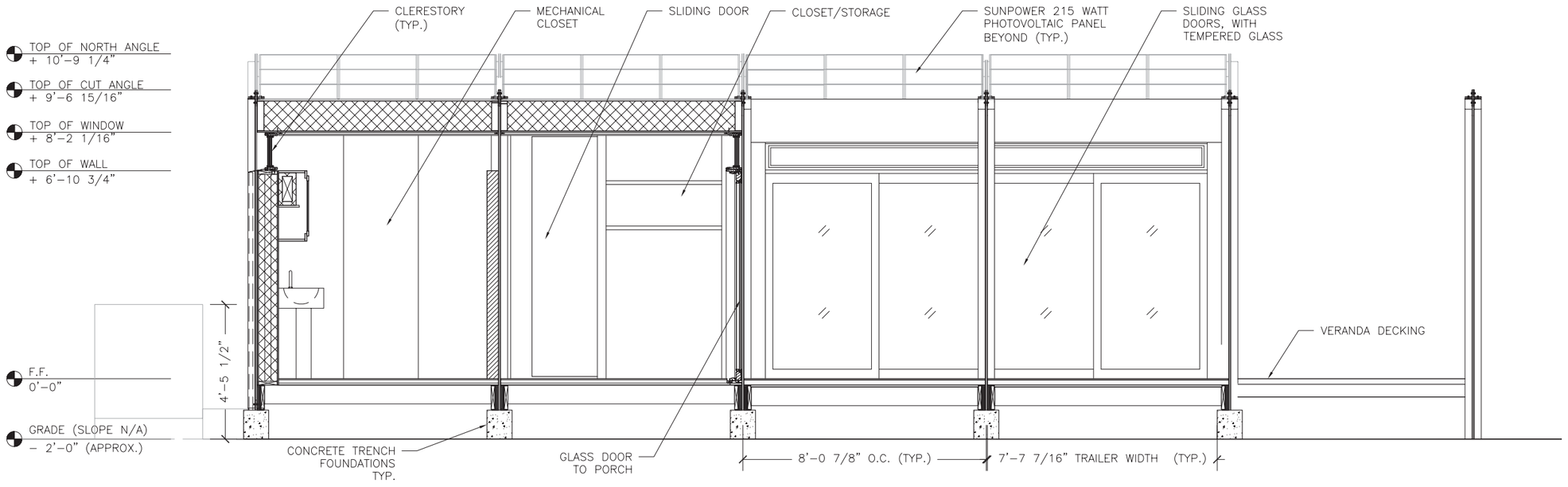


2 A3.02 **WEST-EAST SECTION LOOKING NORTH**

Through Living Space 1/4" = 1'-0" 0 4 8



1 A3.02 **WEST-EAST SECTION LOOKING NORTH**

Through Deck 1/4" = 1'-0" 0 4 8

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A3.02

BUILDING SECTIONS

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH

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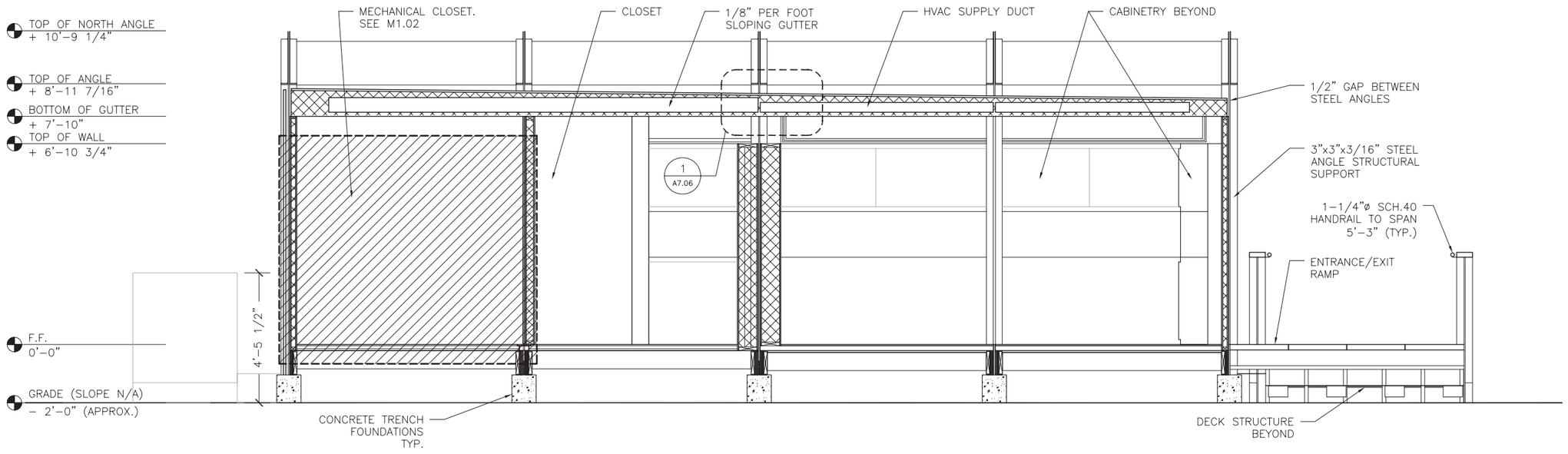

1
A3.03

WEST-EAST SECTION LOOKING NORTH

Through Gutter

1/4" = 1'-0"

0 4 8

A3.03

BUILDING
SECTIONS

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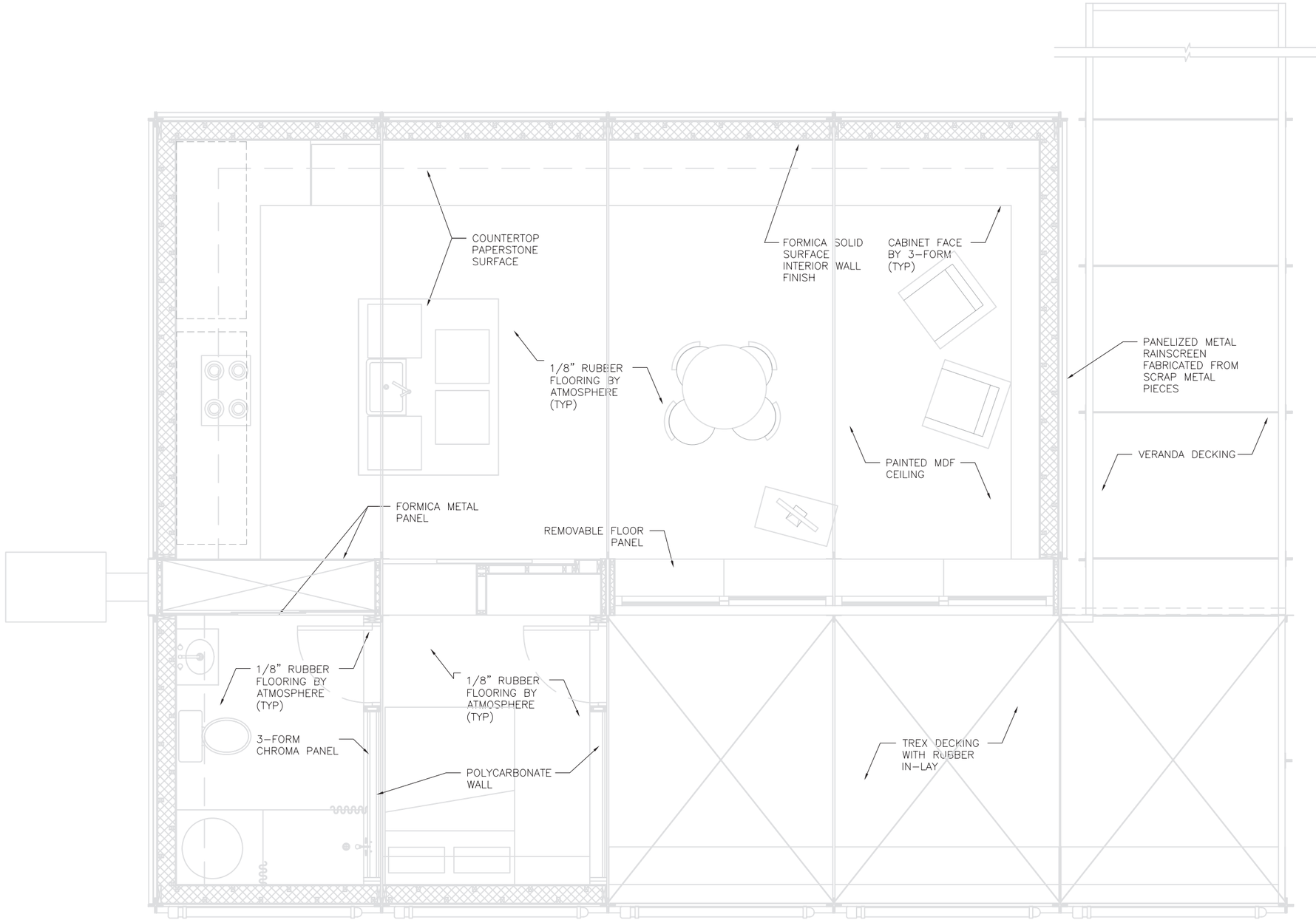
Cincinnati, OH



1 A5.01 **PRIMARY MATERIALS LAYOUT**

1/4" = 1'-0" 0 4 8

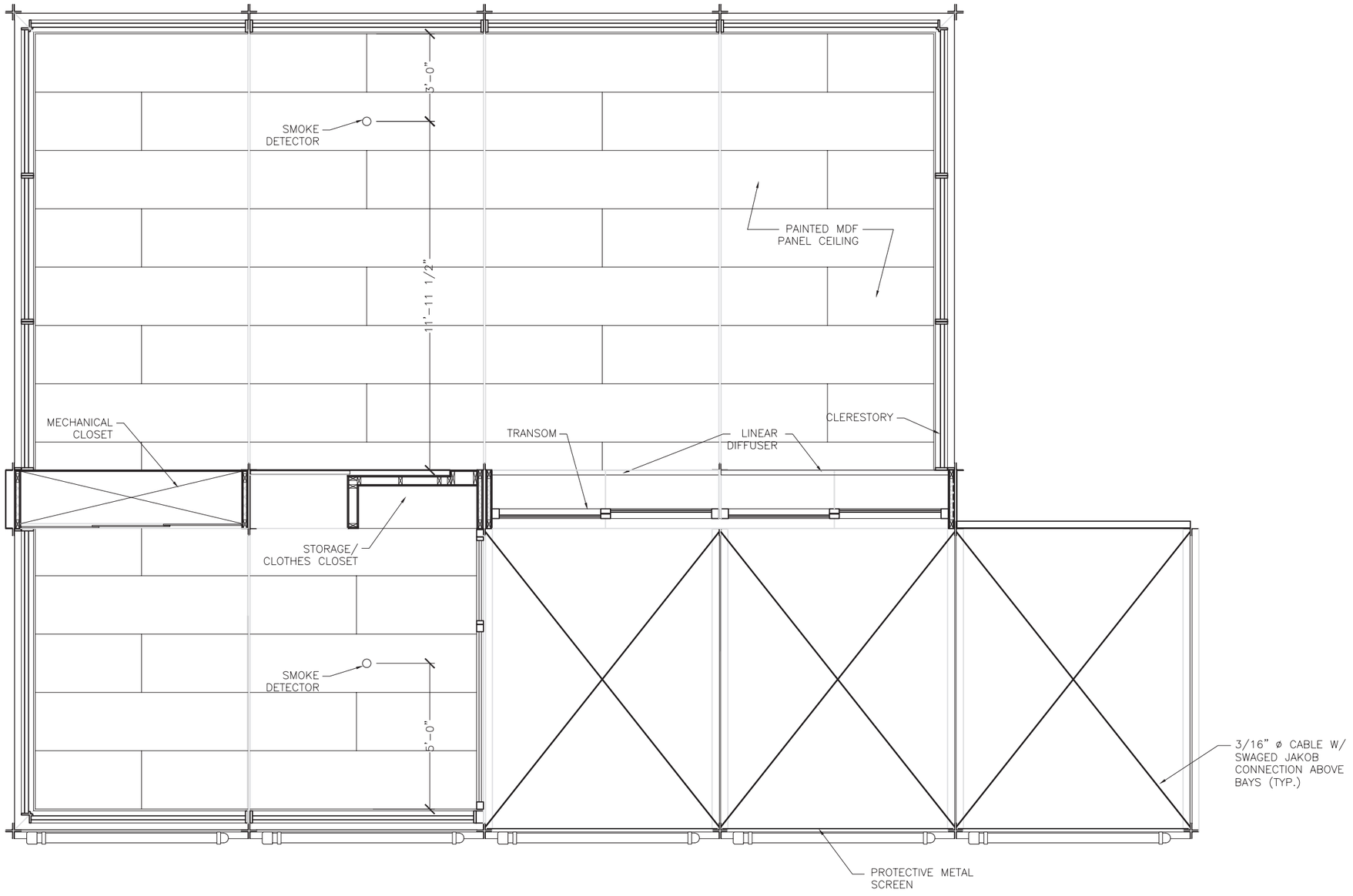
[reFORM
SOLAR DECATHLON 2007

A5.01

MATERIALS LAYOUT

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH



1 / A6.01 **REFLECTED CEILING PLAN**

1/4" = 1'-0" 0 4 8

[reFORM
SOLAR DECATHLON 2007

A6.01

RCP

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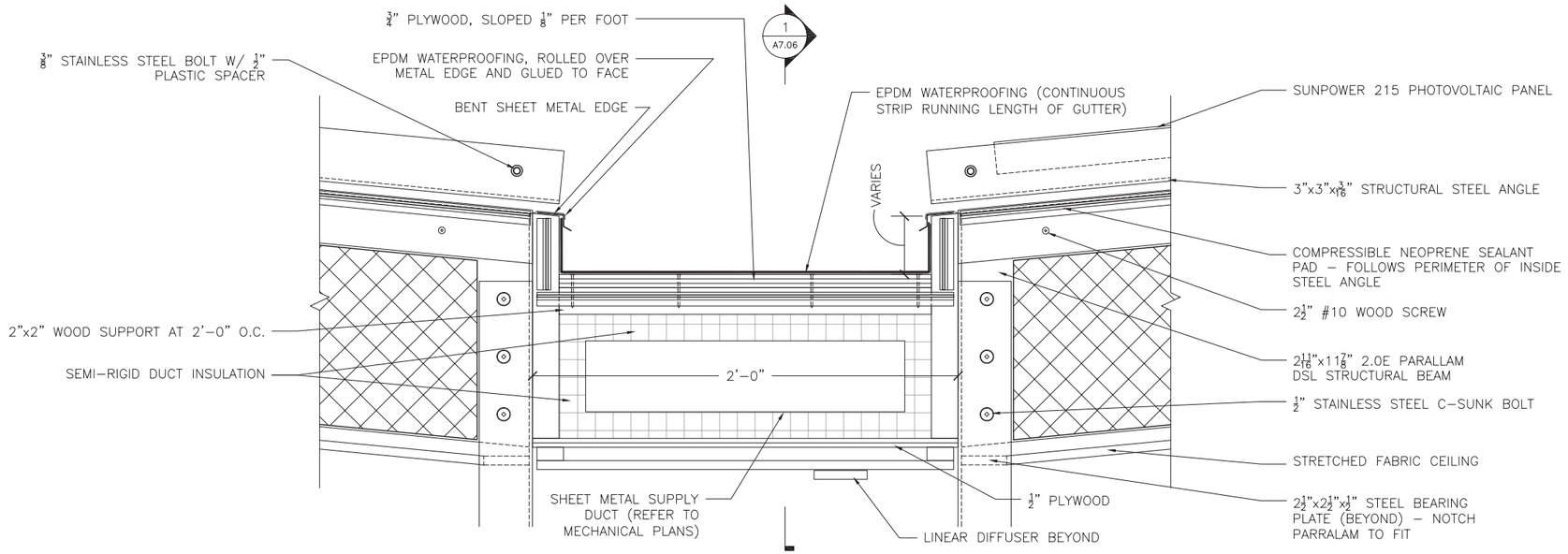
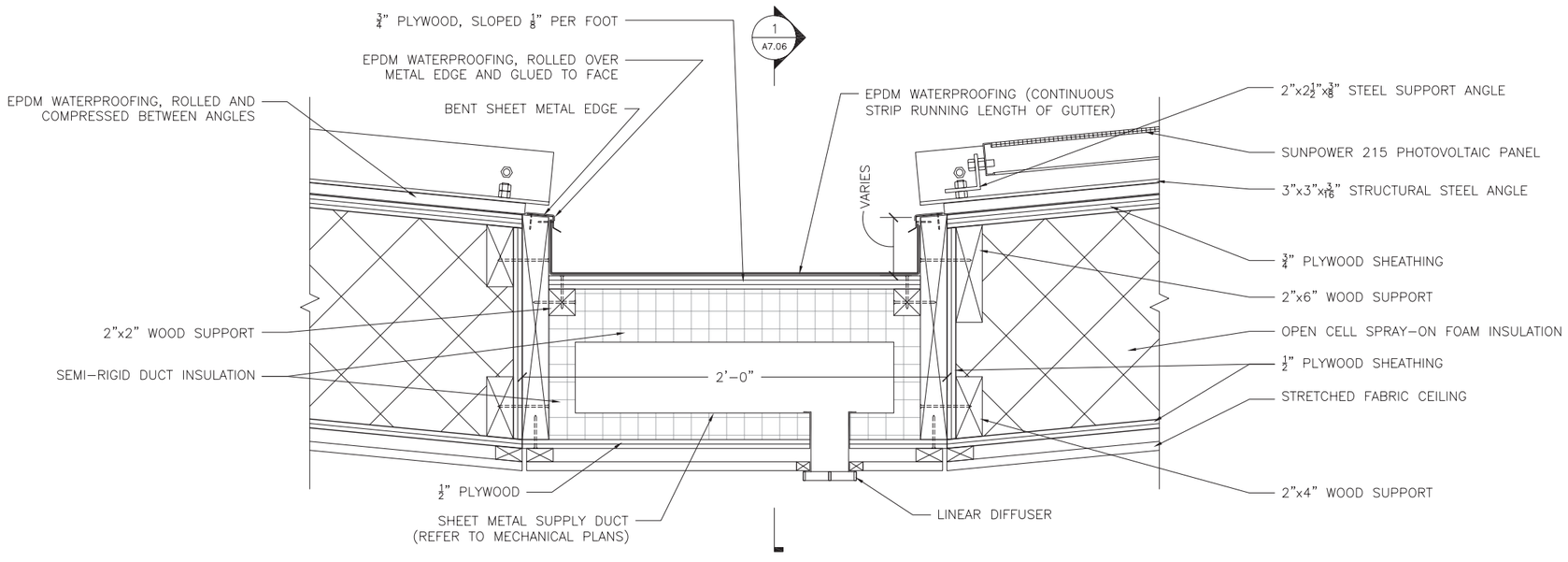


2
A7.01

GUTTER CONSTRUCTION AT TRAILER CONNECTION

NS Section View

1 1/2" = 1'-0" 0 8" 16"



1
A7.01

GUTTER CONSTRUCTION, TYP.

NS Section View

1 1/2" = 1'-0" 0 8" 16"

[reFORM
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A7.01

ARCHITECTURAL DETAILS

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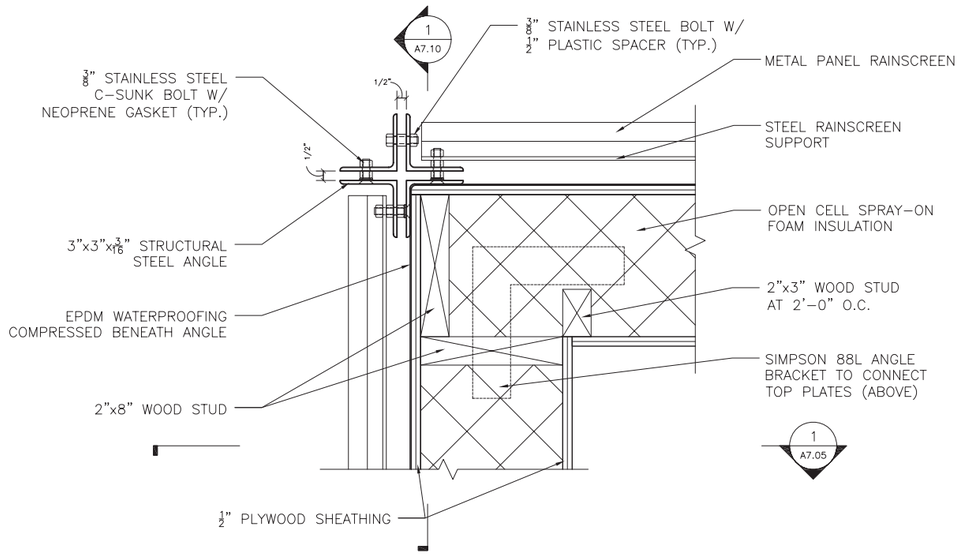
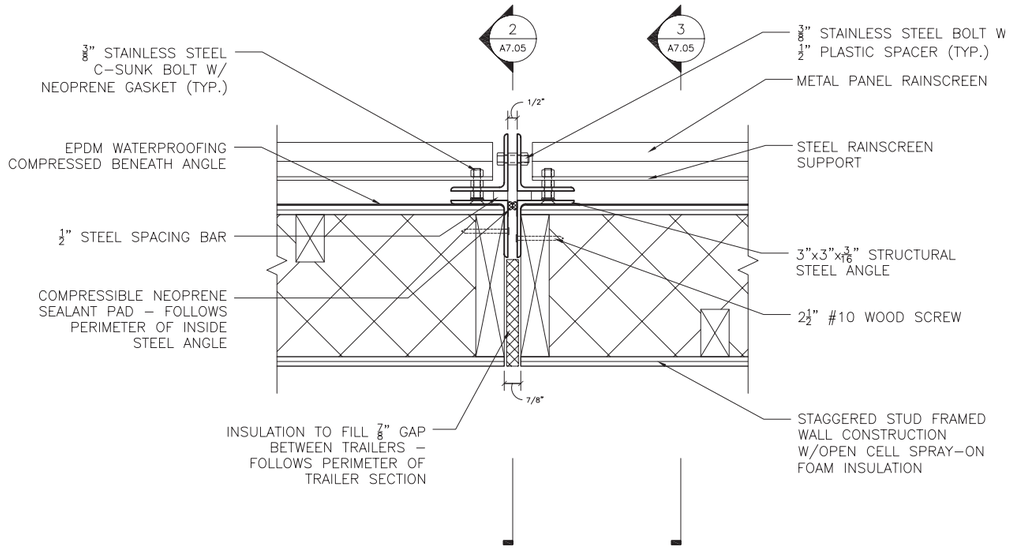


