



UNIVERSITY FACILITIES MANAGEMENT

Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

ADDENDUM NO. 1 - OUTLINE AND SUMMARY INFORMATION

Project Name: Molecular Bioscience Renovation & Maintenance PPA No.: 22-0045
Location: Montana State University Bozeman Campus Date: August 20, 2026

To: *All Plan Holders of Record*

*The Plans and Specification prepared by (**Bechtle Architects**) dated (**Jun. 03, 2026**), shall be clarified and added as follow. The bidder proposes to perform all the following clarifications or changes. It is understood that the Base Bid shall include any modification of Work or Additional Work that may be required by reason of the following change or clarifications.*

The Bidders are to acknowledge the receipt of this Addendum by inserting its number and date into their Bid Forms. Failure to acknowledge may subject the Bidder to disqualification and rejection of the bid. This Addendum forms part of the Contract Documents as if bound therein and modifies them as follows:

I. PRIOR APPROVALS

23 0541 – Noise & Vibration control for HVAC Piping & Equipment Approved substitution: Vibro Acoustics

23 2113 – Hydronic Piping, Flexible Pipe connectors Approved substitution: Engineered Flexible Products (EFP), IMI Flow Design

23 2113 – Hydronic Piping, Flow Balancing Valves Approved substitution: IMI Flow Design

Plumbing AS-1&2, Approved substitution: American Wheatley Air Dirt Separator

Plumbing PET-1, Approved substitution: American Wheatley BDT Series Expansion Tank

Plumbing GF-1, Approved as noted substitution; American Wheatley Simplex Glycol Feeder – Provide digital unit.

Plumbing MV-1, Approved substitution: Lawler 802 Thermostatic Water Controller (86008)

Plumbing ES-1, approved substitution; Stingray T5510 Floor mounted Combination shower/eye/face wash w/ SV125RB Thermostatic mixing valve

22 XXXX – Seismic, Noise & Vibration Control for plumbing piping & equipment approved substitution; Vibro Acoustics

II. AMENDMENTS TO THE PROJECT MANUAL

- 1) See attached Asbestos Inspection Report dated August 29, 2024 from Tetra Tech.
- 2) 09 2116 – existing wall framing is assumed 2x wood framing. All new framing shall match existing.
- 3) 12 3553.23 – Solid-Plastic Laboratory Casework – OMIT section, no solid-plastic laboratory casework is required.

III. AMENDMENTS TO THE DRAWINGS

- 1) A001 - Staging area identified on site plan, **See updated A001.**
- 2) A001 – Generator enclosure renovation added to site plan. **See updated A001.**
- 3) A011 – Demolition General Notes: Clarifications:
 - a) note 'B' states that contractor is responsible for permits before start of work. Specifications state that owner is responsible for all building permits and impact fees except electrical and plumbing. – **Owner has paid for building permit, contractor shall be responsible for mechanical, electrical, and plumbing permits through the State building department. Omit note 'B' on A011 Demolition General Notes.**
 - b) Note 'C' general information note for contractor to verify on site demo'd walls are non structural prior to removing.
 - c) Note 'I' for budget purposes only areas affected / damaged flooring to be replaced with like material. Assumed material is Armstrong VCT Standard Excelon, color TBD.
- 4) A013 – General RCP note 'A' shall read "G113 for partitions and assemblies..." not G116.
- 5) A021 ceiling section in hallway assumed to not be removed in entirety. A121 identifies to replace any damaged tile.
- 6) A111 – Partition Notes: Omit notes 'B' & 'C', these notes no longer apply to this project.
 - a) Note 'E' all new walls to extend partitions to underside of floor / roof deck
- 7) A111 – Added window schedule. Two windows to be hollow metal direct set ¼" glazing, painted frame to match door frames.
- 8) See attached basis of design for wired security fence.
- 9) Scope of walls color coded as 1-hour fire walls intent is to identify where modified 5/8" type 'x' GWB and fire caulking required.
- 10) A121 – Ceiling tile is assumed Armstrong Cortega, 2x4 second look, angled tegular white, 15/16 track. Verify on site. Assume 25% replacement per room.
- 11) A123 – see attached structural report for size and location of added structural frame to support new rooftop mounted chiller.
- 12) A401 – Window location / size updated.
- 13) See added A526 – roof details from previous construction phase. Also attached is submittal of existing roofing system.

IV. GENERAL INFORMATION

- 1) General Contractor is responsible for coordinating 24-hour fire watch during the construction process.
- 2) Review attached Pre-bid walk through meeting minutes.
 - a) Discussed MSU's anticipated budget of \$5,000,000.
 - b) Staging area to be east side of parking lot.
- 3) Attic space does not have an existing access panel, contractor to remove sheetrock as necessary to provide blown-in insulation to fill cavity solid.
- 4) Note to "Deep clean of cooler" is fully sanitize and clean cooler.
- 5) Note to "Deep clean patch and paint" is to clean walls, patch holes and touchup paint.
- 6) New walls except eye wash walls to receive insulation.
- 7) Existing 2nd Floor assembly is 1-1/2" light weight concrete, 3/4" plywood sheathing & 18" TJI joist.

V. ATTACHMENTS

26-0817_pre-bid_meeting-minutes.pdf

25-072 – MSU Molecular Bioscience Building – Structural Review (12-11-25).pdf

075300-1 – Elastomeric Membrane Roofing PI – BAapproved08-29-2025.pdf

MOIR_2326_CENTRAL_v24 - Sheet - A001 - SITE PLAN (MOD).pdf

MOIR_2326_CENTRAL_v24 - Sheet - A111 - MAIN - REMODEL PLANS.pdf

MOIR_2326_CENTRAL_v24 - Sheet - A401 - REMODEL INT ELEVATIONS.pdf

MOIR_2326_CENTRAL_v24 - Sheet - A526 - ROOF DETAILS Copy 1.pdf

MSU-Molecular Bioscience Building-Asbestos Inspection Report.pdf

Sliding Door for Wire Security Room - 4 x 8_ H-8306 - ULINE.pdf

230541 Vibro Acoustics 099SubstitutionRequest.pdf

232113 EFP 099SubstitutionRequest.pdf

232113 IMI 099SubstitutionRequest.pdf

Substitution Request Form American Wheatley Air Dirt Separartor.pdf

Substitution Request Form American Wheatley Expansion Tanks.pdf

Substitution Request Form American Wheatley Glycol Feeder.pdf

Substitution Request Form Camus Boiler.pdf

Substitution Request Form Lawler.pdf

Substitution Request Form Stingray.pdf

Vibro Acoustics Plumbing 099SubstitutionRequest.pdf



PREBID CONFERENCE AGENDA

Project: Molecular Bioscience Renovation & Maintenance

Meeting Date: 08/17/2026

Location: On site, 960 Technology Blvd, Bozeman, MT

Project No.: PPA No.; 22-0045

Owner Contact Person: Donny Beebe Phone: 406-994-4547
Fax: donald.beebe@montana.edu

Contact Person: Nick Fulton Phone: 406-599-9432
Email: nickf@bechtlearchitects.com

A. INTRODUCTION

1. Introduce design and owner staff (present and not in attendance), giving brief description of each one's responsibilities and authorities.
 - a. Donny Beebe, MSU Project Manager
 - b. Nick Fulton, Bechtle Architects, Project Architect
 - c. Bill Edden, SE Engineers, Project Mechanical Engineer
 - d. Aliana, Blacksheep Engineering, Lighting Designer
 - e. (not in attendance) Andy Moore, Blacksheep Engineering, Electrical Engineer
 - f. (not in attendance) Robert Blakeman, Coffman Engineers, Fire Suppression Engineer.
2. Sign-in sheet at entry table, see attached.

B. DOCUMENTS

1. Plans & Specifications are available electronically through Bechtle Architects and MSU exchange
2. Reviewed instructions to bidders for bid submittal requirements.
3. utilized form 099 for substitutions, August 25, 2026 last day for acceptance.
4. No Addendums have been issued to date, first one will be issued week of this walk. Last date of addendum issue will be August 25, 2026.

C. CLARIFICATIONS

2. All construction to be completed in one phase
3. Site staging area to be on east side of building parking lot. Area was used for exterior renovation last year.
4. MSU Anticipated budget \$5,000,000
5. Coordination with tenants will need to be high priority during construction. 72 hour notice for shutdowns.
6. New roof top condenser added structure to be included in Addendum.
7. Owner will remove all laboratory equipment from areas of renovation prior to beginning of construction.

D. PROJECT WALK THROUGH (Remodels and additions)

1. no specific restriction of work hours, close coordination of tenants during times of excessive noise.

2. Question on attic access above mechanical room. – in order to insulate space above mechanical room contractor will need to remove sections of ceiling to gain access to attic.

PRE BID SIGN IN SHEET

TCS Northwest	406-533-5080	travis@tcsnw.com	Travis Melton
Oswood Const	406-761-1465	ozzieoswood@gmail.com	Troy Oswood
		DRoswood@hotmail.com	Doug Oswood
SE Engineers	406-600-8796	bille@seengineersmt.com	Bill Edden
Bechtle Architects	406-599-9432	nickf@bechtlearchitects.com	Nick Fulton
Golden Eagle Const.	406-594-0748	bryson@geconstruction.com	Bryson Buska
GEC	406-579-8481	kalina@geconstruction.com	Kalina
Jackson Group	406-498-1435	kodyl@jacksoncontractorgroup.com	Kody Lane
Martel	406-595-1142	IThompson@martelconstruction.com	Isaac Thompson
Martel	406-596-5816	maxtroutman@martelconstruction.com	Max Troutman
Langlas	406-399-1775	kstrutz@langlas.com	Kyle Strutz
JCI	406-536-9711	allison.tschetter@jci.com	Allison Tschetter
MT Conc. Polishing	406-880-2383	jan@mtpolishing.com	Jan Branning
Spring Corp	406-581-0029	tspring@springcorp.net	Ty Spring
Taylor Construction	661-623-4988	sam.b@taylor-construct.com	Sam Barnes
		Seth.h@taylor-construct.com	Seth Hammel
Anthem Electric	406-320-2168	Joshm@anthemelectricllc.com	Josh M
Anthem Electric	406-922-7421	michaelf@anthemelectricllc.com	Michael Finch
CS Structures	406-581-5611	levi@csstructuresmt.com	Levi Clark
Mclees	406-539-8151	jason@mcleesinc.com	Jason T



Date: December 11, 2025
Attn: Nick Fulton

Client: Bechtle Architects
Address: 4515 Valley Commons Drive, Suite 201
Bozeman, MT 59718
Email: nickf@bechtlearchitects.com

RE: Structural Review – MSU Bioscience Building – 960 Technology Boulevard; Bozeman, MT

Nick,

Per your request, Vantage Engineering (Vantage) has completed a review of the above-referenced structure. The purpose of this report was to review the existing roof framing of the building and provide recommendations for the support of a new mechanical chiller unit. Please find this letter and its attached documentation as a record of our review and recommendations.

The structure in question is an existing two-story academic building located off of Montana State University's campus. A new mechanical chilling unit is proposed to be placed on the roof framing to service the building. A mechanical design was completed SE Engineers, who have determined a chiller unit and relative placement on the roof appropriate for the building and its occupancy. The technical specifications of the chosen unit have been enclosed within this report for reference. The proposed chiller unit has a functioning weight of 6,940 pounds. The unit weight, along with the weight of the steel support structure, is to be transferred from its current position on the roof to the existing structure.

The existing structural drawings were completed by DCI Engineers in July of 2002 and provided to Vantage for review. The purpose of this review was to determine the adequacy of the existing structure to transfer the loads from the proposed chiller unit. Vantage used the design loading and framing specifications from the original construction drawings to determine whether improvements were needed to the existing framing. On review, it has been determined that the existing W-flange beam acting as the primary transfer girder for the chiller unit has adequate capacity to transfer both the design tributary loading from the existing roof assembly as well as the unit's functioning weight. However, the weight of the chiller exceeds the allowable uniform load on the existing TJI roof rafters. For this reason, the chiller is to be placed on a steel support structure and transferred to the existing

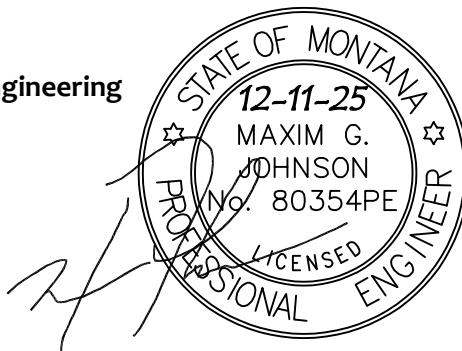
steel girders with four steel columns. Calculations for each of these items has been enclosed within this report for review.

Enclosed are exhibits and details showing our recommendations for the proposed addition of the chilling unit. The contractor is to verify the assumptions of the exhibits and details contained within this report prior to undergoing any field modifications. If variations exist from the assumptions of this report, contact our office for further recommendation and review.

Vantage is not providing recommendations for any temporary shoring of the existing structure that may be needed for installation of the mechanical unit, as this will be the responsibility of the contractor. If you have any questions regarding the contents of this report, please contact the undersigned.

Vantage Engineering

Signature:

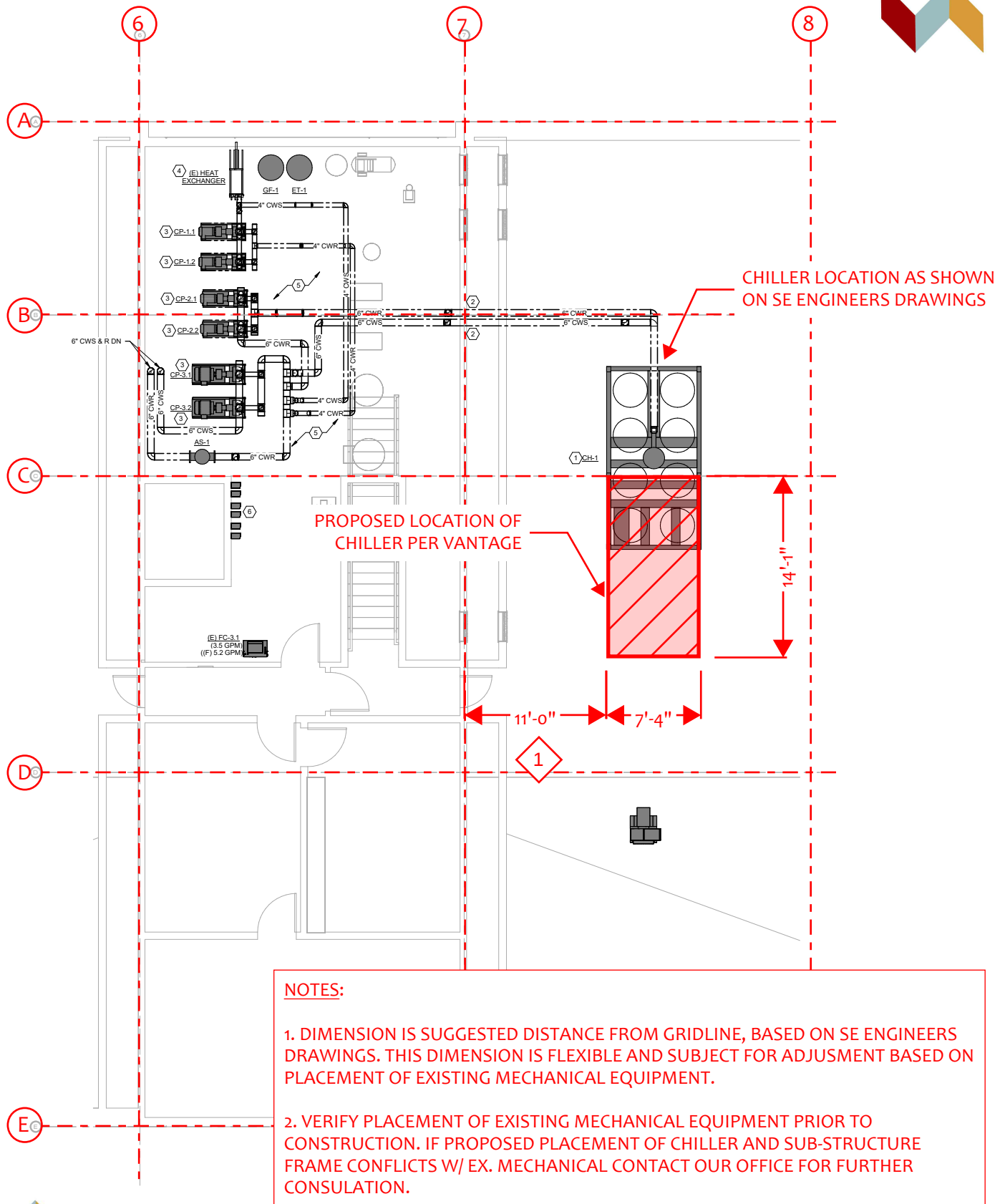


Name (printed): Max Johnson, P.E.

Title: Principal Structural Engineer

Enclosures:

Design Document 1-3 (DD1-DD3)
Detail Sketches 1-3 (SK1-SK3)
Chiller Technical Specifications
Chiller Mounting Weights
Seismic Spring Isolator Technical Specifications
W-Flange Transfer Beam Calculation
Existing W-Flange Beam Calculation
Existing W-Flange Beam w/ Chiller Weight Calculation
Rafter Reaction Calculations
Existing TJI Rafter Review



NOTES:

1. DIMENSION IS SUGGESTED DISTANCE FROM GRIDLINE, BASED ON SE ENGINEERS DRAWINGS. THIS DIMENSION IS FLEXIBLE AND SUBJECT FOR ADJUSTMENT BASED ON PLACEMENT OF EXISTING MECHANICAL EQUIPMENT.
2. VERIFY PLACEMENT OF EXISTING MECHANICAL EQUIPMENT PRIOR TO CONSTRUCTION. IF PROPOSED PLACEMENT OF CHILLER AND SUB-STRUCTURE FRAME CONFLICTS W/ EX. MECHANICAL CONTACT OUR OFFICE FOR FURTHER CONSULTATION.



VANTAGE
ENGINEERING SURVEYING

3400 Valley Commerce Drive | Suite 2 | Houston, TX 77057
Website: www.vantageeng.com
Email: info@vantageeng.com
Phone: (281) 916-9169

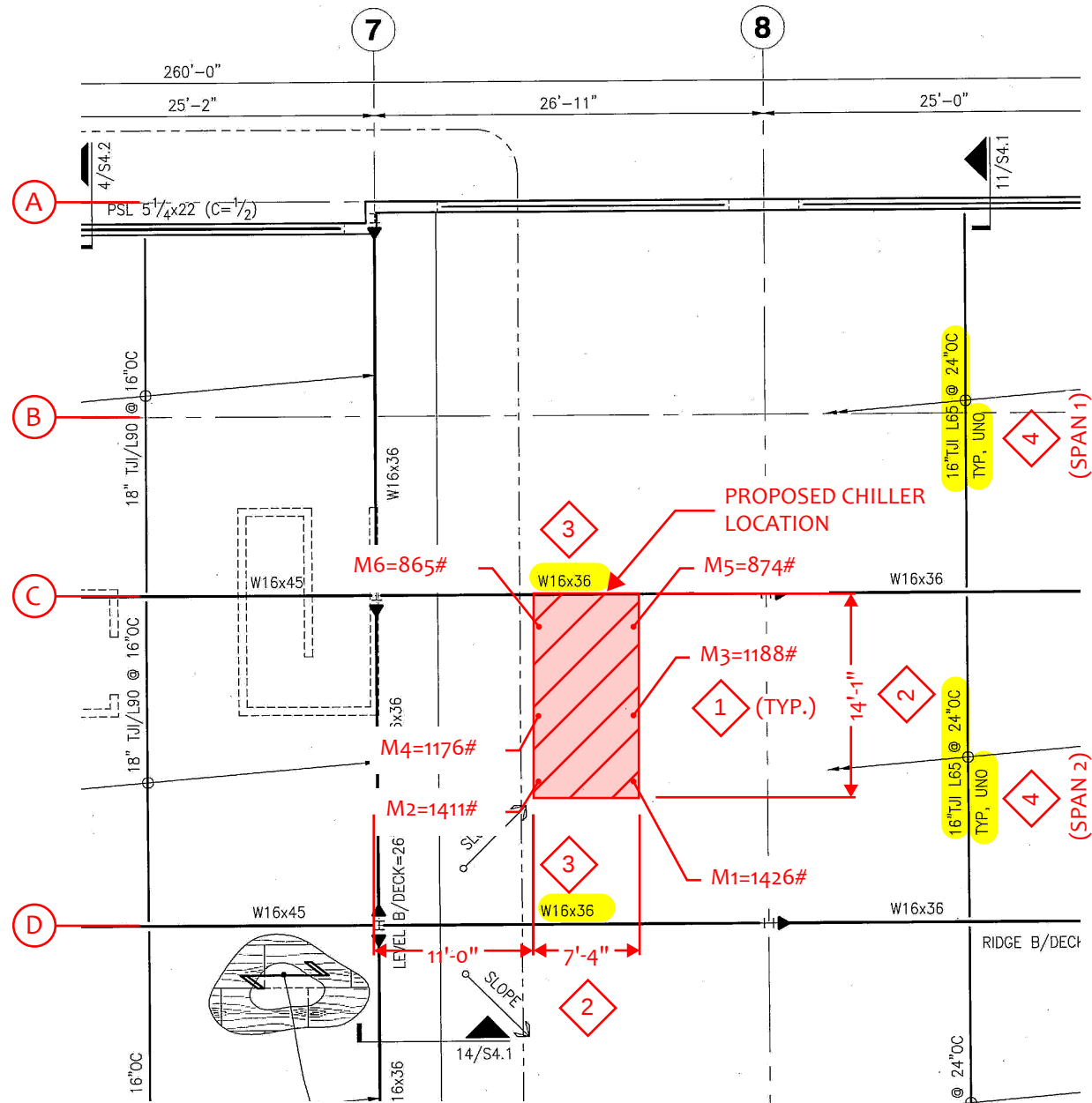
PROPOSED MECHANICAL UNIT LOCATION

SCALE: 3/32"=1'-0"

PROJECT NAME: MSU MOLECULAR BIOSCIENCE BUILDING
PROJECT ID: 25-072
DESIGN BY: M. JOHNSON
CHECKED BY: M. JOHNSON

DESIGN ID:

DD #1



DESIGN CRITERIA FROM ORIGINAL CONSTRUCTION DOCUMENTS:

Roof Dead Load	15 PSF
Top Chord	9 PSF
Bot. Chord	6 PSF
Floor Dead Load	24 PSF
Total Deflection Limit	See DESIGN REQUIREMENTS
Live Load Deflection Limit	See DESIGN REQUIREMENTS
Truss Uplift Load [Net]	5 PSF

Roof (snow)	40 PSF (1)
Offices	50 PSF (3)
Stairs & Landings	100 PSF (2)
Exit Corridors	100 PSF

DEFLECTIONS:	Total Load Deflection Limit [L/240]
	Live load Deflection Limit [L/360]

FOR HIGH ROOF FRAMING
SEE PLAN THIS SHEET

NOTES:

1. MOUNTING LOADS (M#) PER ENCLOSED CHILLER SPECIFICATION SHEET (PROVIDED BY SE ENGINEERS)
2. CHILLER DIMENSIONS PER MANUFACTURER.
3. REF. ENCLOSED CALCULATION FOR REVIEW OF EXISTING W-FLANGE BEAM AGAINST CHILLER LOADS.
4. REF. ENCLOSED CALCULATION FOR REVIEW OF EXISTING ROOF 'I' RAFTERS AGAINST CHILLER LOADS.

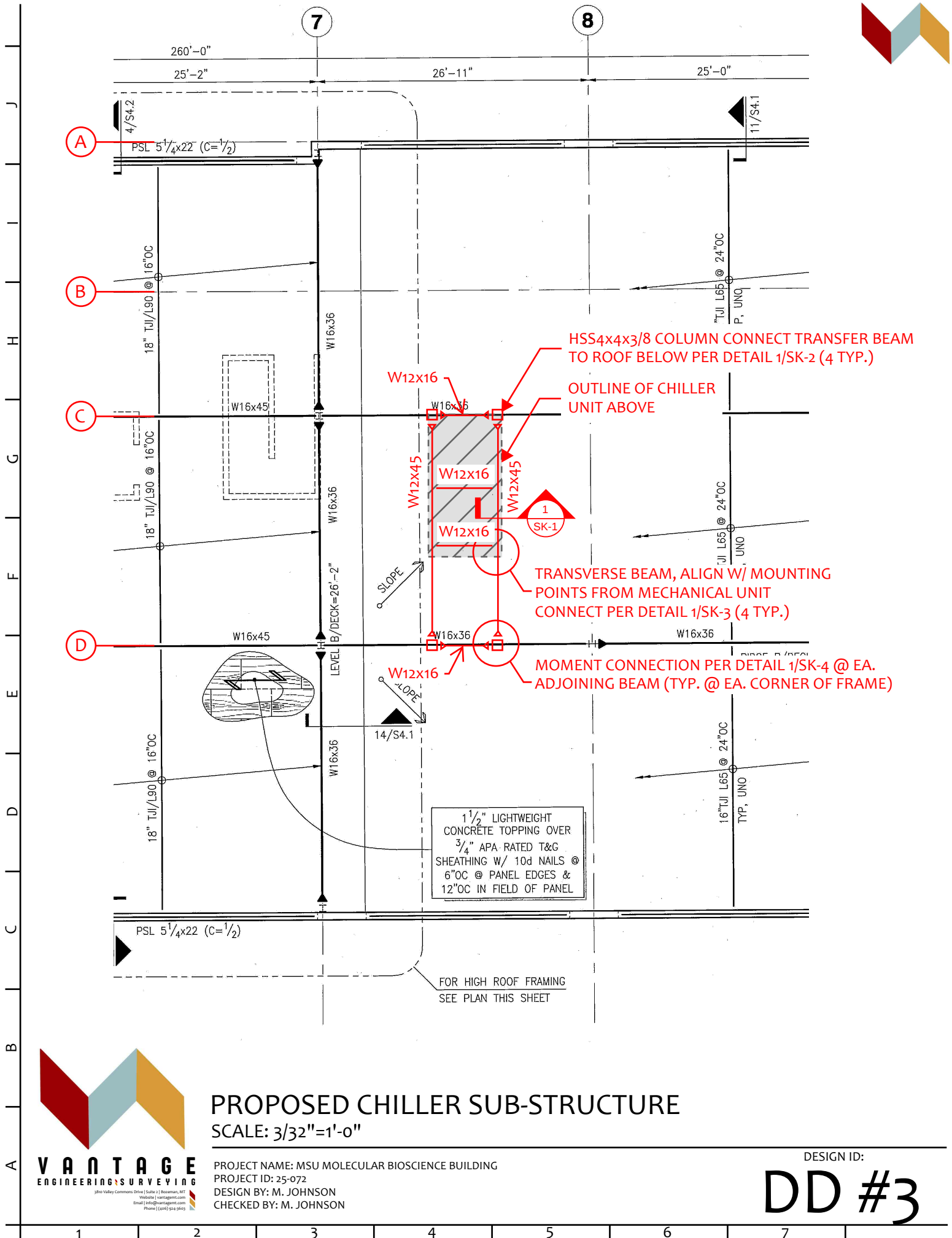


CHILLER LOCATION AGAINST EXISTING STRUCTURAL
SCALE: 3/32"=1'-0"

PROJECT NAME: MSU MOLECULAR BIOSCIENCE BUILDING
PROJECT ID: 25-072
DESIGN BY: M. JOHNSON
CHECKED BY: M. JOHNSON

DESIGN ID:

DD #2

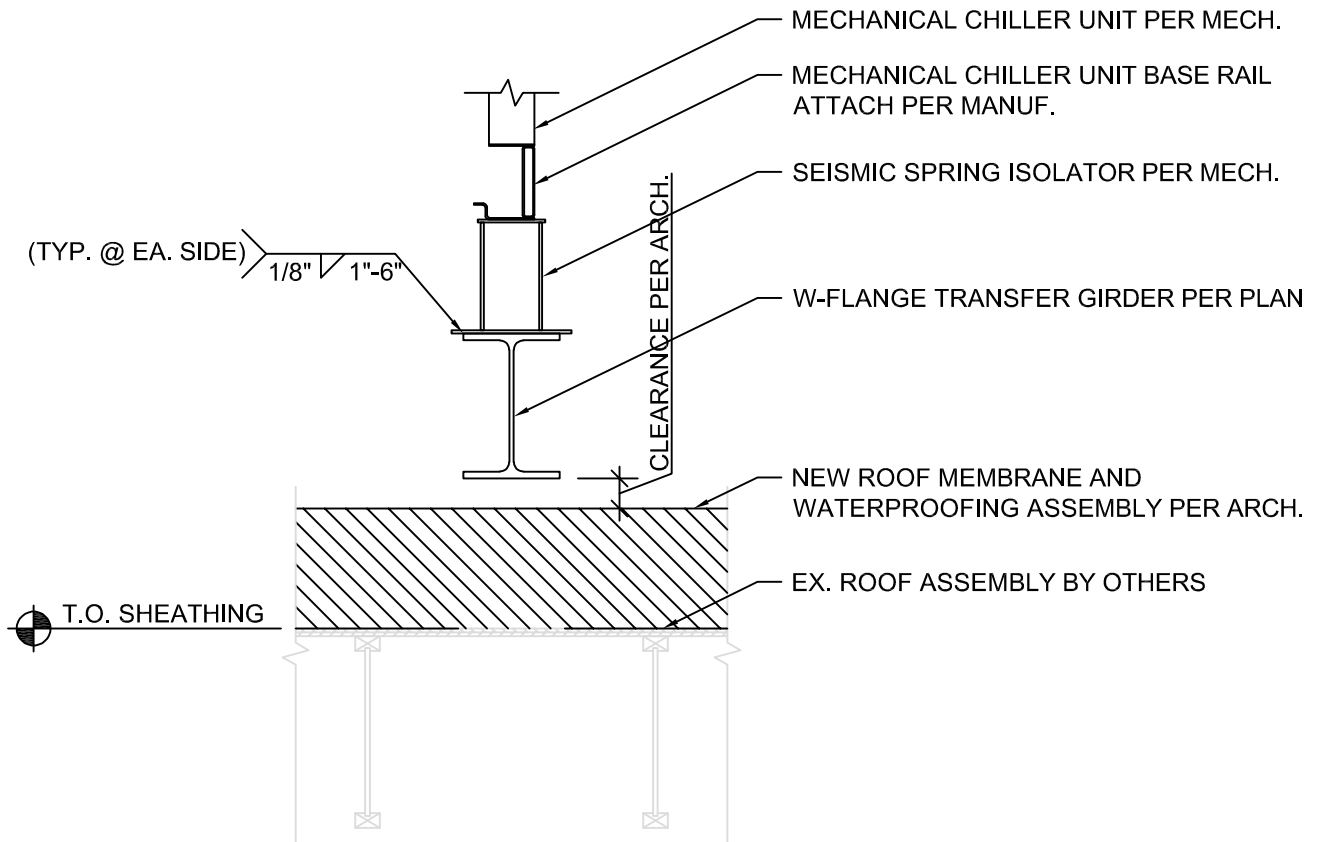


PROPOSED CHILLER SUB-STRUCTURE
SCALE: 3/32"=1'-0"

PROJECT NAME: MSU MOLECULAR BIOSCIENCE BUILDING
PROJECT ID: 25-072
DESIGN BY: M. JOHNSON
CHECKED BY: M. JOHNSON

DESIGN ID:

DD #3



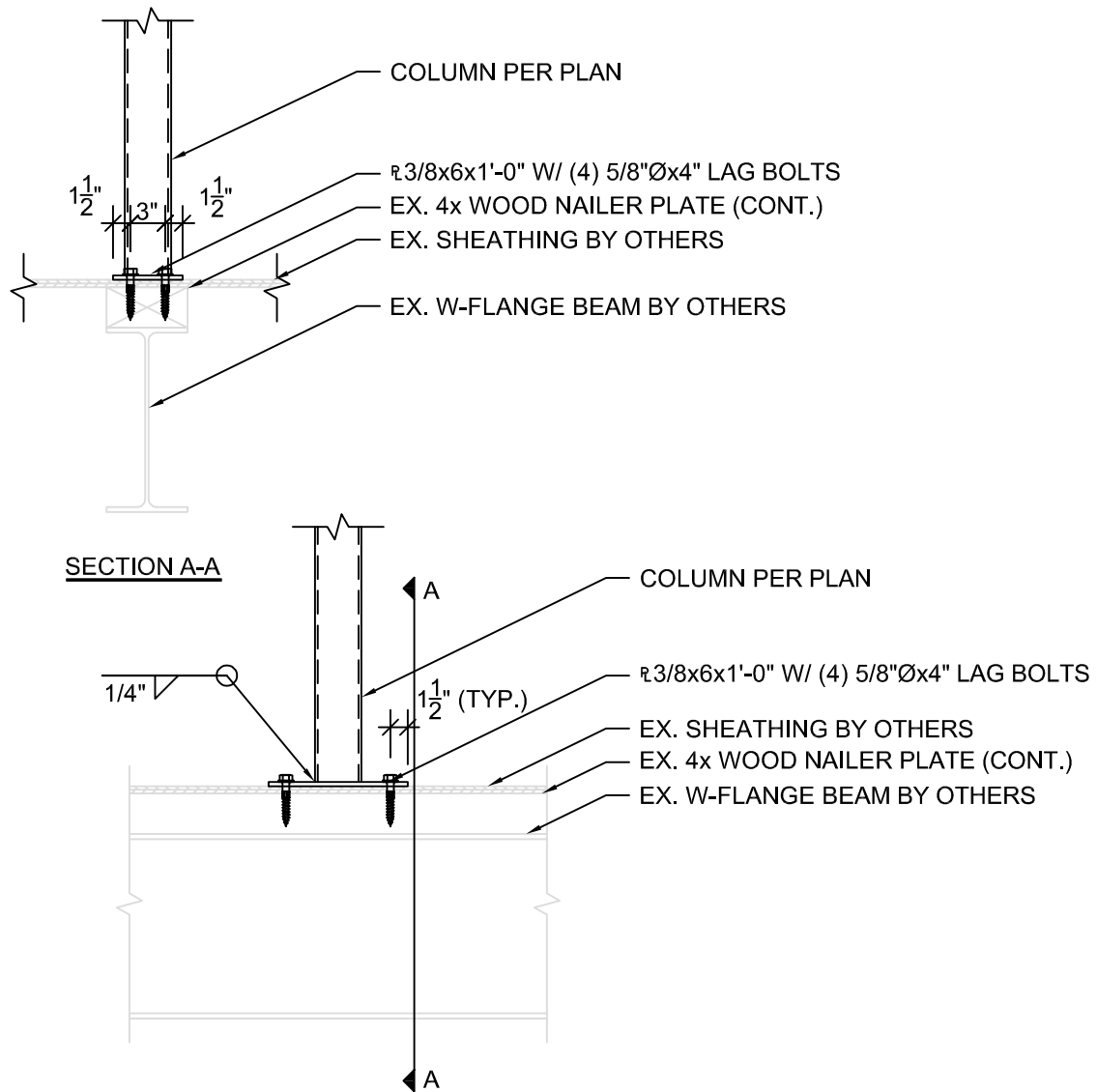
SUB-STRUCTURE ASSEMBLY DETAIL

SCALE: 3/32"=1'-0"

PROJECT NAME: MSU MOLECULAR BIOSCIENCE BUILDING
PROJECT ID: 25-072
DESIGN BY: M. JOHNSON
CHECKED BY: M. JOHNSON

DESIGN ID:

SK-1



TRANSFER BEAM CONNECTION DETAIL

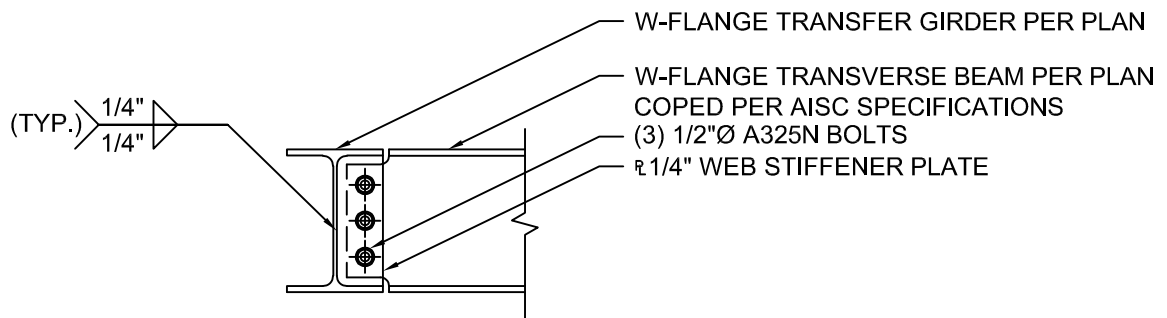
SCALE: 3/32"=1'-0"



PROJECT NAME: MSU MOLECULAR BIOSCIENCE BUILDING
PROJECT ID: 25-072
DESIGN BY: M. JOHNSON
CHECKED BY: M. JOHNSON

DESIGN ID:

SK-2



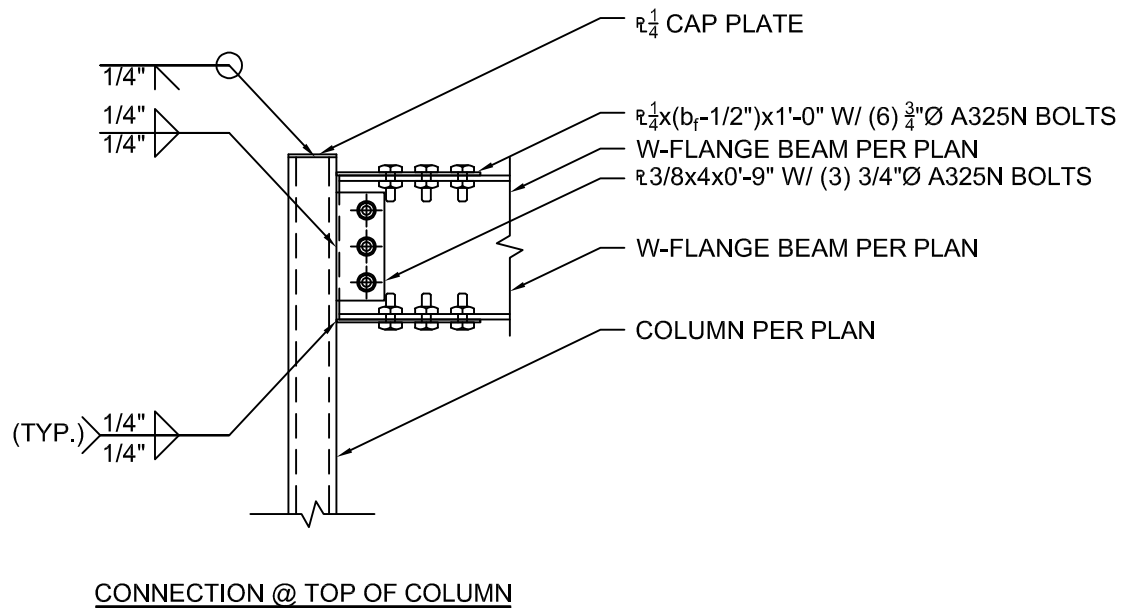
TRANSVERSE BEAM CONNECTION DETAIL

SCALE: 3/32"=1'-0"

PROJECT NAME: MSU MOLECULAR BIOSCIENCE BUILDING
PROJECT ID: 25-072
DESIGN BY: M. JOHNSON
CHECKED BY: M. JOHNSON

DESIGN ID:

SK-3



CONNECTION @ TOP OF COLUMN

NOTES:

1. VERIFY ALL STEEL ELEVATIONS & DIMENSIONS W/ ARCH. DRAWINGS PRIOR TO FABRICATION.



TYP. MOMENT CONNECTION @ HSS COLUMN

SCALE: 3/32"=1'-0"

PROJECT NAME: MSU MOLECULAR BIOSCIENCE BUILDING

PROJECT ID: 25-072

DESIGN BY: M. JOHNSON

CHECKED BY: M. JOHNSON

DESIGN ID:

SK-4

Job Information		Technical Data Sheet
Job Name	MSU - Molecular	
Date	9/16/2025	
Submitted By	Blake Buechler	
Software Version	17.10	
Unit Tag	DST Air Cooled Chiller 002	



Image may not represent ordered unit

Unit Overview					
Model Number	Capacity ton	Voltage	Unit Starter Type	ASHRAE 90.1	LEED Enhanced Refrigerant Management Credit
AGZ008F	114.4	208 v / 60 Hz / 3 Ph	Across the Line	'07, '10, '13, '16, '19, '22	Pass
Unit Type			Platform		Unit Revision
Air-Cooled Scroll Compressor Chiller			Standard Efficiency Packaged		0A
Display			Tubing		
Door Mounted Display			EEXV, Repl FD, Liq/Disch Shutoff, HS Relief, No Suction Shutoff, No HGBP		
Fan Type			Refrigerant Type	Refrigerant Weight	
AC Fan Motors & DC (First Fans DC/Circuit) - DV			R32	96 lb (per unit)	
Compressor			Approval		
USNNSUNN			ETL/cETL, AHRI & ASHRAE 90.1		

Actual refrigerant charge depends on the final unit construction, refer to unit nameplate.

Evaporator	
Evaporator Model:	PPA502H162
Fluid Volume:	10.9 gal
Connection Hand:	Universal, 1-Pass, Grooved, Standard Head
Connection Size:	4.0 in
Insulation:	Single Layer Insulation to Suction at each Compressor

Entering Fluid Temperature	Leaving Fluid Temperature	Fluid Type	Glycol Concentration	Fluid Flow	Fluid Flow (with glycol) Min / Max	Pressure Drop	Pressure Drop (with glycol) Min / Max	Fouling Factor
54.00 °F	44.00 °F	Propylene Glycol	40.0 %	300.4 gpm	158.7 / 530.1 gpm	17.1 ft H ₂ O	4.90 / 52.3 ft H ₂ O	0.000100 °F.ft ² .h/Btu

Note: Evaporator Pressure Drop does not include a strainer. Minimum flow is based on a Constant Flow Pumping System Type.

Condenser			
Coil Fins:	MicroChannel		
Guards:	Condenser Coil Louvers & Base Frame Wire Grilles		
Design Ambient Air Temperature	Altitude	Fan Diameter	Minimum Design Ambient Temperature
95.0 °F	4500 ft	31.5 in	-10.0 °F

Unit Performance

Design										
Capacity			Input Power			Efficiency (EER)			IPLV/IP (EER)*	
114.4 ton			138.9 kW			9.883 Btu/W.h			16.96 Btu/W.h	
Performance Points rated at AHRI Ambient Relief - with Glycol										
Unit					Evaporator				Condenser	
Point #	% Load	Capacity ton	Input Power kW	Efficiency (EER) Btu/W.h	Fluid Flow gpm	Pressure Drop ft H ₂ O	Entering Fluid °F	Leaving Fluid °F	Ambient Air °F	Altitude ft
1	100.0	114.4	138.9	9.883	300.4	17.1	54.00	44.00	95.0	4500
2	75.0	85.77	78.40	13.13	300.4	17.0	51.50	44.00	80.0	4500
3	50.0	57.18	38.83	17.67	300.4	17.0	49.00	44.00	65.0	4500
4	25.0	28.59	19.12	17.94	300.4	17.0	46.50	44.00	55.0	4500
Performance Points rated at AHRI Standard Conditions - with Water										
Point #	% Load		Capacity ton		Input Power kW		Efficiency (EER) Btu/W.h			
1	100		121.5		136.7		10.66			
2	75		91.09		77.17		14.17			
3	50		60.73		38.23		19.06			
4	25		30.36		18.82		19.36			

* IPLV reflects AHRI standard rating conditions with water and does not change with user defined conditions

Sound (with insulation)

Sound Pressure (at 30 feet)								
63 Hz dB	125 Hz dB	250 Hz dB	500 Hz dB	1 kHz dB	2 kHz dB	4 kHz dB	8 kHz dB	Overall dBA
43	52	55	60	60	62	52	48	66
Sound Power								
63 Hz dB	125 Hz dB	250 Hz dB	500 Hz dB	1 kHz dB	2 kHz dB	4 kHz dB	8 kHz dB	Overall dBA
70	79	83	87	87	89	79	75	93

Octave band is non 'A' weighted and overall readings are 'A' weighted. Sound data rated in accordance with AHRI Standard-370.

Physical

Unit				
Length*	Height	Width*	Shipping Weight*	Operating Weight*
170 in	99 in	88 in	6843 lb	6940 lb

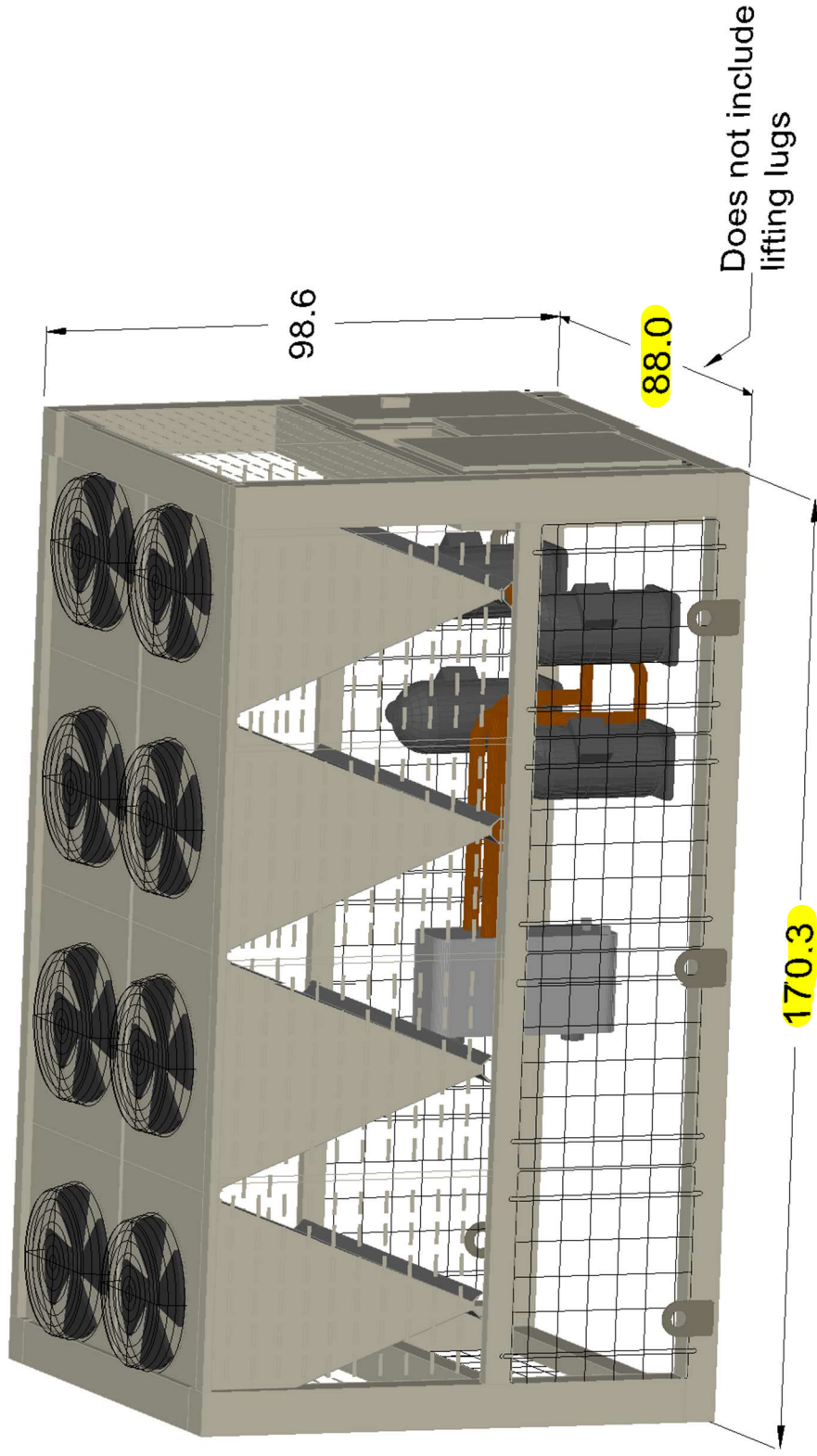
* Shipping and operating weights are based on 'worst case' unit configuration variations but do not include the weights of any Options or Accessories. Contact Chiller Applications for additional information.

Electrical

Unit Electrical Data			
Voltage	Starter Type	Fan Motor Quantity	FLA Fan Motors (each)
208 V / 60 Hz / 3 Ph	Across the Line	8	3.3 A

Power Connection Type:	Single Point Disconnect Switch
Short Circuit Current Rating:	65 kA
Phase Voltage:	Phase & Under/Over Voltage Protection with LED

Note: Input voltage must be within ±10% of nameplate voltage, and the voltage unbalance between phases must not exceed 2%.



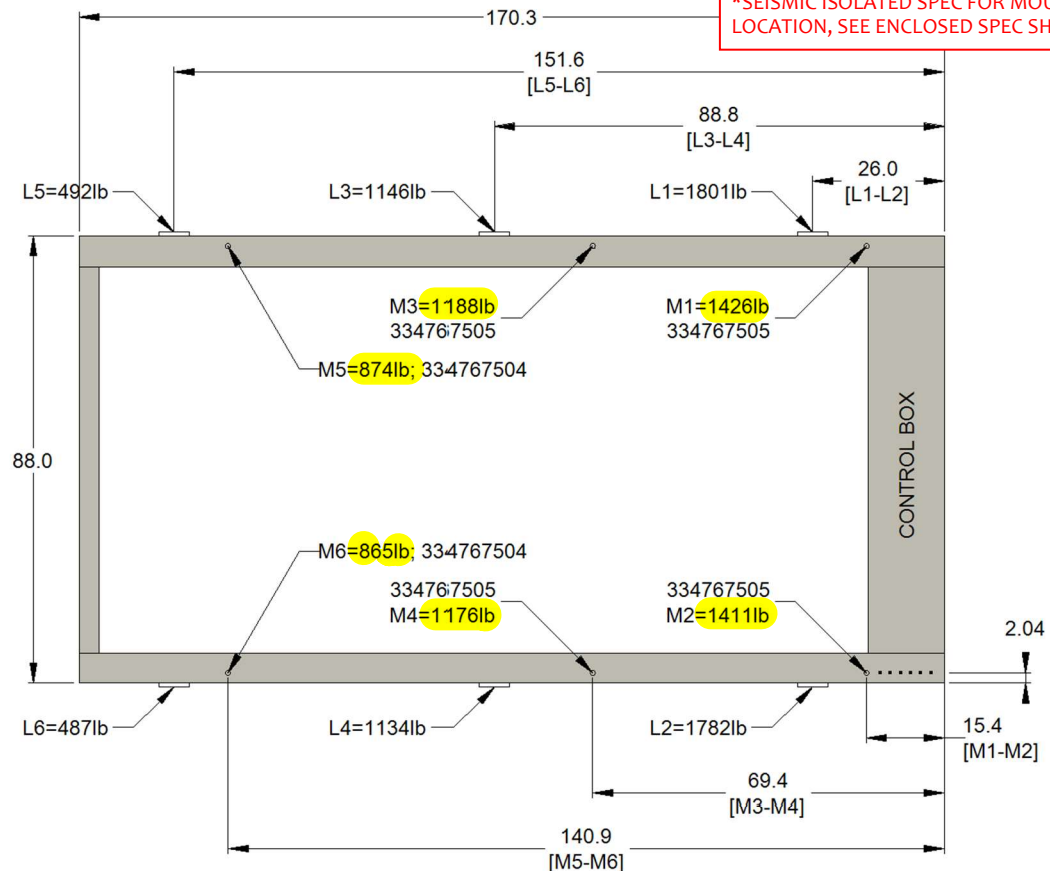
NOTE: A water strainer must be installed at the inlet of the evaporator to protect it from damage. Please refer to the IOM for additional details.

Trailblazer® Air-Cooled Scroll		Unit Tag: DST Air Cooled Chiller 002	Sales Office: Vemco, Inc.	
Product: Trailblazer® Air-Cooled Scroll		Project Name: MSU - Molecular	Sales Engineer: Blake Buechler	
Model: AGZ008F		Aug. 20, 2025	Ver/Rev:	Sheet: 1 of 1
			Scale: NTS	Tolerance: +/- 0.25"
			Dwg Units: (in)	

No change to this drawing may be made unless approved in writing by Daikin Applied. Purchaser must determine that the equipment is fit and sufficient for the job specifications.

Mounting and Lifting

BASE FRAME TOP VIEW



MOUNTING WEIGHT

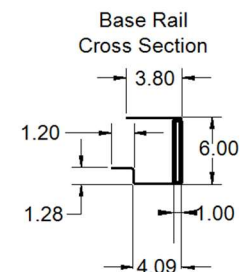
M1 = 1426# -- SCSR-2A-H-1600*
M2 = 1411# -- SCSR-2A-H-1600*
M3 = 1188# -- SCSR-2A-H-1400*
M4 = 1176# -- SCSR-2A-H-1400*
M5 = 874# -- SCSR-2A-H-1000*
M6 = 865# -- SCSR-2A-H-1000*

TOTAL WEIGHT = 6940 LB

*SEISMIC ISOLATED SPEC FOR MOUNTAIN LOCATION, SEE ENCLOSED SPEC SHEET

NOTES:

- 1) L = LIFTING WEIGHT
- 2) M = MOUNTING LOAD
- 3) UNIT SHIPPING WEIGHT = 6843lb
- 4) UNIT OPERATING WEIGHT = 6940lb
- 5) MOUNTING HOLE SIZE = .75"
- 6) MOUNTING HOLES ONLY ON BOTTOM OF BASE
- 7) UNIT WIDTH DIMENSION DOES NOT INCLUDE 1 INCH THICKNESS OF THE LIFTING LUG ASSEMBLIES ON BOTH SIDES, WHICH MAY BE REMOVED AFTER INSTALLATION BUT MUST BE RETAINED FOR FUTURE LIFTING / UNIT REMOVAL



Trailblazer® Air-Cooled Scroll

Product: Trailblazer® Air-Cooled

Model: AGZ008F

Sales Engineer: Blake Buechler

Unit Tag: DST Air Cooled Chiller 002

Project Name: MSU - Molecular

Sales Office: Vemco, Inc.

Aug. 20, 2025

Ver/Rev:

Sheet 1 of 1



13600 Industrial Park Blvd. Minneapolis, MN 55441
www.DaikinApplied.com Software Version: 17.10

Scale: NTS

Tolerance: +/-0.25"

Dwg Units: (in)

No change to this drawing may be made unless approved in writing by Daikin Applied. Purchaser must determine that the equipment is fit and sufficient for the job specifications.

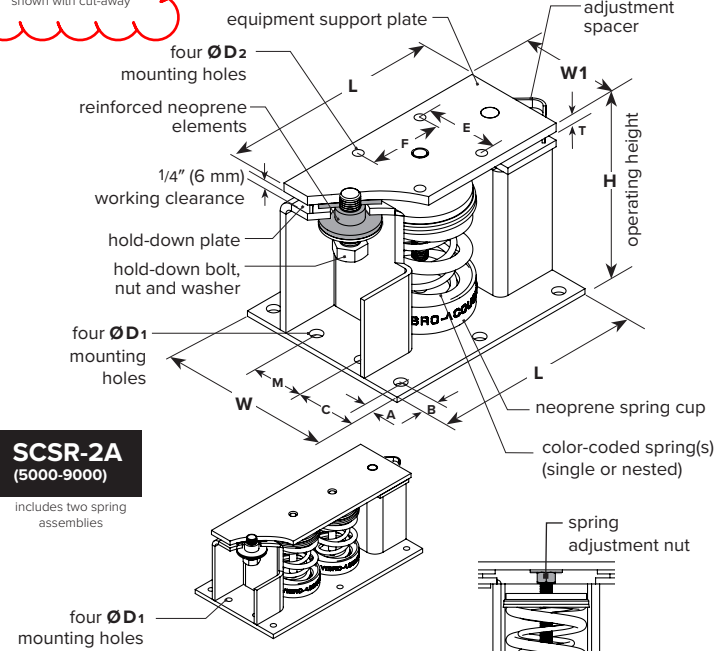
tel: 416-291-7371
fax: 416-291-8049

1-800-565-8401
1-888-811-2264

web: www.vibro-acoustics.com
eml: info@vibro-acoustics.com

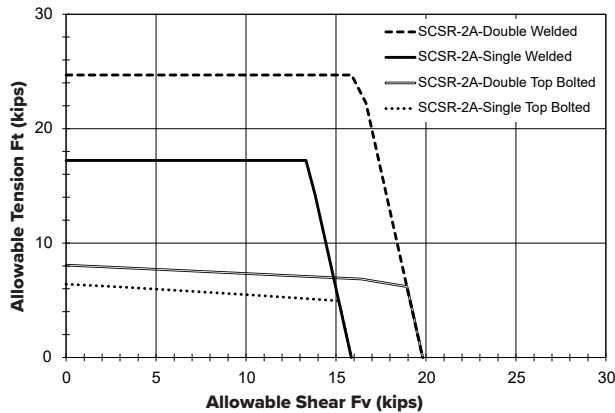
SCSR-2A (50-4500)

shown with cut-away



SCSR-2A (5000-9000)

includes two spring assemblies



NOTES

- The ratings assigned to the SCSR with single spring incorporate an additional safety factor of 1.25 which is considered for the shear and tension capacities.
- "Top bolted" ratings are based on using (4) A307 bolts to secure top plate to equipment or base.
- "Welded" ratings are based on using fillet weld with 1/4" leg size and 3.5" length on both sides of top plate above hold down bolts.
- Laterally and vertically restrained spring type isolators with housing and heavy top plates for equipment support.

SCSR Seismic Restrained Spring Isolator STEEL STRUCTURE

SCSR
2A

File No.: DS-SCSR2-S-020

Date: 15 Aug 2023

Supersedes: DS-SCSR2-S-019

Date: 3 Aug 2021

PERFORMANCE

Model	Spring Color outer-inner	Rated Load		Deflection at rated load		Isolator Weight †	
		lb	kN	in	mm	lb	kg
SCSR-2A-H-50	Grey	50	0.22	2.0	51	43.4	19.7
SCSR-2A-H-100	Blue	100	0.44	2.0	51	43.4	19.7
SCSR-2A-H-150	Grey-White	150	0.67	2.0	51	44.1	20.0
SCSR-2A-H-200	Blue-White	200	0.89	2.0	51	44.1	20.0
SCSR-2A-H-300	Blue-Orange	300	1.33	2.0	51	44.7	20.3
SCSR-2A-H-400	Red	400	1.78	2.0	51	44.6	20.2
SCSR-2A-H-500	Red-White	500	2.22	2.0	51	45.3	20.5
SCSR-2A-H-600	Red-Orange	600	2.67	2.0	51	45.9	20.8
SCSR-2A-H-700	Red-Green	700	3.11	2.0	51	45.9	20.8
SCSR-2A-H-800	Green	800	3.56	2.0	51	45.1	20.5
SCSR-2A-H-900	Green-White	900	4.00	2.0	51	45.8	20.8
SCSR-2A-H-1000	Green-Orange	1000	4.45	2.0	51	46.4	21.0
SCSR-2A-H-1100	Green-Green	1100	4.89	2.0	51	46.4	21.0
SCSR-2A-H-1200	Green-Grey	1200	5.34	2.0	51	46.6	21.1
SCSR-2A-H-1400	Green-Blue	1400	6.23	2.0	51	47.2	21.4
SCSR-2A-H-1600	Green-Black	1600	7.12	2.0	51	46.9	21.3
SCSR-2A-H-1800	Green-Ivory	1800	8.01	2.0	51	47.3	21.5
SCSR-2A-H-2000	Black	2000	8.90	2.0	51	45.1	20.5
SCSR-2A-H-2200	Black-Orange	2200	9.97	2.0	51	46.4	21.0
SCSR-2A-H-2400	Black-Grey	2400	10.68	2.0	51	46.6	21.1
SCSR-2A-H-2600	Black-Blue	2600	11.57	2.0	51	47.2	21.4
SCSR-2A-H-2800	Black-Black	2800	12.46	2.0	51	46.9	21.3
SCSR-2A-H-3200	Black-Red	3200	14.23	2.0	51	47.6	21.6
SCSR-2A-H-3700	Blue-Grey	3700	16.45	2.0	51	47.8	21.7
SCSR-2A-H-4100	Blue-Black	4100	18.24	2.0	51	48.4	22.0
SCSR-2A-H-4500	Blue-Red	4500	20.02	2.0	51	49.0	22.2
SCSR-2A-H-5200	(2)Black-Blue	5200	23.13	2.0	51	94.0	42.6
SCSR-2A-H-6400	(2)Black-Red	6400	28.46	2.0	51	96.0	43.5
SCSR-2A-H-7400	(2)Blue-Grey	7400	32.92	2.0	51	98.0	44.5
SCSR-2A-H-8200	(2)Blue-Black	8200	36.48	2.0	51	100.0	45.4
SCSR-2A-H-9000	(2)Blue-Red	9000	40.03	2.0	51	104.0	47.2

† weights approximate

DIMENSIONS

Model	L in mm	W in mm	H in mm	A in mm	B in mm	C in mm	M in mm
50-4500	12 5/8 321	10 25/4	9 2/29	3/4 19	1 2/5	3 1/2 89	3 7/6
5200-9000	21 5/33	11 2/79	9 2/29	1 1/4 29	1 1/4 29	3 5/4 92	3 3/4 95

Model	W1 in mm	E in mm	F in mm	ØD1 in mm	ØD2 in mm	T in mm
50-4500	5 5/8 143	4 1/8 105	4 1/8 105	1 1/8 17	3/8 14	1/2 13
5200-9000	7 1/8	4 1/2 114	10 1/2 267	1 1/8 17	1 1/8 17	1/2 13

- Welded steel construction housings with vertically restraining limit stops.
- Top Plate and restraining bolts are designed to be out of contact with housing during normal operation.
- Reinforcing neoprene elements(snubbers) are incorporated to minimize short-circuiting of restraining bolts. Springs supported with neoprene cups for noise isolation.
- Minimum 50% additional travel to solid. Minimum kx/ky ratio of 0.8.
- Housing is hot-dipped galvanized. All springs are powder-coated. Other components are plated or coated for outdoor applications.