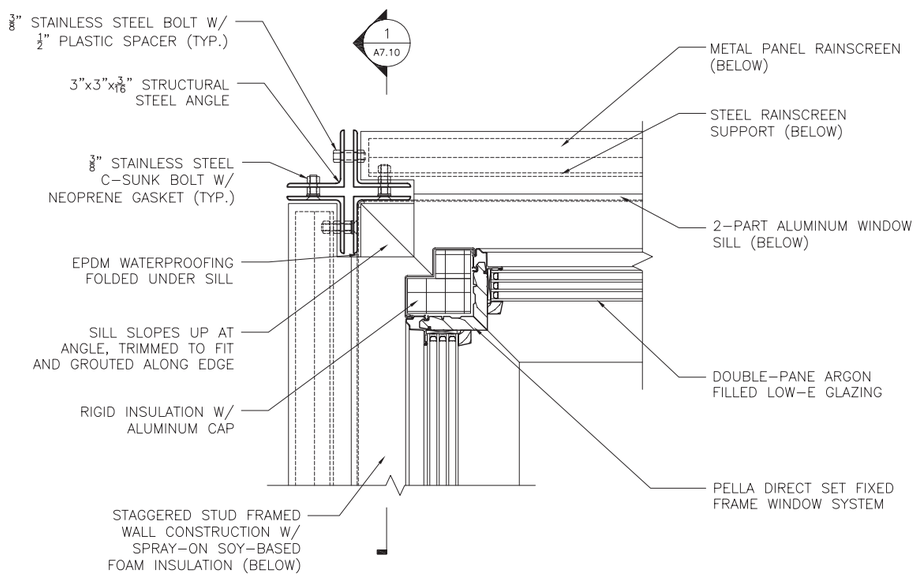
4 A7.02 **WALL DETAIL AT CORNER**

Plan View 1 1/2" = 1'-0" 0 8" 16"



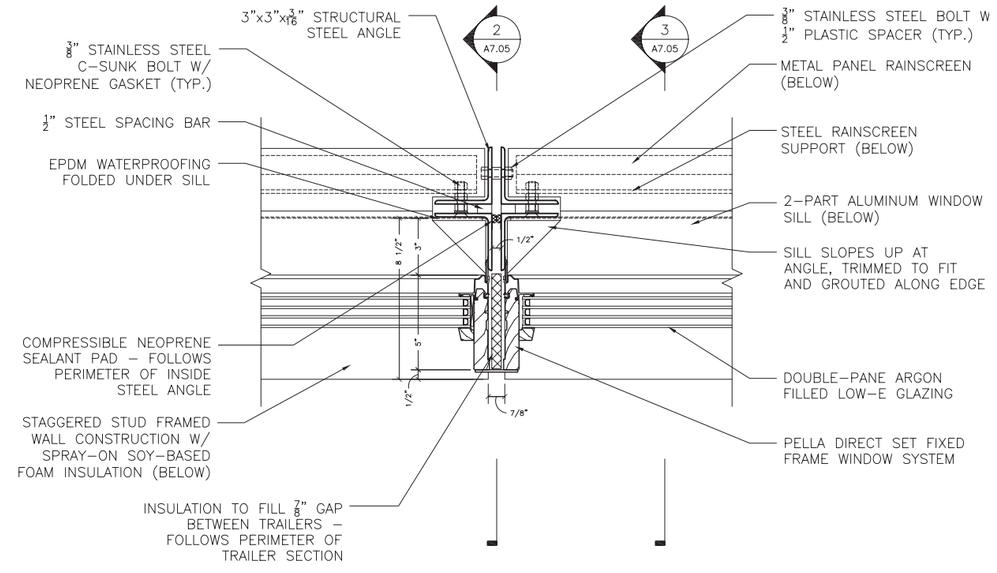
2 A7.02 **WALL AT TRAILER CONNECTION, TYP.**

Plan View 1 1/2" = 1'-0" 0 8" 16"



3 A7.02 **CLERESTORY AT CORNER**

Plan View 1 1/2" = 1'-0" 0 8" 16"



1 A7.02 **CLERESTORY AT TRAILER CONNECTION, TYP.**

Plan View 1 1/2" = 1'-0" 0 8" 16"

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A7.02

ARCHITECTURAL DETAILS

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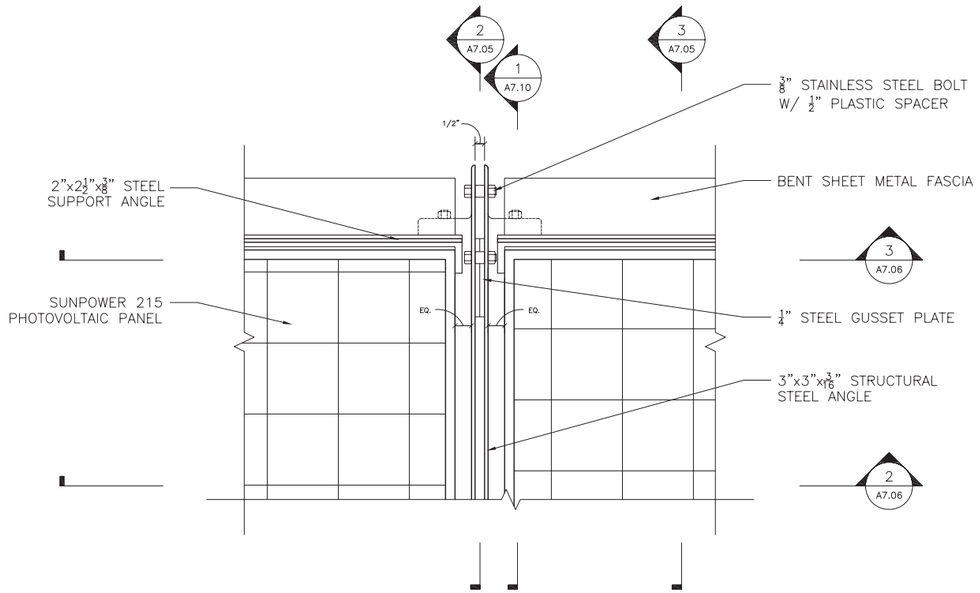
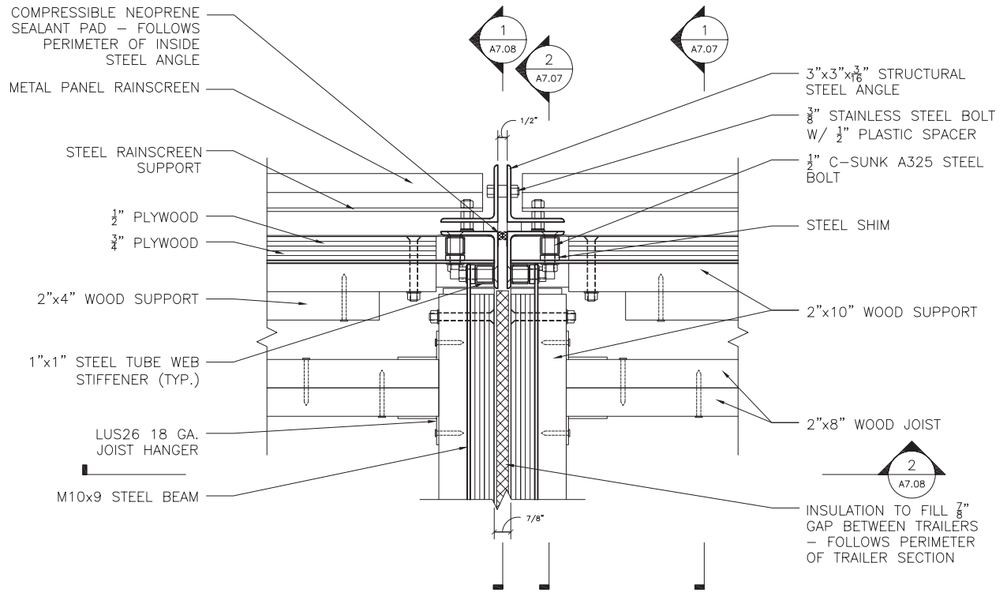


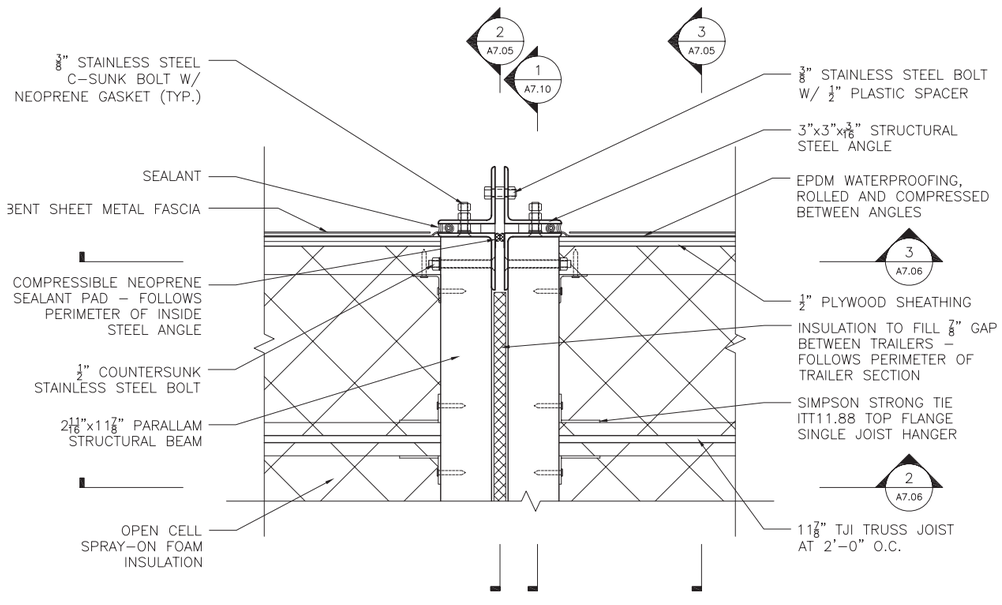
4 A7.03 **SOLAR PANEL FRAMING AT ROOF**

Plan View 1/2" = 1'-0" 0 2 4



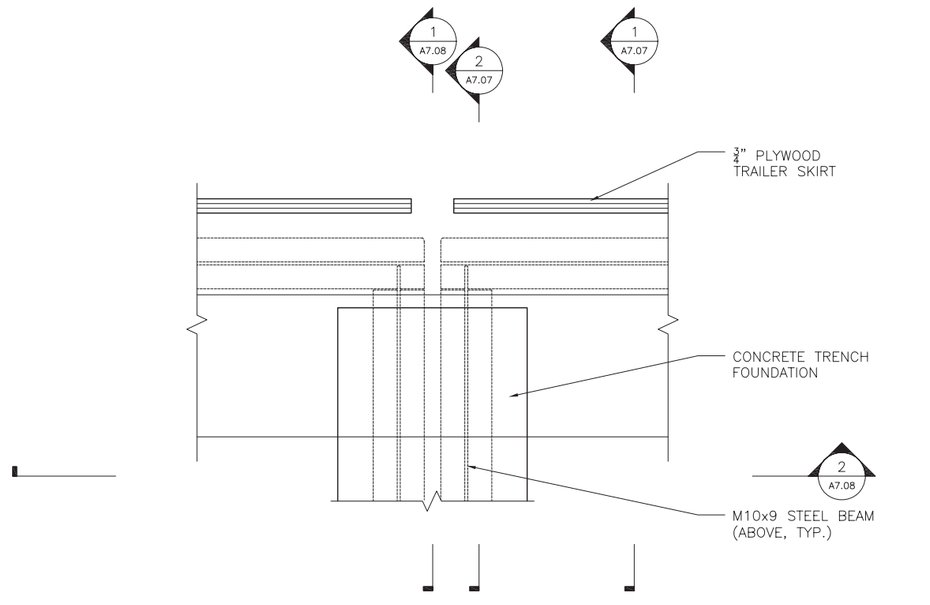
2 A7.03 **TRAILER CONNECTION, TYP.**

Plan View 1 1/2" = 1'-0" 0 8" 16"



3 A7.03 **STEEL TO MICROLAM CONNECTION AT ROOF**

Plan View 1 1/2" = 1'-0" 0 8" 16"



1 A7.03 **FOUNDATION AT TRAILER CONNECTION**

Plan View 1 1/2" = 1'-0" 0 8" 16"

[reFORM
SOLAR DECATHLON 2007

A7.03

ARCHITECTURAL DETAILS

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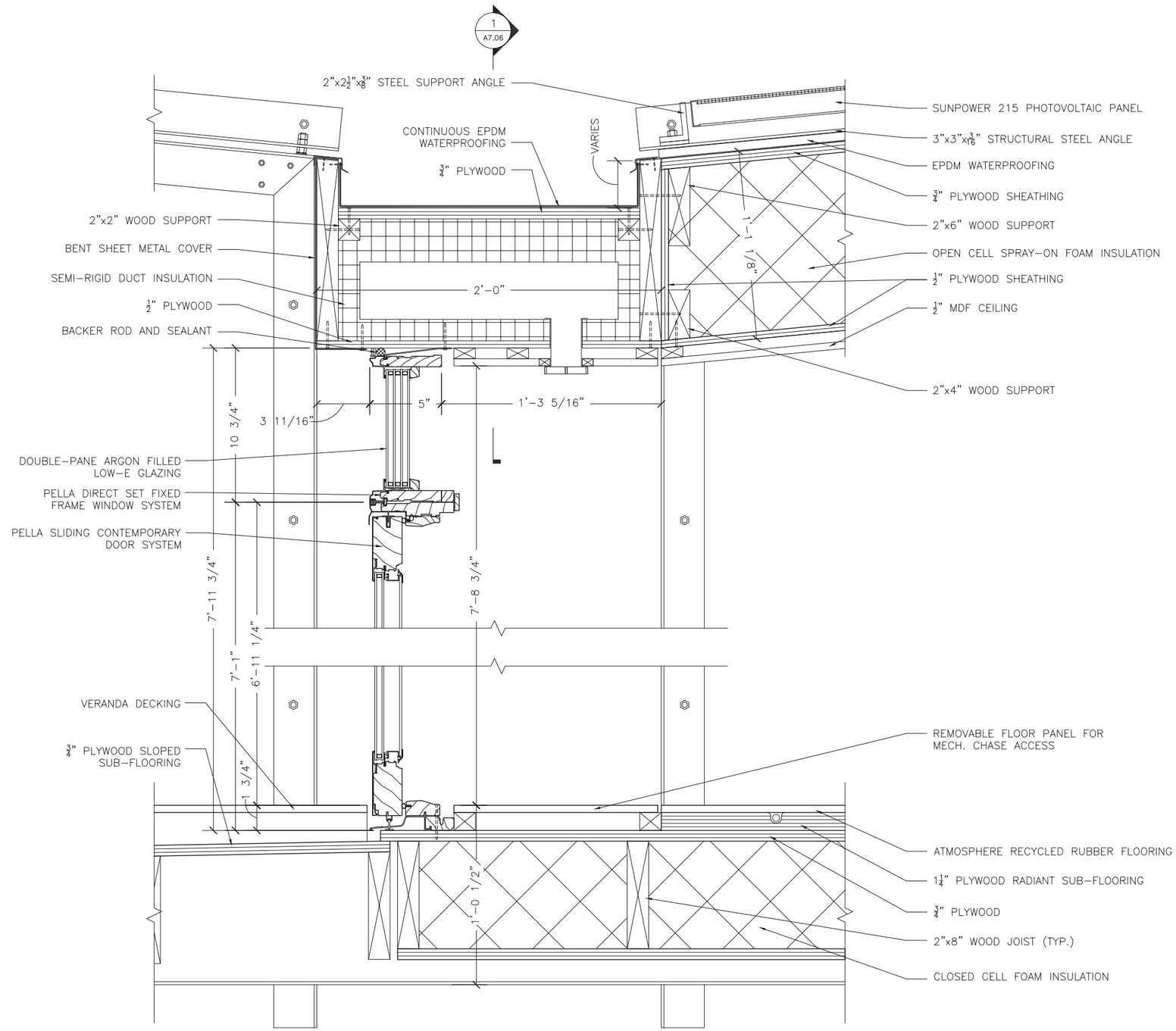

1
A7.04

WALL SECTION AT GUTTER

NS SECTION VIEW

1 1/2" = 1'-0" 0 8" 16"

[reFORM
SOLAR DECATHLON 2007

A7.04

ARCHITECTURAL DETAILS

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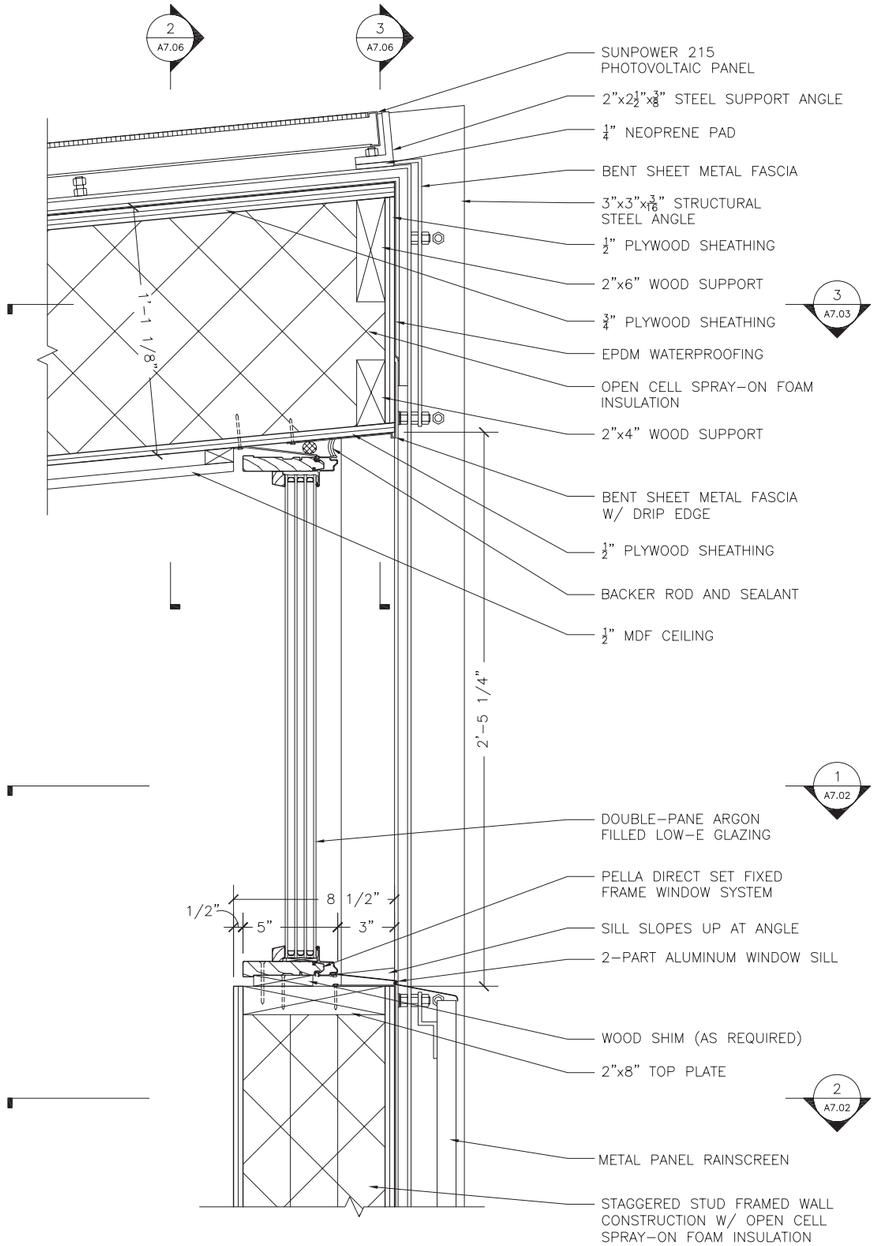
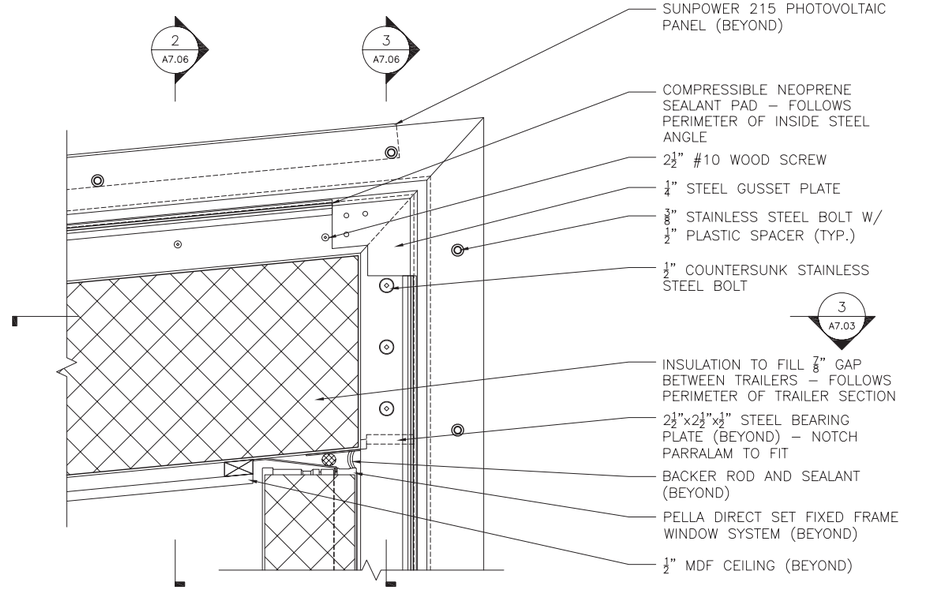