Project:			Plan view of mount locations: 			1.		6.	
Customer:						2.		7.	
Consultant:						3.		8.	
Dwg No.:						4.		9.	
Rev:			5.		10.		QTY of sets required:		
Drawn by:									
V-A Project Manager:			EQUIPMENT:						
TAG:			DATE:						
COMMENTS:									

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam

Project File: 25-072 - MSU Molecular Bioscience Building - Calcs.ec6

LIC#: KW-06019402, Build:20.23.08.01

Max Johnson

(c) ENERCALC INC 1983-2023

DESCRIPTION: Transfer Girder Calculation - Centered Orientation

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

Material Properties

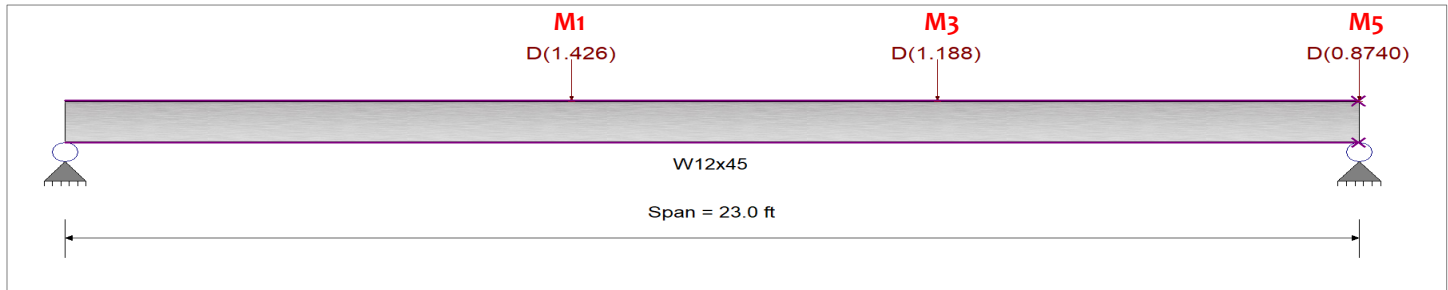
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Load(s) for Span Number 1

Point Load : D = 1.426 k @ 9.0 ft, (Mounting Load)

Point Load : D = 1.188 k @ 15.5 ft, (Mounting Load, M3)

Point Load : D = 0.8740 k @ 23.0 ft, (Mounting Load, M5)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.088 : 1	Maximum Shear Stress Ratio =	0.023 : 1
Section used for this span	W12x45	Section used for this span	W12x45
Ma : Applied	14.108 k-ft	Va : Applied	1.871 k
Mn / Omega : Allowable	160.180 k-ft	Vn/Omega : Allowable	81.070 k
Load Combination	D Only	Load Combination	D Only
Span # where maximum occurs	Span # 1	Location of maximum on span	23.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0 in Ratio =	0 <360	n/a
Max Upward Transient Deflection	0 in Ratio =	0 <360	n/a
Max Downward Total Deflection	0.130 in Ratio =	2131 >=240.	Span: 1 : D Only
Max Upward Total Deflection	0 in Ratio =	0 <240.0	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values						Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx/Vnx/Omega
D Only												
Dsgn. L = 23.00 ft	1	0.088	0.023	14.11		14.11	267.50	160.18	1.00	1.00	1.87	121.61
+0.60D												
Dsgn. L = 23.00 ft	1	0.053	0.014	8.46		8.46	267.50	160.18	1.00	1.00	1.12	121.61

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.1295	11.566		0.0000	0.000

Vertical Reactions

Support notation : Far left is #

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.768	2.745
Max Upward from Load Combinations	1.061	1.647
Max Upward from Load Cases	1.768	2.745
D Only	1.768	2.745
+0.60D	1.061	1.647

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: 25-072 - MSU Molecular Bioscience Building - Calcs.ec6

LIC# : KW-06019402, Build:20.23.08.01

Max Johnson

(c) ENERCALC INC 1983-2023

DESCRIPTION: Existing Beam Check (No Additional Load)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

Material Properties

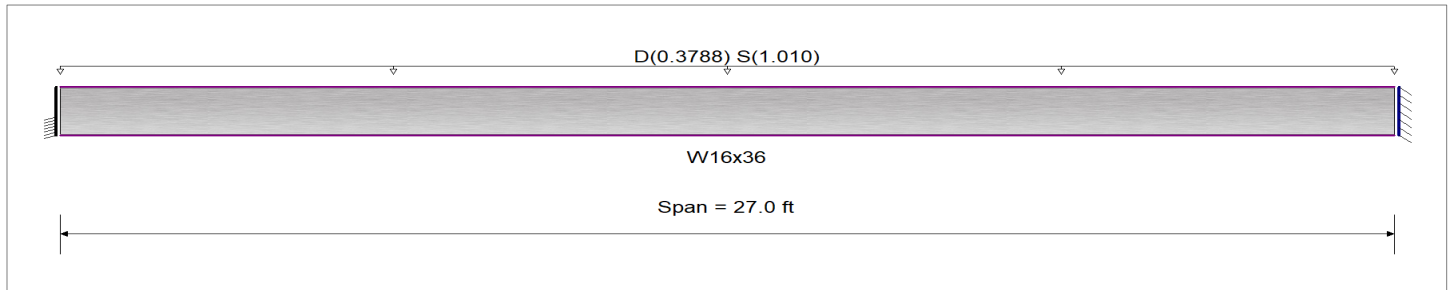
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0150, S = 0.040 ksf, Tributary Width = 25.250 ft, (DESIGN LOADS FROM STRUCTURAL CONST. DOCUMENTS)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.542 : 1	Maximum Shear Stress Ratio =	0.205 : 1
Section used for this span	W16x36	Section used for this span	W16x36
Ma : Applied	86.558 k-ft	Va : Applied	19.235 k
Mn / Omega : Allowable	159.681 k-ft	Vn/Omega : Allowable	93.810 k
Load Combination	+D+S	Load Combination	+D+S
Span # where maximum occurs	Span # 1	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.186 in Ratio = 1,742	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in Ratio = 0	<360	n/a
Max Downward Total Deflection	0.262 in Ratio = 1235	>=240.	Span: 1 : +D+S
Max Upward Total Deflection	0 in Ratio = 0	<240.0	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination			Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
Segment Length	Span #		M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only														
Dsgn. L = 27.00 ft	1		0.158	0.060	12.60	-25.20	25.20	266.67	159.68	1.00	1.00	5.60	140.72	93.81
+D+S														
Dsgn. L = 27.00 ft	1		0.542	0.205	43.28	-86.56	86.56	266.67	159.68	1.00	1.00	19.24	140.72	93.81
+D+0.750S														
Dsgn. L = 27.00 ft	1		0.446	0.169	35.61	-71.22	71.22	266.67	159.68	1.00	1.00	15.83	140.72	93.81
+0.60D														
Dsgn. L = 27.00 ft	1		0.095	0.036	7.56	-15.12	15.12	266.67	159.68	1.00	1.00	3.36	140.72	93.81

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2623	13.577		0.0000	0.000

Vertical Reactions

Support notation : Far left is #

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	19.235	19.235
Max Upward from Load Combinations	19.235	19.235
Max Upward from Load Cases	13.635	13.635
D Only	5.600	5.600
+D+S	19.235	19.235
+D+0.750S	15.826	15.826
+0.60D	3.360	3.360

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: 25-072 - MSU Molecular Bioscience Building - Calcs.ec6

LIC# : KW-06019402, Build:20.23.08.01

Max Johnson

(c) ENERCALC INC 1983-2023

DESCRIPTION: Existing Beam Check (With Loads from New Chiller)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

Material Properties

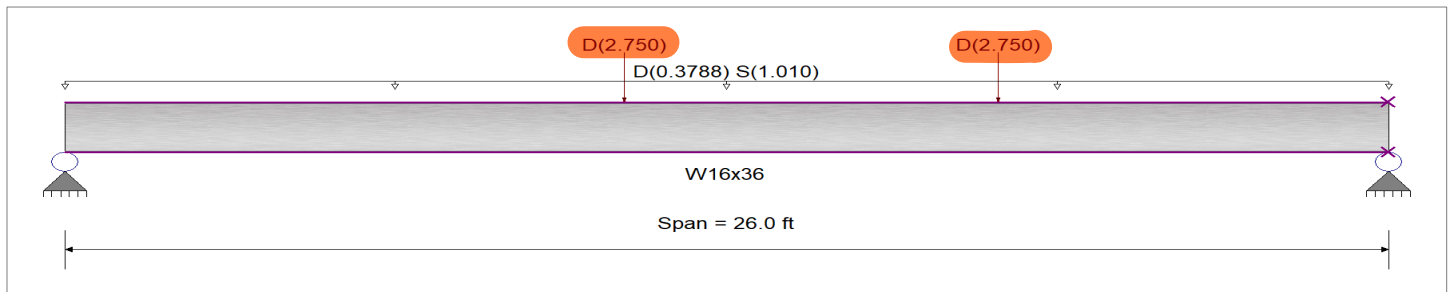
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0150, S = 0.040 ksf, Tributary Width = 25.250 ft, (DESIGN LOADS FROM STRUCTURAL CONST. DOCUMENTS)

Point Load : D = 2.750 k @ 11.0 ft, (CHILLER LOADS M2, M4, M6)

Point Load : D = 2.750 k @ 18.333 ft, (CHILLER LOADS M1, M3, M5)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.915 : 1	Maximum Shear Stress Ratio =	0.231 : 1
Section used for this span	W16x36	Section used for this span	W16x36
Ma : Applied	146.108 k-ft	Va : Applied	21.625 k
Mn / Omega : Allowable	159.681 k-ft	Vn/Omega : Allowable	93.810 k
Load Combination	+D+S	Load Combination	+D+S
Span # where maximum occurs	Span # 1	Location of maximum on span	26.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.802 in Ratio = 388	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in Ratio = 0	<360	n/a
Max Downward Total Deflection	1.368 in Ratio = 228	>=180.	Span: 1 : +D+S
Max Upward Total Deflection	0 in Ratio = 0	<180.0	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx/Vnx/Omega	
D Only													
Dsgn. L = 26.00 ft	1	0.381	0.091	60.87		60.87	266.67	159.68	1.00	1.00	8.50	140.72	93.81
+D+S													
Dsgn. L = 26.00 ft	1	0.915	0.231	146.11		146.11	266.67	159.68	1.00	1.00	21.63	140.72	93.81
+D+0.750S													
Dsgn. L = 26.00 ft	1	0.781	0.196	124.78		124.78	266.67	159.68	1.00	1.00	18.34	140.72	93.81
+0.60D													
Dsgn. L = 26.00 ft	1	0.229	0.054	36.52		36.52	266.67	159.68	1.00	1.00	5.10	140.72	93.81

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	1.3680	13.074		0.0000	0.000

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	20.920	21.625
Max Upward from Load Combinations	20.920	21.625

Project Title:
Engineer:
Project ID:
Project Descr:

Multiple Simple Beam

Project File: 25-072 - MSU Molecular Bioscience Building - Calcs.ec6

LIC# : KW-06019402, Build:20.23.08.01

Max Johnson

(c) ENERCALC INC 1983-2023

Description : REACTION CALCULATIONS: SPAN 1 & SPAN 2

Wood Beam Design : REACTION CALC - SPAN 1

Calculations per NDS 2018, IBC 2021, ASCE 7-16

BEAM Size : 1.75x16, Microllam LVL, Fully Braced

Using Allowable Stress Design with IBC 2021 Load Combinations, Major Axis Bending

Wood Species : iLevel Truss Joist

Wood Grade : MicroLam LVL 2.0 E

Fb - Tension	2600 psi	Fc - Prll	2510 psi	Fv	285 psi	Ebend- xx	2000 ksi	Density	42.01 pcf
Fb - Compr	2600 psi	Fc - Perp	750 psi	Ft	1555 psi	Eminbend - xx	1016.535 ksi		

Applied Loads

Unif Load: **D = 0.0040 k/ft, Trib= 2.0 ft**

Unif Load: **D = 0.0150, S = 0.040 k/ft, Trib= 2.0 ft**

1Point: **D = 0.870 k @ 6.0 ft**

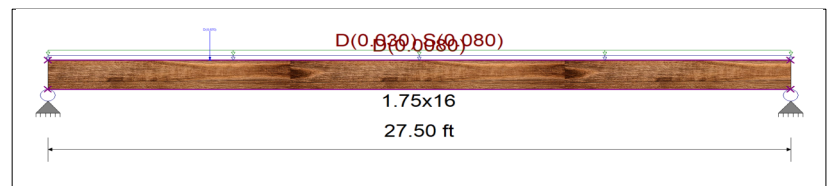
Design Summary

Max fb/Fb Ratio = **0.778** : 1
fb : Actual : 2,236.70 psi at 12.100 ft in Span # 1
Fb : Allowable : 2,875.28 psi
Load Comb : +D+S

Max fv/FvRatio = **0.352** : 1
fv : Actual : 115.25 psi at 0.000 ft in Span # 1
Fv : Allowable : 327.75 psi
Load Comb : +D+S

Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	1.20			1.10			
Right Support	0.71			1.10			

2,300# JOIST REACTION FROM CHILLER



Max Deflections

Transient Downward	0.866 in	Total Downward	1.615 in
Ratio	380	Ratio	204 <240
	LC: S Only		LC: +D+S
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : REACTION CALC - SPAN 2

Calculations per NDS 2018, IBC 2021, ASCE 7-16

BEAM Size : 1.75x16, Microllam LVL, Fully Braced

Using Allowable Stress Design with IBC 2021 Load Combinations, Major Axis Bending

Wood Species : iLevel Truss Joist

Wood Grade : MicroLam LVL 2.0 E

Fb - Tension	2600 psi	Fc - Prll	2510 psi	Fv	285 psi	Ebend- xx	2000 ksi	Density	42.01 pcf
Fb - Compr	2600 psi	Fc - Perp	750 psi	Ft	1555 psi	Eminbend - xx	1016.535 ksi		

Applied Loads

Unif Load: **D = 0.0040 k/ft, Trib= 2.0 ft**

Unif Load: **D = 0.0150, S = 0.040 k/ft, Trib= 2.0 ft**

1Point: **D = 1.426 k @ 4.750 ft**

Design Summary

Max fb/Fb Ratio = **0.646** : 1
fb : Actual : 1,857.36 psi at 8.970 ft in Span # 1
Fb : Allowable : 2,875.28 psi
Load Comb : +D+S

Max fv/FvRatio = **0.382** : 1
fv : Actual : 125.07 psi at 0.000 ft in Span # 1
Fv : Allowable : 327.75 psi
Load Comb : +D+S

Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	1.57			0.92			
Right Support	0.73			0.92			

2,490# JOIST REACTION FROM CHILLER



Max Deflections

Transient Downward	0.424 in	Total Downward	0.935 in
Ratio	651	Ratio	295
	LC: S Only		LC: +D+S
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

ENGINEERING SERVICES

Upon request, iLevel Trus Joist® Commercial can provide the following services for the products described in this commercial TJI® Joist Specifier's Guide:

- A complete design package including shop drawings and detailed design calculations.
- Review and analysis of the application.
- Drawings or calculations sealed by a professional engineer.



Our engineering staff offers professional capabilities in the design and application of all iLevel® products.

Installation Review

Although responsibility for proper installation lies with the contractor-builder, iLevel Trus Joist® Commercial provides detailed suggestions and guidelines for installation. If requested, an iLevel Trus Joist® Commercial representative will visit the site to verify the contractor's understanding of proper installation. iLevel engineers also are available to help solve jobsite application problems.

Engineering Responsibility Position Statement

iLevel is a manufacturer of proprietary structural components.

It employs a staff of engineers to aid in the development, manufacture, and marketing of its products. iLevel does not replace or accept the responsibility of the design professional of record for any structure.

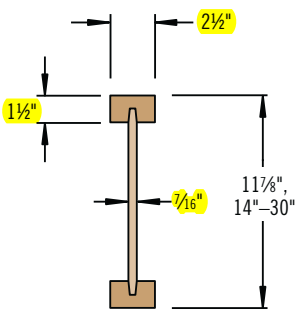
iLevel accepts the delegation of engineering responsibility only for the products it manufactures, provided that the application conditions are specified by the design professional of record, or other responsible party when a design professional is not engaged. iLevel provides engineering in the design of its products and does not displace the need on any project for a design professional of record.

Legacy Literature
See Note on Front Cover

TJI® JOIST DESCRIPTIONS

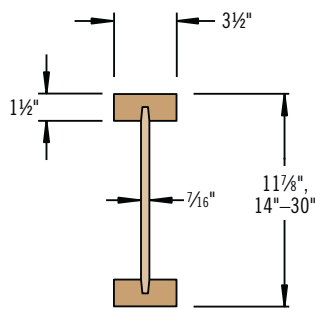
This guide covers four series of joists: TJI® L65, TJI® L90, TJI® H90, and TJI® HS90. These joists are primarily intended for commercial applications such as retail stores, office buildings, schools, restaurants, hotels, warehouses, and nursing homes. They are typically designed, manufactured, and sold by iLevel Trus Joist® Commercial for each specific job. Contact your iLevel Trus Joist® Commercial representative for more information.

TJI® joists are normally produced without camber. However, camber is available at 2,250' radius as a special order. Camber is not recommended for floors, or for multiple-span or cantilever applications.



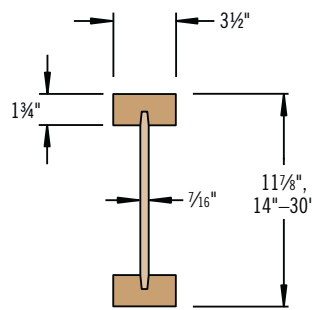
TJI® L65

Top and bottom flanges of 1½" x 2½"
iLevel® Trus Joist® Microllam® LVL
with 7/16" iLevel® Trus Joist®
Performance Plus® web.



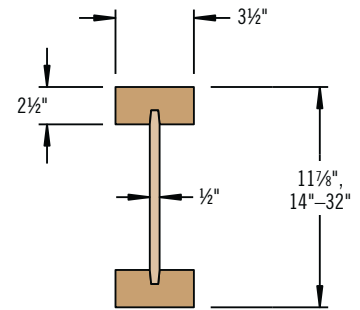
TJI® L90

Top and bottom flanges of 1½" x 3½"
iLevel® Trus Joist® Microllam® LVL
with 7/16" iLevel® Trus Joist®
Performance Plus® web.



TJI® H90

Top and bottom flanges of 1¾" x 3½"
iLevel® Trus Joist® Microllam® LVL
with 7/16" iLevel® Trus Joist®
Performance Plus® web.



TJI® HS90

Top and bottom flanges of 3½" x 2½"
iLevel® Trus Joist® Microllam® LVL
with ½" iLevel® Trus Joist®
Performance Plus® web.

- For heavy loads and 8' on-center roof systems
- Increased bending strength and stiffness

Joist depths from 14" to 32" are available in 2" increments.

Building Codes and Product Acceptance: See ICC ES ESR-1153, ICC ES ESR-1387, HUD SEB No. 689 Rev.11, HUD MR 925k, L.A. City RR #25538 and RR #25202, DSA PA-048, and DSA PA-045

Joist Depth	Basic Properties						Reaction Properties ⁽⁴⁾⁽⁵⁾							
	Joist Weight (lbs/ft)	Resistive Moment ⁽¹⁾ (ft-lbs)	Vertical Shear ⁽²⁾ (lbs)	EI x 10 ⁶ (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Nailed Floor Sheathing (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Glue-Nailed Floor Sheathing (in. ² -lbs)	End Reaction (lbs)				Intermediate Reaction (lbs)			
							Bearing Length				Bearing Length			
							1 3/4" (2 1/2" for HS90)		3 1/2"		3 1/2"		5 1/4"	
							Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾	
							No	Yes	No	Yes	No	Yes	No	Yes
TJI® L65 Joist														
11 1/2"	3.3	6,750	1,925	450	512	561	1,375	1,745	1,885	1,925	2,745	3,120	3,365	3,735
14"	3.6	8,030	2,125	666	752	821	1,375	1,750	1,885	2,125	2,745	3,365	3,365	3,985
16"	3.9	9,210	2,330	913	1,025	1,116	1,375	1,750	1,885	2,330	2,745	3,490	3,365	4,105
18"	4.2	10,380	2,535	1,205	1,348	1,462	1,375	1,750	1,885	2,535	2,745	3,615	3,365	4,230
20"	4.4	11,540	2,740	1,545	1,722	1,864	N.A.	1,750	N.A.	2,740	N.A.	3,740	N.A.	4,355
22"	4.7	12,690	2,935	1,934	2,149	2,322	N.A.	1,750	N.A.	2,935	N.A.	3,860	N.A.	4,480
SPAN 1 = 27'-6" -> CONTROLLING SPAN $P_u = (27.5 \text{ FT}/2) * 2 \text{ FT} * (15 \text{ PSF} + 40 \text{ PSF} + 3.9 \text{ PSF}) = 1,620\# \text{ (EXISTING BEARING LOAD)}$ WEB STIFFENERS PRESENT PER STRUCTURAL DETAILS -> 1,750# BEARING CAPACITY $1,620\# \text{ DEMAND} < 1,750\# \text{ CAPACITY} \text{ -- OKAY}$ $1,620\#/1,750\# = 92.5\% \text{ UNITY -- OKAY}$ BEARING LOAD W/ M5 MOUNTING LOAD (874\#) FROM CHILLER = 2,300\# $2,300\#/1,750\# = 132\% \text{ -- N.G.}$							N.A.	1,750	N.A.	3,060	N.A.	3,875	N.A.	4,605
							N.A.	1,750	N.A.	2,900	N.A.	4,725 ⁽⁷⁾	N.A.	5,345 ⁽⁸⁾
							N.A.	1,750	N.A.	2,900	N.A.	4,850 ⁽⁷⁾	N.A.	5,470 ⁽⁸⁾
							N.A.	1,750	N.A.	2,900	N.A.	4,975 ⁽⁷⁾	N.A.	5,590 ⁽⁸⁾
							N.A.	1,750	N.A.	2,900	N.A.	4,975 ⁽⁷⁾	N.A.	5,590 ⁽⁸⁾
24"	5.8	19,700	3,060	3,172	3,442	3,659	N.A.	2,345	N.A.	2,830	N.A.	5,405	N.A.	6,020
SPAN 2 = 23'-0" $P_u = (23 \text{ FT}/2) * 2 \text{ FT} * (15 \text{ PSF} + 40 \text{ PSF} + 3.9 \text{ PSF}) = 1,355\# \text{ (EXISTING BEARING LOAD)}$ WEB STIFFENERS PRESENT PER STRUCTURAL DETAILS -> 1,750# BEARING CAPACITY $1,355\# \text{ DEMAND} < 1,750\# \text{ CAPACITY} \text{ -- OKAY}$ $1,355\#/1,750\# = 77.5\% \text{ UNITY -- OKAY}$ BEARING LOAD W/ M1 MOUNTING LOAD (1,426\#) FROM CHILLER = 2,490\# $2,490\#/1,750\# = 142\% \text{ -- N.G.}$							N.A.	2,345	N.A.	2,830	N.A.	5,405	N.A.	6,020
							N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
							N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
							N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
							N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
24"	6.3	22,755	3,060	3,549	3,825	4,046	N.A.	2,345	N.A.	2,830	N.A.	5,425	N.A.	6,155
26"	6.5	24,645	2,900	4,266	4,590	4,850	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
28"	6.8	26,520	2,900	5,059	5,436	5,737	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
30"	7.1	28,380	2,900	5,930	6,363	6,710	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
TJI® HS90 Joist														
11 1/2"	6.0	16,050	2,320	900	941	973	1,835	2,320	2,150	2,320	3,995	4,650	4,690	5,345
14"	6.3	19,425	2,565	1,355	1,410	1,455	1,835	2,565	2,150	2,565	3,995	4,980	4,690	5,670
16"	6.6	22,550	2,790	1,876	1,948	2,005	1,835	2,790	2,150	2,790	3,995	4,980	4,690	5,670
18"	7.0	25,640	3,020	2,488	2,578	2,650	1,835	3,020	2,150	3,020	3,995	5,310	4,690	6,000
20"	7.3	28,695	3,250	3,195	3,306	3,394	N.A.	3,250	N.A.	3,250	N.A.	5,425	N.A.	6,330
22"	7.6	31,725	3,480	3,998	4,131	4,238	N.A.	3,475	N.A.	3,480	N.A.	5,425	N.A.	6,330
24"	7.9	34,730	3,710	4,901	5,059	5,186	N.A.	3,500	N.A.	3,710	N.A.	5,425	N.A.	6,655
26"	8.2	37,715	3,940	5,905	6,090	6,238	N.A.	3,500	N.A.	3,940	N.A.	6,985 ⁽⁷⁾	N.A.	7,675 ⁽⁸⁾
28"	8.5	40,680	4,165	7,014	7,228	7,400	N.A.	3,500	N.A.	4,165	N.A.	6,985 ⁽⁷⁾	N.A.	7,675 ⁽⁸⁾
30"	8.8	43,630	4,375	8,230	8,476	8,672	N.A.	3,500	N.A.	4,375	N.A.	7,310 ⁽⁷⁾	N.A.	8,005 ⁽⁸⁾
32"	9.1	46,560	4,375	9,555	9,834	10,057	N.A.	3,500	N.A.	4,375	N.A.	7,640 ⁽⁷⁾	N.A.	8,335 ⁽⁸⁾

■ The stated allowable design properties are for loads of normal duration. Adjustments to the allowable design values shall be in accordance with the applicable code.

- Caution:** Do not increase joist resistive moment properties by a repetitive-member-use factor; resistive moment properties reflect the latest ASTM standards.
- For possible increases in shear capacity see below.
- For deflection calculation only. Assumes 12" joist spacing (24" spacing for HS90 joists) with a 24" span-rated panel.

(4) Interpolation between bearing lengths is permitted for allowable design reactions.

(5) Allowable bearing lengths have been determined based on iLevel Trus Joist® Commercial products. Allowable bearing on supporting members shall be checked.

(6) Refer to page 16 for web stiffener details.

(7) 5 1/4" bearing length is required at intermediate reactions.

(8) 7" bearing length is required at intermediate reactions.

TJI® Joist Shear Design

When joists are used as simple-span members, the design shear is equal to the shear at the face of the support.

When joists **up to 24" in depth** are used as multiple-span members, the design shear is the calculated shear at the interior support reduced by the following:

$$R = \frac{W}{19.25} \leq 18\%$$

Where: R is the percent reduction
W is uniform load in plf

TJI® L65 Allowable Uniform Load (PLF)

Span	Depth									
	11 7/8"		14"		16"		18"		20"	
	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL
12'	320	368	354	407	388	446	412	474	416	479
14'	252	401	350	442	*	485	*	515	*	520
16'	210	242	250	288	287	330	309	355	312	359
18'	118	263	168	313	221	359	281	386	*	390
20'	153	191	198	228	227	261	256	294	277	319
22'	76	204	109	247	144	284	184	320	229	347
24'	114	152	160	184	184	211	207	238	230	265
26'	51	152	73	200	98	230	125	259	157	288
28'	86	115	126	152	152	175	171	197	190	219
30'	39	115	56	165	75	190	97	214	121	238
32'	67	90	98	128	127	147	144	165	160	184
34'	30	90	44	131	59	159	76	180	96	200
36'		71	78	104	106	125	122	141	136	157
38'		71	35	104	47	136	61	153	77	170
40'		57		84	86	108	105	121	117	135
		57		84	38	114	49	132	62	147
		47		69	70	94	92	106	102	117
		47		69	31	94	40	115	51	128
		39		57		78	76	93	90	103
		39		57		78	34	101	43	112
		32		48		65		82	79	91
		32		48		65		85	36	99
				40		55		72	69	81
				40		55		72	30	89
				34		47		62		73
				34		47		62		79
						40		53		66
						40		53		68

* Indicates that total load (TL) value controls.

■ Green numbers refer to 115% total load (TL).

Load Table Instructions

To size floor joists: N/A -> ROOF RAFTER DESIGN

- Check both total load (100% TL) and live load (100% LL). Total load values limit deflection to L/240. Live load values are based on a nailed floor system and the commercial deflection criteria shown on page 22. Live load (100% LL) values may be increased with a glue-nailed floor system; use iLevel® TJ-Beam® software or contact your iLevel Trus Joist® Commercial representative for assistance.

To size roof joists:

- Check the appropriate snow load area (115% TL) value or non-snow load area (125% TL) value to determine the maximum allowable total load. Both total load values limit joist deflection to L/180.
- Consult local codes to verify deflection limits required for specific applications.

General Notes

- Values shown are maximum allowable load capacities based on the following assumptions:
 - simple span; horizontal clear distance between supports.
 - glue-nailed floor.

CONCLUSION:

RAFTERS ARE CURRENTLY SIZED APPROPRIATELY FOR THE EXISTING LOADS AS SHOWN IN THE ORIGINAL CONSTRUCTION DOCUMENTS. THERE IS NO EXCESS CAPACITY IN THE RAFTERS TO HANDLE NEW LOADING FROM THE APPLICATION OF A NEW PIECE OF MECHANICAL EQUIPMENT FROM A STRENGTH, DEFLECTION, OR CONNECTION STANDPOINT. PROVIDE STEEL SUB-STRUCTURE TO AVOID INCURRING ANY ADDITIONAL LOADING ON THE EXISTING RAFTERS.

SPAN 2 = 23'-0" -> INTERPOLATE VALUES:

115% TL -> 2 FT*(15 PSF + 40 PSF) = 110 PLF
LOAD CAPACITY = (175+147)/2 = 161 PLF -- OKAY
CAPACITY FOR L/240 = 161 PLF/1.33 = 120.8 PLF -- OKAY

125% TL -> 2 FT*(15 PSF + 30 PSF) = 90 PLF
CAPACITY = (175+147)/2 = 174.5 PLF -- OKAY
CAPACITY FOR L/240 = 174.5/1.33 = 130.8 PLF -- OKAY

SPAN 1 = 27'-6" -> INTERPOLATE VALUES:

115% TL -> 2 FT*(15 PSF + 40 PSF) = 110 PLF
CAPACITY = 112.25 PLF -- OKAY
CAPACITY FOR L/240 = 112.3/1.33 = 84 PLF -- NG

125% TL -> 2 FT*(15 PSF + 30 PSF) = 90 PLF
CAPACITY = 119.5 PLF -- OKAY
CAPACITY FOR L/240 = 119.5/1.33 = 90 PLF -- OKAY

N/A - 100% TL (Total Load)
Use this and the 100% LL to select floor member. This is the maximum allowable total load in pounds per linear foot of joist. Values are limited by deflection equal to L/240 at total load.

N/A - 100% LL (Live Load)

Use this and the 100% TL to select floor member. This number is the maximum allowable live load capacity in pounds per linear foot of joist. Value is based on the Commercial Floor Deflection Limit shown on page 22.

Span	11 7/8"		14"		16"	
	100% TL	115% TL	100% TL	115% TL	100% TL	115% TL
	100% LL	125% TL	100% LL	125% TL	100% LL	125% TL
12'	320	368	354	407	388	446
	252	401	350	442	*	485

115% TL (Total Load)

<- USE THIS VALUE FOR DESIGN AGAINST SNOW LOAD

Use this to select roof member in snow load areas. This is the maximum allowable total load in pounds per linear foot of joist. Values are limited by deflection equal to L/180 at total load. *

125% TL (Total Load)

<- USE THIS VALUE FOR DESIGN AGAINST LIVE LOAD

Use this to select roof member in non-snow load areas. This is the maximum allowable total load in pounds per linear foot of joist. Values are limited by deflection equal to L/180 at total load. *

*REDUCE TABLE CAPACITY VALUES BY 33% TO REACH L/240 DEFLECTION AT TL

Submittal #075300-1

Elastomeric Membrane Roofing PI

	SHOP DRAWING / SUBMITTAL REVIEW	
	☐ APPROVED	☒ REVIEWED
	☐ APPROVED AS NOTED	
	☐ REVISE & RESUBMIT	
	☐ MAKE CORRECTIONS & PROCEED WITH FABRICATION	
SUBMITTAL WAS REVIEWED FOR DESIGN CONFORMITY AND GENERAL CONFORMANCE TO CONTRACT DOCUMENTS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING DIMENSIONS AT JOBSITE FOR TOLERANCE, CLEARANCE, QUANTITIES, FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION, COORDINATION OF HIS WORK WITH OTHER TRADES AND FULL COMPLIANCE WITH CONTRACT DOCUMENTS.		
<u>Avery Sanders</u>	<u>08/07/2025</u>	
SIGNATURE	DATE	

R&R Taylor reviewed. Notes in orange.
Architect please review and advise.

☒ APPROVED

☐ NOT APPROVED

☐ APPROVED as
CORRECTED

☐ REVISE and
RESUBMIT

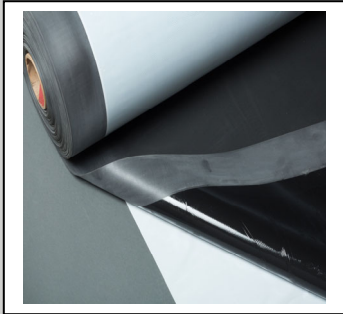
Architect's review is only for conformance with the design concept of the Project and the compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication processes or the techniques of construction, and the coordination of all trades.

 **BECHTLE**
ARCHITECTS


Nicole Boteilho
8/29/25

Bechtle reviewed. Notes in red.

Technical Information Sheet



RubberGard™ EPDM SA

Item Description	Item Number
.060" x 10' x 100' (1.52 mm x 3.05 m x 30.5 m)	W56L61010SA

Description

Elevate RubberGard EPDM SA membrane with Secure Bond™ Technology is designed to be the next generation of self-adhered roof system application. Secure Bond Technology is factory applied which helps ensure uniform adhesion across the entire membrane, creating a powerful bond with the substrate. This advanced technology not only improves installation speed over traditional fully adhered applications, but also widens the installation window with the ability to be installed down to 20 °F (-7 °C). With no VOCs, RubberGard EPDM SA with Secure Bond Technology is an excellent solution for all your fully adhered roofing needs.

RubberGard EPDM SA membrane meets or exceeds all the requirements for ASTM D 4637 for Type I non-reinforced EPDM single-ply roofing membranes.

Membrane Preparation

1. Substrates must be clean, dry, and free of foreign material such as grease and any debris which could inhibit adhesion. This may require cleaning with a broom or blower.
2. Fasten insulation per current Holcim technical specifications to provide a proper substrate.
3. Install RubberGard EPDM SA membrane only when ambient and substrate temperatures are minimum 20 °F (-7 °C) and rising. Do not install RubberGard EPDM SA below this minimum temperature.
4. Apply Single-Ply QuickPrime Primer, Single-Ply LVOC Primer or Elevate Jet Bond Membrane Adhesive to vertical surfaces before installing flashing membrane.
5. Unroll and position the membrane over the substrate to achieve the desired alignment and overlaps. Allow membrane to relax before positioning and adhering. **NOTE: Once the membrane has fully relaxed, follow field membrane and roof edge membrane application methods below to adhere the membrane to the approved substrate.**

Method of Application

Field Membrane Application (Steps 1-5):

1. Once the membrane has relaxed in place a minimum of 30 minutes (longer in colder weather), and the seam positions are properly aligned, carefully fold back the leading edge of the membrane at one end to expose the release liner without disturbing the original position of the membrane.

Field Membrane Application (Steps 1-5) Continued:

2. Starting from the center split of the exposed release liner, remove the liner on both sides of the split at a 45° angle back beyond the membrane edge, making sure to pull enough of the release liner to hold below the membrane. Remove approximately 5' (1.5 m) of release liner from one end of the sheet and adhere the membrane to the substrate. The release liner removed should be enough to extend out beyond both edges of the membrane.

NOTE: Do not fold the length of the roll in half.

3. Keeping the membrane flat and secured, and the seam overlap aligned, continue removing the release liner at a 45° angle along the entire length of the entire sheet (up to 100'). Pulling the release liner at a higher angle can cause the sheet to move and may trap air. The two halves of the release liner should be pulled out at the same time by two people. Keep the release liner as close to the roof surface as possible during removal. **NOTE: Removal of the liner and any handling of the exposed SA adhesive should be done by two persons minimum.**
4. To initiate adhesion, use a stiff bristled broom and apply downward pressure across the width of the sheet working toward the sheet edge. Repeat the process for the other half of the membrane by starting from the center and brooming toward the sheet edge.
5. Roll the installed membrane with a weighted roller (5 lb per lineal inch) across the width of the membrane to ensure full contact with the substrate. **NOTE: Do not roll membrane in place with a weighted roller if installed over ISOGARD™ HD or Resista™ / ISOGARD CG.**

Application Information – Jet Bond Adhesive Used as Primer on Vertical Surfaces:

1. Apply Jet Bond Adhesive in a one-side (substrate only) primer application using a coverage rate of 2,000 square feet (20 square) per canister.
2. Pattern application shall be two back and forth overlapping passes to ensure full coverage.
3. Allow adhesive to flash off before mating the self-adhered membrane.