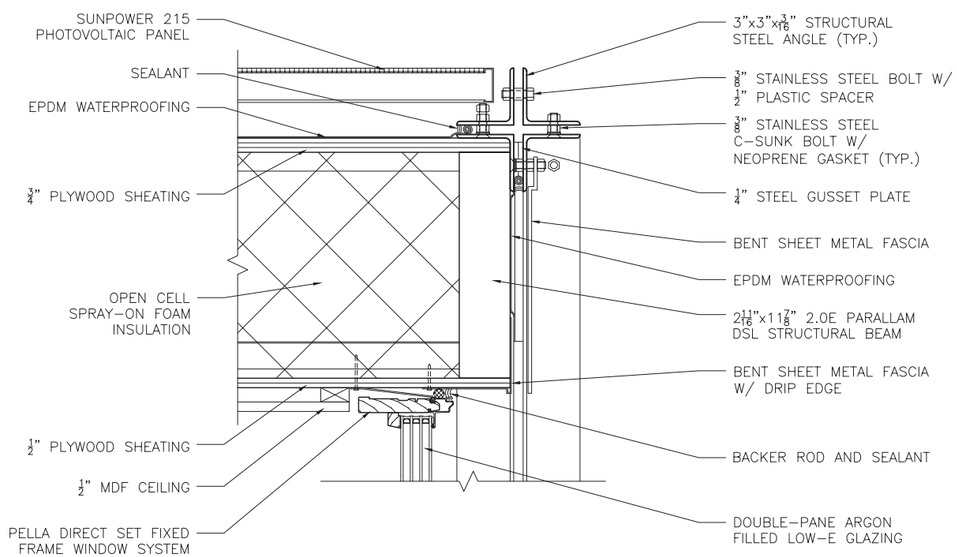
3 A7.05 **SECTION DETAIL AT NORTH WALL CLERESTORY**

NS Section View 1 1/2" = 1'-0" 0 8" 16"



2 A7.05 **SEAM AT TRAILER CONNECTION**

NS Section View 1 1/2" = 1'-0" 0 8" 16"



1 A7.05 **SECTION DETAIL AT EAST WALL CLERESTORY**

EW Section View 1 1/2" = 1'-0" 0 8" 16"

[reFORM
SOLAR DECATHLON 2007

A7.05

ARCHITECTURAL DETAILS

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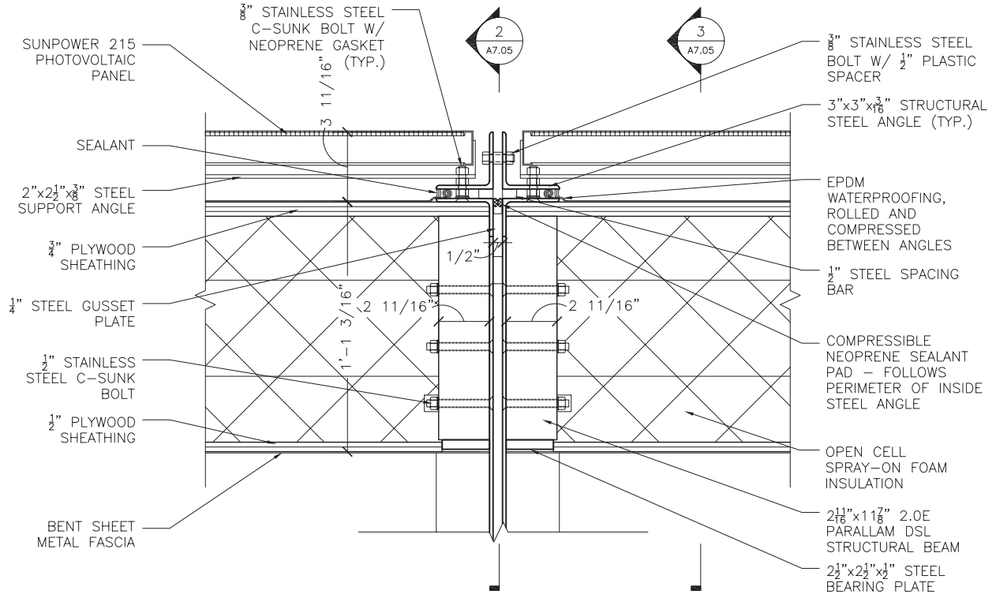
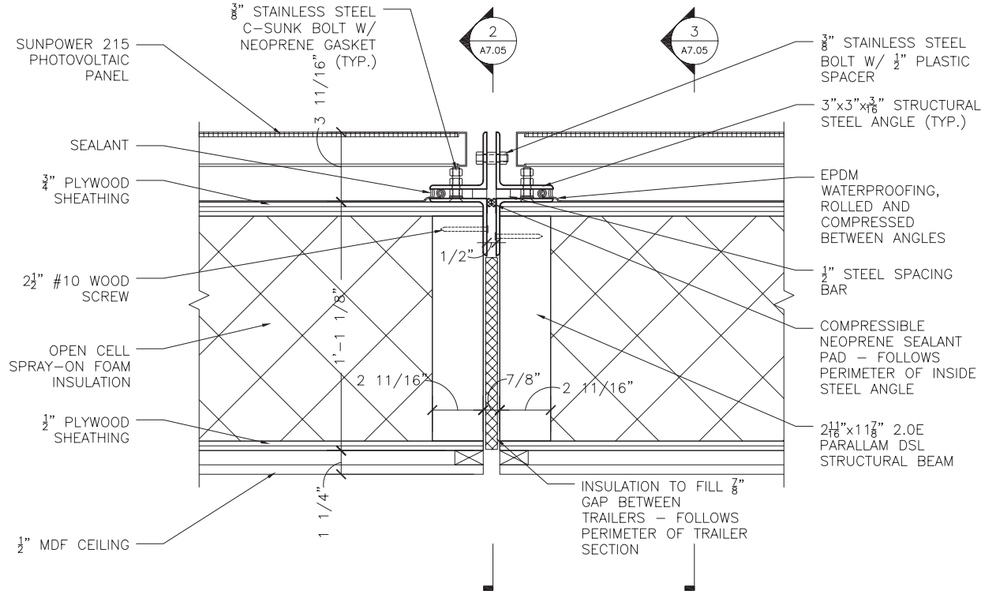


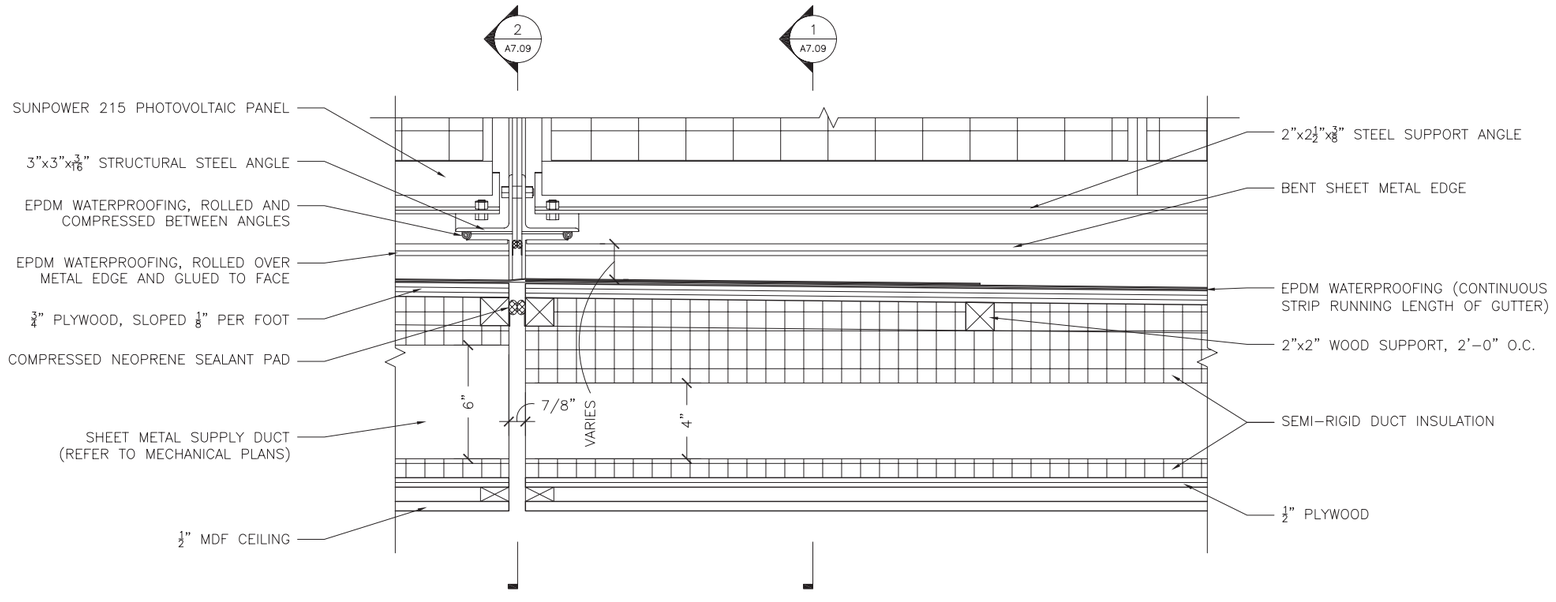
3 A7.06 **ROOF AT TRAILER EDGE CONNECTION**

EW Section View 1 1/2" = 1'-0" 0 8" 16"



2 A7.06 **ROOF AT TRAILER CONNECTION, TYP.**

EW Section View 1 1/2" = 1'-0" 0 8" 16"



1 A7.06 **GUTTER ASSEMBLY**

EW Section View 1 1/2" = 1'-0" 0 8" 16"

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A7.06

ARCHITECTURAL DETAILS

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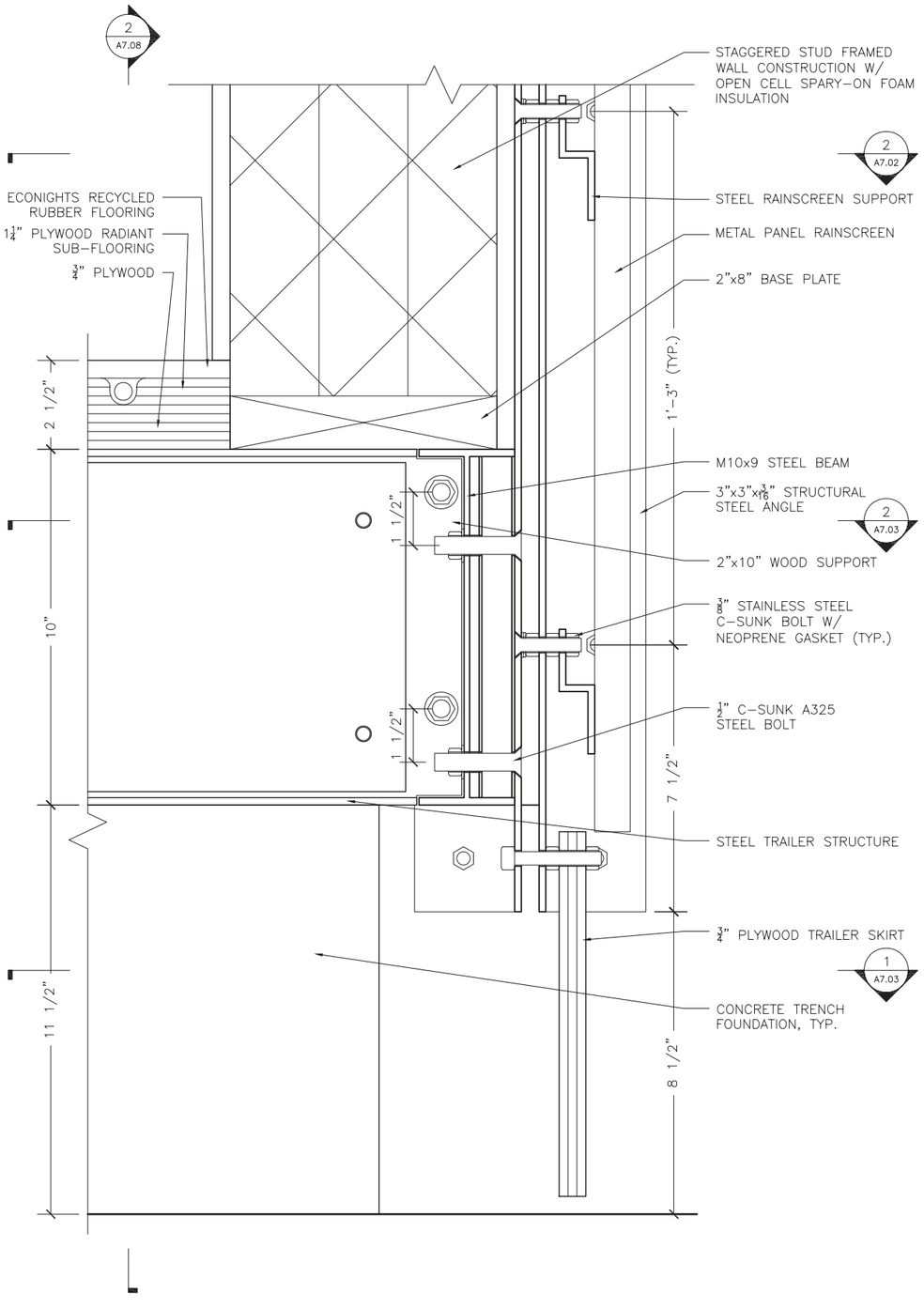
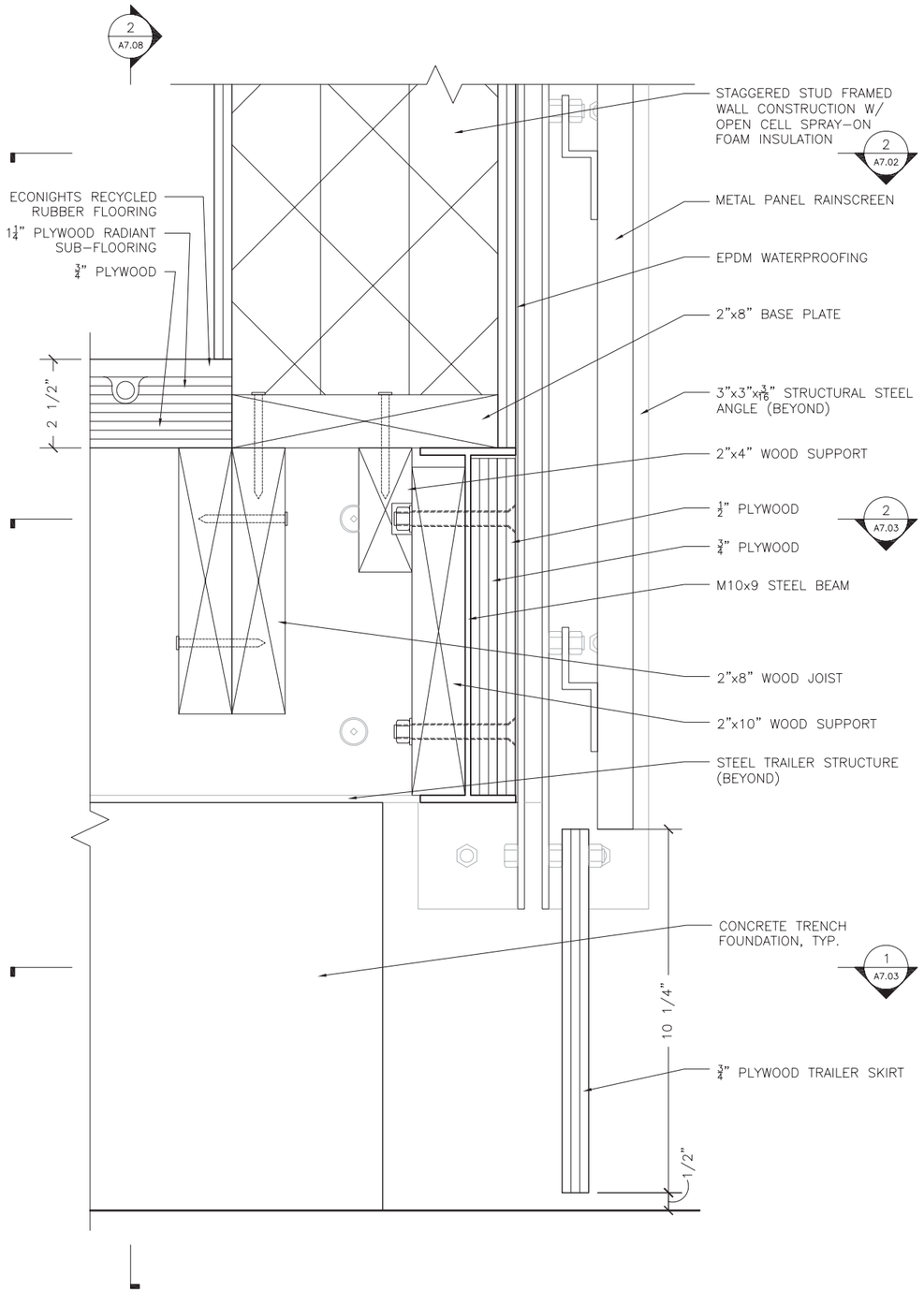


2 A7.07 FLOOR TO WALL AT TRAILER CORNER

NS Section View 3" = 1'-0" 0 4" 8"



1 A7.07 FLOOR TO WALL, TYP.

NS Section View 3" = 1'-0" 0 4" 8"

[reFORM
SOLAR DECATHLON 2007

A7.07

ARCHITECTURAL DETAILS

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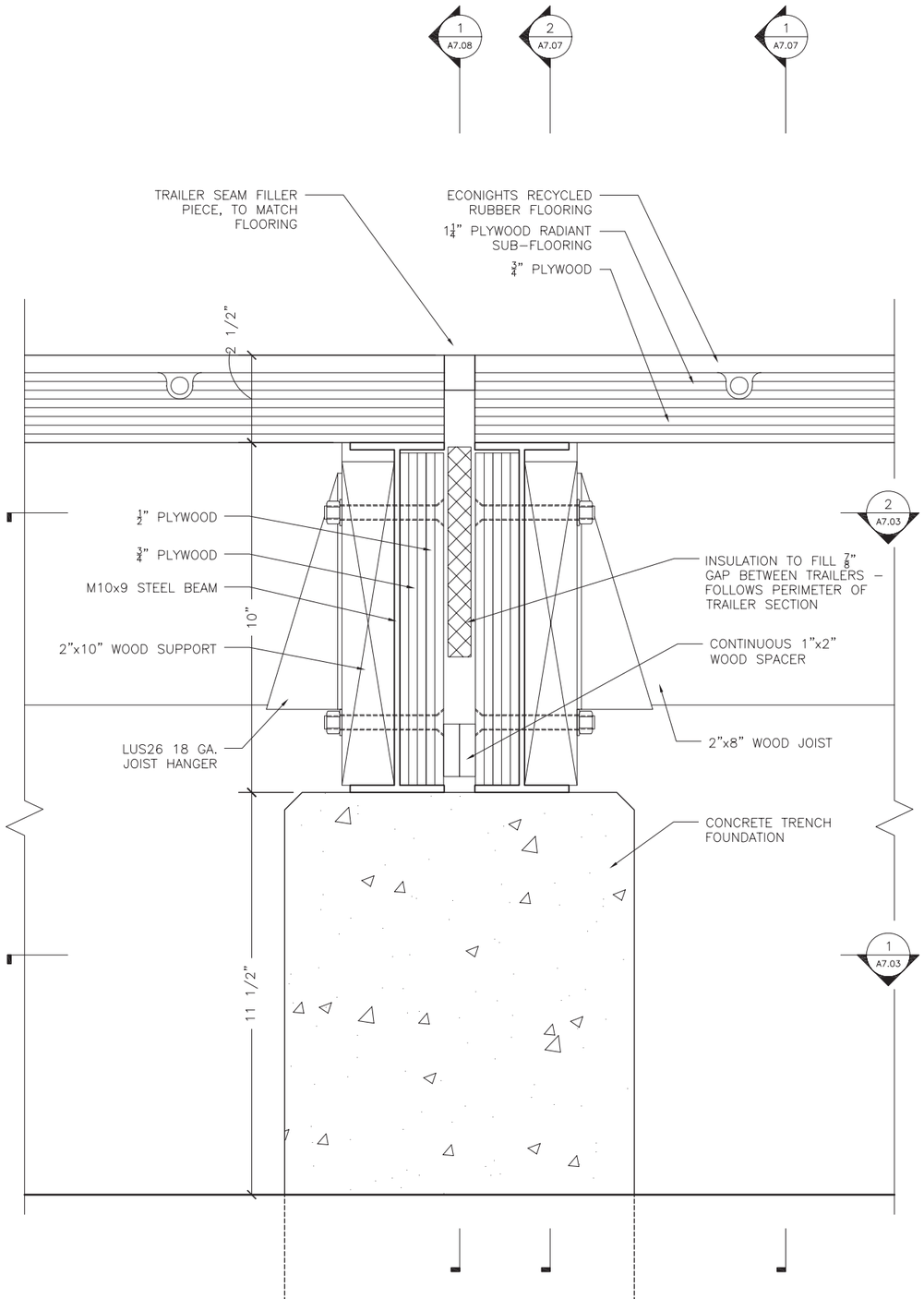