Seaming

NOTE: It is very important that both surfaces are clean, and no moisture is present on the splicing surfaces.

1. Side Laps - Fold back the membrane at the side lap to expose the unadhered selvedge edge of the top sheet and the bottom surface of the field seam. Prime the area to receive QuickSeam™ 3" (76 mm) Splice Tape with an approved Elevate primer per current specifications. Use the touch/push test to verify the primer has flashed off then apply the QuickSeam tape per Elevate "QuickSeam Splice Tape Application Instructions".
2. End Laps – Because the Secure Bond Adhesive extends the entire length of the roll, adjoining end laps must be stripped in. Prime and overlap the butt ends of EPDM SA membrane a minimum of 3" (76 mm). Apply additional primer 4" (102 mm) to either side of the overlap. After the primer has flashed off, strip in the entire end lap with 6" (152 mm) Batten Cover Strip.
3. Detailing - Install t-joint patches at all Batten Cover Strip overlaps, tape laps, etc., and apply a bead of Lap sealant as required by current Holcim specifications.

Storage

- Warehouse membrane in a clean dry location.
- Membrane that is stored on jobsite must be kept dry.
- Material must be a minimum of 20 °F (-7 °C) prior to installation.
- Store away from sources of punctures and physical damage.
- Make certain the structural decking will support the loads incurred by material when stored on rooftop. The deck load limitations should be specified by the project designer.
- Store away from ignition sources.

Shelf Life

18 Months when stored between 60 °F (16 °C) and 80 °F (27 °C) out of direct sunlight.

Precautions

- Take care when moving, transporting, and handling to avoid sources of punctures and physical damage.
- Removal of the plastic release liner from the adhesive backing may create a static electric charge; care should be used when removing and handling the release liner.
- Refer to Safety Data Sheets (SDS) for additional safety information.

LEED® Information

Post-Consumer Recycled Content: 0%
Post Industrial Recycled Content: 3-5%
Manufacturing Location: Tuscumbia, AL

NOTE: LEED® is a registered trademark of the U.S. Green Building Council



1454psi tensile strength is acceptable

Typical Properties – Secure Bond Pressure Sensitive Adhesives

Property	Test Method	Performance Minimum	Typical Performance
Color	---	---	Clear
Nominal Thickness	ASTM E 408-71	N/A	0.007 in (0.180 mm)
Weight	---	---	0.040 lb/ft ² (0.002 kg/m ²)

Typical Properties

Property	Test Method	Performance Min.	Typical Performance – 60 mil
Overall Thickness	D412	0.0504 in (1.372 mm)	0.059 in (1.499 mm)
Tensile Strength	D 412 (Die C)	1305 psi (9.0 MPa)	1454 psi (10.0 MPa)
Elongation, Ultimate	D 412 (Die C)	300%	622%
Tensile Set	D412 Method A (Die C)	10%	2.18%
Tear Resistance	D 624 (Die C)	159 lbf/in (26.3 kN/m)	219 lbf/in (38.4 kN/m)
Brittleness Point	D2137	-49 °F (-45 °C)	-49 °F (-45 °C)
Ozone Resistance, no cracks	D1149	--	Pass
Heat Aging:	D 573	--	--
Tensile	D 412 (Die C)	1205 psi (8.3 MPa)	1490 psi (10.3 MPa)
Elongation, Ultimate	D 412	200%	322%
Tear Resistance	D 624	125 lbf/in (21.9 kN/m)	179 lbf/in (31.3 kN/m)
Linear Dimensional Change	D 1204	± 1.0%	-0.32%
Water Absorption	D471	+8%, -2 %	+1.515
Weight	---	---	.47 lb/ft ²
Factory Seam Strength	D 816 Method B (Modified)	50 lbf/in (8.8 kN/m) or Sheet Failure	Sheet Failure
Weather Resistance:	---	---	---
Visual Inspection	D 518	Pass	Pass
PRFSE	D 518	30%	53%
Elongation, Ultimate	D 412 (Die C)	200%	255%
Air Permeance (Material)	E 2178*	<0.004 ft ³ /ft ² (0.02 L/(s·m ²))	Pass

*The ASTM 2178 values listed are for the air permeance of the RubberGard EPDM SA membrane component only. For use of the product as a component in an air barrier assembly, please consult your Holcim Building Systems Advisor (BSA), Code Agency or Authority having Jurisdiction (AHJ) for the acceptable air barrier assembly details.

Substrates			
Acceptable Substrates	Primer Req'd	Acceptable Application Temperatures	Special Application Considerations / NOTE
ISO 95+™ GL / ISOGARD GL	No	20 - 120 °F (-7 – 49 °C)	---
ISOGARD HD	No	20 - 120 °F (-7 – 49 °C)	Do not roll in place with weighted roller
Resista / ISOGARD CG	No	20 - 120 °F (-7 – 49 °C)	Do not roll in place with weighted roller
Structural Concrete	No	20 - 120 °F (-7 – 49 °C)	Must be clean, dry, and properly cured prior to application
Lightweight Concrete	No	20 - 120 °F (-7 – 49 °C)	Use on clean, dry and properly cured cellular lightweight concrete only, not acceptable with lightweight aggregate concrete
DensDeck* Prime	No	20 - 120 °F (-7 – 49 °C)	---
Securock**	No	20 - 120 °F (-7 – 49 °C)	---
Plywood	No	20 - 120 °F (-7 – 49 °C)	Check local code for acceptance of direct application
OSB Board	No	20 - 120 °F (-7 – 49 °C)	Check local code for acceptance of direct application
CMU / Masonry and Vertical Substrates	Yes	20 - 120 °F (-7 – 49 °C)	Must be clean & dry prior to application. Apply Single-Ply QuickPrime or Single Ply LVOC Primer to all vertical substrates.
* DensDeck is a registered trademark of the G-P Gypsum Corporation ** Securock is a registered trademark of the USG Corporation			

Please contact Holcim Technical Services at 800-428-4511 for further information.

This sheet is meant to highlight Elevate products and specifications and is subject to change without notice. Holcim takes responsibility for furnishing quality materials that meet published Elevate product specifications or other technical documents, subject to normal manufacturing tolerances. Neither Holcim nor its representatives practice architecture. Holcim offers no opinion on and expressly refuses any responsibility for the soundness of any structure. Holcim accepts no liability for structural failure or resultant damages. Consult a competent structural engineer prior to installation if the structural soundness or structural ability to properly support a planned installation is in question. No Holcim representative is authorized to vary this disclaimer.

Technical Information Sheet



QuickSeam™ FormFlash

Item Description	Item Number
9" x 50' (228.6 mm x 15.24 m)	W56RAC1650
12" x 50' (304.8 mm x 15.24 m)	W56RAC1653
18" x 50' (457.2 mm x 15.24 m)	W56RAC162A

Description

QuickSeam FormFlash consists of uncured FormFlash factory laminated to QuickSeam Tape. It is designed to flash inside and outside corners, pipes, penetration pockets and other applications as required by Elevate Specifications and Details.

Method of Application

1. Use QuickPrime™ Plus, QuickPrime Plus LVOC, Single-Ply QuickPrime Primer or Single-Ply LVOC Primer and a QuickScrubber™ or QuickScrubber Plus pad and handle to clean and prime mating surfaces. Refer to Elevate Installation Instruction Sheet for QuickSeam FormFlash (included in each carton) and Elevate Specifications and Details.
2. When cloudy conditions below 60 °F (15.6 °C) occur, use heat guns (without ignition sources) to warm QuickSeam FormFlash. This will ensure good formability of the QuickSeam FormFlash to the primed substrate.
3. On sunny days less than 70 °F (21.1 °C), place QuickSeam FormFlash on roof (prior to application) with flashing side up to allow QuickSeam FormFlash to warm to ensure good formability.
4. On sunny days greater than 70 °F (21.1 °C), place QuickSeam FormFlash on roof (prior to application) with release paper side up to prevent QuickSeam FormFlash from gaining too much heat and to ensure good formability.
5. Refer to application instructions for specifics: www.HolcimElevate.com

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C).
- Do not store on roof in direct sunlight or at temperatures above 80 °F (26.7 °C).
- When exposed to lower temperatures; restore to room temperature prior to use.

Shelf Life

Shelf life of one year can be expected when stored in original container at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

Refer to Safety Data Sheets (SDS) for additional safety information.

Packaging

- 9" x 50' (228.6 mm x 15.24 m), 2 rolls per carton, 40 cartons per pallet
- 12" x 50' (304.8 mm x 15.24 m), 1 roll per carton, 36 cartons per pallet
- 18" x 50' (457.2 mm x 15.24 m), 1 roll per carton, 24 cartons per pallet

NOTE: QuickScrubber and/or QuickScrubber Plus pads and handles are included in each carton. Quantities vary depending on the QuickSeam product. Do not use brushes or rollers to apply primer.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Prescott, AR

NOTE: LEED® is a registered trademark of the U.S. Green Building Council



Typical Properties – QuickSeam Tape	
Properties	Value
Base	Rubber Polymers
Color	Black
Solvents	None
Solids	100%
Cured State	Cured
Thickness	0.025" (0.635 mm) ± 0.007" (0.18 mm)

Typical Properties – Flashing Material	
Properties	Value
Base	EPDM
Color	Black
Solvents	None
Solids	100%
Cured State	Uncured
Thickness	0.065" (1.65 mm) ± 0.005" (0.13 mm)

Please contact Holcim Technical Services at 800-428-4511 for further information.

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Technical Information Sheet



QuickPrime™ Plus

Item Description	Item Number
1 Quart	W56RAC1695
1 Gallon	W563587041
3 Gallon	W563587044

Description

QuickPrime Plus is designed to clean and prime RubberGard™ EPDM membranes (LSFR, Platinum, FullForce, RubberGard Max) prior to application of QuickSeam™ products where required by Elevate Specifications and Details. QuickPrime Plus is NOT acceptable for use on EcoWhite™ EPDM, UltraPly™ TPO or Elevate PVC membranes.

QuickPrime Plus must be applied with a QuickScrubber™ or QuickScrubber Plus pad and handle when preparing EPDM membranes to receive QuickSeam products. It may be used to clean membrane prior to the application of Elevate Splice Adhesive (SA-1065). It also may be brush or roller applied over vertical substrates in preparation for the application of FullForce EPDM or TPO SA membranes.

Method of Application

1. Splice surfaces must be clean, dry, and free of foreign materials and excess dusting agent. Clean with broom or rags to remove contaminants. For in-service membranes, additional cleaning with soap and water followed by Elevate Splice Wash is necessary.
2. Stir QuickPrime Plus thoroughly before and during use. Apply QuickPrime Plus at the rate of 200 - 250 ft² per gallon (4.91 - 6.14 m² per liter) per side to the splicing surfaces using the QuickScrubber or QuickScrubber Plus pad and handle.
3. Use back and forth strokes with heavy pressure along the length of the splicing area, until membrane surfaces become dark gray in color with no streaking or puddling.
4. Additional scrubbing is required at factory seams, areas of excess dusting agent, or other contaminated areas of the RubberGard membrane. Change QuickScrubber pad every 200' (61 m).
5. Application of primer at factory seams requires parallel as well as perpendicular motions along the seam step-off. Apply sufficient pressure on the QuickScrubber Plus pad and handle during application so the pad holder flattens to allow the total surface of the pad to contact with the RubberGard membrane.
6. Allow the surfaces to dry according to the touch-push test (usually less than 10 minutes) before applying QuickSeam products or Splice Adhesive SA-1065.
7. Complete seaming procedures per Elevate Specifications and Details.

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (16 °C) and 80 °F (27 °C).
- Do not store on roof in direct sunlight or at temperatures above 80 °F (27 °C).
- When exposed to lower temperatures; restore to room temperature prior to use.

Shelf Life

Shelf life of one year can be expected when stored in original container at temperatures between 60 °F (16 °C) and 80 °F (27 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

- Refer to Safety Data Sheets (SDS) for additional safety information.
- Thinning is not allowed.
- Flammable. Keep away from fires (open flame) and other possible ignition sources during storage and use. Do not smoke when using.
- Use only in well-ventilated areas.
- Use of neoprene or nitrile gloves and eye protection with side shield is recommended.
- Do not apply to roofing membranes with rollers, brushes, or rags. Use only in conjunction with QuickScrubber or QuickScrubber Plus pad and handle.
- Mix thoroughly before and during use.

Packaging		
Container	Pallet	Weight
1 Quart (.95 Liter) can	12-1 Quart cans / carton	23 lb/ 10.45 kg
	600-1 Quart cans (50 cartons) / pallet	1150 lb/ 522.7 kg
1 Gallon (3.78 Liter) pail	4-1 Gallon pails / carton	32 lb/14.5 kg
	216-1 Gallon pails (54 cartons) / pallet	1728 lb/785.5 kg
3 Gallon (11.4 liter) pail	75-3 Gallon pails / pallet	1658.25 lb/ 753.35 kg

Coverage Rates		
General	200 - 250 f ² /gal (4.91 - 6.14 m ² /L) for single-side application 100-125 f ² /gal ft ² per gallon (2.45 – 3.07 m ² /L) for two-side application	
Various Product Applications	3" QuickSeam Tape	375-450' (114-137 m)/ gal
	6" QuickSeam Tape	180-225' (55-68 m)/ gal
	7" QuickSeam Tape	150-200' (46-61 m)/gal
	6" QuickSeam Batten Cover	300-375' (91-114 m)/gal
	5" QuickSeam Flashing	340-400' (104-122 m)/gal

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: South Bend, IN or Rockland, MA

NOTE: LEED® is a registered trademark of the U.S. Green Building Council



Typical Properties	
Properties	Value
Base	Synthetic Rubber Polymers
Color	Translucent Grey
Solvents	Heptane, Toluene
Percent Solids	16-18%
Viscosity	Very thin, free flowing
Weight (Nominal)	6.62 lb/gal (0.79 kg/L)
Specific Gravity	0.793
Flash Point	0.0 °F (-18 °C)
V.O.C. Content	Not to exceed 5.55 lb/gal (664 g/L)

Please contact Holcim Technical Services at 800-428-4511 for further information.

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Technical Information Sheet



Insulation Fastening Plate

Item Description	Item Number
Pail: 1,000 Pieces	W56RAC4190

Description

Insulation Fastening Plates are specially designed to be used with Elevate All-Purpose, Heavy-Duty, Concrete Drive and Stainless-Steel Fasteners in roofing applications for attaching insulation as required by Elevate Specifications.

Method of Application

1. Position insulation plates over insulation as specified by Elevate Specifications.
2. Attach plates to roof deck using the appropriate Elevate fastener.
3. Install plates ribbed side up.

Storage

Store in unopened original containers protected from the weather.

Precautions

- Do not overdrive or underdrive fastener.
- Plates are designed to anchor roof insulation only.
- Avoid field seams directly over insulation plates.
- **Cannot be used with Elevate Heavy Duty (HD) Plus Fasteners.**

LEED® Information

Post-Consumer Recycled Content:	8%
Post Industrial Recycled Content:	17%
Manufacturing Location:	Cleveland, OH



NOTE: LEED® is a registered trademark of the U.S. Green Building Council

Product Packaging

Plate Diameter	3" (76 mm)
Pail	1000 pieces
Weight of Pail	42 lb (19 kg) per
Pails per Pallet	60

Typical Properties

Properties	Typical Performance
Material	AZ50 Galvalume®
Material Thickness	0.017" (0.43 mm) - 0.023" (0.58mm)
Diameter	3" (76 mm)
Corrosion Resistant Coating	Meets FM No. 4470 Criteria
Pull Through Resistance	400 lbf (181.4 kgf) from center hole
Corrosion Resistance	Meets FM 4470 criteria

*Galvalume® is a registered trademark of BIEC International, Inc.

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Technical Information Sheet



QuickSeam™ Reinforced Perimeter Fastening (RPF) Strip

Item Description	Item Number
6" (152 mm) x 100' (30.5 m)	W56RAC1632

Description

QuickSeam Reinforced Perimeter Fastening (RPF) Strip is a 6" (152 mm) wide RubberGard™ MAX membrane with 3" (76 mm) wide QuickSeam Tape factory laminated to it along one edge. It is used for non-penetrating membrane securement as specified in Elevate Specifications and Details.

Method of Application

1. Unroll the QuickSeam RPF Strip with the release paper up and the tape portion farthest away from the wall or penetration.
2. Anchor QuickSeam RPF Strip using Elevate 2" seam plates and fasteners 12" (305 mm) o.c. max. per current base tie-in details.
3. Attachment option: QuickSeam RPF Strip may be fastened with metal or polymer batten strips to the deck (in the mechanically attached and fully adhered systems only) or fastened into the wall (metal battens only). Polymer batten may be used to fasten into wood sheathed parapet walls. Refer to appropriate Elevate details for specifics.
4. Position EPDM membrane over QuickSeam RPF Strip with release paper in place and allow membrane to relax.
5. Fold back EPDM membrane to expose the tape.
6. Prime the EPDM to be spliced to the tape using QuickPrime™ Plus, QuickPrime Plus LVOC, Single-Ply QuickPrime Primer or Single-Ply LVOC Primer and QuickScrubber™ or QuickScrubber Plus pad and handle per current procedures.
7. Allow the primer to dry or to flash-off according to the specification for each priming product.
8. Remove the release paper.
9. Roll the primed EPDM membrane into the tape.
10. Bond the portion of the QuickSeam RPF Strip without tape to the membrane using an approved Elevate bonding adhesive or Splice Adhesive SA-1065.
11. Roll the EPDM membrane over the QuickSeam RPF Strip with a 1½" (38 mm) wide silicone hand roller to ensure proper adhesion.

Packaging

- 2 – 6" (152.4 mm) x 100' (30.5 m) rolls per carton
- 21 cartons per pallet

NOTE: QuickScrubber and/or QuickScrubber Plus pads and handles are included in each carton. Quantities vary depending on the QuickSeam product.

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (16 °C) and 80 °F (27 °C).
- Do not store on roof in direct sunlight or at temperatures above 80 °F (27 °C).
- When exposed to lower temperatures; restore to room temperature prior to use.

Shelf Life

Shelf life of 24 months can be expected when stored in original container at temperatures between 60 °F (16 °C) and 80 °F (27 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

Refer to Safety Data Sheets (SDS) for additional safety information.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Prescott, AR

NOTE: LEED® is a registered trademark of the U.S. Green Building Council



Typical Properties – QuickSeam Tape	
Properties	Value
Base	Rubber Polymers
Color	Black
Solvents	None
Solids	100%
Specific Gravity	98± 0.02 (H2O = 1)
Cured State	Cured
Thickness	0.030" (0.77 mm) ± 0.007" (0.18 mm)
Width	3" (133.3 mm) + 0, - 1/16"
Length	100' (30.48 m) +1'/-0

Typical Properties – RubberGard MAX	
Properties	Value
Base	EPDM
Color	Black
Solvents	None
Solids	100%
Cured State	Cured
Thickness	0.060" (1.52 mm) ± 10%
Width	6" + 0, - 0.125"
Breaking Strength	80 lb/ft (355.9 N)

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Technical Information Sheet



ISOGARD™ GL Insulation

Item Description

Flat and Tapered Polyiso Boards

Flat Boards: 4' x 4' (1.22 m x 1.22 m), 4' x 8' (1.22 m x 2.44 m)

Tapered Boards: 4' x 4' (1.22 m x 1.22 m)

Slope Range: 1/16" per foot (.5%) to 1/2" per foot (4%)

Thickness Range: 0.5" (12.7 mm) to 4.5" (114.3 mm)

Other options available include: 4' x 7'4" (1.22 m x 2.25m).

Export cut for international shipments and scored ISO for metal retrofits.

Meets or exceeds performance requirements of ASTM C 1289, Type II, Class 1

Description

Elevate™ ISOGARD GL flat and tapered roof insulation consists of a closed cell polyiso foam core laminated to a glass reinforced mat facer on both major surfaces. Flat and tapered ISOGARD insulation provides outstanding thermal performance on commercial roofing applications, while providing positive rooftop drainage to help eliminate ponding water when tapered ISOGARD GL insulation is used.

All Elevate polyisocyanurate foam insulations use EPA accepted blowing agents. Elevate ISOGARD GL incorporates a HCFC-free blowing agent that does not contribute to the depletion of the ozone layer (ODP-free).

Method of Application

1. Insulation shall be neatly fitted to all roof penetrations, projections, and nailers.
2. No more insulation shall be installed than can be covered with membrane and completed before the end of each day's work or before the onset of inclement weather.
3. Elevate ISOGARD GL board may be installed using:

- Elevate fasteners and plates.

NOTE: For ballasted systems, the top layer of Elevate insulation may not be mechanically attached.

- Hot asphalt (requires a cover board, when hot asphalt or torch applied base sheet is installed)
- Elevate approved insulation adhesives.
 - I.S.O. Twin Pack™
 - I.S.O.Stick™
 - Twin Jet
 - I.S.O. Spray™ R

Acceptable Immediate Substrates

- 2,500 psi Structural concrete (must be clean, dry, and properly cured)
- Steel deck (min 22 ga)
- Plywood and OSB (min 1/2")
- Lightweight concrete
- Gypsum deck (min 2")

NOTE: Please consult the Design Guides and QuickSpecs online at www.holcimelevate.com to review specific information regarding the assembly.

Storage

- Keep insulation dry at all times.
- Elevate insulation above the deck or ground.
- Cover insulation with waterproof tarps.

Precautions

- Polyiso foam will burn if exposed to a flame of sufficient heat and intensity. Keep away from heat, sparks, and open flames.
- Protect against dust that may be generated during installation.
- Refer to Safety Data Sheet (SDS) for additional information.
- Take care when transporting and handling Elevate insulation to avoid physical damage.

Specification Compliance

ASTM C1289, Type II, Class 1

UL Classified – UL1256

FM 4470 Class 1 Approved

Manufactured in an ISO 9001 Registered Facility

CAN/ULC-S704-11, Type 2, Class 2

CAN/ULC-S704-11, Type 3, Class 2 available upon request



LEED® Information

See Recycled Content in Typical Properties table.

Manufacturing Locations:

- Bristol, CT
- De Forest, WI
- Salt Lake City, UT
- Youngwood, PA
- Florence, KY
- Jacksonville, FL

NOTE: LEED® is a registered trademark of the U.S. Green Building Council

Typical Properties (Meets ASTM C 1289, Type II, Class 1)

Property	ASTM Test Method	Elevate Typical Performance
Thermal Resistance	C518	40 °F (4.4 °C) 6.2 R/in 75 °F (23.9 °C) 5.7 R/in 110 °F (43.3 °C) 5.0 R/in
Compressive Strength	D1621	Grade 2: 20 psi (138 kPa) Grade 3: 25 psi (172 kPa) *
Density	D1622	2 pcf (32 kg/m ³)
Dimensional Stability	D2126	<2%
Moisture Vapor Transmission	E96	<1 perm (<57.5 ng/(Pa·s·m ²))
Water Absorption	C209	<1% by volume
Service Temperature	---	-100 to 250 °F (-73 to 121 °C)
Flame Spread	E84	Index 50
Smoke Development	E84	Index 160 - 180

*25 psi (172 kPa) available upon request.

Product Information

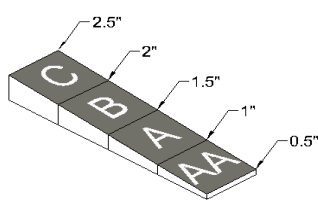
Thickness*		R-Value	Max Flute Span		Approximate Recycled Content		
inches	mm	**	inches	mm	Post-Consumer	Post Industrial	Total
0.5	12.70	2.9	1.50	38.10	52%	15%	67%
1.0	25.40	5.7	2.62	66.67	37%	15%	52%
1.1	27.94	6.3	2.62	66.67	36%	15%	51%
1.2	30.48	6.8	2.62	66.67	34%	15%	49%
1.3	33.02	7.4	3.67	93.34	32%	15%	47%
1.4	35.56	8.0	3.67	93.34	30%	15%	45%
1.5	38.10	8.6	4.37	111.12	29%	15%	44%
1.6	40.64	9.1	4.37	111.12	27%	15%	42%
1.7	43.18	9.7	4.37	111.12	26%	15%	41%
1.75	44.45	10.0	4.37	111.12	26%	15%	41%
1.8	45.72	10.3	4.37	111.12	25%	15%	40%
1.9	48.26	10.8	4.37	111.12	24%	15%	39%
2.0	50.80	11.4	4.37	111.12	24%	15%	39%
2.1	53.34	12.0	4.37	111.12	22%	15%	37%
2.2	55.88	12.6	4.37	111.12	21%	15%	36%
2.25	57.15	12.9	4.37	111.12	21%	15%	36%
2.3	58.42	13.2	4.37	111.12	21%	15%	36%
2.4	60.96	13.8	4.37	111.12	20%	15%	35%
2.5	63.50	14.4	4.37	111.12	20%	15%	35%
2.6	66.04	15.0	4.37	111.12	19%	15%	34%
2.7	68.58	15.6	4.37	111.12	18%	15%	33%
2.75	69.85	15.9	4.37	111.12	18%	15%	33%
2.8	71.12	16.2	4.37	111.12	18%	15%	33%
2.9	73.66	16.8	4.37	111.12	17%	15%	32%
3.0	76.20	17.4	4.37	111.12	17%	15%	32%
3.1	78.74	18.0	4.37	111.12	16%	15%	31%
3.2	81.28	18.6	4.37	111.12	16%	15%	31%
3.25	82.55	18.9	4.37	111.12	16%	15%	31%
3.3	83.82	19.2	4.37	111.12	16%	15%	31%
3.4	86.36	19.9	4.37	111.12	15%	15%	30%
3.5	88.90	20.5	4.37	111.12	15%	15%	30%
3.6	91.44	21.1	4.37	111.12	14%	15%	29%
3.7	93.98	21.7	4.37	111.12	14%	15%	29%
3.75	95.25	22.0	4.37	111.12	14%	15%	29%
3.8	96.52	22.3	4.37	111.12	14%	15%	29%
3.9	99.06	23.0	4.37	111.12	14%	15%	29%
4.0	101.60	23.6	4.50	114.30	14%	15%	29%
4.1	104.14	24.2	4.50	114.30	13%	15%	28%
4.2	106.58	24.9	4.50	114.30	13%	15%	28%
4.25	107.95	25.2	4.50	114.30	13%	15%	28%
4.3	109.22	25.5	4.50	114.30	13%	15%	28%
4.4	111.76	26.1	4.50	114.30	13%	15%	28%
4.5	114.3	26.8	4.50	114.30	13%	15%	28%

*Other thicknesses available upon request.

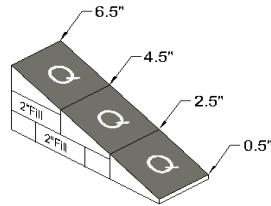
**R- values provide a 15-year time-weighted average in accordance with CAN/ULC-S770.

Tapered ISOGLARD GL (available sizes)

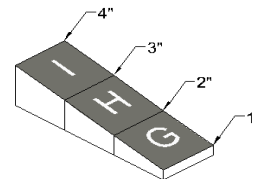
Panel Code	Min-Max Thickness		Slope	
	Inches	mm		
AA	0.5 – 1.0	12.7 – 25.4	1/8"/ft	1%
A	1.0 – 1.5	25.4 – 38.1	1/8"/ft	1%
B	1.5 – 2.0	38.1 – 50.8	1/8"/ft	1%
C	2.0 – 2.5	50.8 – 63.5	1/8"/ft	1%
G	1.0 – 2.0	25.4 – 50.8	1/4"/ft	2%
H	2.0 – 3.0	50.8 – 76.2	1/4"/ft	2%
I	3.0 – 4.0	76.2 – 101.6	1/4"/ft	2%
X	0.5 – 1.5	12.7 – 38.1	1/4"/ft	2%
Y	1.5 – 2.5	38.1 – 63.5	1/4"/ft	2%
Z	2.5 – 3.5	63.5 – 88.9	1/4"/ft	2%
Q	0.5 – 2.5	12.7 – 63.5	1/2"/ft	4%
SS	0.5 – 2.0	12.7 – 50.8	3/8"/ft	3%



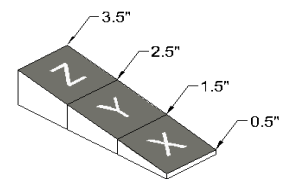
1/8"/ft. Tapered Section



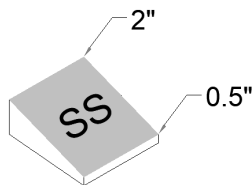
1/2"/ft. Tapered Section



1/4"/ft. Tapered Section



1/4"/ft. Tapered Section



3/8"/ft. Tapered Section

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Technical Information Sheet



QuickSeam™ Pipe Flashing

Item Description	Item Number
Pipe Flashing	W563581063

Description

QuickSeam Pipe Flashings are specifically designed to be used in roofing applications for flashing of round penetrations. QuickSeam Pipe Flashings will fit various penetrations and must be cut to correct pipe diameter before installation. QuickSeam Pipe Flashings may be used to flash penetrations for both RubberGard™ EPDM as well as APP and SBS Modified Bitumen systems. Refer to Elevate details MB-P-5 for use with APP.

Method of Application

1. Clean the Rubbergard membrane using QuickPrime™ Plus, QuickPrime Plus LVOC, Single Ply QuickPrimer or Single Ply LVOC Primer using a QuickScrubber™ or QuickScrubber Plus pad and handle to remove all dusting agents, dirt and other contaminants that will affect the finished bond.
2. Allow to dry according to the touch-push test.
3. Cut along the top edge of the ring on the QuickSeam Pipe Flashing corresponding to the size of the pipe.
4. Remove the release liner from the tape portion.
5. Install the pipe flashing and roll the flange with a silicone hand roller.
6. Install the clamping ring and Lap Sealant per Elevate Specifications and Details.
7. Install per specific requirements as outlined on the QuickSeam Pipe Flashing Technical Information Sheet located in the Elevate Asphalt Technical Manual.

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C).
- Do not store on roof in direct sunlight or at temperatures above 80 °F (26.7 °C).
- When exposed to lower temperatures; restore to room temperature prior to use.

Shelf Life

Shelf life of two years can be expected when stored in original container at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

- Refer to Safety Data Sheets (SDS) for additional safety information.
- Do not install on uneven substrates.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Bensenville, IL

NOTE: LEED® is a registered trademark of the U.S. Green Building Council

Typical Properties	
Properties	Value
Molded Pipe Flashing	
Base	Molded EPDM
Color	Black
Sizes	Universal – Fits 1" O.D. to 6.875" O.D. (25.4 mm to 174.6 mm)
Clamp	Stainless Steel – worm gear type (clamps are included)
Pipe Flange	13" (33 cm) outside diameter
Thickness	0.055"-0.075" (1.4 mm – 1.9 mm)
QuickSeam Tape	
Base	Rubber Polymer
Color	Black
Solvents	None
Percent Solids	100%
Cured State	Cured
Thickness	0.030" (0.762 mm) + 0.005" (0.13 mm)

Fit Guidelines: Fits Pipe Outside Diameters	
1.000" - 1.375"	25.4 mm – 34.9 mm
1.625" - 1.875"	41.3 mm – 47.6 mm
2.000" - 2.625"	50.8 mm – 66.7 mm
2.750" - 3.625"	69.8 mm – 92.1 mm
4.000" - 4.500"	102.0 mm – 114.0 mm
5.000" - 5.563"	127.0 mm – 141.0 mm
6.000" - 6.875"	152.4 mm – 174.6 mm
NOTE: For penetrations less than 1" in diameter, use Elevate QuickSeam Conduit Flashing.	

Please contact Holcim Technical Services at 800-428-4511 for further information.

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Manufacturer

Georgia-Pacific Gypsum Georgia-Pacific Canada
133 Peachtree Street 2180 Meadowvale Boulevard, Suite 200
Atlanta, GA 30303 Mississauga, ON L5N 5S3
Technical Service Hotline: 1-800-225-6119

Description

DensDeck[®] Prime Roof Board has been enhanced to provide a broader compatibility and higher performance with roofing adhesives. Face mat enhancements allow adhesives to be applied more uniformly and consistently. In adhered, single ply membrane testing, enhanced DensDeck Prime demonstrated an average of 24% better bond than the original products, when using solvent based adhesives. (Average based on 60 sq.ft./gal coverage rates.)* Choose DensDeck Prime Roof Boards for adhered and self-adhered "peel & stick" roofing systems, as well as hot mopped, cold mastic and torch-applied modified bitumen roofs. Enhanced DensDeck Prime Roof Boards create a stronger and more economical installation by reducing the amounts of mastic or adhesive used and potentially eliminates the field primer. Consult with membrane manufacturer for actual priming requirements.

DensDeck Prime Roof Boards are the first and only fiberglass mat gypsum roof boards with a 90-day weather exposure limited warranty when applied vertically on a parapet wall. ** (Limited to 1/2" and 5/8" products only.)

Primary Uses

Roof system manufacturers and designers have found DensDeck Prime Roof Board to be compatible with many types of roofing systems, including: modified asphalt, single-ply, metal systems, recover board, as well as an overlayment for polyisocyanurate and polystyrene insulation. DensDeck Prime Roof Board can also be used as a form board for poured gypsum concrete deck in roof applications as well as a substrate for spray foam roofing systems. 1/2" (12.7 mm) and 5/8" (15.9 mm) DensDeck Prime Roof Board may also be used in vertical applications as a backer board or liner for the roof side of parapet walls.

DensDeck Prime Roof Board may allow the bonding of cold mastic modified bitumen and torching directly to the surface. *Consult with the system manufacturer for recommendations on this application.*

DensDeck Prime Roof Board is the preferred substrate for vapor retarders.

Standards and Code Approvals

DensDeck Prime Roof Boards are manufactured to meet ASTM C1177 and have the following approvals:

- Florida Product Approved
- Miami-Dade County Product Control Approved

Recommendations and Limitations

DensDeck Prime Roof Boards are manufactured to act with a properly designed roof system following good roofing practices. The actual use of DensDeck Prime Roof Board as a roofing component in any system or assembly is the responsibility of the roofing system's design authority. Consult with the appropriate system manufacturer and/or design authority for system and assembly specifications and instructions on applying other products to DensDeck Prime Roof Board. Georgia-Pacific does not warrant and is not responsible for any systems or assemblies utilizing DensDeck Prime Roof Board or any component in such systems or assemblies other than DensDeck Prime Roof Board.

The need for a separator sheet between the DensDeck Prime Roof Board and the roofing membrane must be determined by the roof membrane manufacturer or roofing system designer.

* Testing was done in accordance with FM approvals 4470, Appendix C: Small Scale Tests, Membrane Delamination Tests for Roofing Membranes and Substrates Using Tensile Loading.

** For complete warranty details, visit www.DensDeck.com. (Limited to 1/2" and 5/8" products only.)

Confirm any priming requirements with the membrane manufacturer. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

DensDeck Prime Roof Boards should not be subjected to abnormal or excessive loads or foot traffic, such as, but not limited to, use on plaza decks or under steel-wheeled equipment that may fracture or damage the panels. Provide suitable roofing system protection when required.

When using DensDeck Prime Roof Boards for hot-mopped applications, Georgia-Pacific recommends maximum asphalt application temperatures of 425°F (218°C) to 450°F (232°C). Application temperatures above these recommended temperatures may adversely affect roof system performance. Consult and follow the roofing system manufacturer's specifications for full mopping applications and temperature requirements.

When using DensDeck Prime Roof Board as a substrate for torch applications, ensure that the product is dry and that the proper torching technique is used. Limit the heat to the DensDeck Prime Roof Board. Maintain a majority of the torch flame directly on the roll.

Conditions beyond the control of Georgia-Pacific, such as weather conditions, dew, leaks, application temperatures and techniques may cause adverse effects with roofing systems.

Handling and Use—CAUTION

This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

Moisture Management

DensDeck Prime Roof Boards, like other components used in roofing systems, must be protected from exposure to moisture before, during and after installation.

Remove the plastic packaging from all DensDeck Prime Roof Board immediately upon receipt of delivery. Failure to remove the plastic packaging may result in entrapment of condensation or moisture. DensDeck Prime Roof Board stored outside must be stored level and off the ground and protected by a breathable waterproof covering. Provide means for air circulation around and under stored bundles of DensDeck Prime Roof Board. DensDeck Prime Roof Board must be covered the same day as installed.

Avoid application of DensDeck Prime Roof Boards during rain, heavy fog and any other conditions that may deposit moisture on the surface, and avoid the overuse of non-vented, direct-fired heaters during winter months. When roofing systems are installed on new poured concrete or light weight concrete decks or when re-roofing over an existing concrete deck, a vapor barrier should be installed above the concrete to retard the migration of water from the concrete into the roof assembly. Always consult the roofing system manufacturer or design authority for specific instructions for applying other products to DensDeck Prime Roof Boards.

Moisture vapor movement by convection must be eliminated, and the flow of water by gravity through imperfections in the roof system must be controlled. After a leak has occurred, no condensation on the upper surface of the system should be tolerated, and the water introduced by the leak must be dissipated to the building interior in a minimum amount of time.

Although DensDeck Prime Roof Boards are engineered with fiberglass facings and high density gypsum cores, the presence of free moisture can have a detrimental effect on the performance of the product and the installation of roofing membranes. For example, hot asphalt applications can blister; torched modified bitumen may not properly bond; and adhesives for single ply membranes may not dry properly.

Submittal Approvals

Job Name _____

continued →

Contractor _____

Date _____

Stamps / Signatures

Moisture accumulation may also significantly decrease wind uplift and vertical pull resistance in the system or assembly. DensDeck® Prime Roof Boards containing excessive free moisture content may need to be evaluated for structural stability to assure wind uplift performance.

Fire Resistance Classifications

DensDeck Prime Roof Boards are excellent fire barriers over combustible and noncombustible roof decks, including steel decks.

UL 790 Classification. DensDeck Prime Roof Boards have been classified by Underwriters Laboratories LLC (UL) for use as a fire barrier over combustible and noncombustible decks in accordance with the ANSI/UL 790 test standard. The UL classification includes a comprehensive Class A, B or C rating. For additional information concerning the UL 790 classification, consult the UL Certification Directory.

UL 1256 Classification. DensDeck Prime Roof Boards have also been classified by UL in roof deck constructions for internal (under deck) fire exposure in accordance with the ANSI/UL 1256 Steiner Tunnel test. For additional information concerning the UL 1256 classification, consult the UL Certification Directory.

FM Class 1 Approvals. DensDeck Prime Roof Boards are included in numerous roofing assemblies with a Factory Mutual (FM) Class 1 fire rating. 1/4" (6.4 mm) DensDeck Prime Roof Boards have passed testing under the FM Calorimeter Standard 4450

and have been approved by FM as such for insulated steel deck roofs when installed according to the conditions identified by FM. For more information concerning FM Approvals and FM Class 1 assemblies with DensDeck Prime Roof Boards, consult FM or RoofNav®.

Type X. 5/8" (15.9 mm) DensDeck® Prime Fireguard® Roof Boards are manufactured to meet the "Type X" requirements of ASTM C1177 for increased fire resistance beyond regular gypsum board.

UL Fire Resistance Ratings. 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards are designated as **Type DD** by UL and included in assembly designs investigated by UL for hourly fire resistance ratings. 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards may also replace any unclassified 5/8" (15.9 mm) gypsum board in an assembly in the UL Fire Resistance Directory under the prefix "P".

Flame Spread and Smoke Developed. When tested in accordance with ASTM E84, DensDeck Prime Roof Boards had Flame Spread 0, Smoke Developed 0.

Wind Uplift

DensDeck Prime Roof Boards are included in numerous assemblies evaluated by FM or other independent laboratories for wind uplift performance. For information concerning such assemblies, please visit www.roofnav.com.

Physical Properties

Properties	1/4" (6.4 mm)	1/2" (12.7mm)	5/8" (15.9 mm)
Thickness, nominal	1/4" (6.4 mm) ± 1/16" (1.6 mm)	1/2" (12.7 mm) ± 1/32" (.8 mm)	5/8" (15.9 mm) ± 1/32" (.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)
Weight, nominal, lbs./sq. ft. (Kg/m²)	1.2 (5.9)	2.0 (9.8)	2.5 (12.2)
Surfacing	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating
Flexural Strength¹, parallel, lbf. min. (N)	≥40 (178)	≥80 (356)	≥100 (444)
Flute Spanability²	2-5/8" (66.7 mm)	5" (127 mm)	8" (203 mm)
Permeance³, perms (ng/Pa•S•m²)	>30 (>1710)	>23 (>1300)	>17 (>970)
R Value⁴, ft²•°F•hr/BTU (m²•K/W)	.28	.56	.67
Linear Variation with Change in Temp., in/in °F (mm/mm/°C°)	8.5 x 10⁻⁶ (15.3 x 10⁻⁶)	8.5 x 10⁻⁶ (15.3 x 10⁻⁶)	8.5 x 10⁻⁶ (15.3 x 10⁻⁶)
Linear Variation with Change in Moisture	6.25 x 10⁻⁶	6.25 x 10⁻⁶	6.25 x 10⁻⁶
Water Absorption⁵, % max	5	5	5
Compressive Strength⁶, psi nominal	900	900	900
Surface Water Absorption, grams, nominal	1.0	1.0	1.0
Flame Spread, Smoke Developed (ASTM E84)	0/0	0/0	0/0
Bending Radius	4' (1219 mm)	6' (1829 mm)	8' (2438 mm)

1. Tested in accordance with ASTM C473 method B.

2. Tested in accordance with ASTM E661.

3. Tested in accordance with ASTM E96 (dry cup method).

4. Tested in accordance with ASTM C518 (heat flow meter).

5. Specified values per ASTM C1177.

6. Tested in accordance with ASTM C473.



U.S.A. Georgia-Pacific Gypsum LLC
Georgia-Pacific Gypsum II LLC
Canada Georgia-Pacific Canada LP

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. West: **1-800-824-7503**
Midwest: **1-800-876-4746**
South Central: **1-800-231-6060**
Southeast: **1-800-327-2344**
Northeast: **1-800-947-4497**

CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

TECHNICAL INFORMATION

U.S.A. and Canada: **1-800-225-6119**, www.gpgypsum.com

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WARRANTIES, REMEDIES AND TERMS OF SALE For current warranty information for this product, please go to www.gpgypsum.com and select the product for warranty information. All sales of this product by Georgia-Pacific are subject to our Terms of Sale available at www.gpgypsum.com.

UPDATES AND CURRENT INFORMATION The information in this document may change without notice. Visit our website at www.gpgypsum.com for updates and current information.

CAUTION For product fire, safety and use information, go to www.buildgp.com/safetyinfo or call 1-800-225-6119.

FIRE SAFETY CAUTION Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.

Technical Information Sheet



QuickSeam™ Splice Tape

Item Description	Item Number
3" X 100' (76.2 mm x 30.5 m)	W56RAC1603
6" X 100' (152.4 mm x 30.5 m)	W56RAC1626
7" X 100' (177.8 mm x 30.5 m)	W56RAC1617

Description

Elevate 3" (76.2 mm), 6" (152.4 mm) and 7" (177.8 mm) QuickSeam Splice Tape is designed for field splicing of RubberGard™ EPDM membrane panels and flashing.

Method of Application

1. Use QuickPrime™ Plus, QuickPrime Plus LVOC, Single-Ply QuickPrime Primer or Single-Ply QuickPrime LVOC and a QuickScrubber™ or QuickScrubber Plus pad and handle to clean and prime mating surfaces.
2. Refer to Elevate Specifications and Details.
3. Refer to application instructions for specifics: www.HolcimElevate.com.

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C).
- Do not store on the roof in direct sunlight or at temperatures above 80 °F (26.7 °C).
- When exposed to lower temperatures, restore to room temperature prior to use.

Shelf Life

Shelf life of one year can be expected when stored in original container at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

Refer to Safety Data Sheets (SDS) for additional safety information.

LEED® Information

Post-Consumer Recycled Content: 0%
 Post Industrial Recycled Content: 0%
 Manufacturing Location: Prescott, AR
NOTE: LEED® is a registered trademark of the U.S. Green Building Council



Typical Properties	
Properties	Value
Base	Rubber Polymers
Color	Black
Solvents	None
Solids	100%
Cured State	Cured
Thickness	0.025" (0.63 mm) ± 0.003" (0.076 mm)
Roll	3" (76.3 mm) x 100' (30.5 m) roll, 6 rolls per carton 4" (101.6 mm) x 100' (30.5 m) roll, 4 rolls per carton 6" (152.4 mm) x 100' (30.5 m) roll, 2 rolls per carton 7" (177.8 mm) x 100' (30.5 m) roll, 2 rolls per carton
Pallet	40 cartons per pallet
NOTE: QuickScrubber and/or QuickScrubber Plus pads and handles are included in each carton. Quantities vary depending on the QuickSeam product.	

Please contact Holcim Technical Services at 800-428-4511 for further information.

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Technical Information Sheet



Heavy-Duty Fastener

Red Fasteners		Black Fasteners		White Fasteners	
Size	Item Number	Size	Item Number	Size	Item Number
1 ¼"	W56RAC4230	9"	W56RAC4247	1 ¼"	W56RAC4390
2"	W56RAC4232	11"	W56RAC4248	2"	W56RAC4391
3"	W56RAC4234	16"	W56RAC4244	3"	W56RAC4392
4"	W56RAC4236	18"	W56RAC4245	4"	W56RAC4393
5"	W56RAC4237	20"	W56RAC4246	5"	W56RAC4394
6"	W56RAC4249	22"	W56RAC4231	6"	W56RAC4395
7"	W56RAC4239	24"	W6RAC4233	7"	W56RAC4396
8"	W56RAC4240			8"	W56RAC4397
10"	W56RAC4241			10"	W56RAC4398
12"	W56RAC4242				
14"	W56RAC4243				

Description

The Heavy-Duty Fastener is specifically designed to be used in roofing applications which require additional corrosion protection and additional pullout resistance. The Heavy-Duty Fastener may be used for attachment of roofing insulation and base sheets in combination with Elevate Insulation Plates, or for attachment of Elevate Batten Strips, Seam Plates, Termination Bars, and other accessories to steel, wood, concrete, and other decks where approved by Elevate Technical Specifications.

Method of Application

- Using the #3 Phillips tip provided, and a variable speed drill, engage the fastener into the deck as noted below. Take care not to over or under drive the fastener. Threads must engage the decking material per Elevate Technical Specifications.
- Determine screw length as follows:
 - Steel Decks: Select fastener length to penetrate through the deck a minimum of ¾" (19.1 mm).
 - Wood Decks: Select fastener length to penetrate into or through the deck a minimum of 1" (25.4 mm).
 - Concrete Decks: Select fastener length to penetrate into deck a minimum of 1" (25.4 mm).
- If pre-drilling of the deck substrate is necessary, use a hammer drill in impact mode with a 7/32" (5.6 mm) carbide drill bit. Install fasteners by using a variable speed drill at a maximum of 1,500 rpm.

Storage

Store in original, unopened packaging protected from the weather.

Precautions

Eye protection must be worn during the installation of the fasteners and any drilling operation.

LEED® Information

Post-Consumer Recycled Content: 25%

Pre-Consumer Recycled Content: 0%

Manufacturing Location: Addison, IL



NOTE: LEED® is a registered trademark of the U.S. Green Building Council

Product Packaging				
Screw Length	Thread Length	Pieces per Container	Weight per Pail/Ctn	Pails/Ctn per Pallet
1 1/4" (31.8 mm)	Full	1,000 / pail	12 lb (5.4 kg)	60
2" (50.8 mm)	Full	1,000 / pail	19 lb (8.6 kg)	60
3" (76.2 mm)	Full	1,000 / pail	29 lb (13.2 kg)	60
4" (101.6 mm)	3" (76.2 mm)	1,000 / pail	37 lb (16.8 kg)	60
5" (127.0 mm)	4" (101.6 mm)	1,000 / pail	47 lb (21.3 kg)	60
6" (152.4 mm)	4" (101.6 mm)	500 / pail	28 lb (12.7 kg)	60
7" (177.8 mm)	4" (101.6 mm)	500 / pail	33 lb 5.0 kg)	60
8" (203.2 mm)	4" (101.6 mm)	500 / pail	38 lb (17.2 kg)	60
9" (228.6 mm)	4" (101.6 mm)	500 / ctn*	42 lb (19.0 kg)	60
10" (254.0 mm)	4" (101.6 mm)	250 / ctn*	50 lb (20.9 kg)	60
11" (279.4 mm)	4" (101.6 mm)	500 / ctn*	51 lb 23.1 kg)	60
12" (304.8 mm)	4" (101.6 mm)	500 / ctn*	55 lb (24.9 kg)	60
14" (355.6 mm)	4" (101.6 mm)	250 / ctn*	65 lb (29.5 kg)	30
16" (406.4 mm)	4" (101.6 mm)	250 / ctn*	38 lb (17.2 kg)	30
18" (457.2 mm)	4" (101.6 mm)	250 / ctn*	43 lb (19.5 kg)	30
20" (508.0 mm)	4" (101.6 mm)	250 / ctn*	47 lb (21.3 kg)	30
22" (558.8 mm)	4" (101.6 mm)	125 / ctn*	65 lb (29.5 kg)	24
24" (609.6 mm)	4" (101.6 mm)	125 / ctn*	65 lb (29.5 kg)	24
* Packaged in cardboard boxes due to fastener length. May require additional lead time.				

Typical Properties	
Property	Typical Performance
Material	SAE 1022, Heat Treated Steel
Thread Size	0.275" (6.98 mm) Nominal Diameter
Threads/Inch	13 min.
Thread Design	Buttress thread
Fastener Tip	Drill point design
Fastener Head	#3 Phillips drive
Pullout in New 22-gauge (0.76 mm) Steel Deck Grade C (Grade 33) Grade E (Grade 80)	595 lb (270 kg) min. 650 lb (295 kg) min.
Pullout in New Structural Concrete	700 lb (317.5 kg) min.
Pullout in New 3/4" (19.0 mm) Plywood Deck	360 lb (163 kg) min.
Corrosion Resistant Coating	Electrocoating of fasteners exhibit 15% or less red rust after 30 cycles of Kesternich and exceed requirements of FM 4470.

Please contact Holcim Technical Services at 800-428-4511 for further information.

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Technical Information Sheet

Image Coming Soon

AP Sealant

Item Description	Item Number
Cartridge: 10 fl oz (300 mL)	W563587078
<i>Complies with ASTM C 920. Classified as Type S, Grade NS, Class 35, Use NT, M, A, O and I.</i>	

Description

AP Sealant is a single-component polyurethane non-sag moisture-curing sealant. It can be used to caulk sheet metal, masonry, brick, and concrete block. It may be used as an exterior sealant at termination bar details and as a fastener sealer over fastener heads per current Elevate specifications and details.

Method of Application

1. Surfaces to receive AP Sealant must be clean, dry, sound, frost-free, and grease-free. If grease or oil is present, it must be removed with a suitable solvent prior to the application of AP Sealant.
2. Apply AP Sealant to substrates above 40 °F (4 °C).
3. AP Sealant is supplied in cartridges or sausage chubs ready to apply. Do not open cartridges until all substrate cleaning and preparation work has been completed.
4. Fill joints from the deepest point to the surface by holding a properly sized nozzle against the back of the joint.
5. Dry tooling is recommended.
6. **DO NOT** use soapy water when tooling.

Storage

- Store in original unopened containers at temperatures between 60 and 80 °F (16 and 27 °C).
- When exposed to lower temperatures, restore to room temperature prior to use.
- For optimum results, rotate stock to ensure stored material has not exceeded the shelf life of one (1) year.

Shelf Life

Shelf life of one (1) year can be expected when stored in original, sealed containers at temperatures between 60 and 80 °F (16 and 27 °C). Shelf life will be shortened if exposed to elevated temperatures.

Coverage Rate

Cartridge seals 24' (7.3 m) in a 1/4" x 1/4" (6.3 mm x 6.3 mm) joint.

Packaging

30 Cartridges per carton; approximately 26 lb per carton.

Clean-Up

For clean-up, use mineral spirits or Elevate Splice Wash SW-100 while material is fresh, generally within twenty-four (24) hours. After AP Sealant cures, it can be removed by abrasion or mechanical means.

Precautions

- Refer to Safety Data Sheets (SDS) for additional safety information.
- Flammable. Keep away from fire and open flames during storage and use. Do not smoke when using.
- Use only in well-ventilated areas.
- Do not contaminate with foreign materials.
- Do not thin.
- AP Sealant is **NOT** to be used for: aquariums, food contact surfaces, hot stacks/stove pipes/fireplaces, structural glazing, below-grade applications, or splices.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Brighton, CO

NOTE: LEED® is a registered trademark of the U.S. Green Building Council

Typical Properties	
Properties	Value
Base	Polyurethane
Color	Gray
Solids	92.5% ± 2
Tooling Time	Less than 20 minutes
UV & Ozone	Excellent
Specific Gravity	1.186 ± 0.024
Cure System	Moisture Activated
V.O.C. Content	111 ± 1 g/L

Please contact Holcim Technical Services at 800-428-4511 for further information.

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Technical Information Sheet



QuickSeam™ Joint Cover

Item Description	Item Number
5.75" $\pm$ 0.125" (146 mm $\pm$ 3.18 mm) diameter	W56RAC1644

Description

QuickSeam Joint Cover is uncured FormFlash™ laminated to QuickSeam tape. A second 3" (76.2 mm) layer of tape is applied at the center and is a special uncured, flowable QuickSeam tape compound. The QuickSeam Joint Cover conforms to irregular surfaces such as encountered at "T" joints, readily providing an excellent seal.

QuickSeam Joint Covers are designed to cover and seal:

- "T" joints formed by field seam intersections.
- Joint covers for seams at change in plane on wall or curb flashings.
- 2" (50.8 mm) seam plates for RubberGard™ MAX pipe penetration attachment layouts.
- "T" joints formed by the installation of pre-fabricated pipe flashings over field or factory seams.
- As a protection pad under sheet metal joints for EdgeGard™ or snap-on metal.

Method of Application

1. Clean the RubberGard membrane using QuickPrime™ Plus and the QuickScrubber™ or QuickScrubber Plus pad and handle to remove all dusting agents, dirt and other contaminants that will affect the finished seam.
2. Allow to dry according to the touch-push test.
3. Additional cleaning may be required to assure that the membrane is completely cleaned. (Caution: more cleaning is needed at factory seams.)
4. Cleaning option: clean the RubberGard membrane using clean cotton cloths and Elevate Splice Wash SW-100 to remove all dusting agents, dirt and other contaminants that will affect the finished seam. Allow to dry.
5. Allow to dry according to the touch-push test.
6. Remove the release paper from the joint cover, taking care not to touch the outside edges of the joint cover.
7. Fold the joint cover in half. Position the center of the joint cover over the target point and mate the joint cover to the prepared surface.
8. Roll the mated surface of the joint cover with a 2" (50.8 mm) silicone roller from the center outward working the joint cover into the step-off or irregularity.
9. Install Seam Edge Treatment per Elevate Specifications and Details.
10. Refer to application instructions for specifics: www.HolcimElevate.com

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C).
- Do not store on roof in direct sunlight or at temperatures above 80 °F (26.7 °C).
- When exposed to lower temperatures; restore to room temperature prior to use.

Shelf Life

Shelf life of one year can be expected when stored in original container at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C). Shelf life will be shortened if exposed to elevated temperatures.

Packaging

100 per carton, 60 cartons per pallet

NOTE: QuickScrubber and/or QuickScrubber Plus pads and handles are included in each carton. Quantities vary depending on the QuickSeam product.

Precautions

- Refer to Safety Data Sheets (SDS) for additional safety information.
- FormFlash will cure when exposed to heat and over time.
- Uncured 3" (76.2 mm) tape center layer will cure when exposed to heat and over time.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Prescott, AR

NOTE: LEED® is a registered trademark of the U.S. Green Building Council



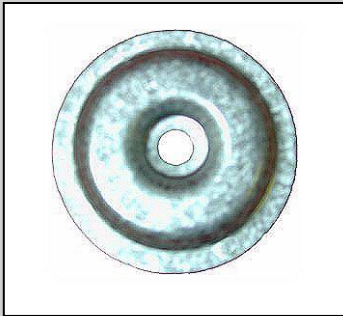
Typical Properties – QuickSeam Tape	
Properties	Value
Base	Rubber Polymers
Color	Black
Solvents	None
Solids	100%
Cured State	Cured (3" center layer uncured and flowable)
Thickness	0.030" (0.77 mm) ± 0.005" (0.13 mm) – center layer 0.037" (0.94 mm) ± 0.005 (0.13 mm)

Typical Properties – Flashing Material	
Properties	Value
Base	EPDM
Color	Black
Solvents	None
Solids	100%
Cured State	Uncured
Thickness	0.045" (1.14 mm) ± 10%
Size	5.75" (146 mm) ± 0.125" (3.18 mm)

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Technical Information Sheet



2" Metal Plate

Item Description	Item Number
Palet: 1,000 Pieces	W56RAC4180

Description

The 2" (51 mm) Metal Plates are specifically designed to be used with Elevate All-Purpose, Heavy Duty (HD) and Concrete Drive Fasteners in roofing system applications, for the attachment of Elevate roof membranes and Reinforced Perimeter Fastening (RPF) Strips as permitted by current Elevate specifications and details.

Method of Application

1. Position the 2" (51 mm) Metal Plates as permitted by current Elevate specifications and details.
2. Attach plates with the appropriate Elevate fastener with the ribbed side up, showing the Elevate label.

Storage

Store in unopened original containers protected for the weather.

Precautions

- Do not overdrive or underdrive fastener.
- Not for use with Heavy Duty Plus Fasteners.
- Avoid installing HD Seam Plates / field seams directly over insulation plates.

LEED® Information

Post-Consumer Recycled Content:	8%
Post Industrial Recycled Content:	17%
Manufacturing Location:	Cleveland, OH / Bryan, OH



NOTE: LEED® is a registered trademark of the U.S. Green Building Council

Product Packaging

Weather Resistant Pail	1000 pieces
Weight of Pail	34 lb (15.4 kg) per
Pails per Pallet	40

Typical Properties

Properties	Typical Performance
Material	Sheet steel with Galvalume® coating
Material Thickness	0.030" (0.76 mm) – 0.036" (0.91 mm)
Size	2" (51 mm) diameter
Hole Diameter	0.265" ± 0.005" (6.731 ± 0.127 mm)
Pull-Through Resistance	400 lb (181.4 kg) from center hole
Corrosion Resistance	Meets FM 4470 criteria

*Galvalume® is a registered trademark of BIEC International, Inc.

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Technical Information Sheet



Lap Sealant HS

Item Description	Item Number
11 fl oz Cartridge (Plastic Pail)	W563587031
11 fl oz Cartridge (Cardboard Carton)	W56358703E

Description

Elevate Lap Sealant HS is a low volatile organic compound (LVOC) sealant designed to be used with approved Elevate primers for seam edge treatment applications and as a sealant in other applications as indicated by current Elevate specifications and details.

Method of Application

1. Surfaces to which Lap Sealant HS is applied must be clean, dry, and free from loose or foreign materials, oil, and grease.
2. Wait to apply seam edge treatment a minimum of four (4) hours after the completion of a flashing seam, but no later than the end of the next day following the completion of the seam. If inclement weather is threatening, apply an approved Elevate primer or Splice Adhesive SA-1065 to the edge of the flashing splice before leaving project.
3. If the seam edge has been contaminated, clean the seam edge a minimum of 1" (25.4 mm) on each side of the step-off with Elevate Splice Wash and allow to dry.
4. Apply an approved primer (QuickPrime Plus, QuickPrime Plus LVOC, Single-Ply QuickPrime, or Single-Ply LVOC Primer) or Splice Adhesive SA-1065 along the entire seam edge, a minimum of 1" (25.4 mm) on each side of the step-off, following Elevate Seam Edge Treatment application procedures and allow the primer to flash-off.
5. Using the plastic nozzle applicator supplied by Elevate, apply a continuous bead of Lap Sealant HS approximately $\frac{3}{8}$ " x $\frac{1}{4}$ " (9.5 mm x 6.3 mm) centered over the flashing seam edge. Be sure to keep the applicator centered over the lap step-off. Refer to current Elevate seam details.

Storage

- Store in original unopened containers at temperatures between 60 °F and 80 °F (15.6 °C and 26.7 °C).
- When exposed to lower temperatures, restore to room temperature prior to use.
- For optimum results, rotate stock to ensure stored material has not exceeded the shelf life of two (2) years.

Shelf Life

Shelf life of two (2) years can be expected when stored in original, sealed containers at temperatures between 60 °F and 80 °F (15.6 °C and 26.7 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

- Refer to Safety Data Sheets (SDS) for additional safety information.
- Flammable. Keep away from fire and open flame during storage and use. Do not smoke during use.
- Use only in well-ventilated areas.
- Do not contaminate with foreign materials.

Coverage Rate

11 fl oz (0.33 L) Cartridge: 20' to 22' (6 m to 6.7 m) of $\frac{3}{8}$ " x $\frac{1}{4}$ " (9.5 mm x 6.3 mm) bead per cartridge

Clean-Up

Recommended cleaner is rubbing alcohol followed by soap and water.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Michigan Center, MI

NOTE: LEED® is a registered trademark of the U.S. Green Building Council



Typical Properties	
Properties	Value
Base	EPDM Rubber
Color	Black
Solvents	Light Aliphatic Solvent
Solids by Volume	80% (minimum)
Press-Flow Viscosity	30 to 50 seconds to extrude 20 g through 0.104" (2.64 mm) diameter orifice at 72 °F to 74 °F (22.2 °C to 23.3 °C)
Weight	11.2 to 12.2 lb/gal (1.34 to 1.46 kg/L)
Specific Gravity	1.34 to 1.46
V.O.C. Content	Less than 2.1 lb/gal (250 g/L)

Product Packaging		
Shipping Unit	Quantity	Contents
Plastic Pail	28 Cartridges per Pail	11 fl oz (0.33 L) Cartridge
Cardboard Carton	25 Cartridges per Pail	11 fl oz (0.33 L) Cartridge

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Technical Information Sheet



QuickSeam™ Flashing

Item Description	Item Number
5" x 100' (127 mm x 30.5 m)	W56RAC1615

Description

QuickSeam Flashing is a semi-cured EPDM flashing laminated to cured seam tape; used to flash gravel stops and other details as specified in Elevate Specifications and Details.

Method of Application

1. Use QuickPrime™ Plus and QuickScrubber™ or QuickScrubber Plus pad and handle to clean and prime membrane and metal mating surfaces.
2. Refer to Elevate Specifications and Details.
3. Refer to application instructions for specifics: www.HolcimElevate.com.

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C).
- Do not store on roof in direct sunlight or at temperatures above 80 °F (26.7 °C).
- When exposed to lower temperatures; restore to room temperature prior to use.

Shelf Life

Shelf life of one year can be expected when stored in original container at temperatures between 60 °F (15.6 °C) and 80 °F (26.7 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

- Refer to Safety Data Sheets (SDS) for additional safety information.
- QuickSeam Flashing is semi-cured. Do not stretch.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Prescott, AR

NOTE: LEED® is a registered trademark of the U.S. Green Building Council


Packaging

- 2 – 5" (127 mm) x 100' (30.5 m) rolls per carton (Rolls may consist of two separate sections of QuickSeam Flashing to make 100')
- 36 cartons per pallet

NOTE: QuickScrubber and/or QuickScrubber Plus pads and handles are included in each carton. Quantities vary depending on the QuickSeam product.

Typical Properties	
Properties	Value
QuickSeam Tape	
Base	Rubber Polymers
Color	Black
Solvents	None
Solids	100%
Cured State	Cured
Thickness	0.045" (1.14 mm) ± 0.005" (0.13 mm)
Width	5¼" (133.4 mm) + 0, - 1/16"
Length	100' (30.5 m)
Flashing Material	
Base	EPDM
Color	Black
Solvents	None
Solids	100%
Cured State	Semi-Cured
Thickness	0.045" (1.14 mm) ± 10%
Width	5" (127 mm) + 0, - 1/8"

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Technical Information Sheet



QuickSeam™ Corner Flashing

Item Description	Item Number
8.5" (216 mm) Diameter	W56RAC1646

Description

Elevate QuickSeam Corner Flashing consists of Elevate FormFlash™ factory laminated to QuickSeam Tape. It is designed to flash inside and outside corners of RubberGard™ EPDM roofing installations.

Method of Application

1. Clean and prepare the RubberGard EPDM membrane using QuickPrime™ Plus, QuickPrime Plus LVOC, Single-Ply QuickPrime or Single-Ply LVOC Primer and a QuickScrubber™ or QuickScrubber Plus pad and handle to remove all dusting agents, dirt and other contaminants that will affect the finished seam.
2. When cloudy conditions below 60 °F (16 °C) occur, use heat guns (without ignition sources) to heat QuickSeam Corner Flashing. This will ensure good formability of the QuickSeam Corner Flashing to the primed substrate.
3. On sunny days less than 70 °F (21 °C), place QuickSeam Corner Flashing on roof (prior to application) with flashing side up to allow QuickSeam Corner Flashing to warm to ensure good formability.
4. On sunny days greater than 70 °F (21 °C), place QuickSeam Corner Flashing on roof (prior to application) with release paper side up to prevent QuickSeam Corner Flashing from gaining too much heat and to ensure good formability.
5. Refer to application instructions for specifics: www.HolcimElevate.com

Storage

- Store in original unopened containers indoors at temperatures between 60 °F (16 °C) and 80 °F (27 °C).
- Do not store on roof in direct sunlight or at temperatures above 80 °F (27 °C).
- When exposed to lower temperatures; restore to room temperature prior to use.

Shelf Life

Shelf life of one year can be expected when stored in original container at temperatures between 60 °F (16 °C) and 80 °F (27 °C). Shelf life will be shortened if exposed to elevated temperatures.

Precautions

- Refer to Safety Data Sheets (SDS) for additional safety information.
- FormFlash will cure when exposed to heat and over time.