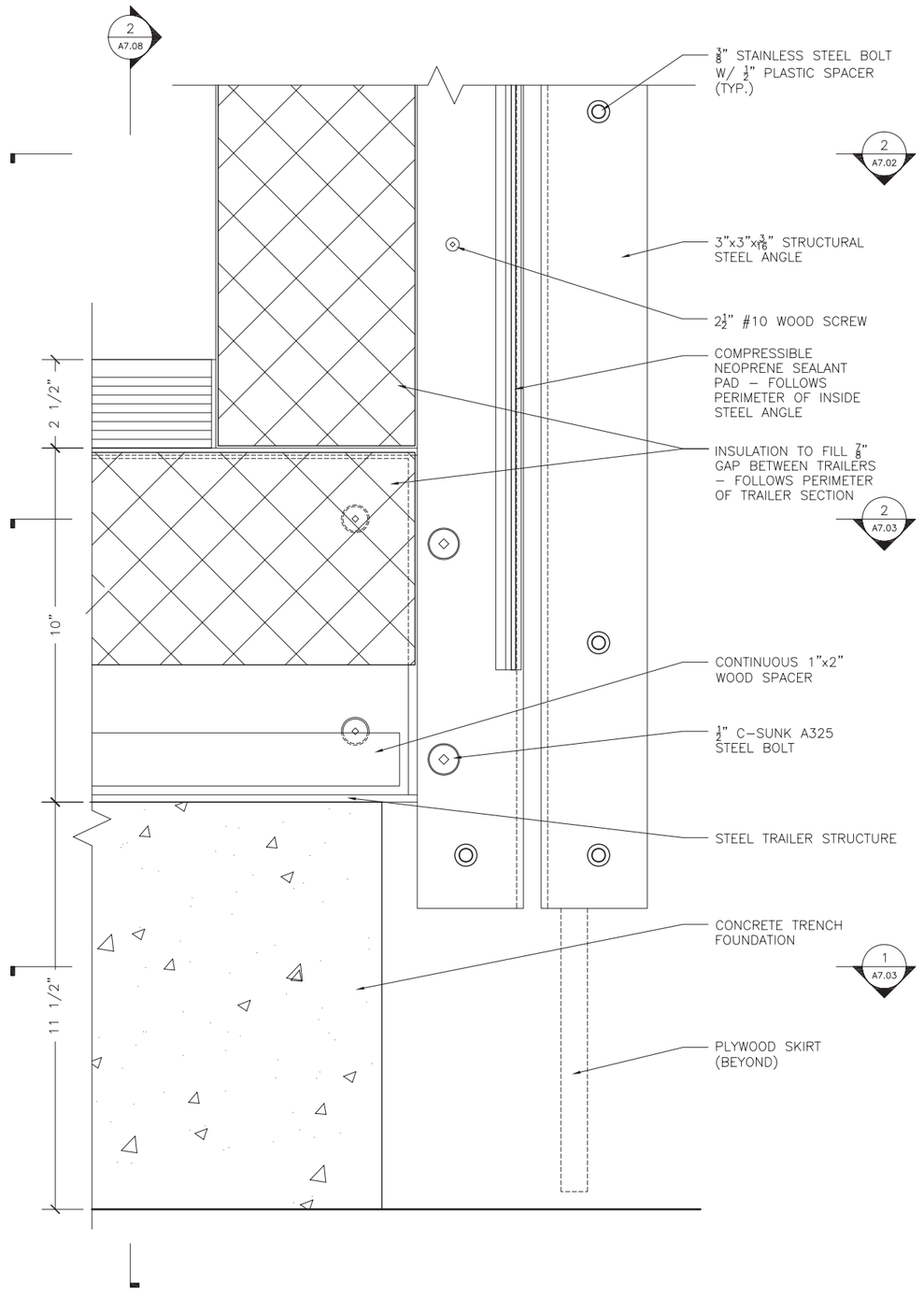

2 A7.08 **TRAILER AND FOUNDATION DETAIL**
EW Section View 3" = 1'-0" 0 4" 8"

1 A7.08 **WATERPROOFING AT TRAILER CONNECTION AND FOUNDATION DETAIL**
NS Section View 3" = 1'-0" 0 4" 8"

[reFORM
SOLAR DECATHLON 2007

A7.08
ARCHITECTURAL DETAILS

JANUARY 9, 2008

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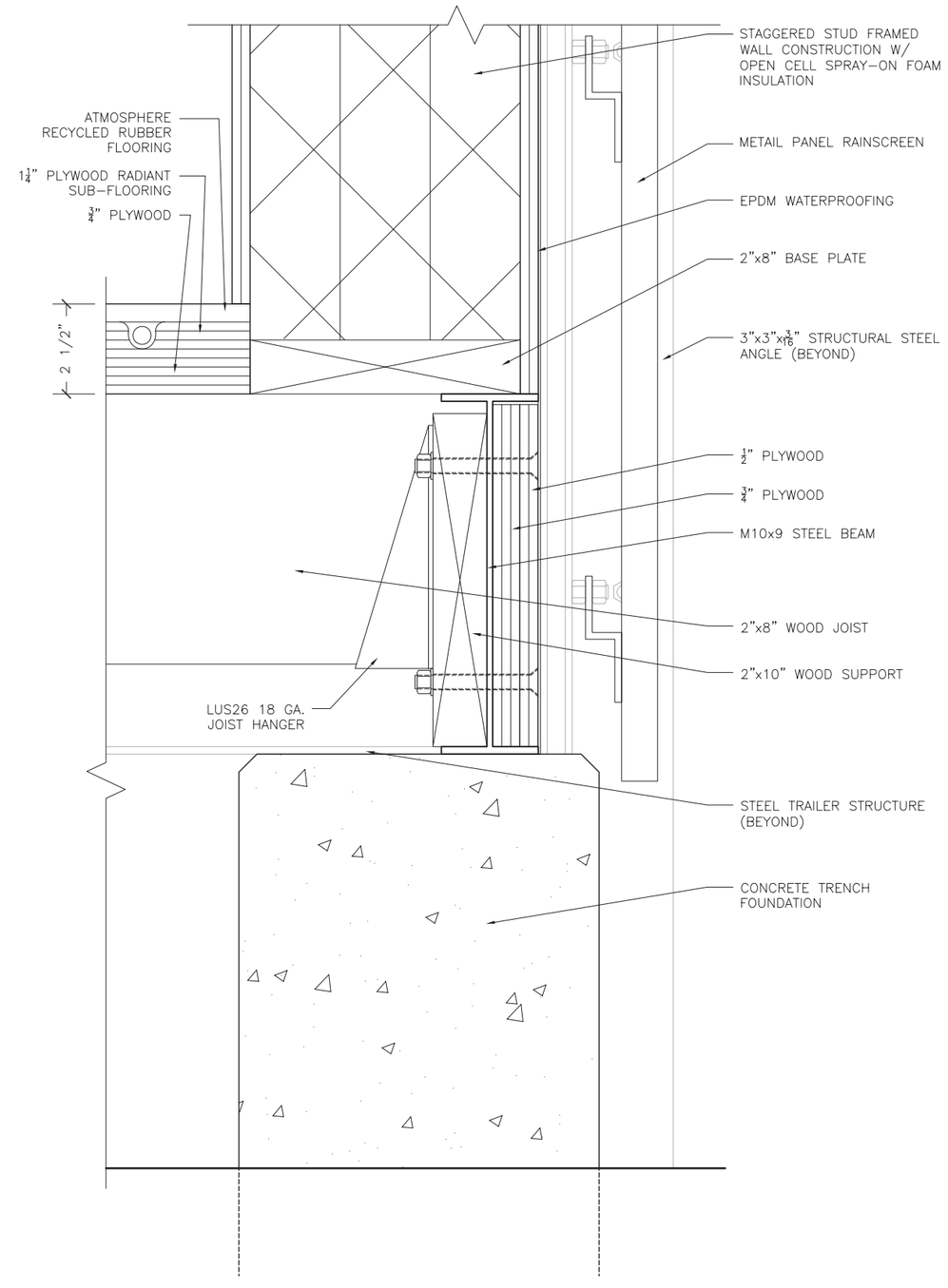

1 / A7.09 **TRAILER AT FOUNDATION DETAIL, AT WEST WALL**

EW Section View

3" = 1'-0" 0 4" 8"

[reFORM
SOLAR DECATHLON 2007

A7.09

ARCHITECTURAL DETAILS

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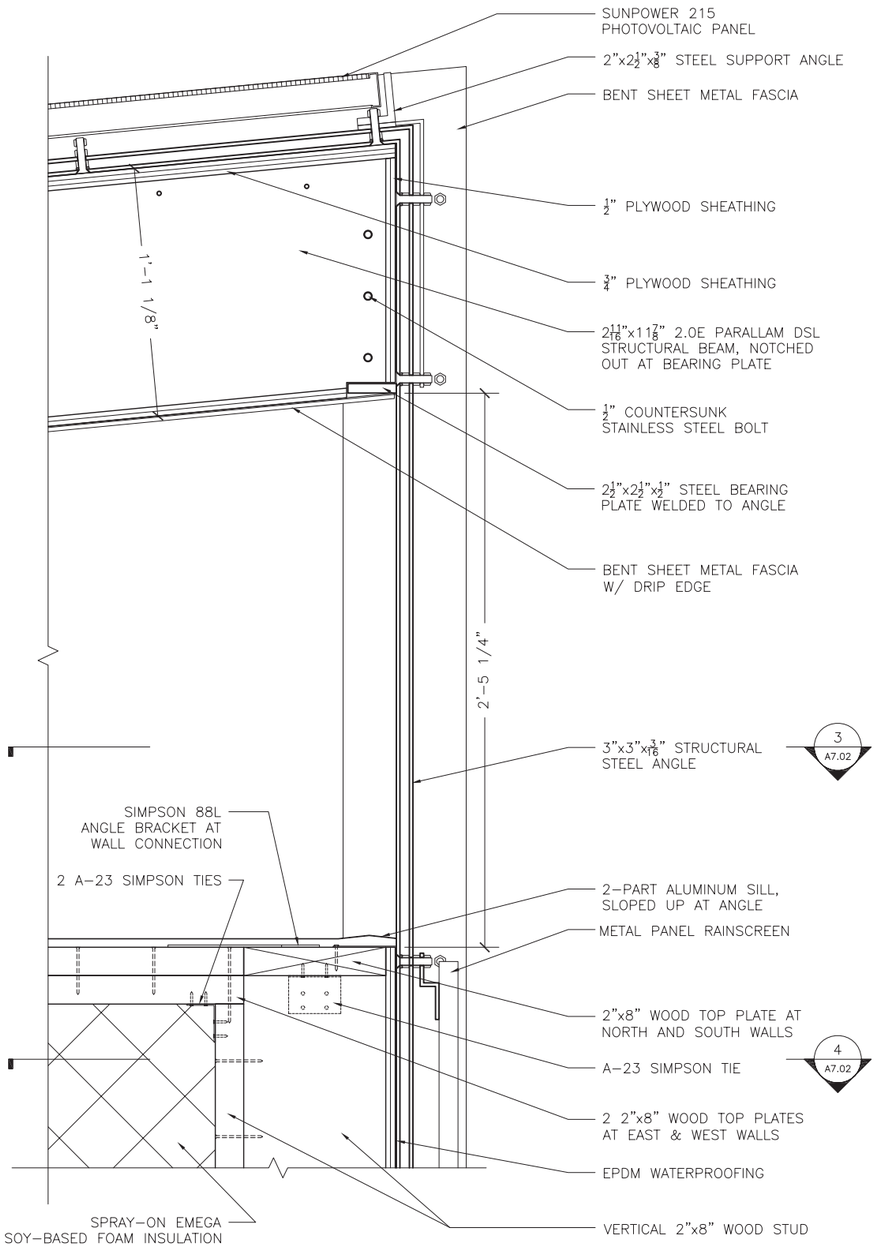

1
A7.10

SECTION DETAIL AT NORTH WALL THROUGH PARALLAM

NS Section View

1 1/2" = 1'-0"

0 8" 16"

[reFORM
SOLAR DECATHLON 2007

A7.10

ARCHITECTURAL
DETAILS

JANUARY 9, 2008

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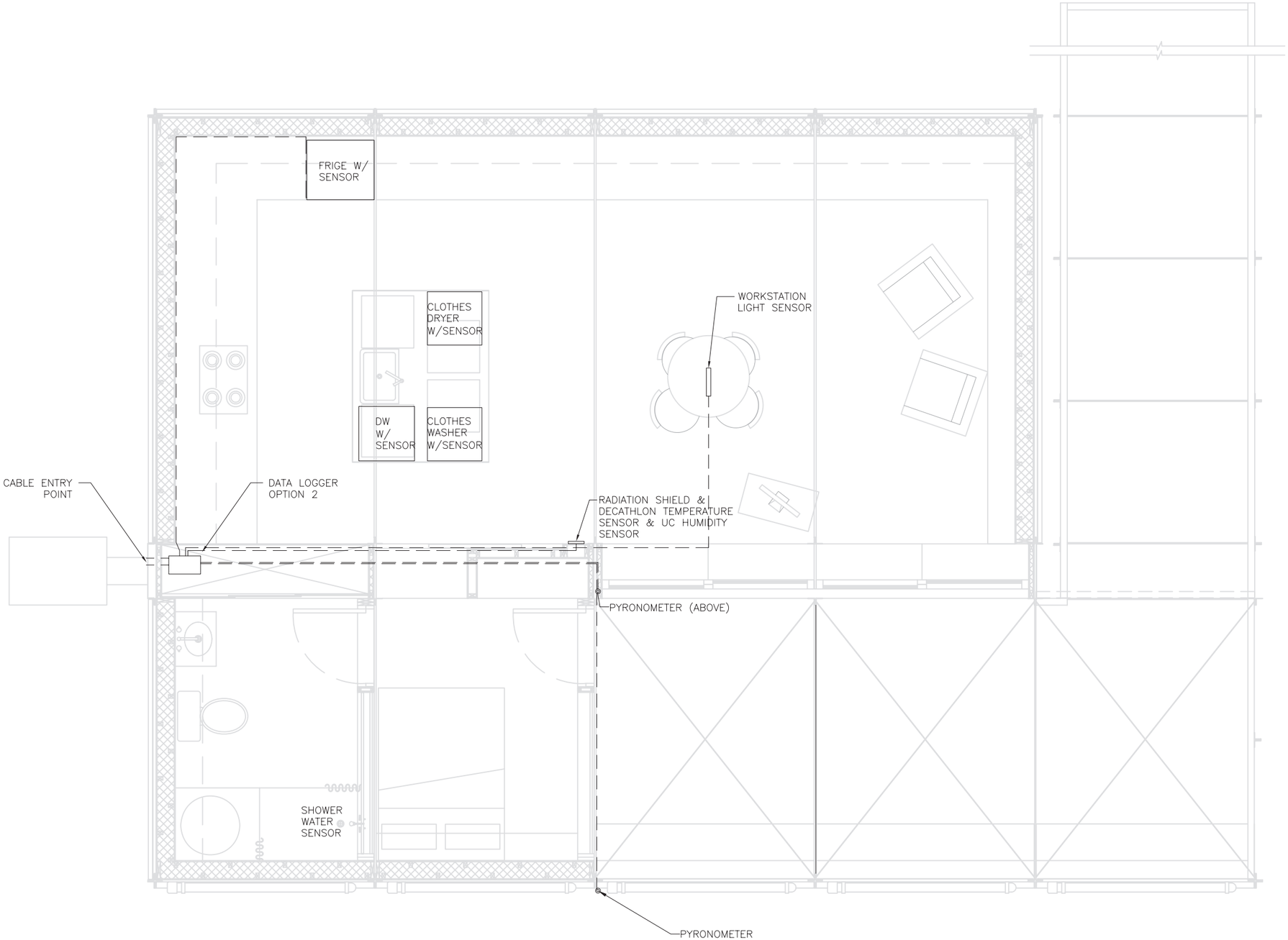
Cincinnati, OH



1 / A8.01 **COMPETITION SENSORS LOCATION PLAN**

1/4" = 1'-0" 0 4 8

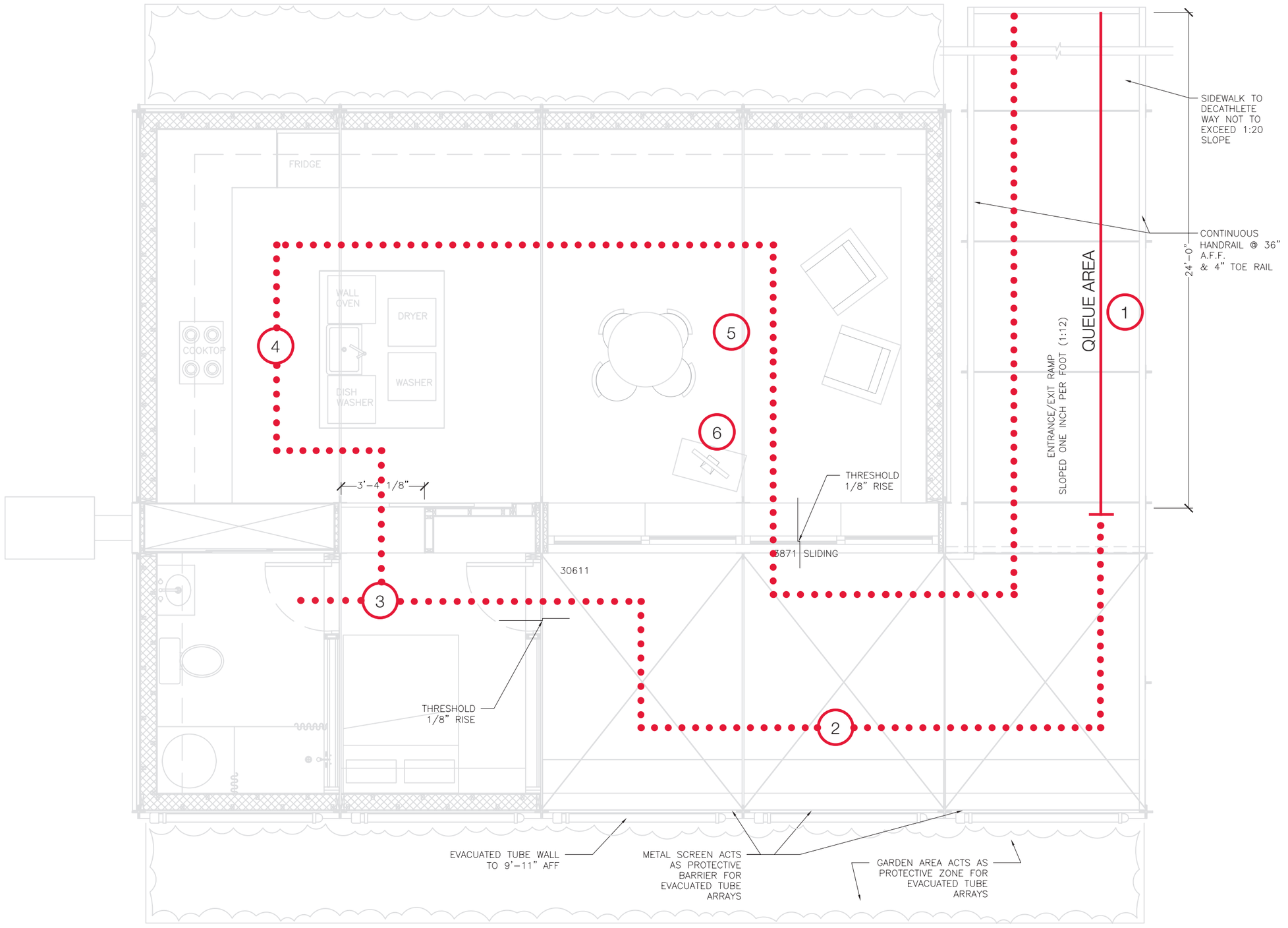
[reFORM
SOLAR DECATHLON 2007

A8.01

SENSOR LOCATIONS FOR NAT'L MALL

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH



1 / A9.01 **ACCESSIBILITY/HOUSE TOUR PLAN**

Showing Queue and Route

1/4" = 1'-0"

0 4 8

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A9.01

ACCESSIBILITY/ TOUR PLAN FOR NAT'L MALL

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH

2007 [RE]FORM HOUSE TOURS

OVERVIEW

The design of our home includes a long, continuous route allowing visitors to learn about its important features. The long and wide entry ramp will be used to as an introduction point and to mediate flow through the house. Exhibit signage is placed all along the route, providing first an overview of the house's feature, then greater detail about the major systems and items within the house. Student docents will be stationed along the route to answer questions and provide more in-depth information, or to guide small groups of 5-10 visitors through the house. They will be trained also to ask questions of the visitors to encourage greater interaction.

LOGISTICS

During low-frequency hours, docents will focus on giving tours, at approximately 15 minutes per group. At 8 hours of touring per day, with 10 tours per hour of 5-10 visitors each, we could accommodate between 400 and 800 people per day on tours.

It is expected, however, that during normal hours, the quantity of visitors will be too high to accommodate leisurely tours, meaning we will allow for constant flow through the house at the pace visitors prefer. If the line becomes too congested, docents will encourage visitors to move more quickly. A docent will be stationed in the front yard of the house to answer any remaining questions as visitors are leaving.

SPECIAL EVENTS

Tours may include live presentations that will enlighten visitors about how to live sustainably. This may include a series of presentations to occur while visitors are waiting in line.

EXHIBIT DESCRIPTION

As soon as they step on to the entrance ramp, visitors will be introduced to the fictional "DoE" Family that inhabits the house. This family, consisting of a father, mother and son, will provide, throughout the tour, their distinct perspectives on the house (design, business and technology, respectively.) Topics at each stop will be determined by visibility of house elements local to that area, but will also be determined by visitor interest areas. (Please see A9.01 for exhibit locations.)

1. INTRODUCTIONS AND OVERVIEWS FROM THE FAMILY
2. IN-DEPTH INFORMATION ABOUT THE MAIN HOUSE CONCEPTS AND SYSTEMS
3. BEDROOM AND BATHROOM HIGHLIGHTS / WATER CONSERVATION
4. KITCHEN AND LAUNDRY HIGHLIGHTS / EFFICIENT APPLIANCES
5. LIVING AND DINING HIGHLIGHTS / DAYLIGHT AND FLEXIBLE SPACE
6. VIRTUAL FLY-THROUGH VIDEO ON CONTINUOUS LOOP

The goal is to reinforce the educational message of hours tours and presentations by offering content in different media. All content will assume and average consumer audience - though docents will be able to provide more specific information. Visitors will also be directed to the team website, where a virtual tour will provide more in-depth information about the systems and products.