LEED® Information

Post-Consumer Recycled Content: 0%

Post Industrial Recycled Content: 0%

Manufacturing Location: Prescott, AR

NOTE: LEED® is a registered trademark of the U.S. Green Building Council

Packaging

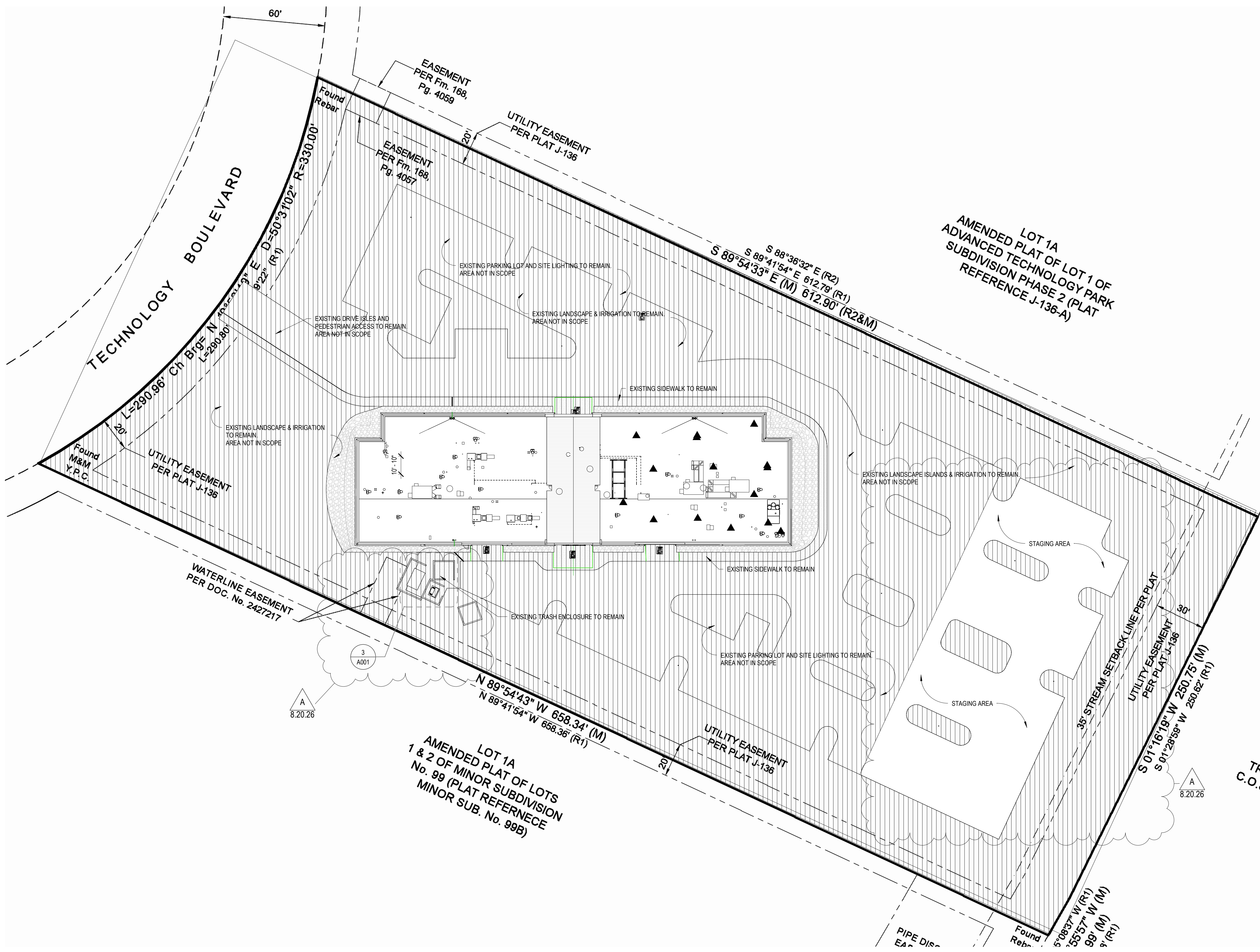
20 per carton, 100 cartons per pallet

NOTE: QuickScrubber and/or QuickScrubber Plus pads and handles are included in each carton. Quantities vary depending on the QuickSeam product.

Typical Properties		
Properties	QuickSeam Tape	Flashing Material
Base	Rubber Polymers	EPDM
Color	Black	Black
Solvents	None	None
Solids	100%	100%
Cured State	Cured	Uncured
Thickness	0.025" (0.64 mm) ± 0.005" (0.13 mm)	0.065" (1.59 mm) ± 0.005" (0.13 mm)
Size	---	8.5" (216 mm)

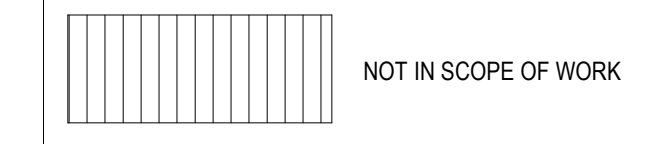
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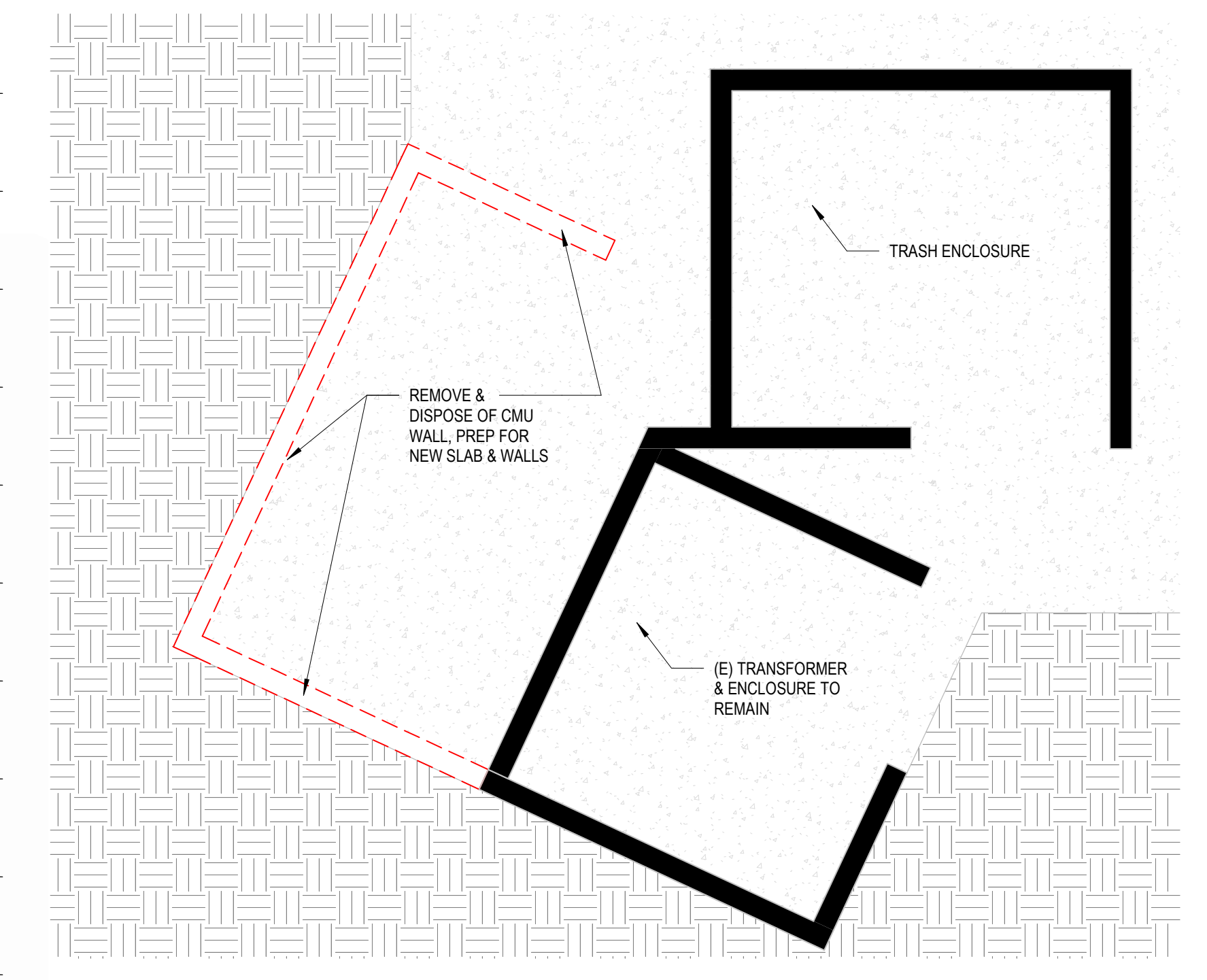
1 PROPOSED ARCHITECTURAL SITE PLAN
SCALE: 1" = 30'-0"

SHADING LEGEND

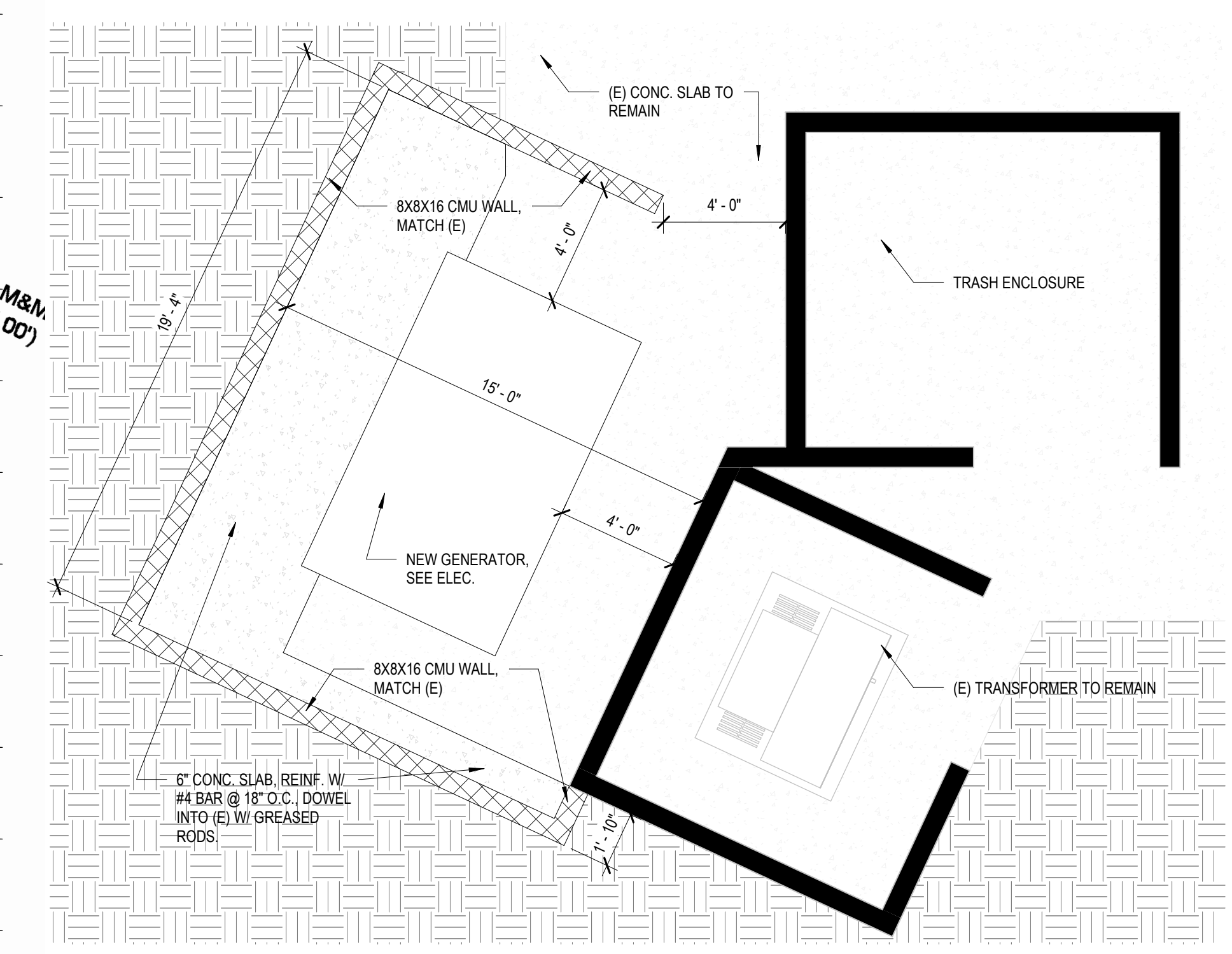


GENERAL SITE PLAN NOTES

- A SHADED AREA IS NOT IN PROJECT SCOPE
- B EXISTING PARKING LOT, SITE LIGHTING, LANDSCAPING & IRRIGATION TO REMAIN.
- C USE WRITTEN DIMENSIONS. DO NOT SCALE DRAWINGS. WHERE NO DIMENSION IS PROVIDED, CONSULT THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
- D CONTRACTOR SHALL VERIFY LOCATION OF EXISTING UTILITIES. ALL EXISTING UTILITIES ARE TO REMAIN. REFER TO CIVIL SURVEY.
- E ALL MATERIAL AND FINISHES ARE TO BE AS SPECIFIED, OR APPROVED EQUAL.
- F CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS SHOWING ANY CHANGES TO PLANS AND DIMENSIONING.



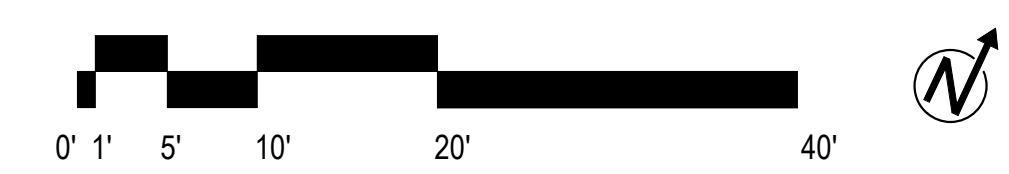
2 GENERATOR ENLARGED DEMO PLAN
SCALE: 1/4" = 1'-0"



3 GENERATOR ENLARGED REMODEL PLAN
SCALE: 1/4" = 1'-0"

KEY PLAN

This space reserved for
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100% CONSTRUCTION DOCUMENTS



MSU-CAMPUS PLANNING,
DESIGN, AND CONSTRUCTION
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

MOLECULAR BIOSCIENCE BUILDING

BECHTLE
ARCHITECTS
4515 Valley Commons Drive #201
Bozeman, MT 59718
406.585.4161 ph 406.585.6919 fax

DRAWN BY: Author		
REVIEWED BY: Checker		
	DESCRIPTION	DATE
	ADD#1	8.20.26

PPA#22-0045
A/E#00-00-00
BA# 2326
SHEET TITLE
SITE PLAN (MOD)

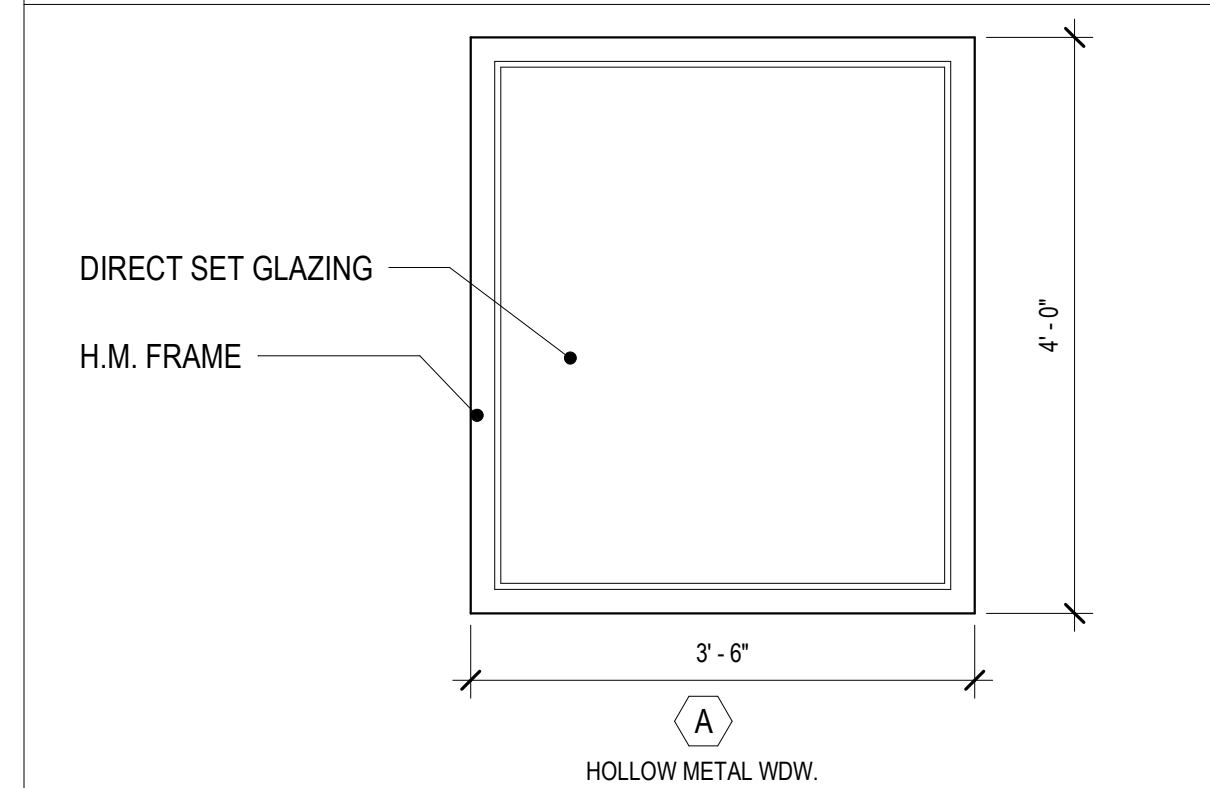
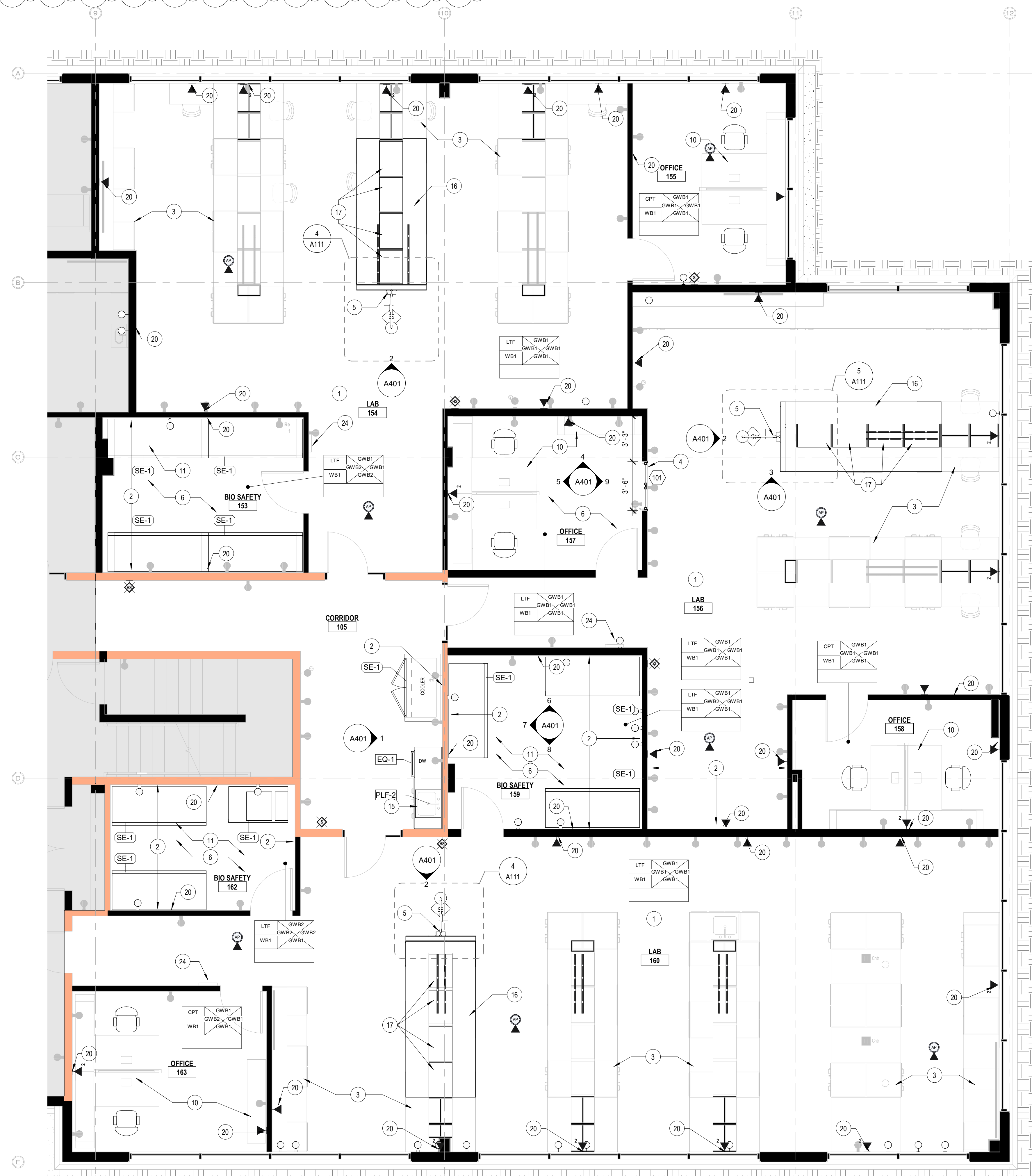
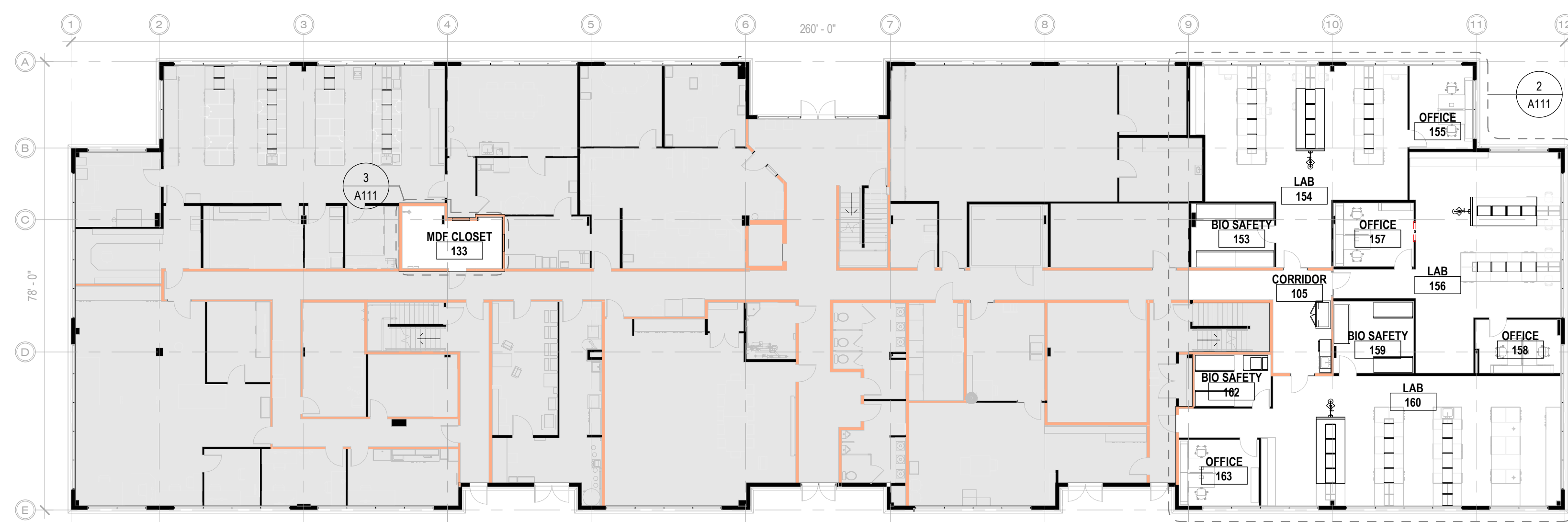
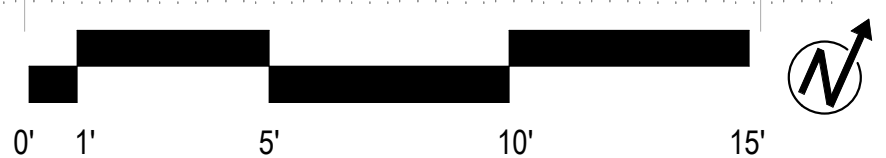
A001

DATE
JUN. 03, 2026

WINDOW SCHEDULE

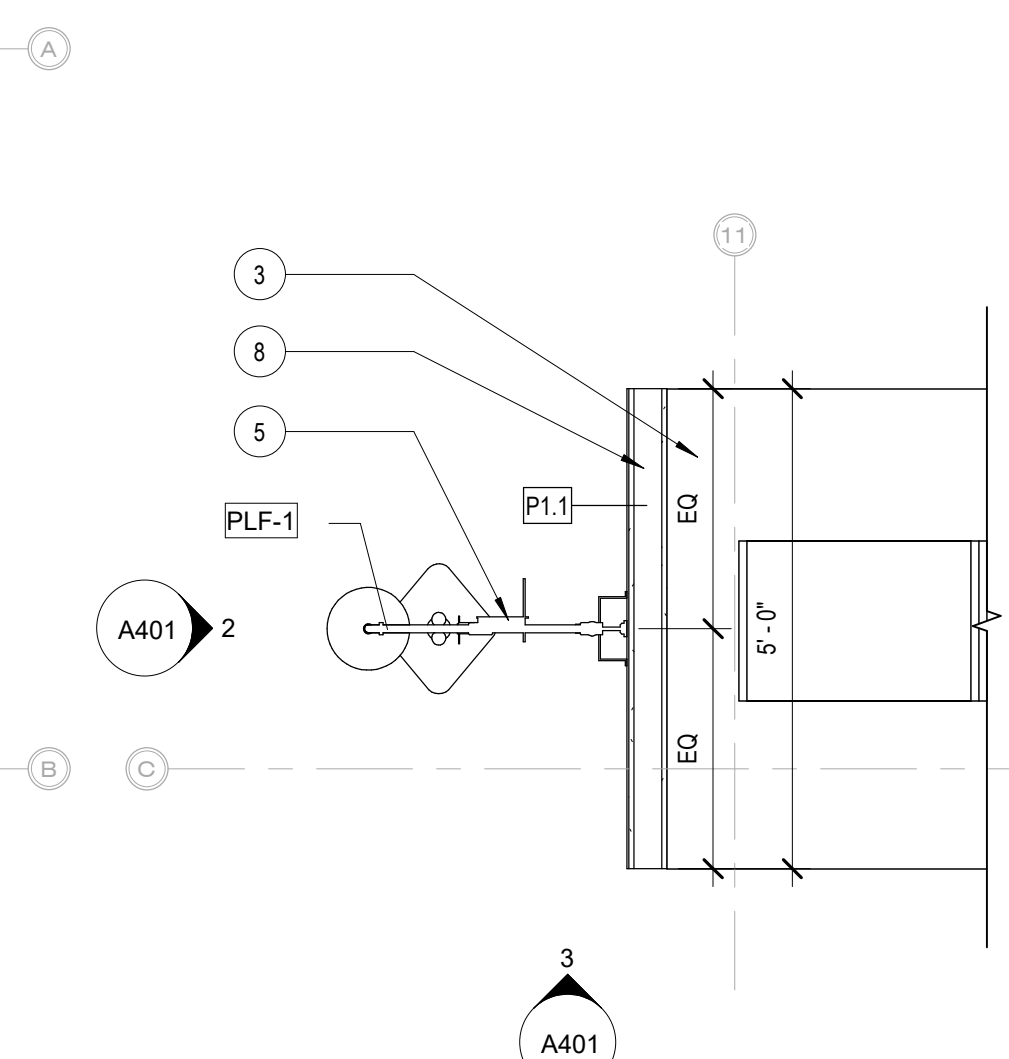
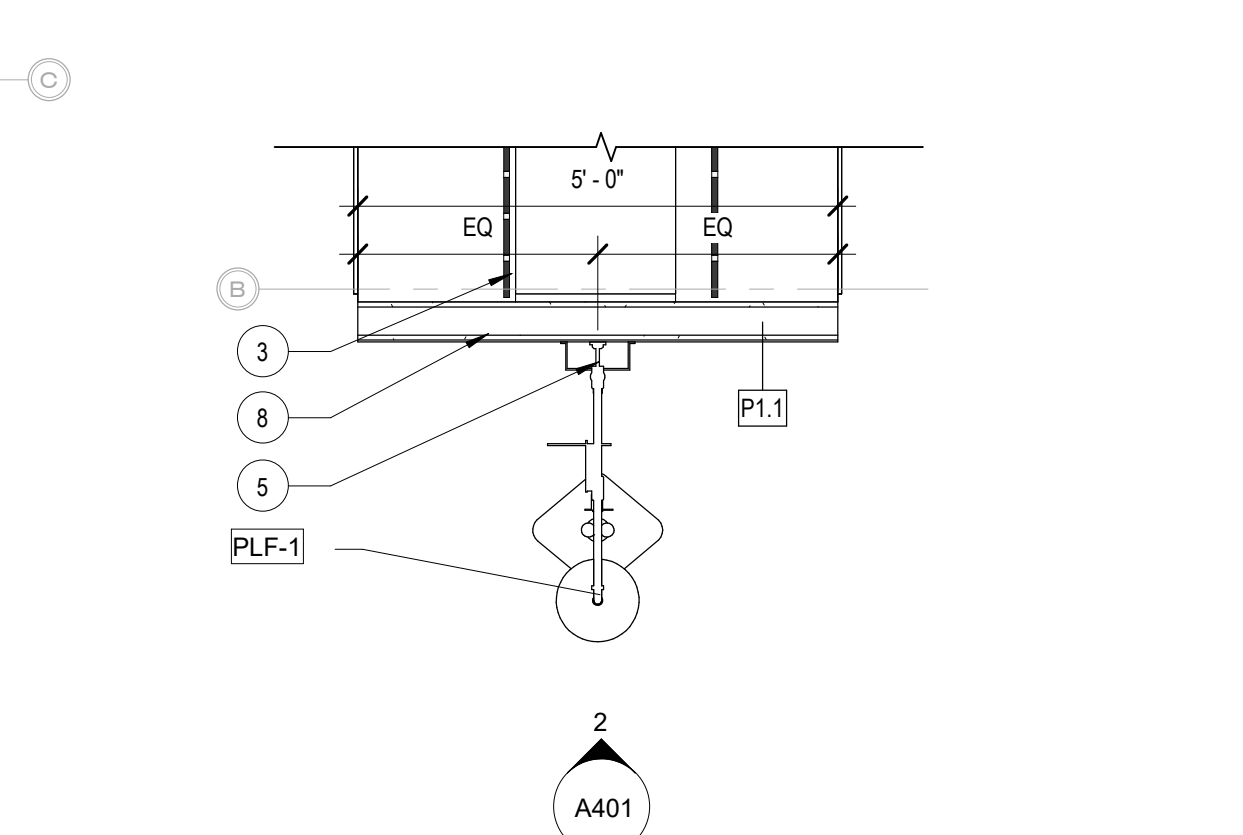
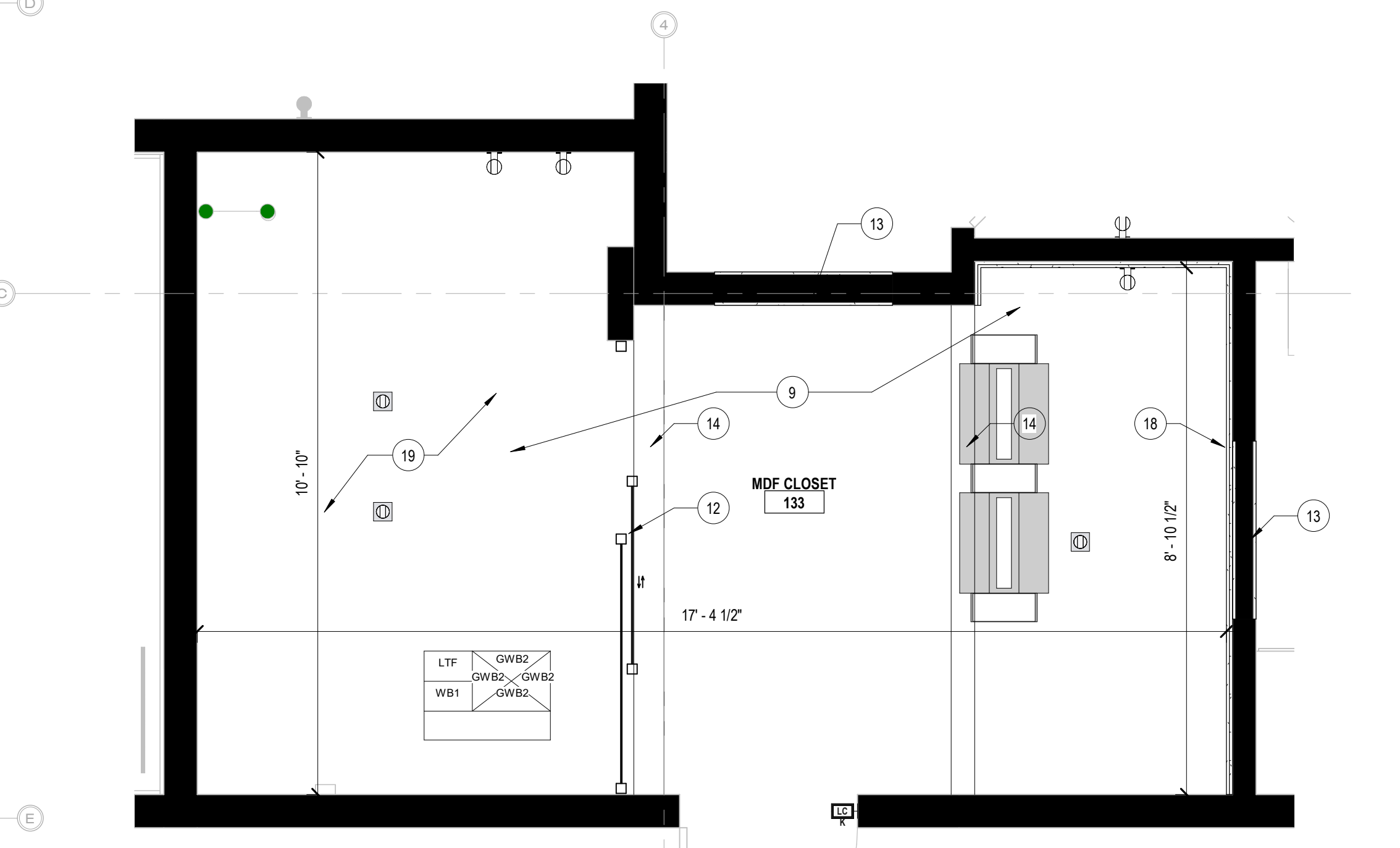
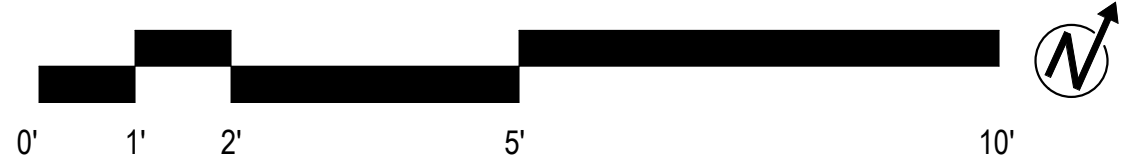
NO.	SIZE		SILL HEIGHT	HEAD HEIGHT	TYPE	MATERIAL	FINISH	GLAZING
	WIDTH	HEIGHT						
101	3'-6"	4'-0"	3'-0"	7'-0"	A	HM	PTD	D.SET
201	3'-6"	4'-0"	3'-0"	7'-0"	A	HM	PTD	D.SET

WINDOW TYPES

A
8.20.262 MAIN / REMODEL ENLARGED PLAN
SCALE: 1/4" = 1'-0"1 MAIN / REMODEL PLAN - OVERALL
SCALE: 1/16" = 1'-0"

SHADING LEGEND

	NOT IN SCOPE OF WORK - EXISTING TO REMAIN
	1 HR FIRE RATED ASSEMBLY

5 LAB 156 - EMERGENCY SHOWER/EYEWASH STATION
SCALE: 1/2" = 1'-0"4 TYPICAL EMERGENCY EYEWASH/SHOWER STATION
SCALE: 1/2" = 1'-0"3 REMODEL PLAN - LEVEL 1 - MDF CLOSET
SCALE: 1/2" = 1'-0"

GENERAL FLOOR PLAN NOTES

- A SEE G113 FOR PARTITIONS & ASSEMBLIES.
- B DIMENSIONS ARE TO F.O. STUD, F.O. CONCRETE, OR CENTERLINE OF COLUMN.
- C USE WRITTEN DIMENSIONS. DO NOT SCALE DRAWINGS, WHERE NO DIMENSION IS PROVIDED, CONSULT THE ARCHITECT FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
- D FRAMING CONTRACTOR IS TO COORDINATE LOCATION AND INSTALL ADEQUATE BLOCKING FOR ALL OWNER AND CONTRACTOR SUPPLIED EQUIPMENT.
- E ALL MATERIAL AND FINISHES ARE TO BE AS SPECIFIED, OR APPROVED EQUAL.
- F CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS SHOWING ANY CHANGES TO PLANS AND DIMENSIONING.

PARTITION NOTES

- A GWB FINISH & TEXTURE:
• TYPICAL GWB FINISH SHALL BE LEVEL 4 WITH LIGHT HAND TROWEL TEXTURE.
- B SOUND ATTENUATION AT SOUND WALLS:
• LEAVE 1/4" GAP AT ALL EDGES OF GWB ABUTTING PERPENDICULAR SURFACES AND FILL GAP WITH ACOUSTICAL SEALANT.
• APPLY 1/4" BEAD ACOUSTICAL SEALANT AROUND ALL ELECTRICAL BOXES, DUCTWORK, PIPES & OTHER WALL PENETRATIONS (THIS INCLUDES ALL PENETRATIONS OF SOUND WALLS IN CONCEALED CEILING SPACES)
- C MOLD RESISTANCE:
• INSTALL 5/8" MOLD RESISTANT GWB AT ALL WALLS & CEILINGS OF BATHROOMS WITH SHOWERS.
• INSTALL 6 MIL VAPOR RETARDER IMMEDIATELY BEHIND GYP @ WET SIDE OF ROOM
- D COORDINATION:
• CONTRACTOR RESPONSIBLE FOR COORDINATING INSTALLATION OF SOUND ISOLATION CLIPS AND SHEAR WALL PLYWOOD WITH ALL OTHER TRADES.
- E CONTINUITY:
• EXTEND PARTITIONS TO UNDERSIDE OF FLOOR OR ROOF STRUCTURE ABOVE UNLESS NOTED OTHERWISE.
• AT WALL, GWB AND SOUND INSULATION SHALL EXTEND TO THE UNDERSIDE OF THE SUBFLOOR OR TO THE ROOF'S SHEATHING ABOVE, TYPICAL.
• FOR WALLS PERPENDICULAR TO THE STRUCTURE, BLOCKING SHALL BE INSTALLED OVER PARTITIONS, AND THE ENTIRE PERIMETER OF BLOCKING SHALL BE CAULKED WITH ACOUSTICAL SEALANT. SOUND INSULATION SHALL EXTEND UP INTO JOIST BAYS TYPICAL AT ALL SOUND WALLS.
• AT GROUND FLOOR TENANT LEASE SPACES, INSTALL GWB AT EXTERIOR PERIMETER WALLS AND DEMISING WALLS BETWEEN UNITS 9' BELOW BOTTOM OF SUSPENSION GRID ONLY.
- F SILL PLATES @ CONCRETE:
• EXTERIOR AND INTERIOR WALLS FRAMED OVER CONCRETE SLAB SHALL HAVE A SINGLE P.T. SILL PLATE, TYPICAL.

INSULATION REQUIREMENTS

CONTRACTOR SHALL BE RESPONSIBLE FOR INSULATING THE RESIDENCE IN ACCORDANCE WITH THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE (IECC) INCLUDING ALL MONTANA AMENDMENTS.

APPLICABLE PRESCRIPTIVE PATH MINIMUM REQUIREMENTS:

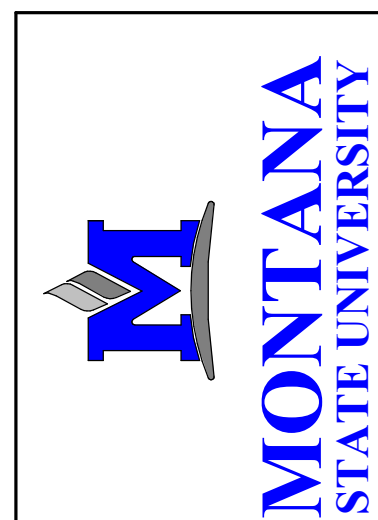
ROOFS	
INSUL. ENTIRELY ABOVE ROOF DECK:	R-30 CI
METAL BUILDINGS:	R-25 + R-11 LS
ATTIC AND OTHER:	R-49
WALLS ABOVE GRADE:	
MASS:	R-13.3 CI
METAL BUILDING:	R-13 + R-14 CI
METAL FRAMED:	R-13 + R-12.5 CI
WOOD FRAMED AND OTHER:	R-13 + R7.5 CI OR R-20 + R-3.8 CI
WALLS BELOW GRADE:	R-10 CI
FLOORS:	
MASS:	R-16.7 CI
JOIST FRAMING:	R-38
SLAB-ON-GRADE FLOORS	
UNHEATED SLABS:	R-20 FOR 24" BELOW
HEATED SLABS:	R-15 FOR 36" BELOW +R-5 FULL SLAB

NOTE: A RESCHECK ANALYSIS MAY ALLOW LOWER R-VALUES (R-10 MIN.)

REMODEL FP KEYED NOTES

NO.	NOTE DESCRIPTION
1	ROOM LAYOUT TO STAY AS IS
2	PROVIDE POWER FOR SPECIALTY EQUIPMENT
3	COUNTERTOP AND CASEWORK TO REMAIN. REPAIR DAMAGES AS NEEDED
4	FIXED 42"x48" WINDOW, SILL HEIGHT 3'-0"
5	EMERGENCY EYE WASH/SHOWER STATION. EMERGENCY FIXTURES ARE TO BE PROVIDED WITH TEMPERED WATER SYSTEMS WITH ADEQUATE CAPACITY TO PROVIDE REQUIRED TEMPERATURE OF WATER FOR REQUIRED LENGTH OF TIME PER ANSI GUIDELINES. SEE PLUMBING.
6	DEEP CLEAN, PATCH & PAINT AS NEEDED
8	PARTITION WALL TO PROVIDE BARRIER BETWEEN WASH STATION AND COUNTERTOP/SHELVING. FFP FINISH ON WATER SIDE
9	IT/DATA CONNECTION TO BE COORDINATED WITH OWNER, SEE ELEC
10	FURNITURE BY OWNER
11	SE-1 SPECIALTY LAB EQUIPMENT BY OWNER
12	WIRE SECURITY FENCE W/ SLIDING DOOR
13	INFILL DOOR OPENINGS
14	PATCH FLOOR
15	REINSTALL SINK, SEE PLUMBING
16	INSTALL NEW COUNTERTOP
17	REINSTALL SHELVING
18	POWER NEEDED FOR 3RD PARTY ISP, APPLY 3/4" PLYWOOD FROM BASE WALL TO T.O. FLOOR DECKING ABOVE. FINISH TO BE FIRE-RATED PAINT.
19	POWER MOUNTED TO DATA RACKS, L6-30, SEE ELECTRICAL
20	UIT DATA JACK, ASSUMED 2 CAT6 CABLES UNLESS OTHERWISE SPECIFIED. 1/4" CONDUIT FROM SINGLE GANG BOX UP TO J-HOOKS EVERY 4' OR CABLE TRAY LEADING TO TELECOMM ROOM. SEE ELEC.
24	(E) FIRE EXTINGUISHER CABINET TO REMAIN

100% CONSTRUCTION DOCUMENTS



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BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

MOLECULAR BIOSCIENCE
BUILDING

BECHTLE
ARCHITECTS

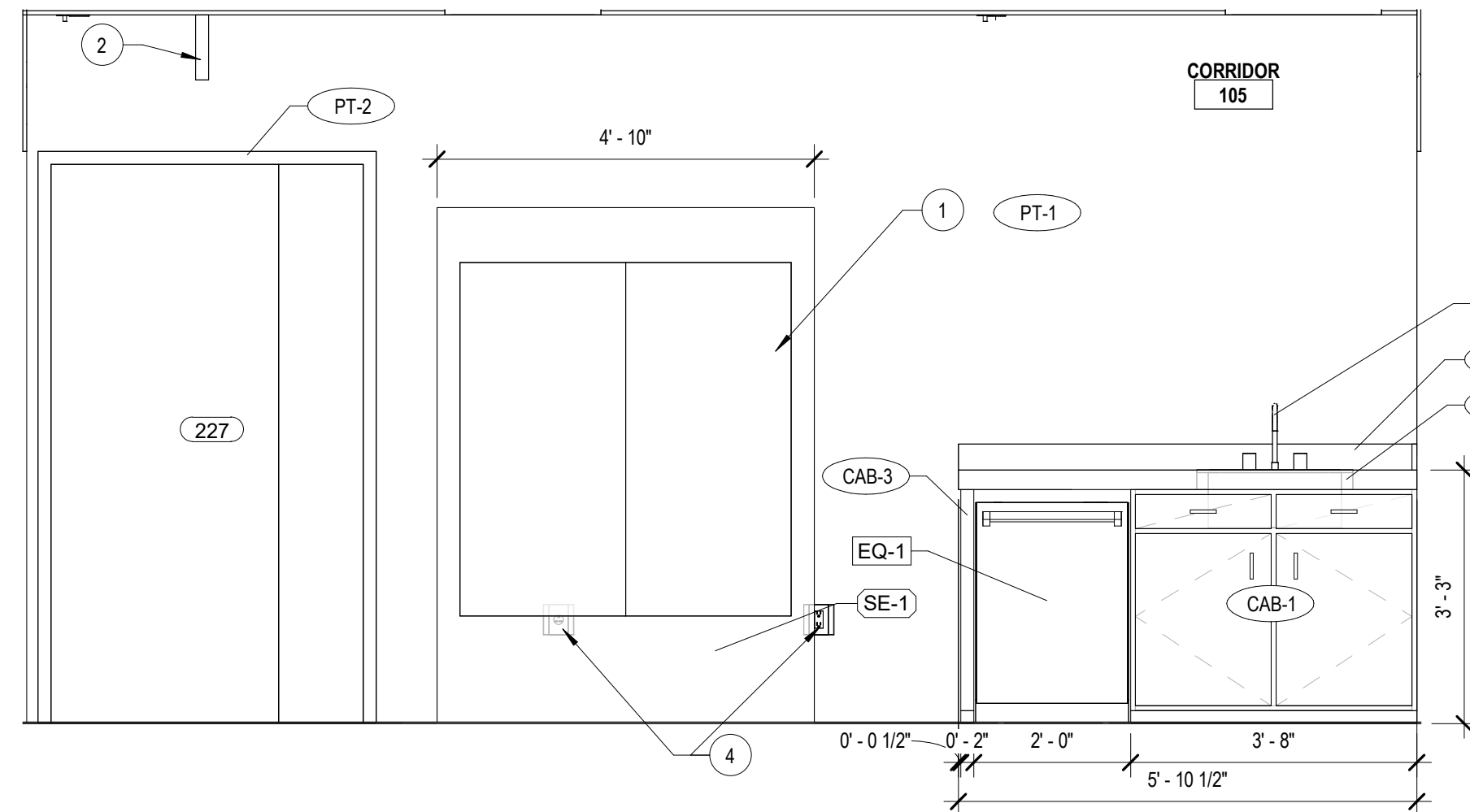
4515 Valley Commons Drive #201
Bozeman, MT 59718
406.585.4161 ph 406.595.6919 fax

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REVIEWED BY: Checker

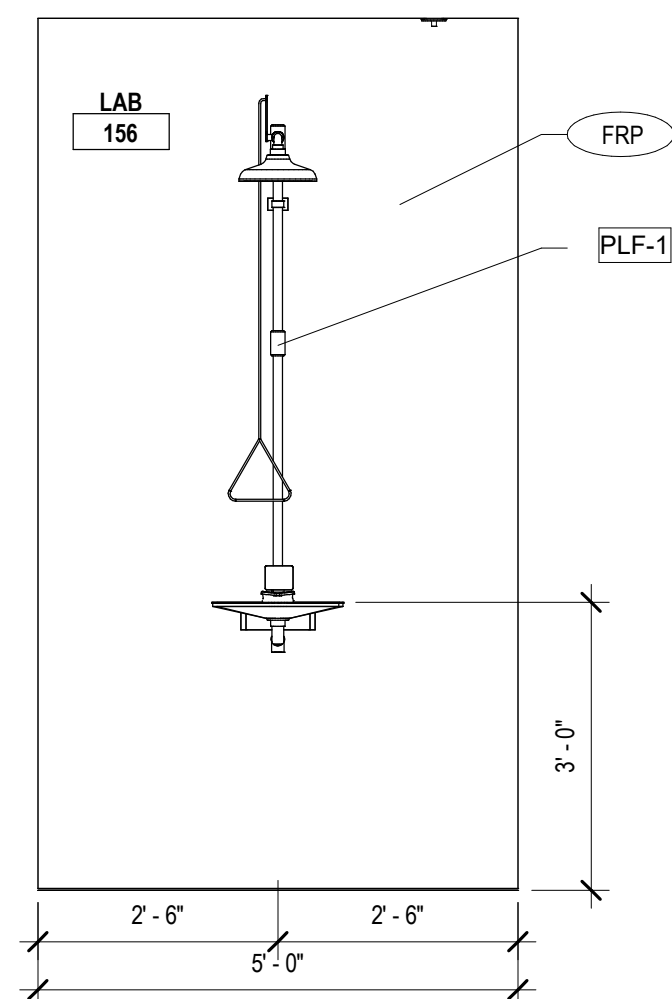
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PPA#22-0045
A/E#00-00-00
BA# 2326
SHEET TITLE
MAIN /
REMODEL PLANS

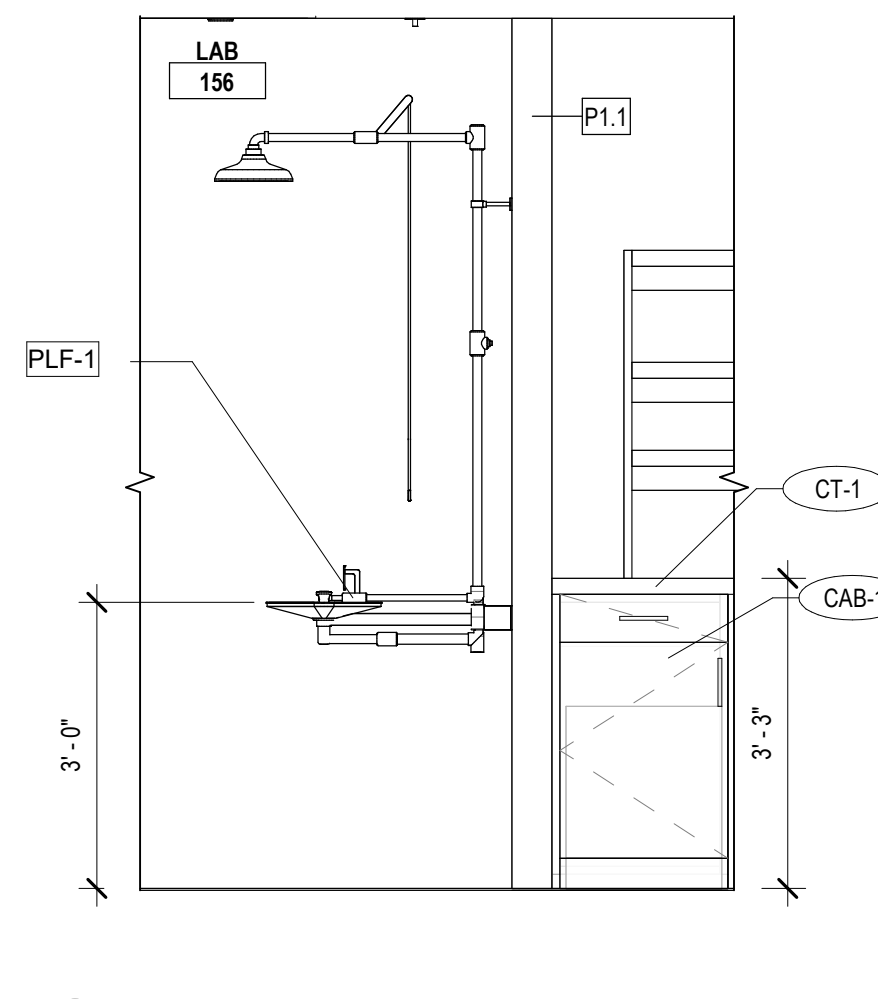
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DATE
JUN. 03, 2026



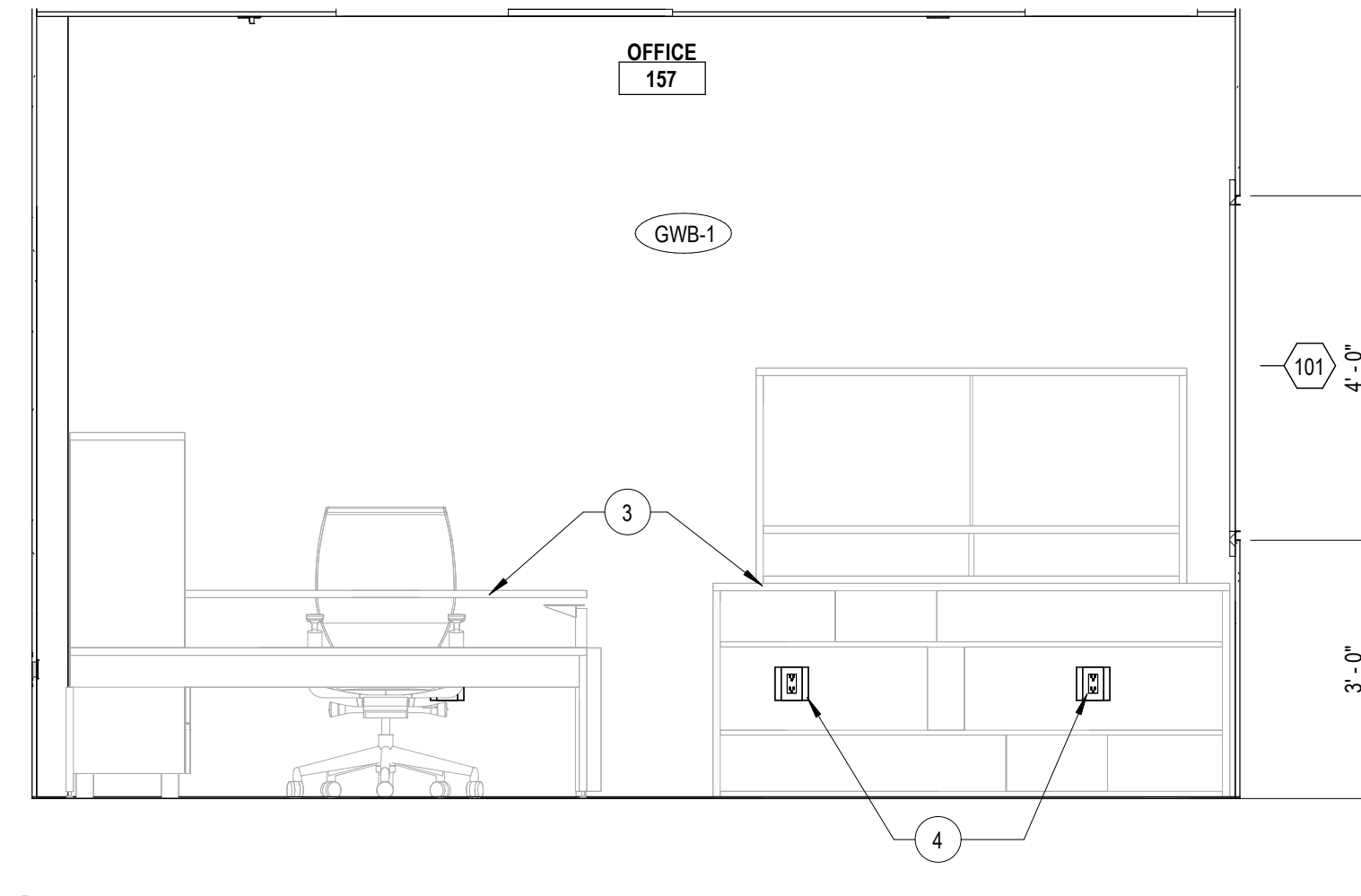
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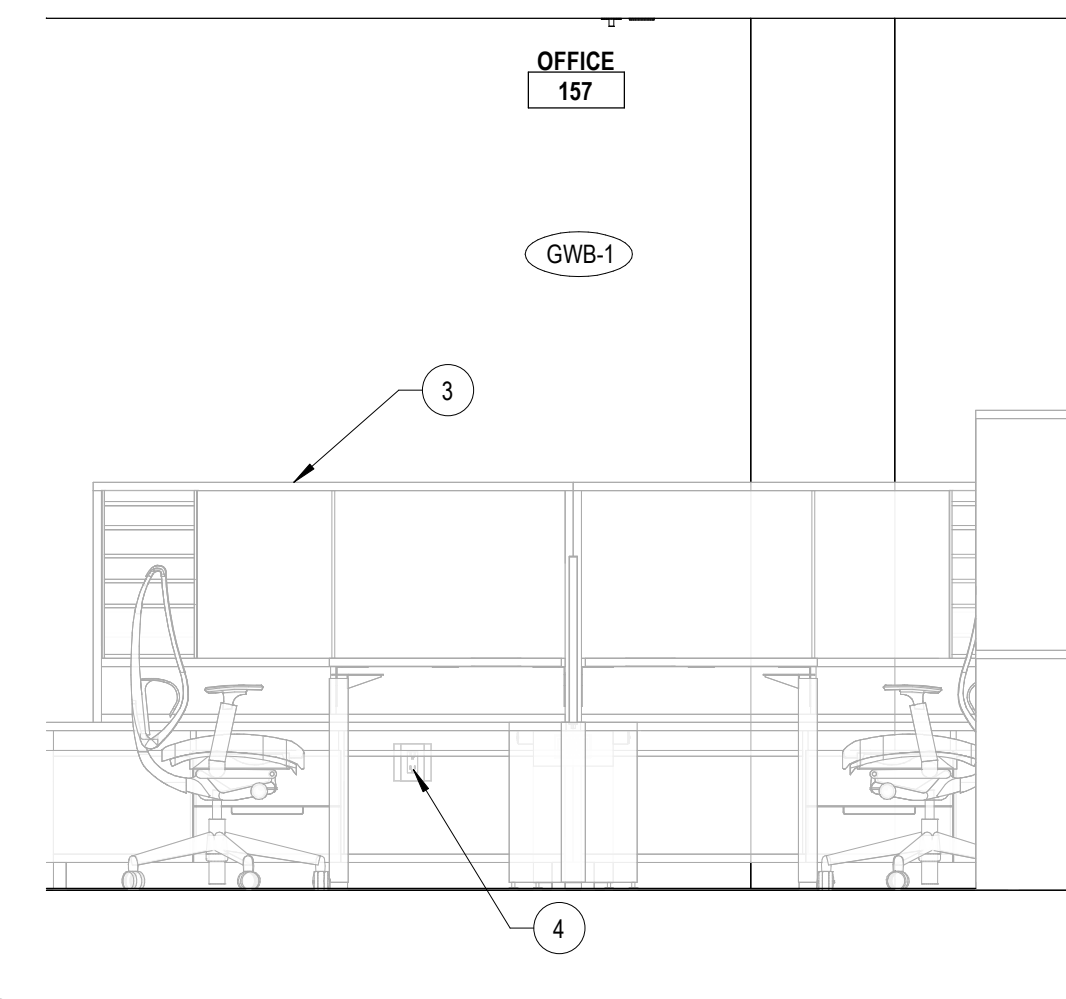
2 TYP. EYEWASH/SHOWER ELEV. 1
SCALE: 1/2" = 1'-0"



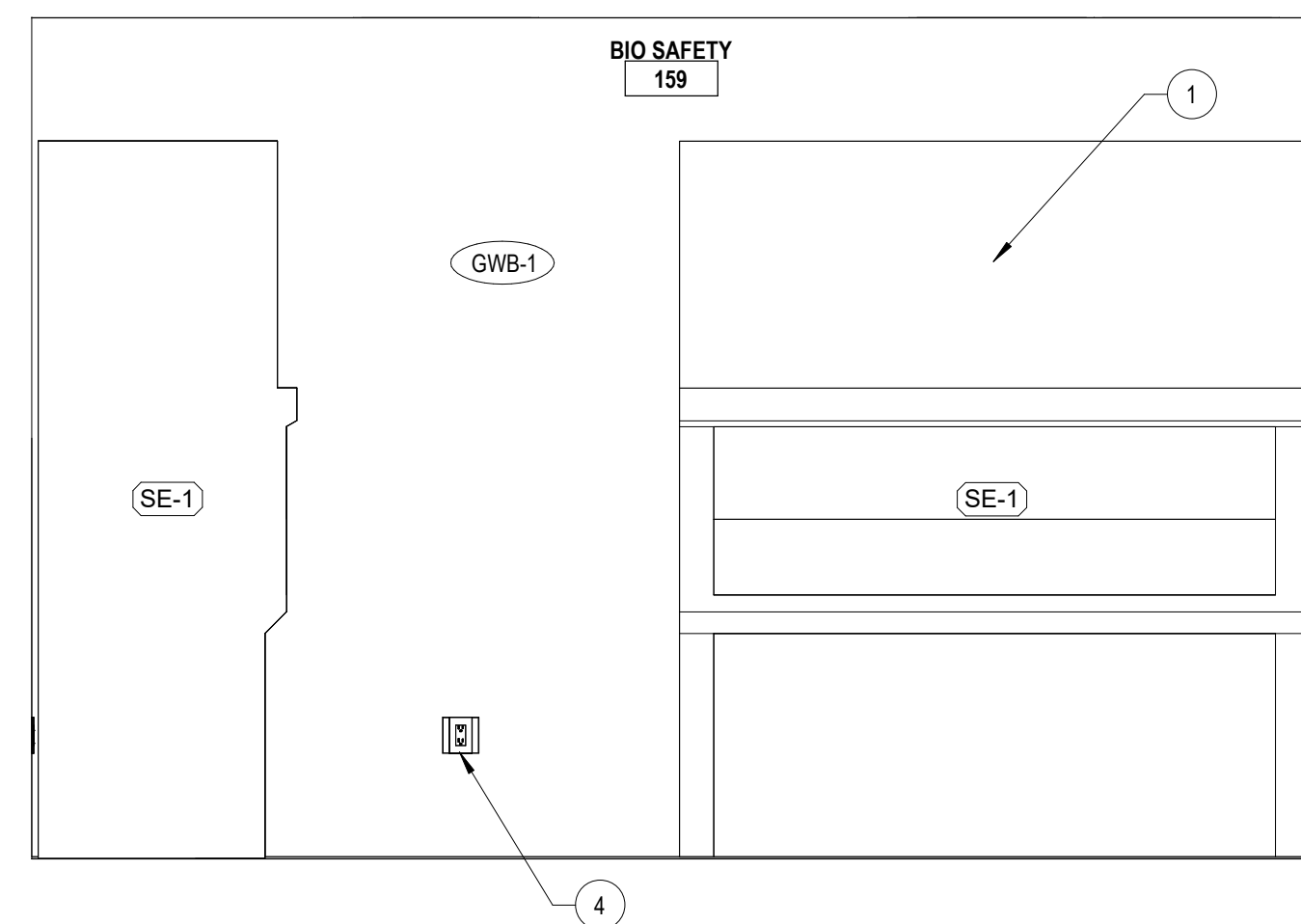
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SCALE: 1/2" = 1'-0"



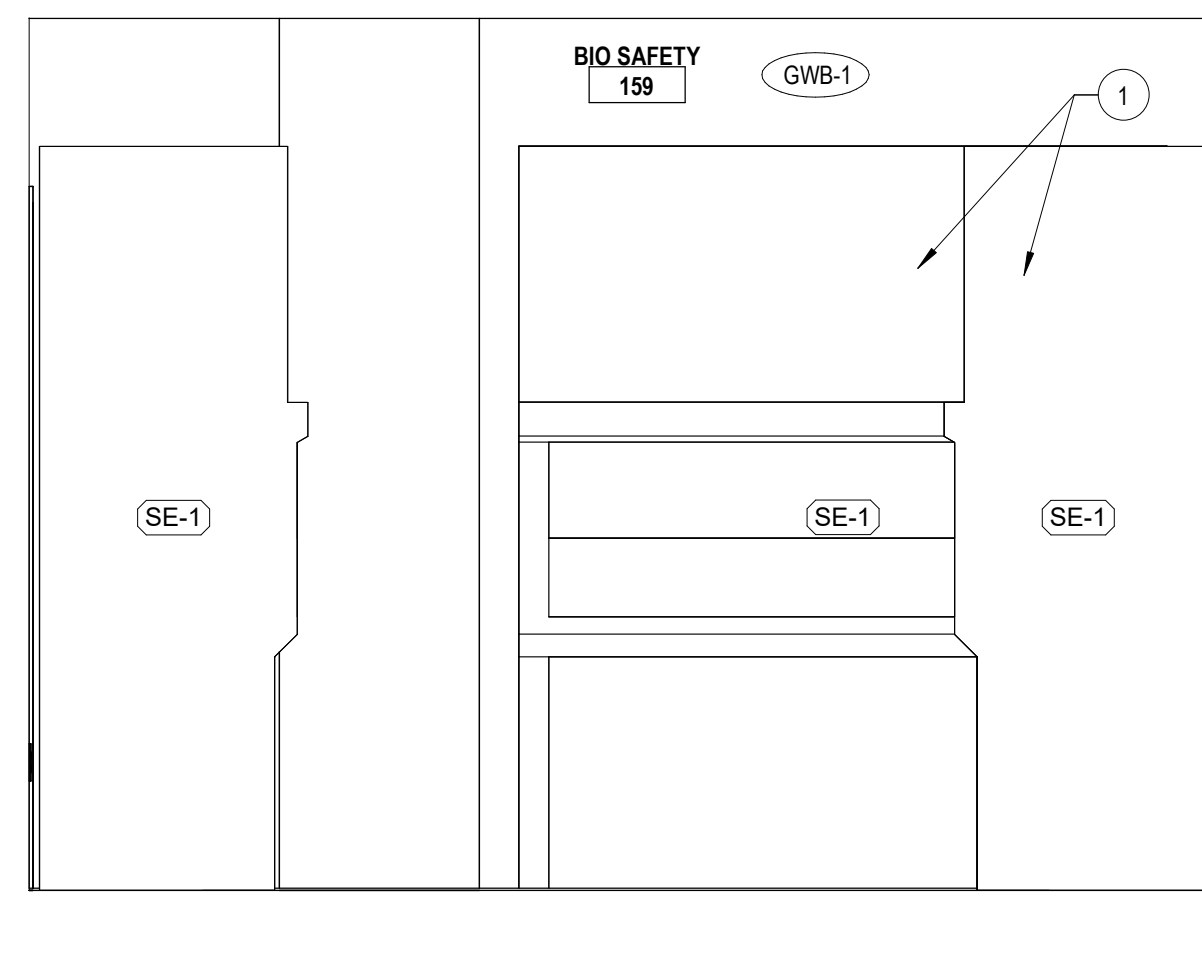
4 OFFICE 157 - PROJECT NORTH
SCALE: 1/2" = 1'-0"