1
A9.02

TOUR ROUTE DESCRIPTION

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A9.02

HOUSE TOUR
FOR NAT'L MALL

JANUARY 9, 2008

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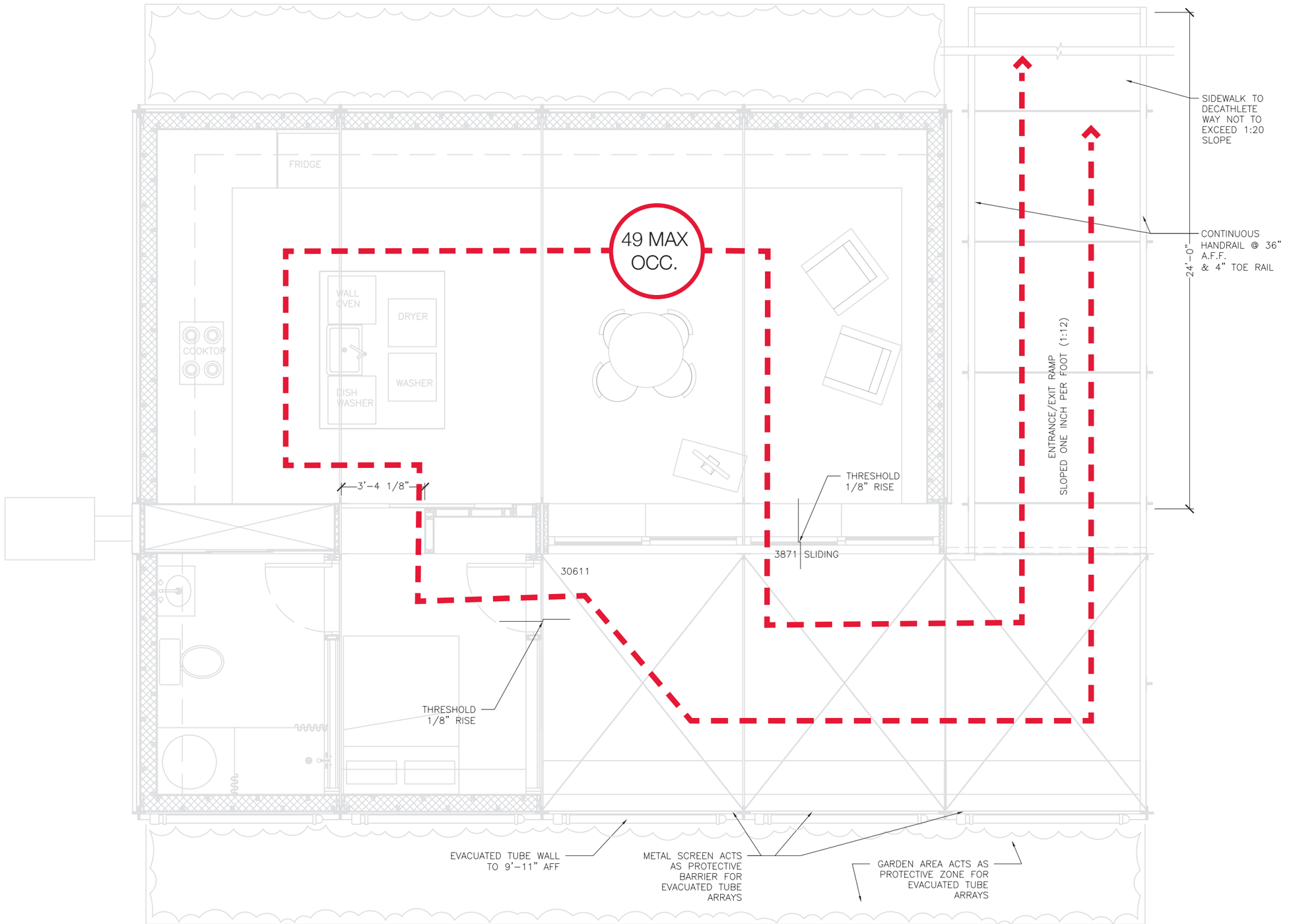

1 F1.01 **EMERGENCY EGRESS PLAN**

1/4" = 1'-0" 0 4 8

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F1.01

EMERGENCY EGRESS PLAN

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH

FIREWATCH AND SAFETY PLAN

EVACUATION ROUTES

ROUTE 1: (SEE F1.01)
Takes the occupants through the Southern glass wall, onto the patio, to the ramps and to the grass.

ROUTE 2: (F1.01)
Takes the occupants through the bedroom, to the patio, and follows the same route down the ramp to safety.

STAGING/QUEUES:
Queing lines can be found on tour route plan (F2.01). They follow the ramps up to the house, and can be easily cleared in the case of an emergency. Those who are in wheelchairs will be allowed to wait at the bottom of the ramp if they prefer, and when there is enough room for them to bypass the queue, they can proceed.

A staging point at the top of the ramp will be manned at all times by a University of Cincinnati [re]form student, to control house occupancy numbers (limited to 49 people at one time).

POSSIBLE HAZARDS

HAZARDS:
Overall, our possible hazards have been limited through design; LED lights minimize fire possibilities, water and plumbing is limited to one trialer to minimize connections, and hot water is always stored behind an enclosed structure.

FIRE/SMOKE SOURCES:
Potential sources of fire and smoke include:
electrical boxes, oven, cooktops, dryers, led lights, portable lights.

TRIPPING HAZARDS/PROTRUSIONS:
All seams in flooring will be flush to minimize tripping hazards. Thresholds will be sunk to accommodate ADA regulations. No superfulous household items will be designed in such a way to pose dangers to blind visitors.

EVACUATION PLAN

INTERIOR EVACUATION PLAN:
Occupants make way to closest exit.
One tour leader clears the house

EXTERIOR EVACUATION PLAN/SCENE CONTROL:
The team member from the queing line directs occupants down the ramp.
One team member clears the area immediately around the ramp to allow for further egress.

CORRECTIVE ACTION

MAIN ELECTRICAL DISCONNECT
Our main electrical disconnect is found within the mechanical closet, easily accessible from the interior of the house. In the event of an emergency, a door to the mechanical closet can be opened, and the breaker boxes accessed immediately.

FIRE EXTINGUISHERS
One fire extinguisher will be in the kitchen, in the island under the sink. A second will be located under the bench on the exterior of the building. All will be rated for Fire and Electrical. (Note - Fire Extinguishers are not to be used until Evacuation is complete).

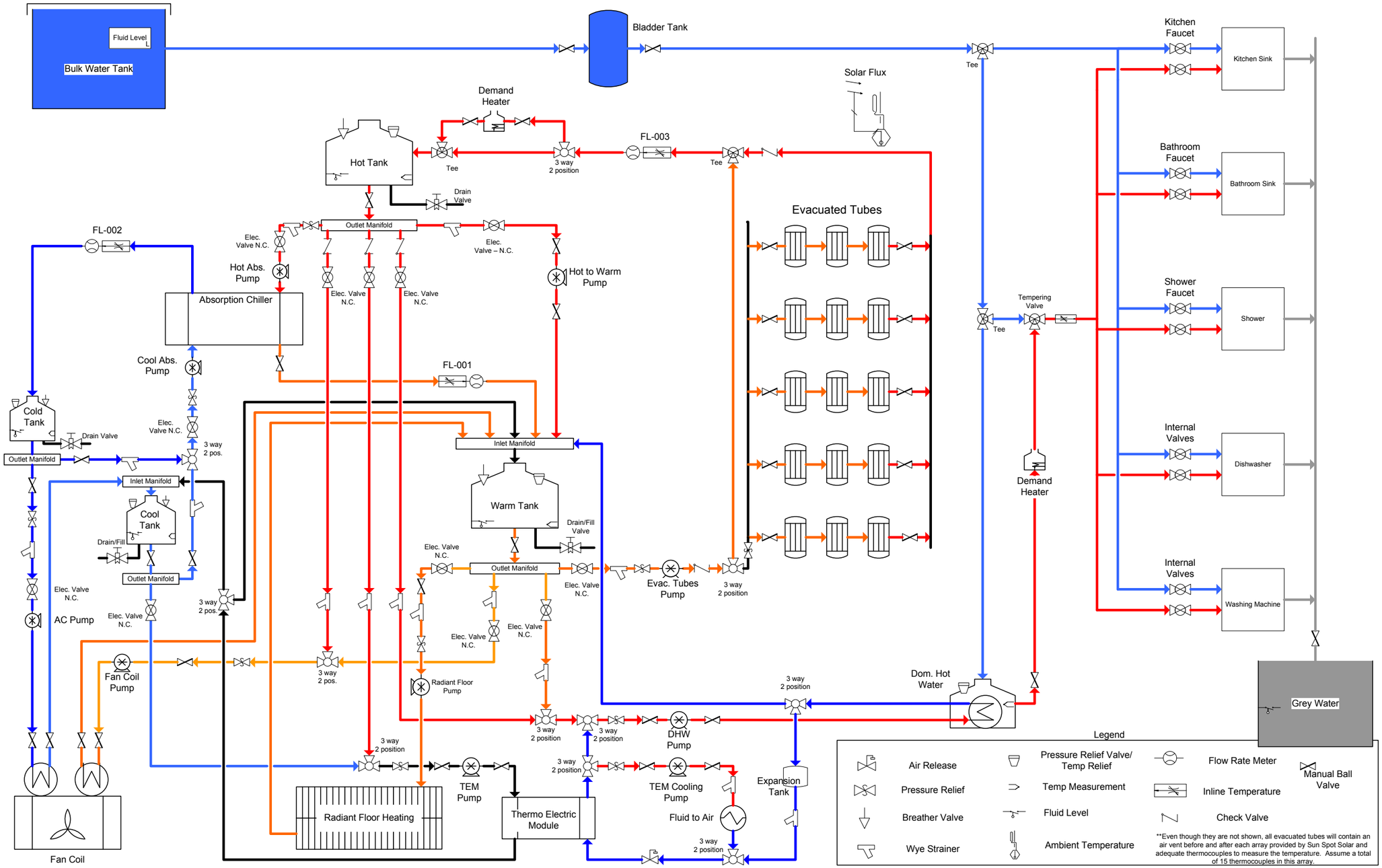
FIRST AID KIT
A First Aid Kit will also be located under the sink. Very basic First Aid can be administered by various team members.

F1.02

FIRE WATCH &
SAFETY PLAN
FOR NAT'L MALL

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH



1
M0.01

MECHANICAL SCHEMATIC DIAGRAM

NTS

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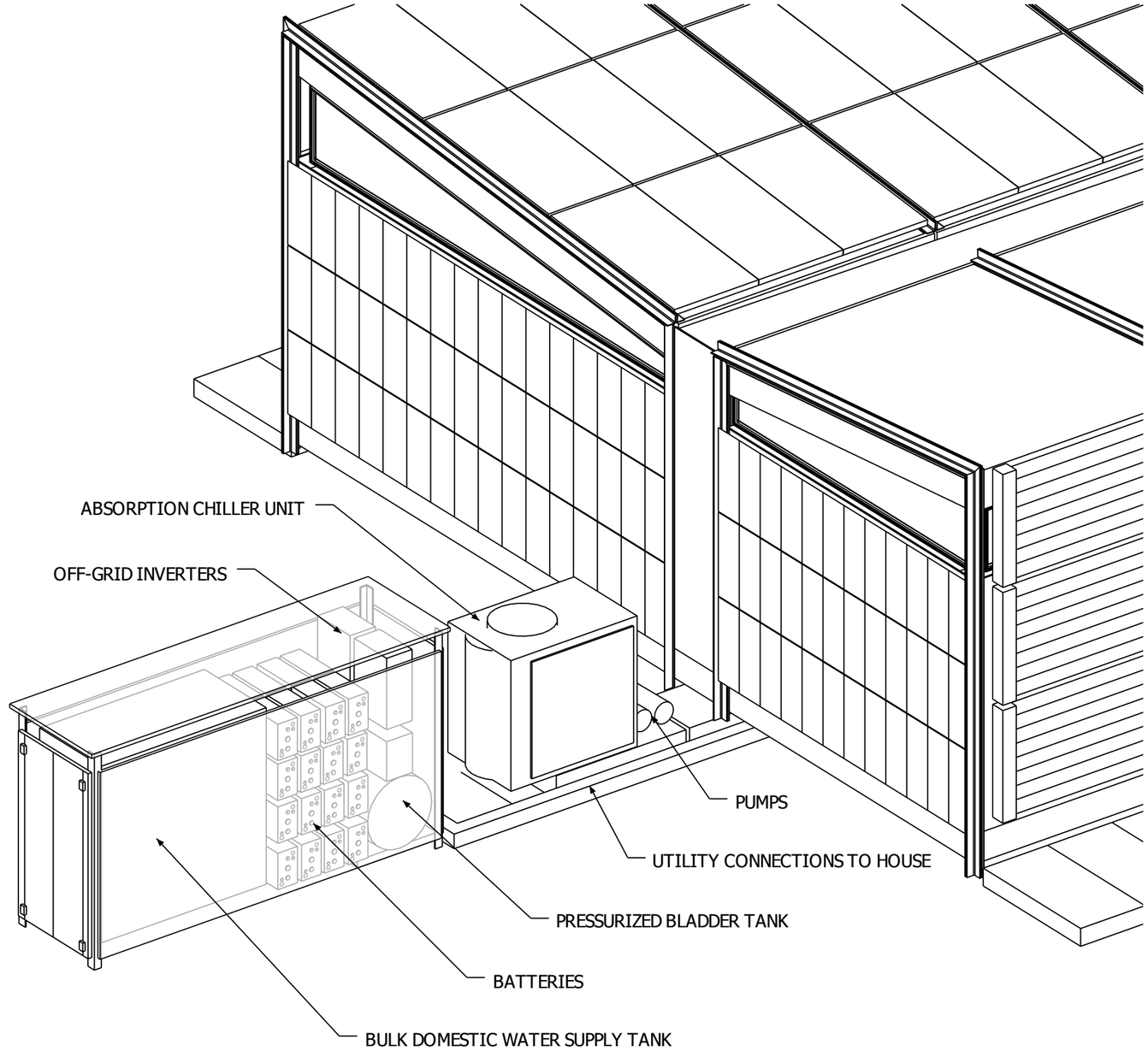
SOLAR DECATHLON 2007

M0.01

MECHANICAL SCHEMATIC

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH



1 M1.01 **MECHANICAL SHED DIAGRAM**

NTS

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SOLAR DECATHLON 2007

M1.01

MECH. SHED FOR NAT'L MALL

JANUARY 9, 2008

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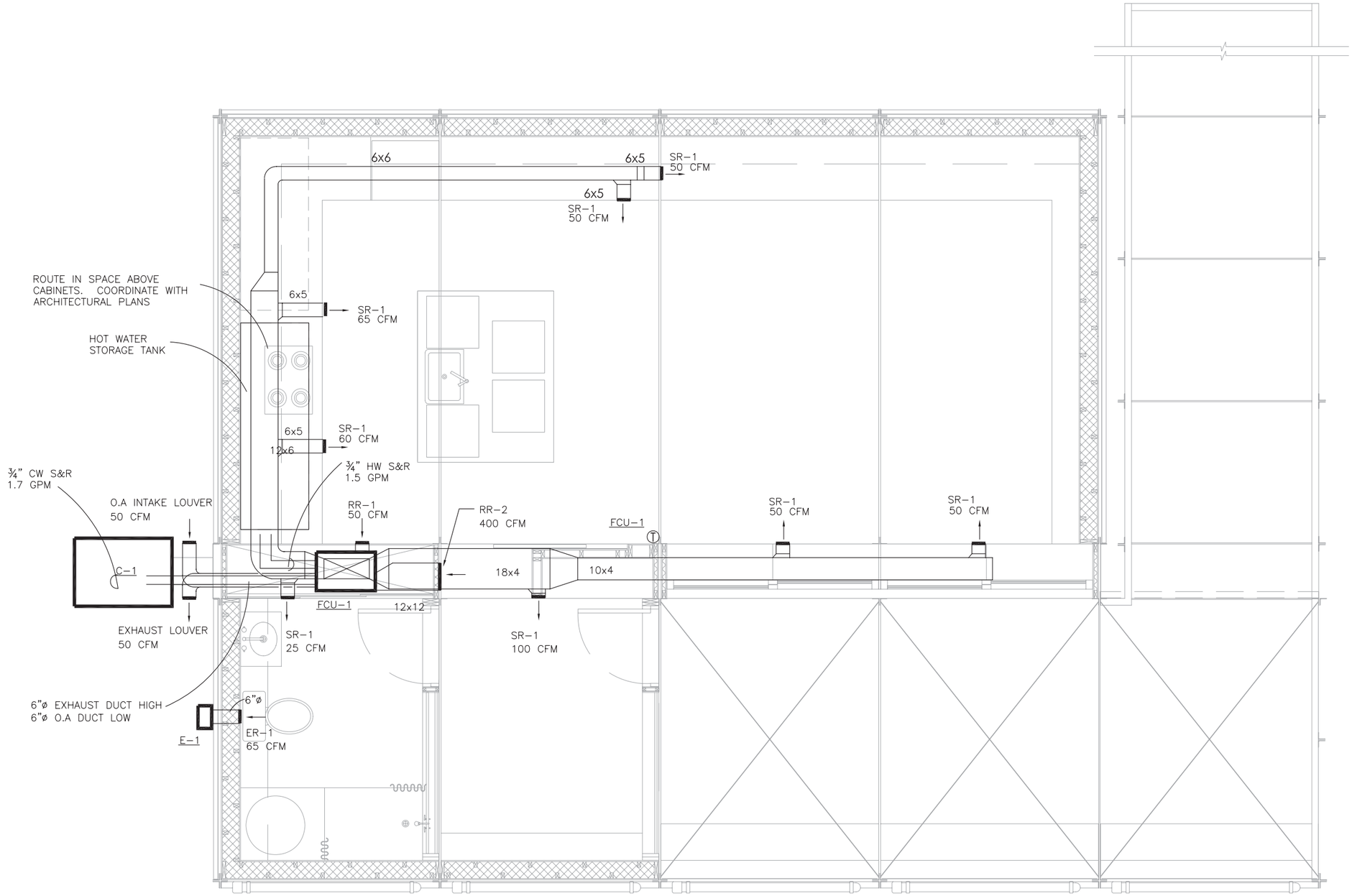

1 M2.01 **AIR HANDLING PLAN**

1/4" = 1'-0" 0 4 8

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M2.01

AIR HANDLING

JANUARY 9, 2008

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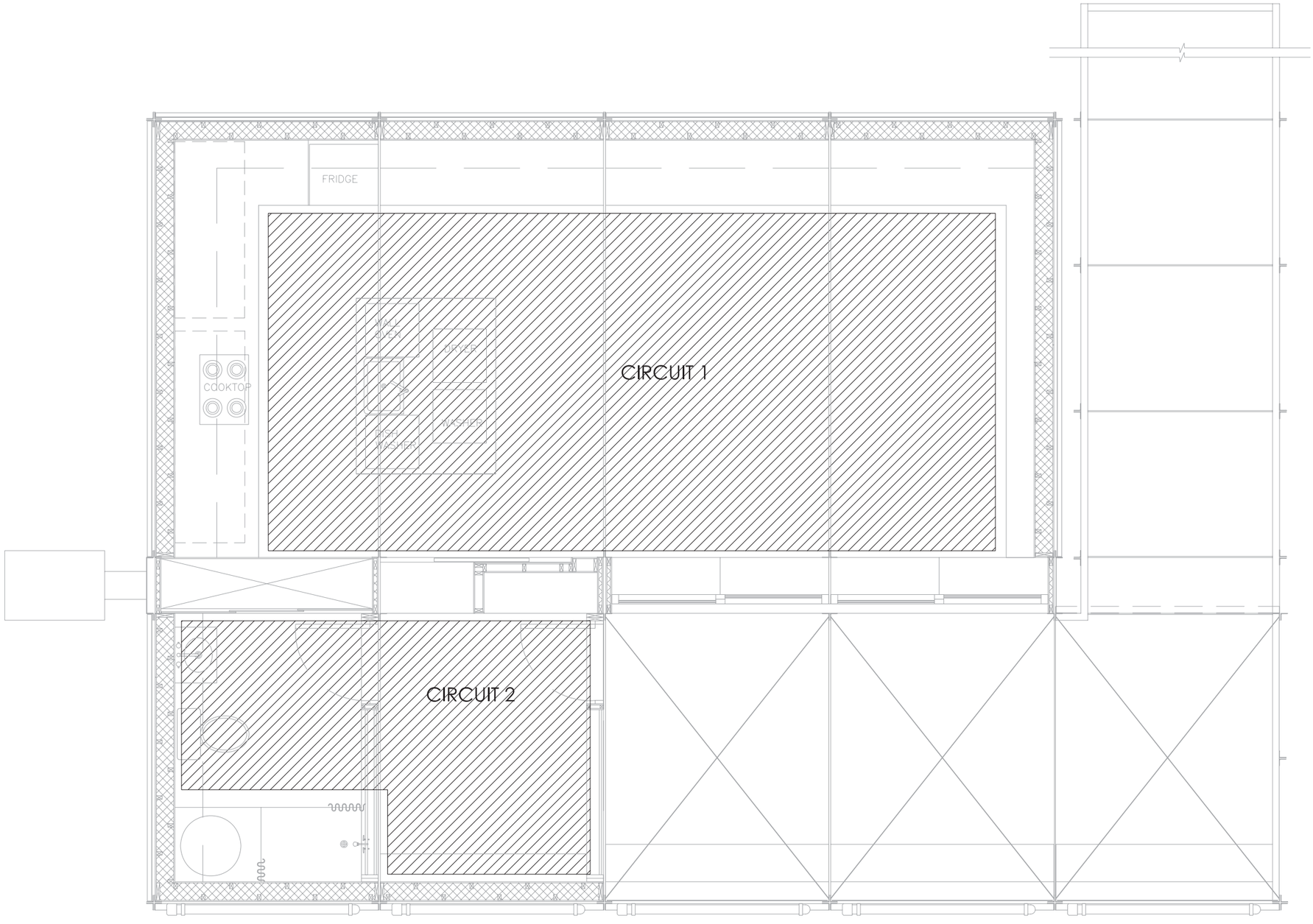
Cincinnati, OH



1 M2.02 **RADIANT FLOOR ZONING**
North and South Zones

1/4" = 1'-0" 0 4 8

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M2.02

RADIANT FLOOR ZONING

JANUARY 9, 2008

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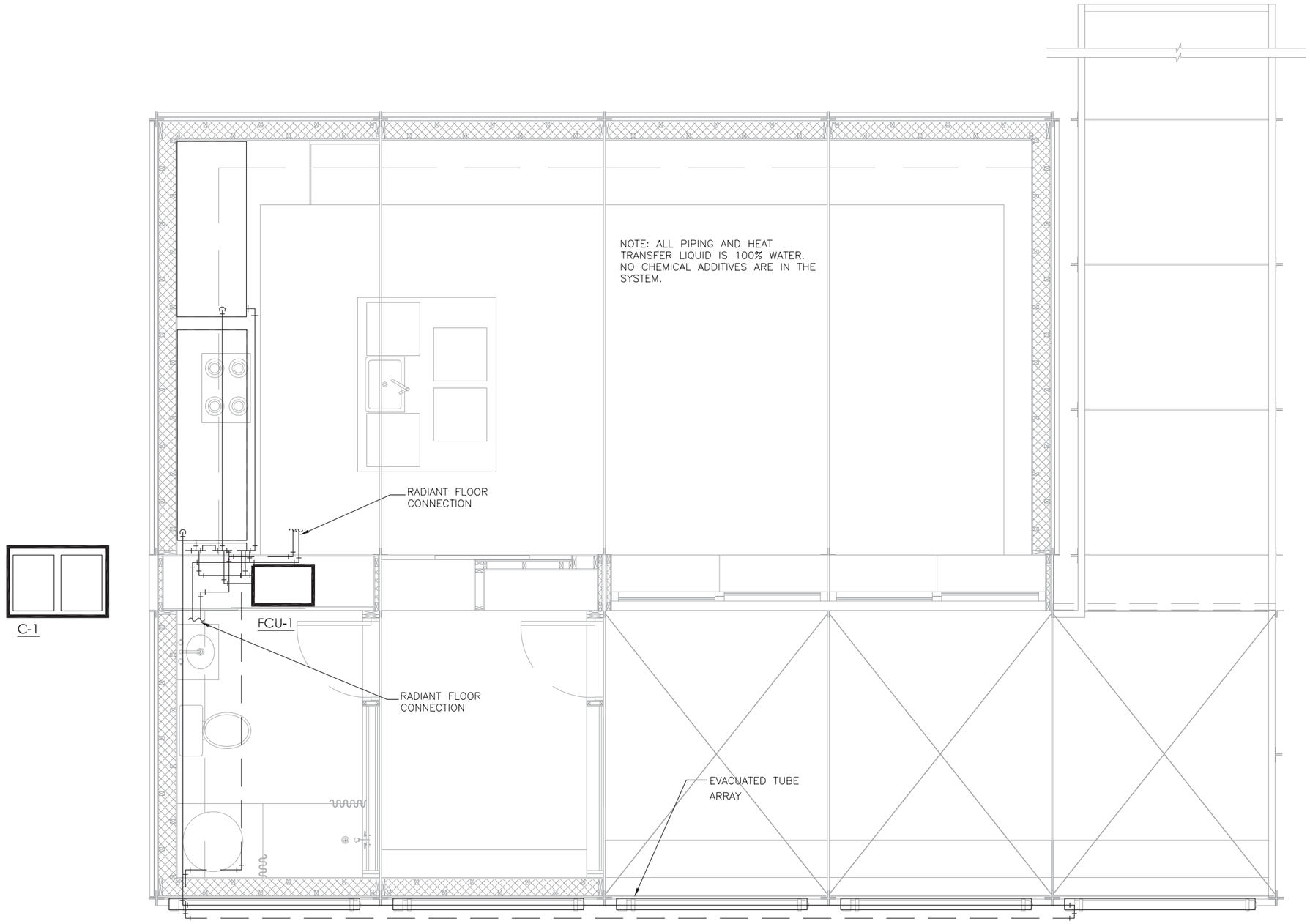

1 / M2.03 **HEATING SYSTEM PLAN**

Water Piping

1/4" = 1'-0"

0 4 8

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M2.03

HEATING SYSTEM

JANUARY 9, 2008

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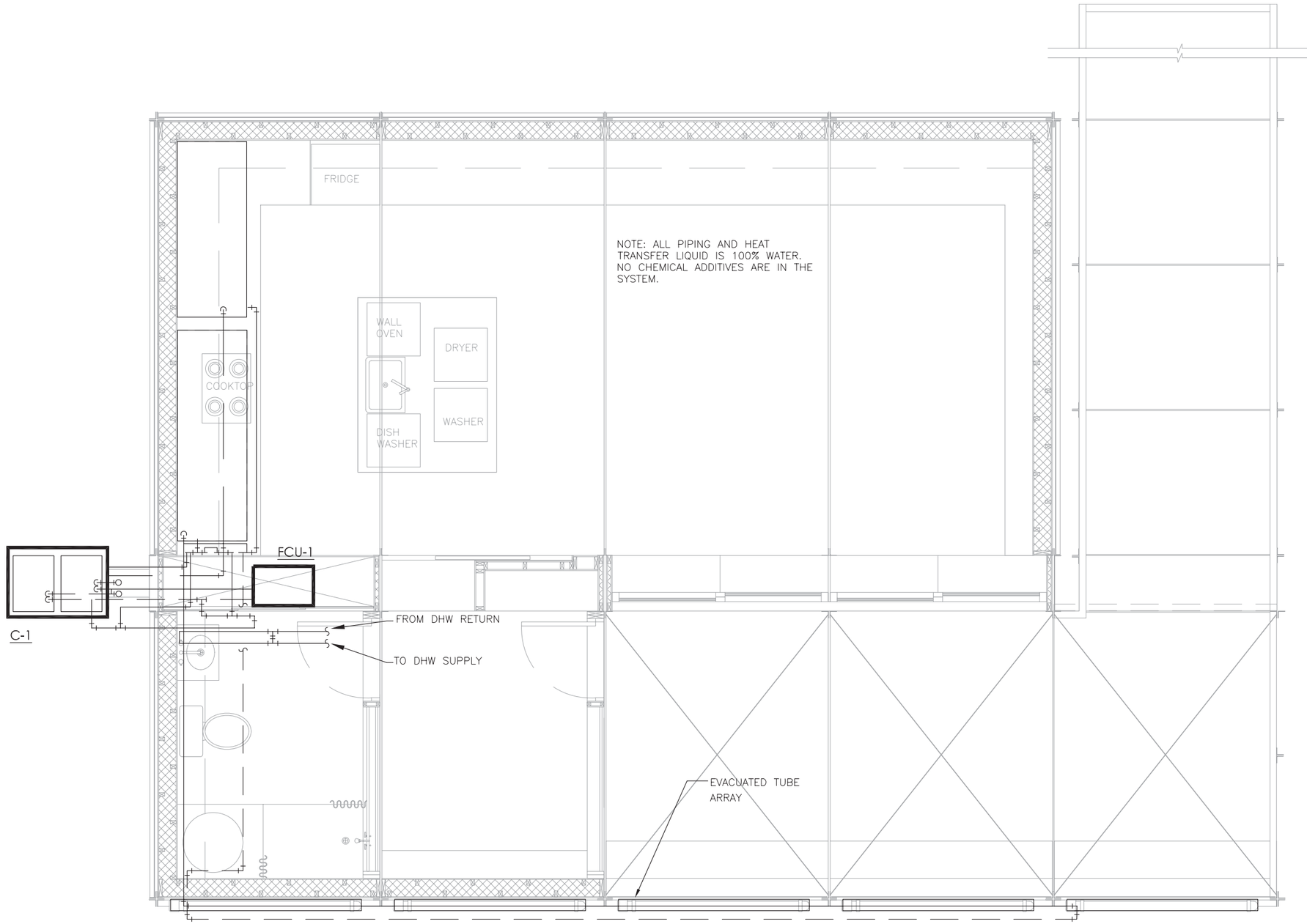
Cincinnati, OH



1 M2.04 **COOLING SYSTEM PLAN**

Water Piping

1/4" = 1'-0" 0 4 8

[reFORM
SOLAR DECATHLON 2007

M2.04

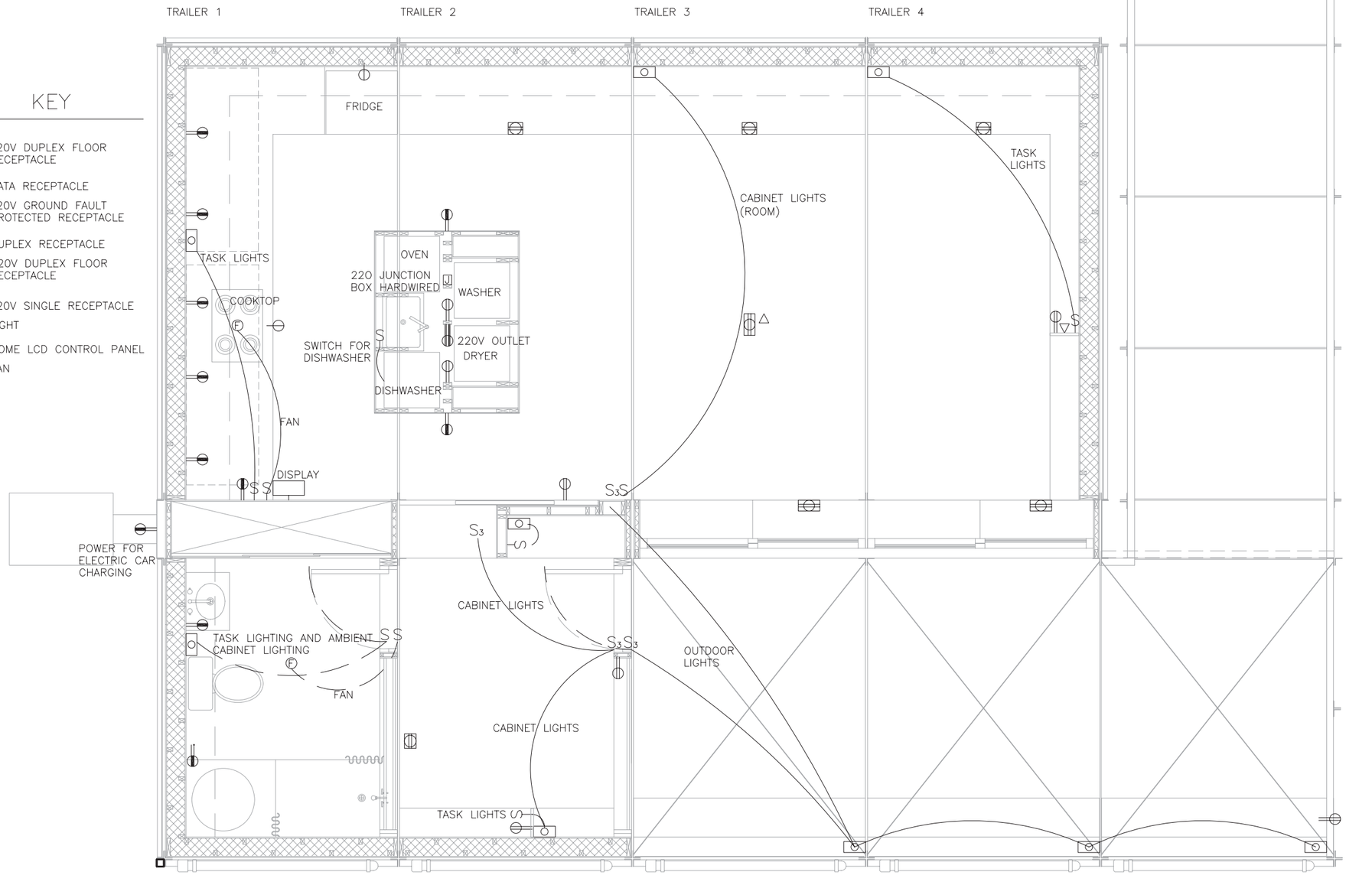
COOLING SYSTEM

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH

KEY

- 120V DUPLEX FLOOR RECEPTACLE
- DATA RECEPTACLE
- 120V GROUND FAULT PROTECTED RECEPTACLE
- DUPLEX RECEPTACLE
- 220V DUPLEX FLOOR RECEPTACLE
- 120V SINGLE RECEPTACLE
- LIGHT
- HOME LCD CONTROL PANEL
- (F) FAN



1 E1.01 **ELECTRICAL PLAN**

NTS

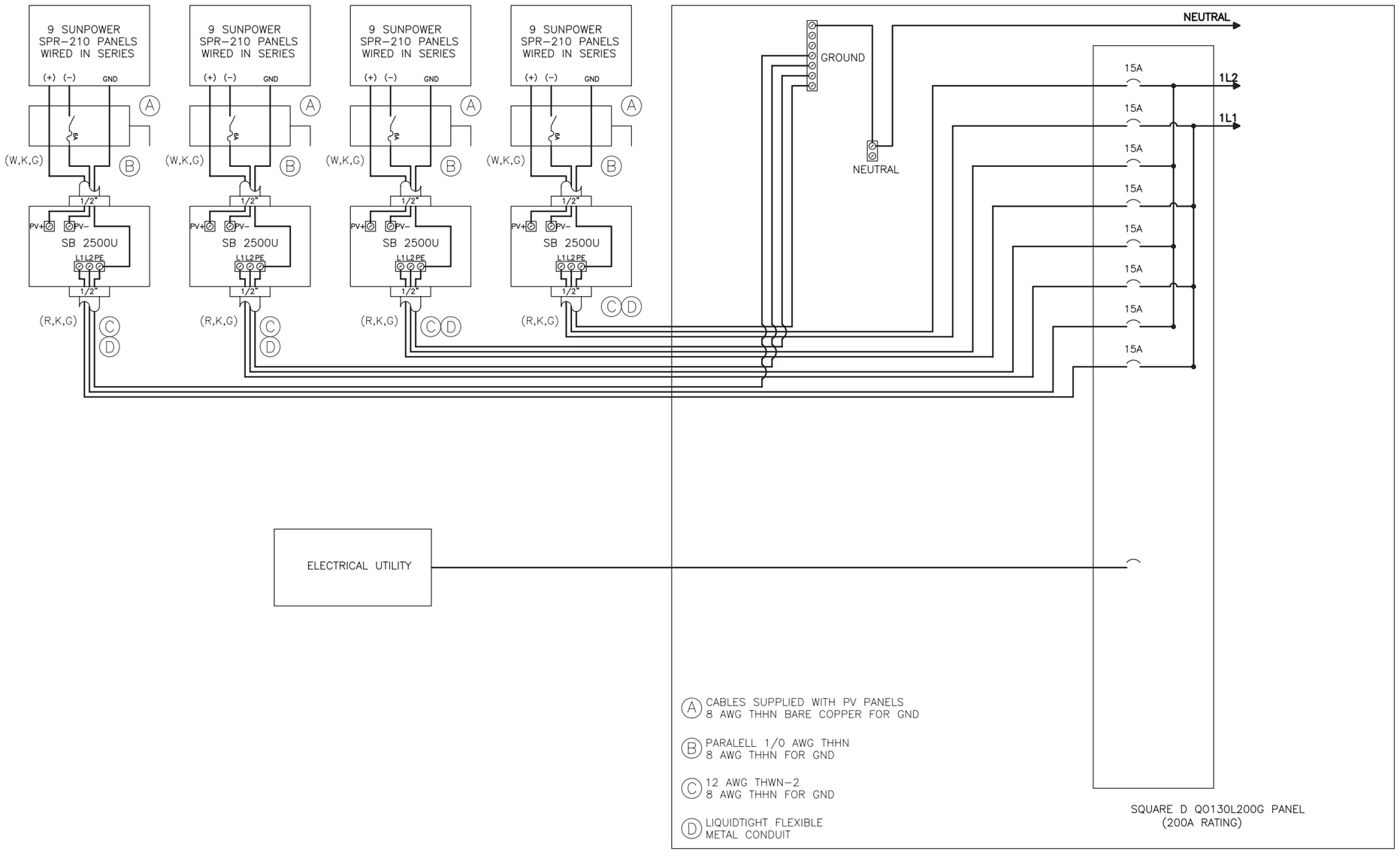
[reFORM
SOLAR DECATHLON 2007

E1.01

ELECTRICAL PLAN

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH



1 E1.02 **POWER SUPPLY DIAGRAM**

NTS

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E1.02

POWER SUPPLY

JANUARY 9, 2008

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Load calc	Rating	Description			Description	Rating	Load calc
=56A*1.25 = 70A	70/1	Sunny Island #1	1	2	Domestic Hot Water Heater	50/2	=9600/240*1.25 = 50A
=56A*1.25 = 70A	70/1	Sunny Island #2	3	4			
=2500/240*1.25 = 13.1A	15/2	Sunny Boy #1 (West)	5	6	Hydronic Hot Water Heater	70/2	=12000/240*1.25 = 62.5A
			7	8			
=2500/240*1.25 = 13.1A	15/2	Sunny Boy #2	9	10	Clothes Dryer	30/2	=5400/240*1.25 = 28.5A
			11	12			
=2500/240*1.25 = 13.1A	15/2	Sunny Boy #3	13	14	Oven	30/2	=5400/240*1.25 = 28.5A
			15	16			
=2500/240*1.25 = 13.1A	15/2	Sunny Boy #4 (East)	17	18	Clothes Washer	20/1	=20A*80% = 16A
			19	20	Dishwasher	20/1	=20A*80% = 16A
=9600/240*1.25 = 50A	50/2	Cooktop	21	22	Refrigerator	20/1	=20A*80% = 16A
			23	24	Kitchen Receptacles #1	20/1 GFCI	=20A*80% = 16A
=20A*80% = 16A	20/1	Trl. 3 middle and Trl 4 South Floor Receps	25	26	Kitchen Receptacles #2	20/1 GFCI	=20A*80% = 16A
=20A*80% = 16A	20/1	All North & Trl. 3 South Floor Recep	27	28	Island North Receptacle	20/1 GFCI	=20A*80% = 16A
=20A*80% = 16A	20/1 GFCI	Bathroom Receptacles	29	30	Island South Receptacle	20/1 GFCI	=20A*80% = 16A
=20A*80% = 16A	20/1 AFCI	Bedroom Receptacles	31	32	Bed, Bath, Outdoor Lighting	20/1 AFCI	=20A*80% = 16A
=20A*80% = 16A	20/1 GFCI	West Outdoor Recep	33	34	Kitchen and Living Rm Lighting	15/1	=15A*80% = 12A
=20A*80% = 16A	20/1 GFCI	North Outdoor Recep	35	36	Fan Coil Unit	15/1	=15A*80% = 12A
=60A*80% = 48 A	60/2	To Panel 2	37	38	Control System	15/1	=15A*80% = 12A
			39	40			
=1400/220*1.25 = 8A	10/2	Rotartica Chiller	1	2	Cold Fan Coil Pump	10/2	=938/240*1.25 = 4.9A
			3	4			
=1865/240*1.25 = 9.7A	10/2	Evacuated Tube Fast Pump	5	6	DHW Pump	10/2	=938/240*1.25 = 4.9A
			7	8			
=469/240*1.25 = 2.5A	10/2	Evacuated Tube Slow Pump	9	10	Hot to Warm Pump	10/2	=938/240*1.25 = 4.9A
			11	12			
=938/240*1.25 = 4.9A	10/2	Combo Pump	13	14	Rotartica Cold Loop Pump	10/2	=938/240*1.25 = 4.9A
			15	16			

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E1.03

BRANCH CIRCUITS FOR NAT'L MALL

JANUARY 9, 2008

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Conduit Fill	Raceway 1	Wires	Load calc	Rating	Description	
3 * .1158 in^2 = .3474 in^2, .3474/30% = 1.158 in^2	1-1/4" LFNC = 1.528 in^2	2 AWG type THWN-2, see Note 3	=56A*1.25 = 70A	70/1	Sunny Island #1	1
3 * .1158 in^2 = .3474 in^2, .3474/30% = 1.158 in^2	1-1/4" LFNC = 1.528 in^2	2 AWG type THWN-2, see Note 3	=56A*1.25 = 70A	70/1	Sunny Island #2	3
2 * .0133 in^2 + .013 in^2 = .0396 in^2, .0396/30% = 0.132 in^2	3/4" LFNC = 0.541 in^2	12 AWG THWN-2 with 8 AWG solid bare ground, see Note 3	=2500/240*1.25 = 13.1A	15/2	Sunny Boy #1 (West)	5 7
2 * .0133 in^2 + .013 in^2 = .0396 in^2, .0396/30% = 0.132 in^2	3/4" LFNC = 0.541 in^2	12 AWG THWN-2 with 8 AWG solid bare ground, see Note 3	=2500/240*1.25 = 13.1A	15/2	Sunny Boy #2	9 11
2 * .0133 in^2 + .013 in^2 = .0396 in^2, .0396/30% = 0.132 in^2	3/4" LFNC = 0.541 in^2	12 AWG THWN-2 with 8 AWG solid bare ground, see Note 3	=2500/240*1.25 = 13.1A	15/2	Sunny Boy #3	13 15
2 * .0133 in^2 + .013 in^2 = .0396 in^2, .0396/30% = 0.132 in^2	3/4" LFNC = 0.541 in^2	12 AWG THWN-2 with 8 AWG solid bare ground, see Note 3	=2500/240*1.25 = 13.1A	15/2	Sunny Boy #4 (East)	17 19
3 * .0366 in^2 = .1098 in^2, .1098 in^2/30% = 0.366 in^2	3/4" EMT = 0.533 in^2	8 AWG THHN, see Note 2	=9600/240*1.25 = 50A	50/2	Cooktop	21 23
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	3/4" EMT = 0.533 in^2	12 AWG THHN, see Note 1	=20A*80% = 16A	20/1	Trl. 3 middle and Trl 4 South Floor Receps	25
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	3/4" EMT = 0.533 in^2	12 AWG THHN, see Note 1	=20A*80% = 16A	20/1	All North & Trl. 3 South Floor Recep	27
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	3/4" EMT = 0.533 in^2	12 AWG THHN, see Note 1	=20A*80% = 16A	20/1 GFCI	Bathroom Receptacles	29
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	3/4" EMT = 0.533 in^2	12 AWG THHN, see Note 1	=20A*80% = 16A	20/1 AFCI	Bedroom Receptacles	31
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	1/2" EMT = 0.304 in^2	12 AWG THHN, see Note 1	=20A*80% = 16A	20/1 GFCI	West Outdoor Recep	33
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	1/2" EMT = 0.304 in^2	12 AWG THHN, see Note 1	=20A*80% = 16A	20/1 GFCI	North Outdoor Recep	35
3 * .0507 in^2 = .1521 in^2, .1521 in^2/30% = 0.507 in^2	1" RMC = 0.887 in^2	6 AWG THHN, see Note 2	=60A*80% = 48 A	60/2	To Panel 2	37 39
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	1/2" LFMC = 0.314 in^2	12 AWG THWN-2, see Note 3	=1400/220*1.25 = 8A	10/2	Rotartica Chiller	1 3
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	1/2" LFMC = 0.314 in^2	12 AWG THHN, see Note 2	=1865/240*1.25 = 9.7A	10/2	Evacuated Tube Fast Pump	5 7
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	1/2" LFMC = 0.314 in^2	12 AWG THHN, see Note 2	=469/240*1.25 = 2.5A	10/2	Evacuated Tube Slow Pump	9 11
3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2	1/2" LFMC = 0.314 in^2	12 AWG THHN, see Note 2	=938/240*1.25 = 4.9A	10/2	Combo Pump	13 15
Note 1:			Note 2:			
With 7-9 current-carrying conductors in conduits, 70% derating factor per NEC table 310.15(B)(2)(a)			With 3 or fewer current-carrying conductors in conduit, no derating required per table 310.15(B)(			
Derated ampacities of THHN and THWN-2 wire in 30 C ambient temperature, per table 310.16:			Ampacities of THHN and THWN-2 wire in 30 C ambient temperature, per table 310.16:			
12 AWG = 21 A			12 AWG = 30 A			
10 AWG = 28 A			10 AWG = 40 A			
8 AWG = 38.5 A			8 AWG = 55 A			
6 AWG = 52.5			6 AWG = 75 A			
Note 3:						
With 3 or fewer current-carrying conductors in conduit, no derating required per table 310.15(B)(2)(a)						
Ampacities of THHN and THWN-2 wire in 60 C ambient temperature, per table 310.16 (0.71 temperature derating):						
12 AWG = 21.3 A						
10 AWG = 28.4 A						
8 AWG = 39 A						
6 AWG = 53 A						
4 AWG = 67.45 A						
2 AWG = 92.3 A						

E1.04

BRANCH CIRCUITS FOR NAT'L MALL

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH

	Description	Rating	Load calc	Wires	Raceway 1	Conduit Fill
2	Domestic Hot Water Heater	50/2	=9600/240*1.25 = 50A	8 AWG THHN, see Note 2	3/4" EMT = 0.533 in^2	3 * .0366 in^2 = .1098 in^2, .1098 in^2/30% = 0.366 in^2
4						
6	Hydronic Hot Water Heater	70/2	=12000/240*1.25 = 62.5A	6 AWG THHN, see Note 2	3/4" LFNC = 0.541 in^2	3 * .0507 in^2 = .1521 in^2, .1521 in^2/30% = 0.507 in^2
8						
10	Clothes Dryer	30/2	=5400/240*1.25 = 28.5A	10 AWG THHN, see Note 2	3/4" EMT = 0.533 in^2	3 * .0211 in^2 = .0633 in^2, .0633 in^2/30% = 0.211 in^2
12						
14	Oven	30/2	=5400/240*1.25 = 28.5A	10 AWG THHN, see Note 2	3/4" EMT = 0.533 in^2	3 * .0211 in^2 = .0633 in^2, .0633 in^2/30% = 0.211 in^2
16						
18	Clothes Washer	20/1	=20A*80% = 16A	12 AWG THHN, see Note 1	3/4" EMT = 0.533 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
20	Dishwasher	20/1	=20A*80% = 16A	12 AWG THHN, see Note 1		
22	Refrigerator	20/1	=20A*80% = 16A	12 AWG THHN, see Note 1	1/2" EMT = 0.304 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
24	Kitchen Receptacles #1	20/1 GFCI	=20A*80% = 16A	12 AWG THHN, see Note 1	3/4" EMT = 0.533 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
26	Kitchen Receptacles #2	20/1 GFCI	=20A*80% = 16A	12 AWG THHN, see Note 1		
28	Island North Receptacle	20/1 GFCI	=20A*80% = 16A	12 AWG THHN, see Note 1	3/4" EMT = 0.533 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
30	Island South Receptacle	20/1 GFCI	=20A*80% = 16A	12 AWG THHN, see Note 1		
32	Bed, Bath, Outdoor Lighting	20/1 AFCI	=20A*80% = 16A	12 AWG THHN, see Note 1	3/4" EMT = 0.533 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
34	Kitchen and Living Rm Lighting	15/1	=15A*80% = 12A	12 AWG THHN, see Note 1	1/2" EMT = 0.304 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
36	Fan Coil Unit	15/1	=15A*80% = 12A	12 AWG THHN, see Note 1	1/2" LFMC = 0.314 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
38	Control System	15/1	=15A*80% = 12A	12 AWG THHN, see Note 1	1/2" EMT = 0.304 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
40						
2	Cold Fan Coil Pump	10/2	=938/240*1.25 = 4.9A	12 AWG THHN, see Note 2	1/2" LFMC = 0.314 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
4						
6	DHW Pump	10/2	=938/240*1.25 = 4.9A	12 AWG THHN, see Note 2	1/2" LFMC = 0.314 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
8						
10	Hot to Warm Pump	10/2	=938/240*1.25 = 4.9A	12 AWG THHN, see Note 2	1/2" LFMC = 0.314 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
12						
14	Rotartica Cold Loop Pump	10/2	=938/240*1.25 = 4.9A	12 AWG THHN, see Note 2	1/2" LFMC = 0.314 in^2	3 * .0133 in^2 = .0399 in^2, .0399 in^2/30% = 0.133 in^2
16						

Note 1:	Note 2:
With 7-9 current-carrying conductors in conduits, 70% derating factor per NEC table 310.15(B)(2)(a)	With 3 or fewer current-carrying conductors in conduit, no derating required per table 310.15(B)(2)(a)
Derated ampacities of THHN and THWN-2 wire in 30 C ambient temperature, per table 310.16:	Ampacities of THHN and THWN-2 wire in 30 C ambient temperature, per table 310.16:
12 AWG = 21 A	12 AWG = 30 A
10 AWG = 28 A	10 AWG = 40 A
8 AWG = 38.5 A	8 AWG = 55 A
6 AWG = 52.5	6 AWG = 75 A
Note 3:	
With 3 or fewer current-carrying conductors in conduit, no derating required per table 310.15(B)(2)(a)	
Ampacities of THHN and THWN-2 wire in 60 C ambient temperature, per table 310.16 (0.71 temperature derating):	
12 AWG = 21.3 A	
10 AWG = 28.4 A	
8 AWG = 39 A	
6 AWG = 53 A	
4 AWG = 67.45 A	
2 AWG = 92.3 A	

E1.05
BRANCH CIRCUITS FOR NAT'L MALL

JANUARY 9, 2008

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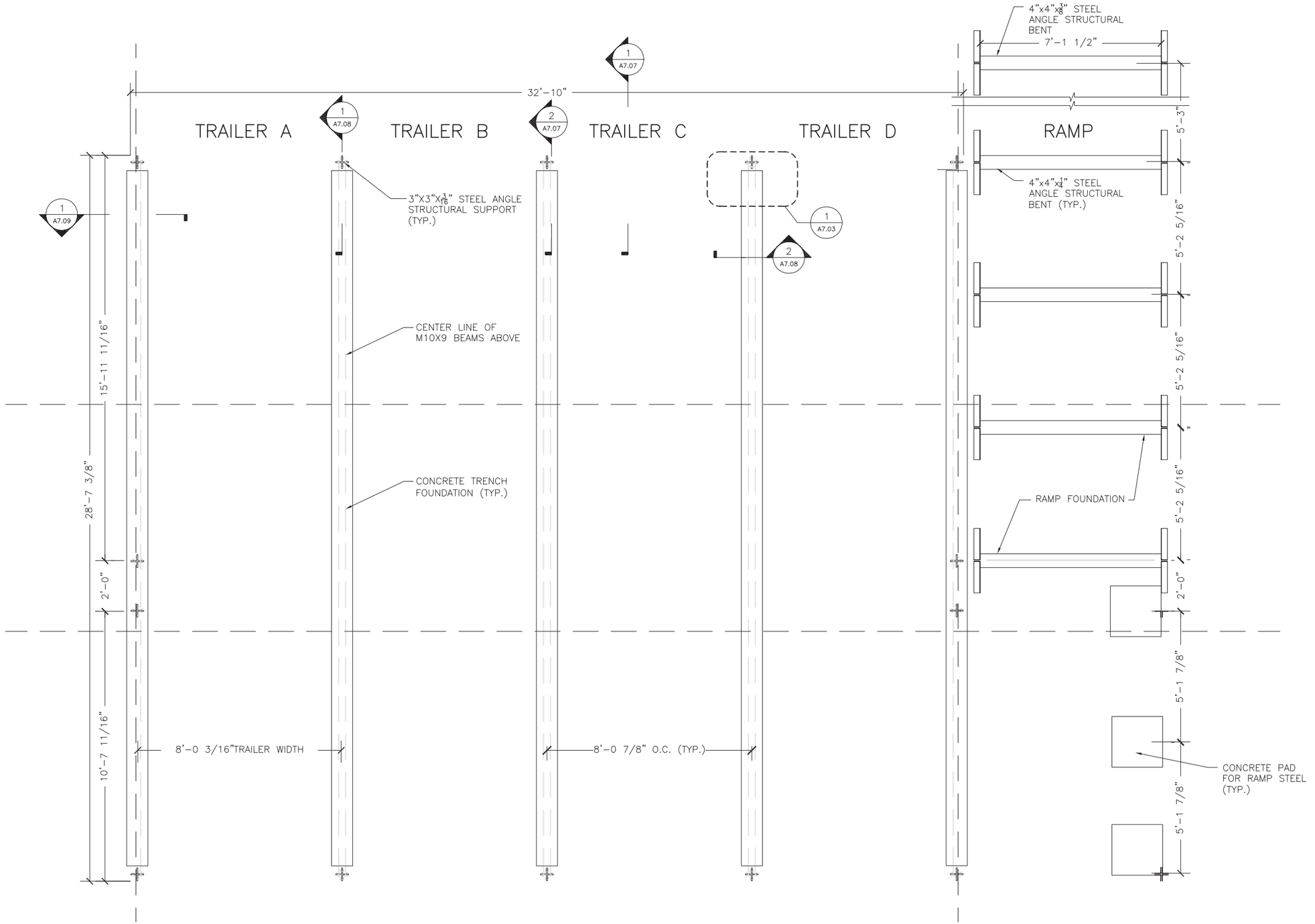
Cincinnati, OH



1 / S1.01 **FOUNDATION PLAN**

1/4" = 1'-0"

0 4 8

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S1.01

FOUNDATION PLAN

JANUARY 9, 2008

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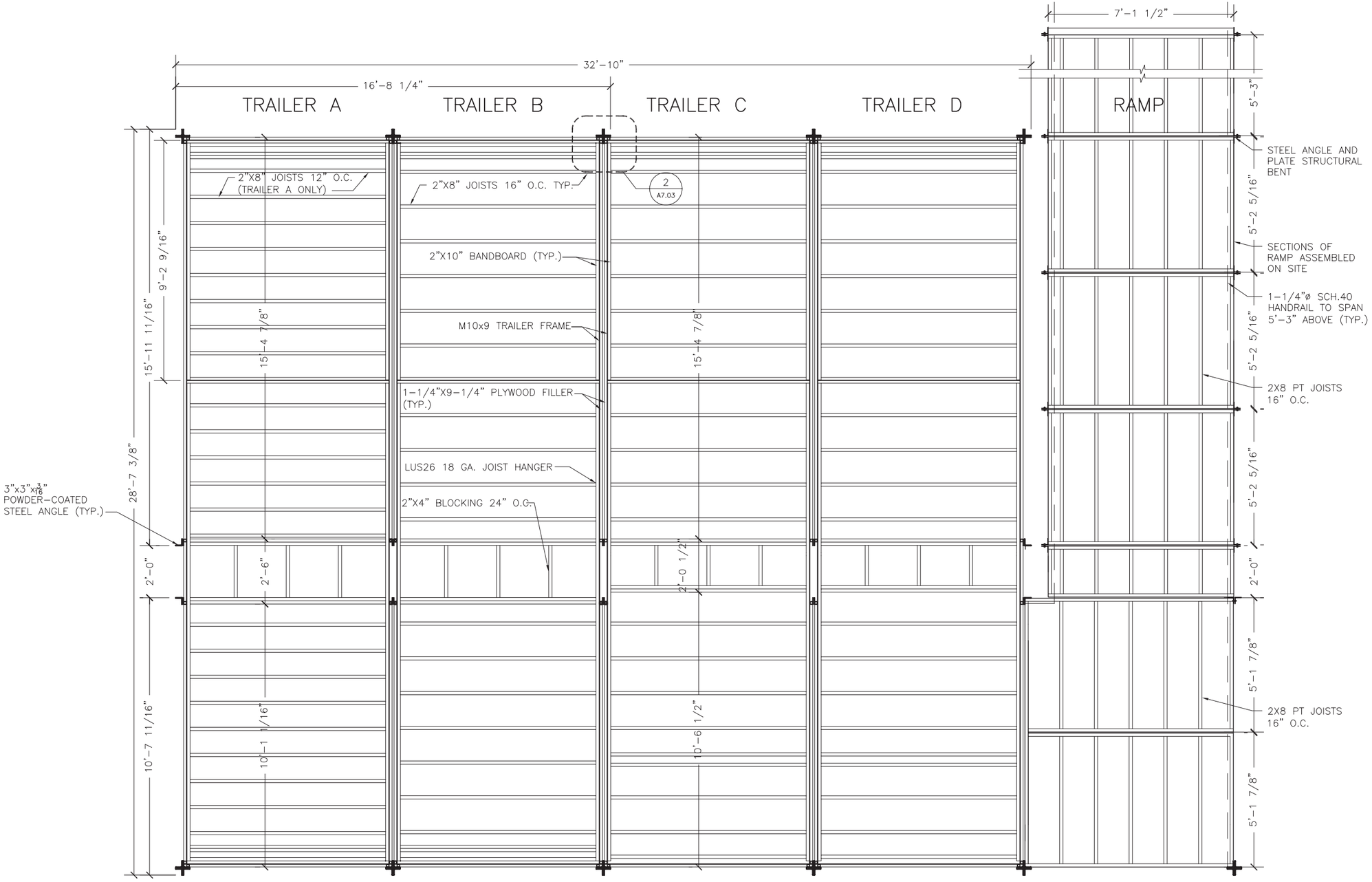
Cincinnati, OH



1 / S1.02 **FLOOR FRAMING PLAN**

1/4" = 1'-0" 0 4 8

[reFORM
SOLAR DECATHLON 2007

S1.02

FLOOR FRAMING PLAN

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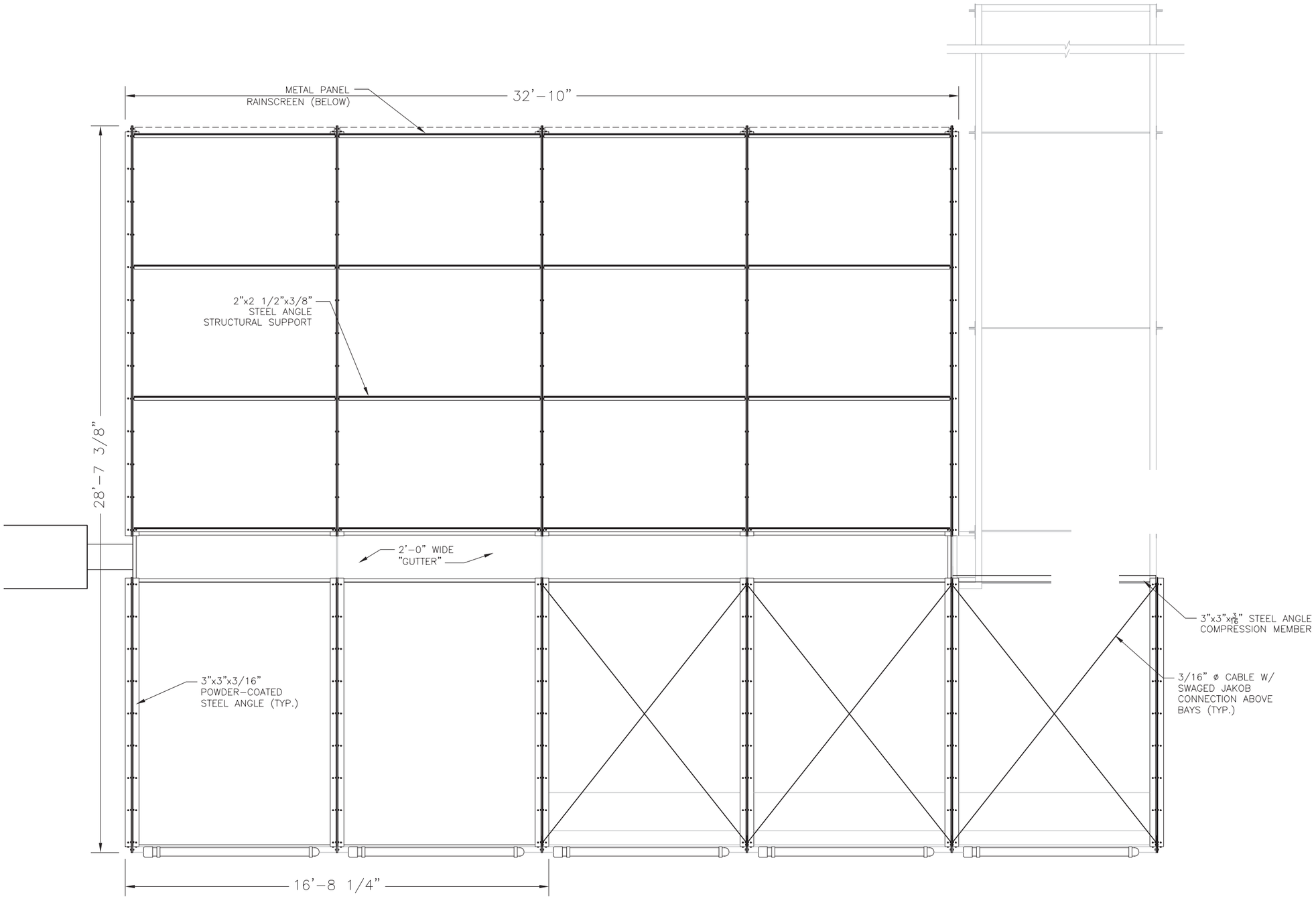
Cincinnati, OH



1 / S1.03 **PV SUPPORT SYSTEM PLAN**

1/4" = 1'-0"

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SOLAR DECATHLON 2007

S1.03

PV SUPPORT PLAN

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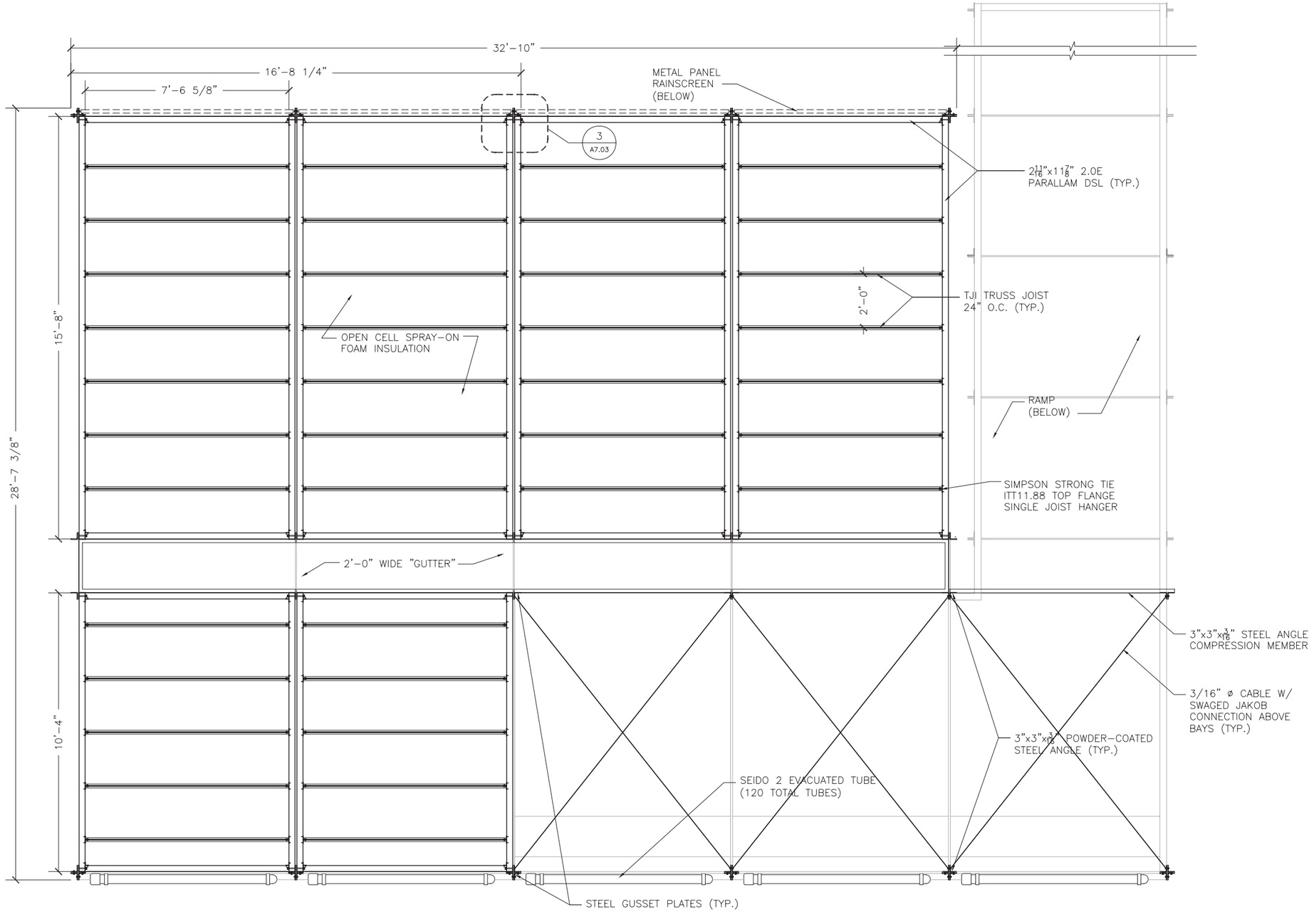
Cincinnati, OH



1 / S1.04 **ROOF FRAMING PLAN**

1/4" = 1'-0"

0 4 8

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SOLAR DECATHLON 2007

S1.04

ROOF FRAMING PLAN

JANUARY 9, 2008

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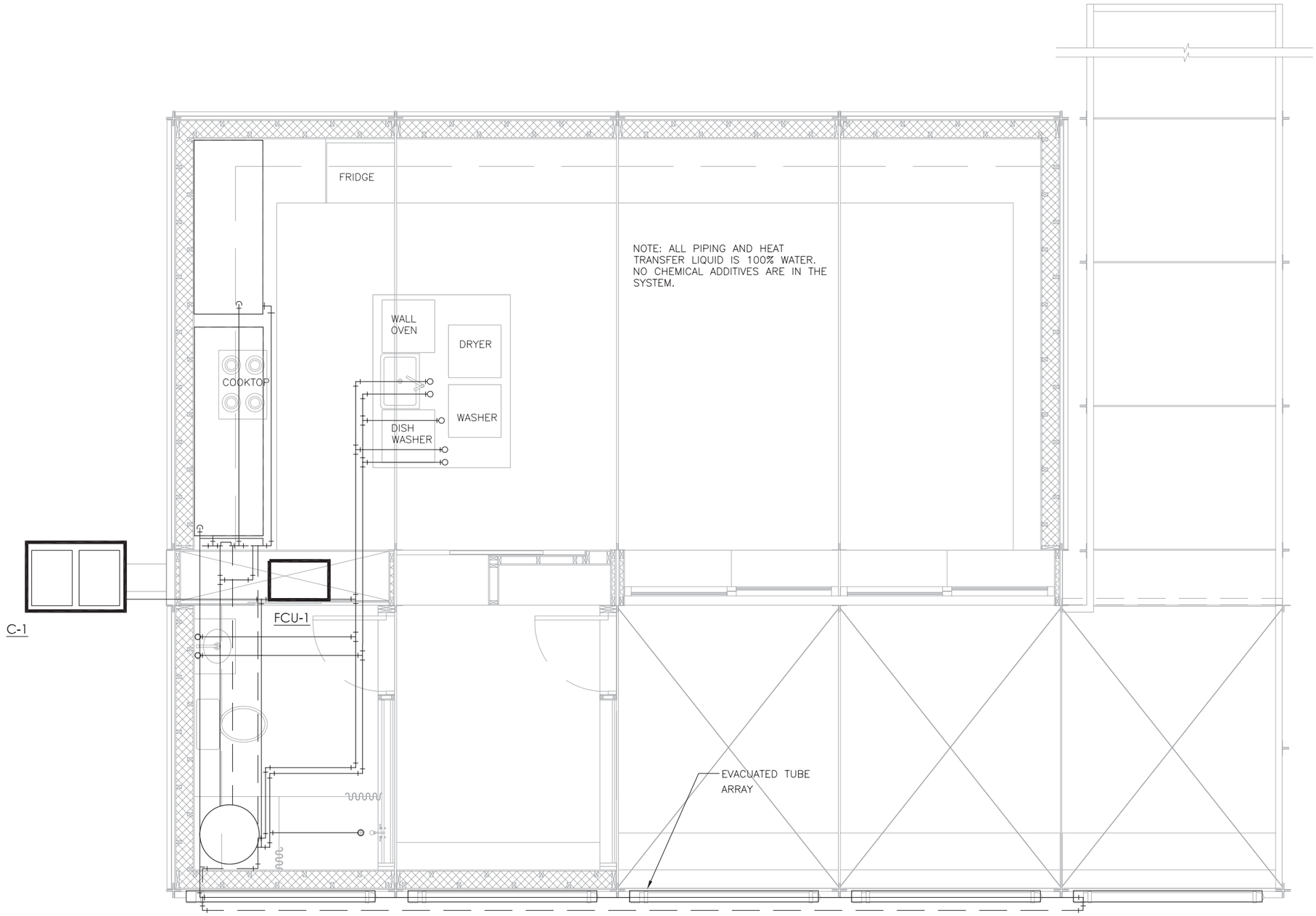


1 P1.01 **DOMESTIC WATER PLUMBING PLAN**

1/4" = 1'-0"

0 4 8

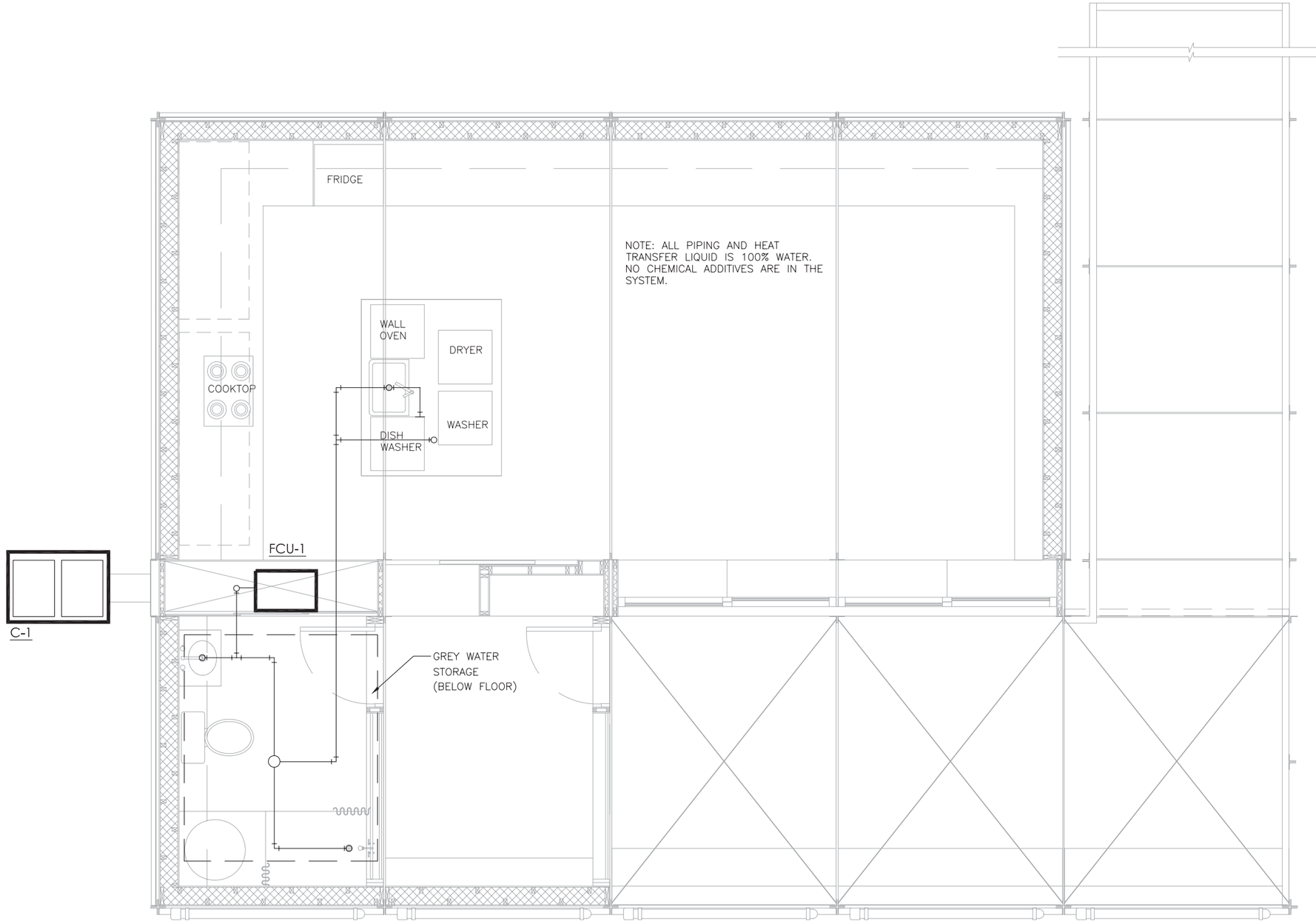
[reFORM
SOLAR DECATHLON 2007

P1.01

PLUMBING PLAN

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH



1 P1.02 **GREY WATER PLUMBING PLAN**

NTS

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SOLAR DECATHLON 2007

P1.02

PLUMBING PLAN

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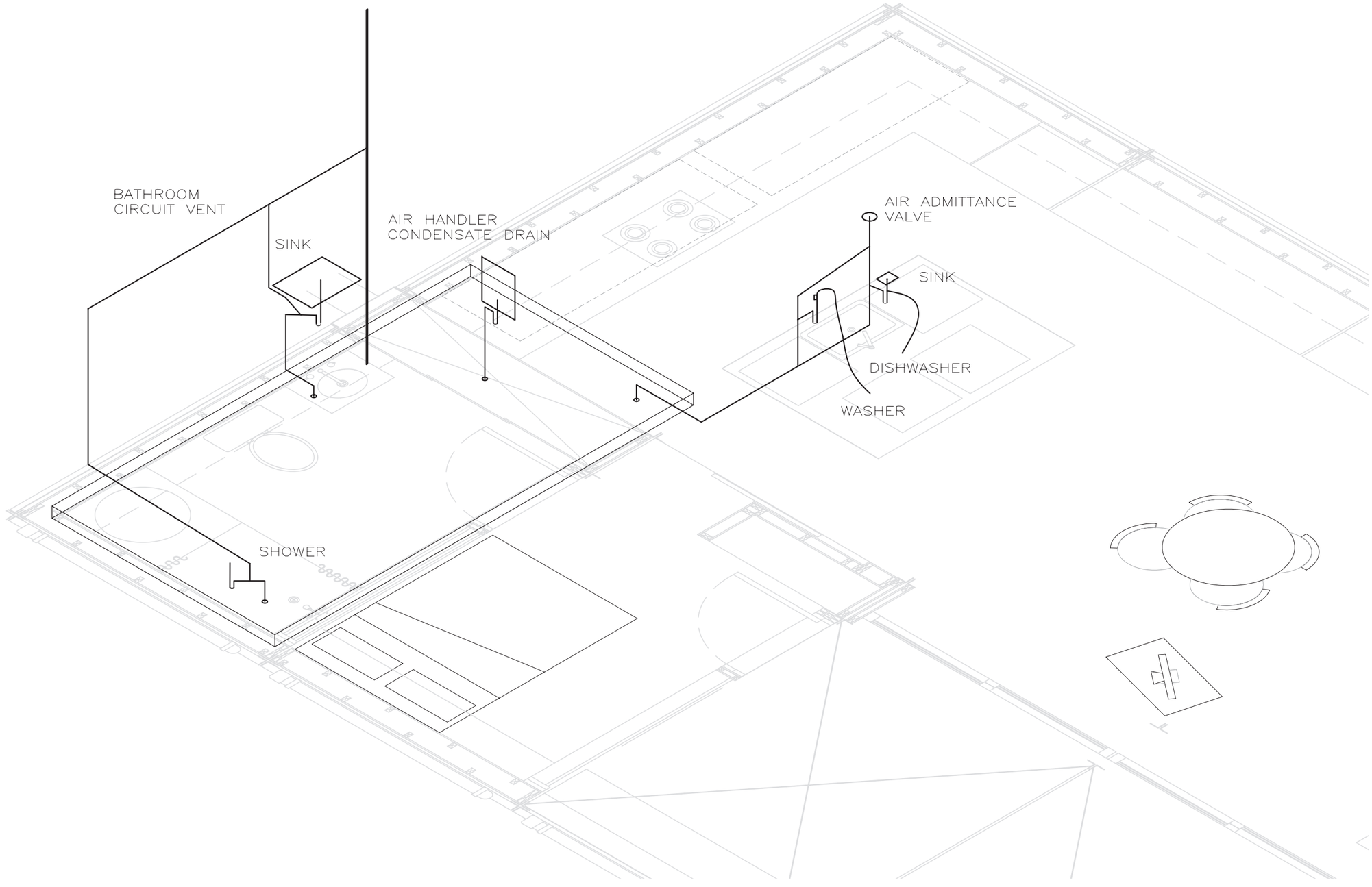

1 P1.03 **ONE-LINE PLUMBING VENT DIAGRAM**

NTS

P1.03

PLUMBING
SYSTEM VENT

JANUARY 9, 2008

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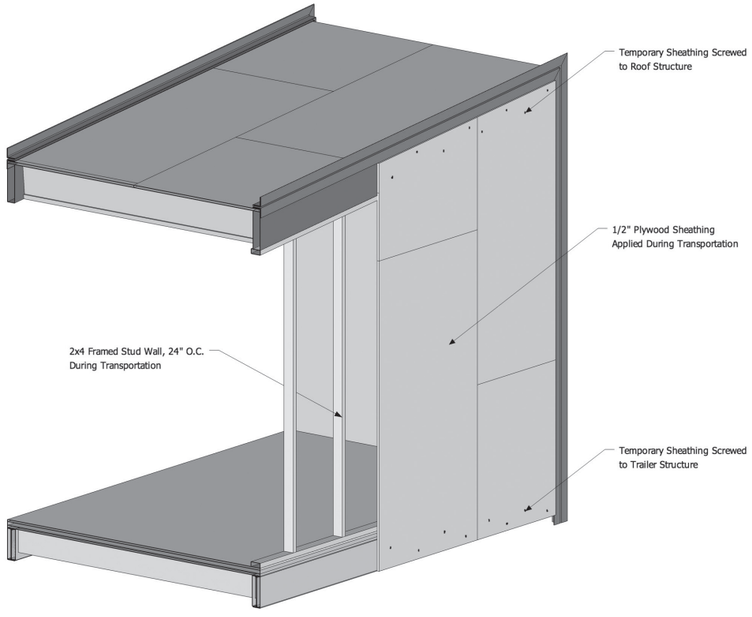
Cincinnati, OH

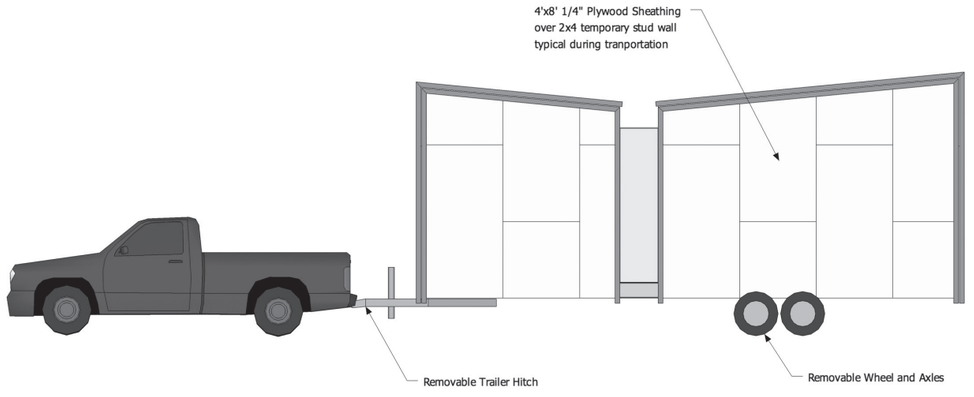
2 T1.01 **TRUCK APPROACH**

NTS



3 T1.01 **DETAIL OF PLYWOOD TO STEEL CONNECTION**

NTS



1 T1.01 **TEMPORARY PLYWOOD BRACING**

NTS

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SOLAR DECATHLON 2007

T1.01

TRANSPORT FOR
NAT'L MALL

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH

STAGING PLAN

House Section Locations:

1) Holding Area
Trailvers are brought in one at a time and will wait in this area until path is clear of pedestrians and other trucks/cars and the team is ready to back the trailer onto the site.

2) Turn-around Area
The trailers must be turned 90 degrees and backed onto the site. The turn will start on the north side of the path, then cross the entire path into the grass on the south side; when the trailers are running north-to-south, they will begin to back onto the site.

3) Staging Area
Once the trailers are backed onto the site and are on the set northern line, the building wrap, plywood bracing, cross bracing, wheels, and axles will be removed from the trailers. The sections of the house will then be rolled to the east into place using a rolling jack system.

4) Final Set Area
The sections of the house will be set onto the permanent foundations stands and the rolling jacks will be removed. When all the sections are in place and have been bolted together, the house will be tied down to the ground and the foundation shear wall will be applied. Light, on-site construction will continue and the four trucks will be removed from the site.

On Site Storage:

A) Light Tent (position 1)- a site assembled covered tent without sides will provide protection from sun or rain during the first phase of construction

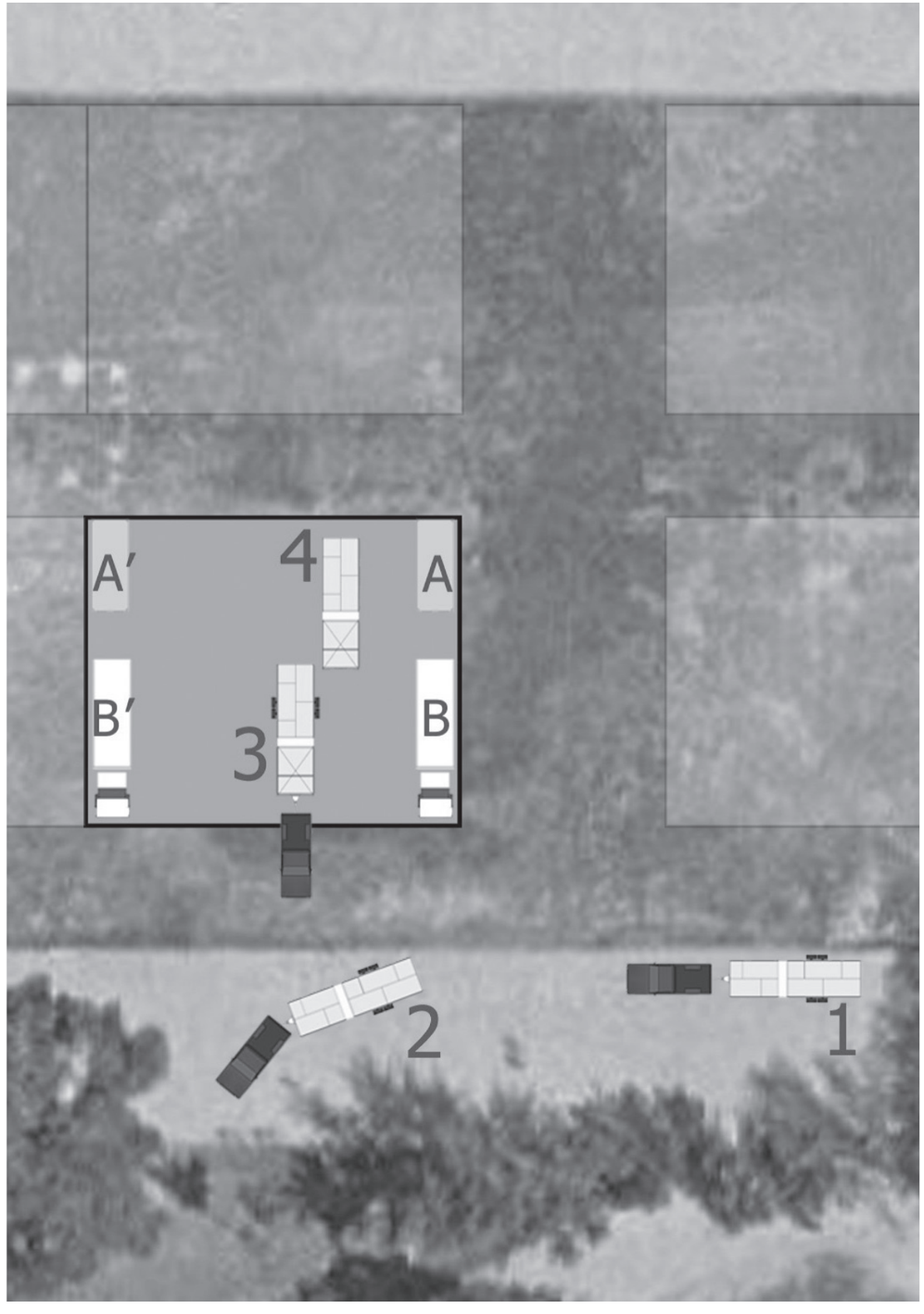
A') Light Tent (position 2)- a site assembled covered tent without sides will provide protection from sun or rain during the second phase of construction

B) 24' Cargo Truck (position 1)- the truck will remain in this position during first phase of the construction period and will contain the team's tool and night storage that is lockable.

B') 24' Cargo Truck (position 2)- the truck will remain in this position during second phase of the construction period and will contain the team's tool and night storage that is lockable.

Dissasembly:

Dissaembly will be the reverse of the assembly process, and will not require any special equipment. Plywood bracing from the original transportation bracing will be reused.



1 T1.02 **STAGING PLAN**
Showing Temporary Positions
NTS

[reFORM
SOLAR DECATHLON 2007

T1.02
STAGING PLAN
FOR NAT'L MALL

JANUARY 9, 2008

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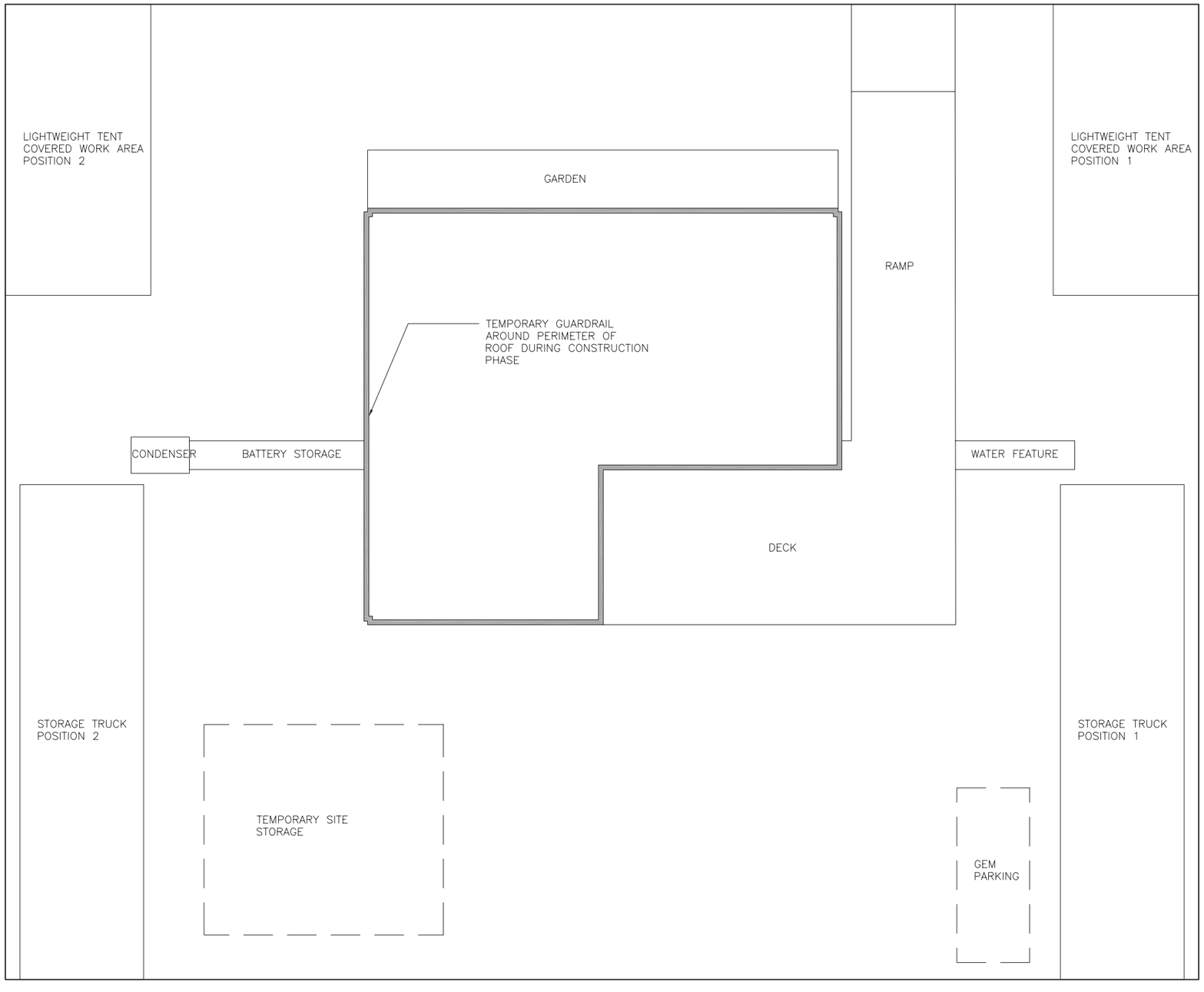

GENERAL NOTES:
ENTIRE SITE TO FOLLOW SOLAR DECATHLON AND OSHAA SAFETY RULES AND REGULATIONS

SEE UNIVERISTY OF CINCINNATI JOBSITE SAFETY REGULATIONS PACKAGE

1 / T1.03 **TEMPORARY CONSTRUCTION ZONE PLANS**

1/8" = 1'-0" 0 8 16

[reFORM
SOLAR DECATHLON 2007

T1.03

CONSTRUCTION ZONES FOR NAT'L MALL

JANUARY 9, 2008

University of Cincinnati
Cincinnati, OH