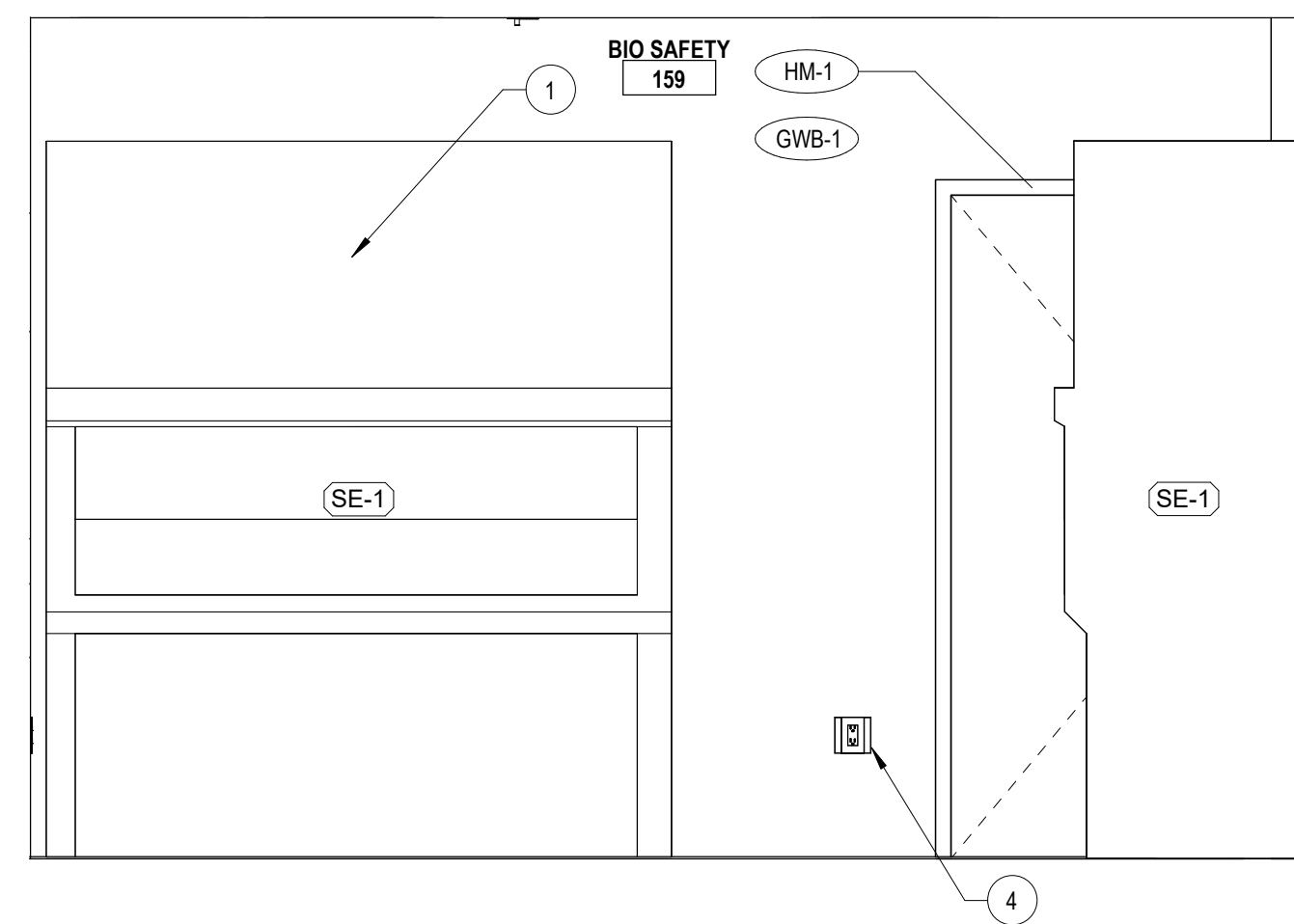
5 OFFICE 157 - PROJECT WEST
SCALE: 1/2" = 1'-0"



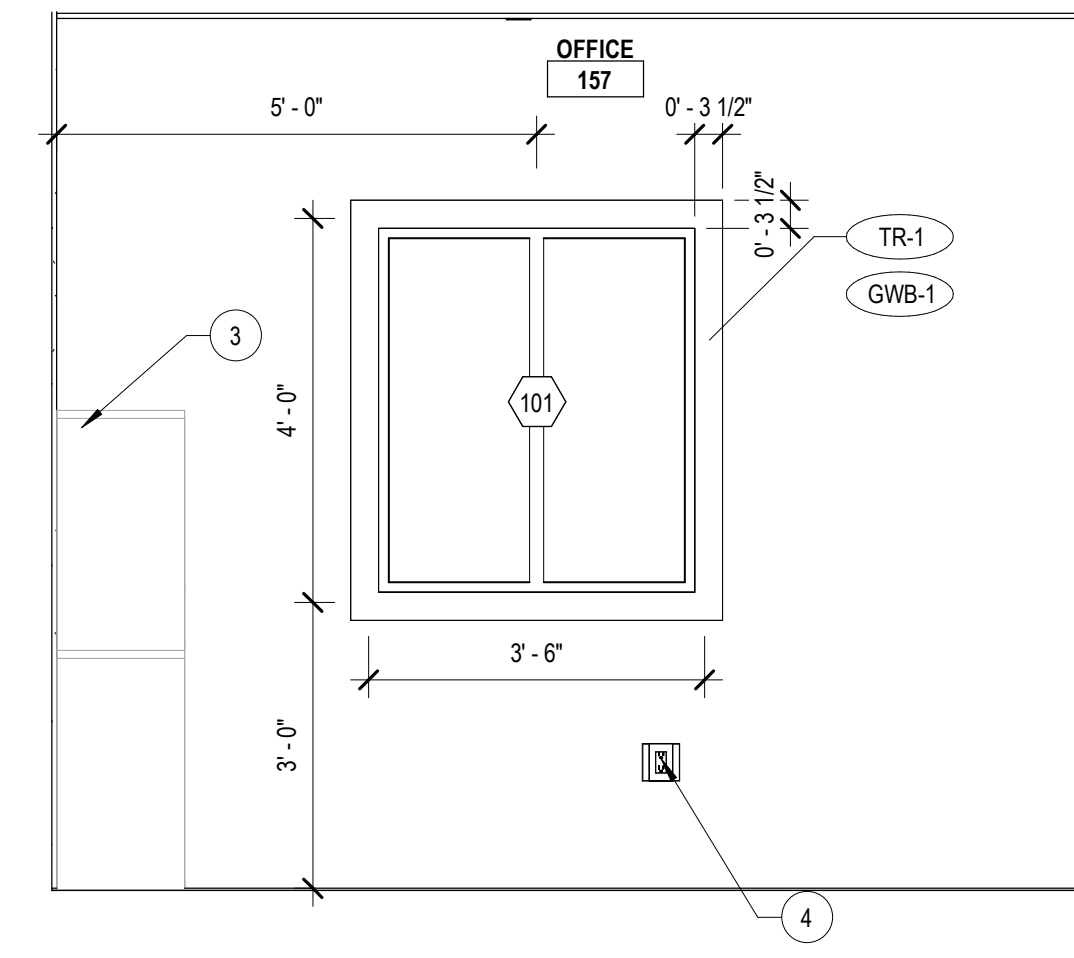
6 BIOSAFETY 159 - PROJECT NORTH
SCALE: 1/2" = 1'-0"



7 BIOSAFETY 159 - PROJECT WEST
SCALE: 1/2" = 1'-0"



8 BIOSAFETY 159 - PROJECT SOUTH
SCALE: 1/2" = 1'-0"



9 OFFICE 157 WINDOW ADDITION
SCALE: 1/2" = 1'-0"

INT. ELEV. GENERAL NOTES

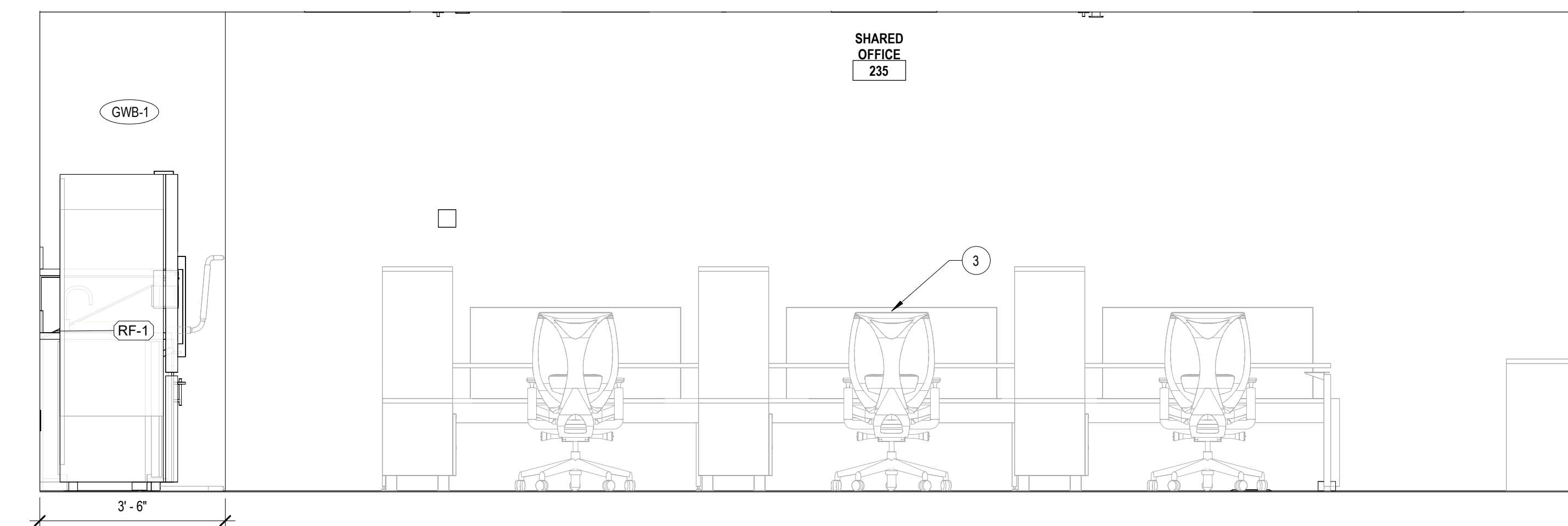
- A SEE G113 FOR PARTITIONS & ASSEMBLIES: [P#]
B 'SE-1' SPECIAL EQUIPMENT, PROVIDED & INSTALLED BY OWNER

INTERIOR MATERIALS

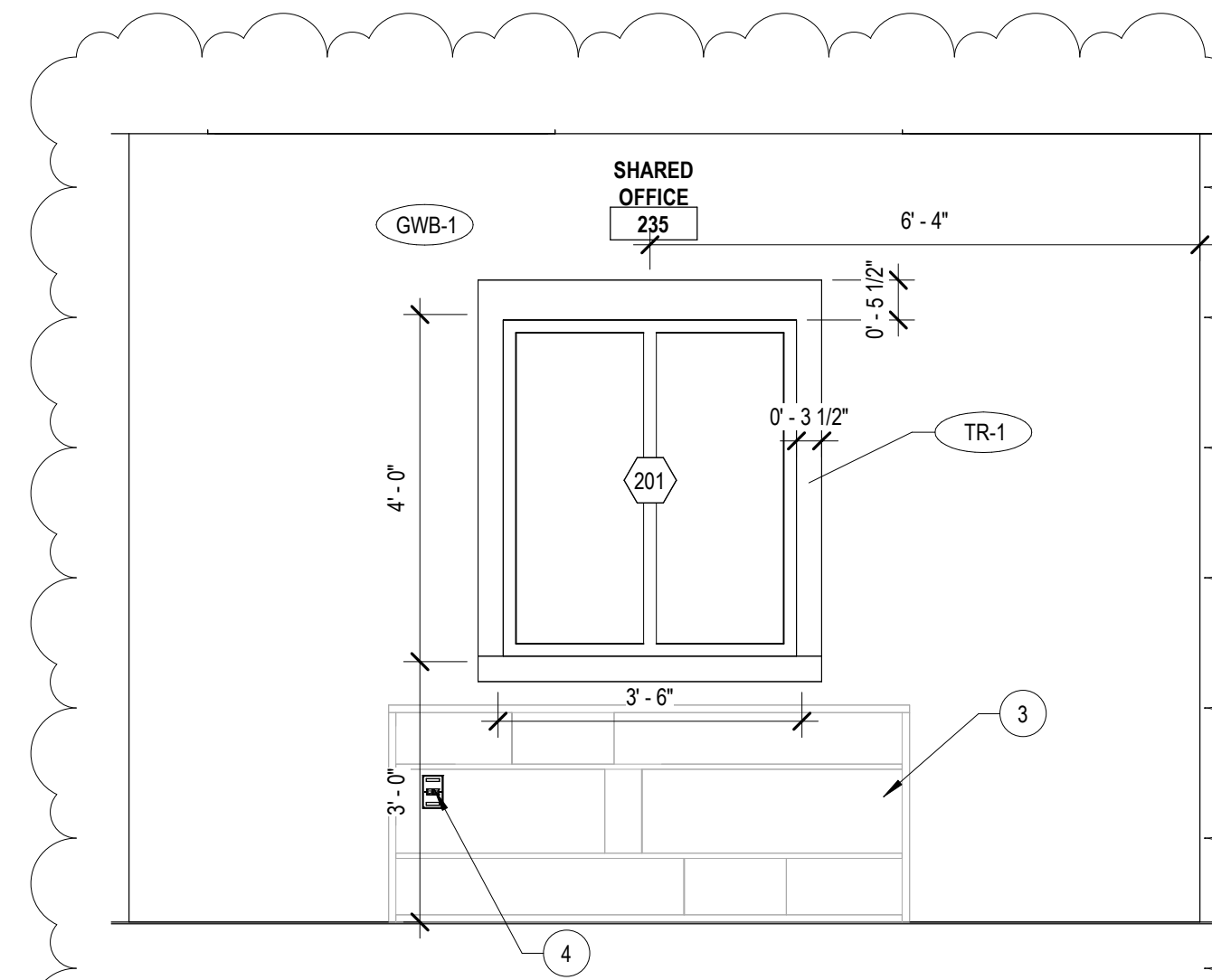
SYMBOL	MATERIAL
BS-1	BACK SPLASH
CAB-1	BASE CABINET
CAB-2	BASE CABINET DRAWERS
CAB-3	BASE CABINET FILLER
CAB-4	UPPER CABINET
CT-1	COUNTERTOP
CTB-1	COUNTERTOP BRACKET
FRP	FIBER REINFORCED PANEL
GWB-1	5/8" GYPSUM WALL BOARD
GWB-2	5/8" TYPE 'X' GYPSUM WALL BOARD
HM-1	HOLLOW METAL FRAME
PT-1	PAINT
PT-2	PAINT
TL-1	TILE SLATE
TR-1	1X4 MDF TRIM

INT ELEV KEYED NOTES

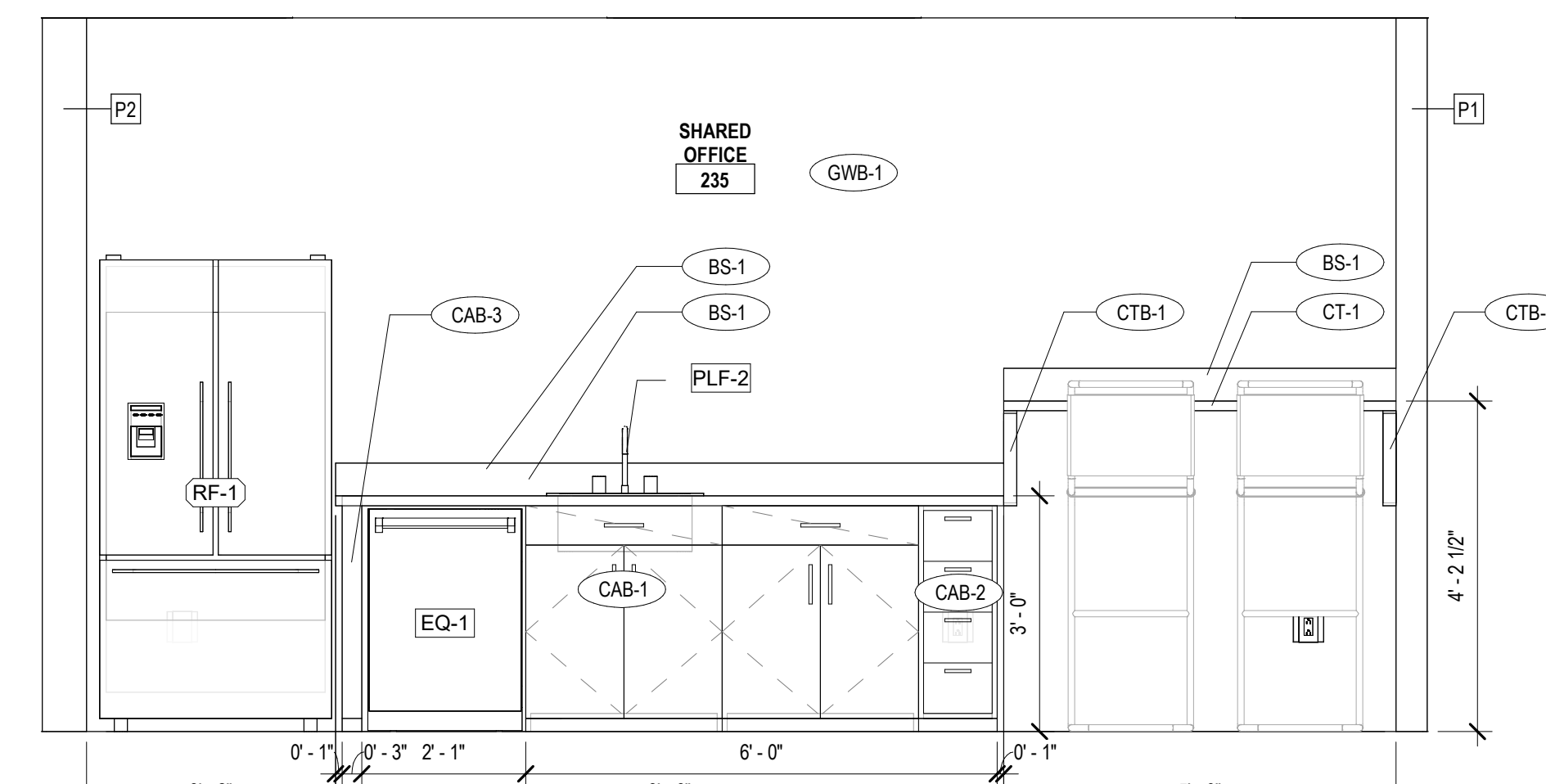
NO.	NOTE DESCRIPTION
1	SPECIALTY LAB EQUIPMENT BY OWNER, SEE ELECTRICAL
2	EXIT SIGN
3	FURNITURE BY OWNER
4	POWER RECEPTACLE, SEE ELECTRICAL



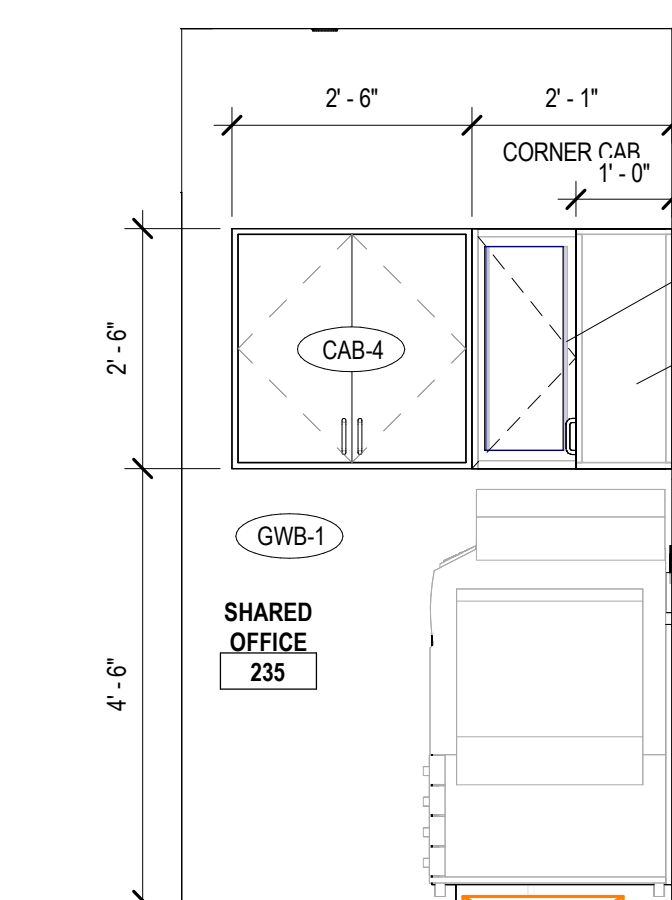
10 SHARED OFFICE 235 - PROJECT NORTH
SCALE: 1/2" = 1'-0"



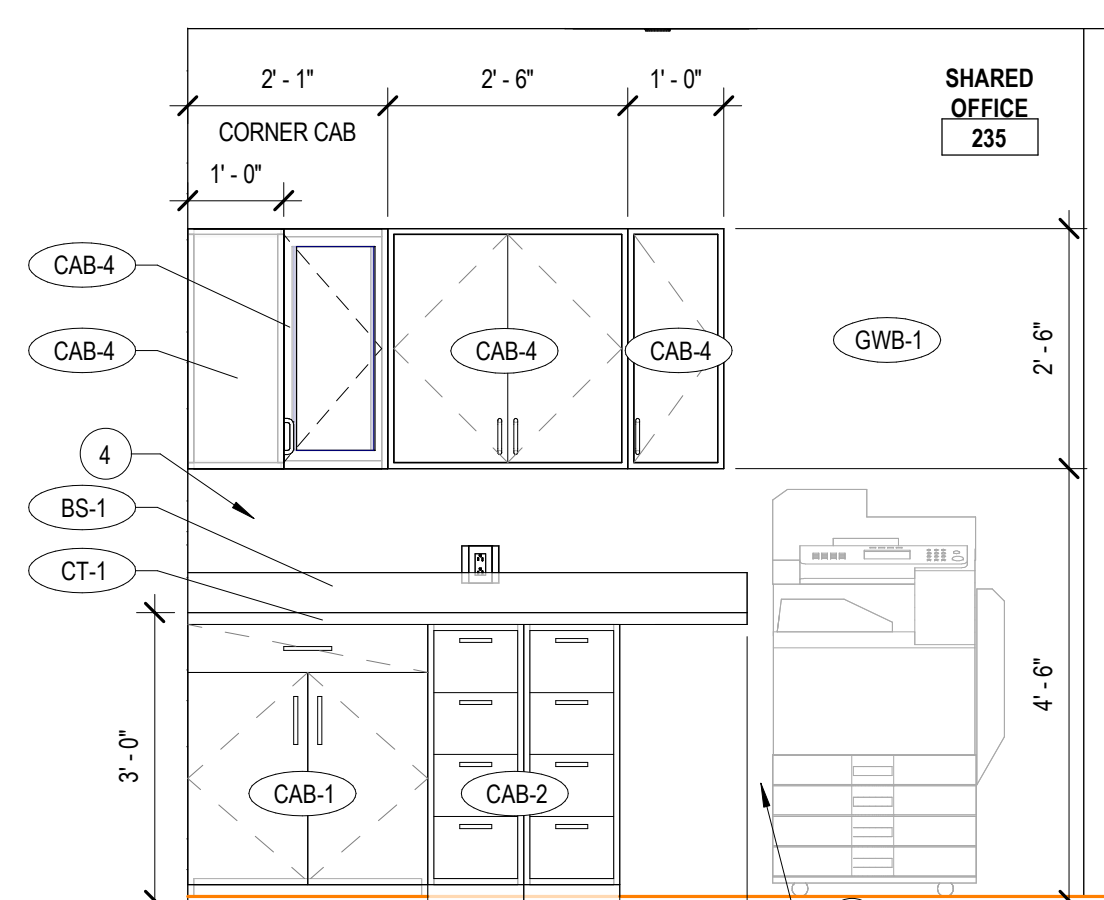
11 SHARED OFFICE 235 - PROJECT EAST
SCALE: 1/2" = 1'-0"



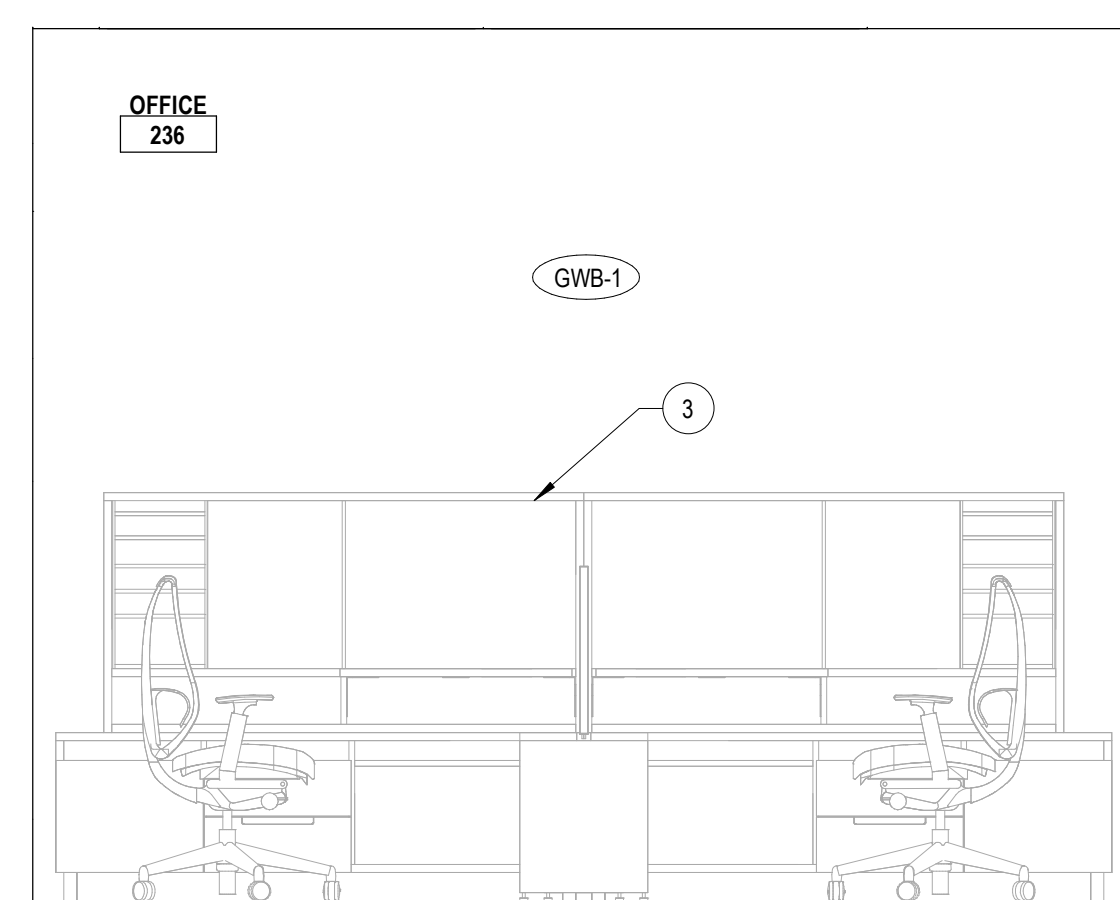
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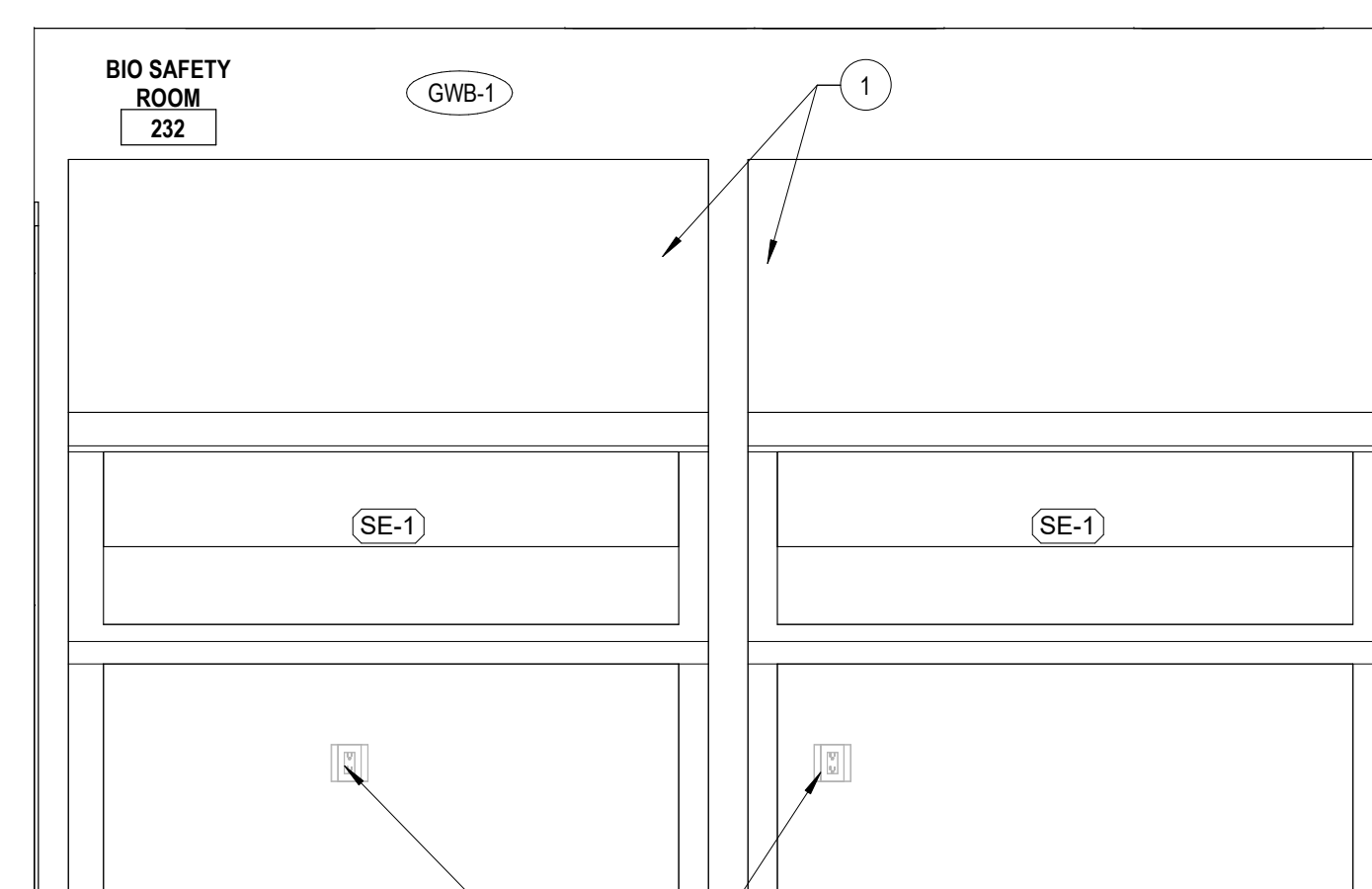
13 LEVEL 2 COPY/SUPPLIES - PROJECT EAST
SCALE: 1/2" = 1'-0"



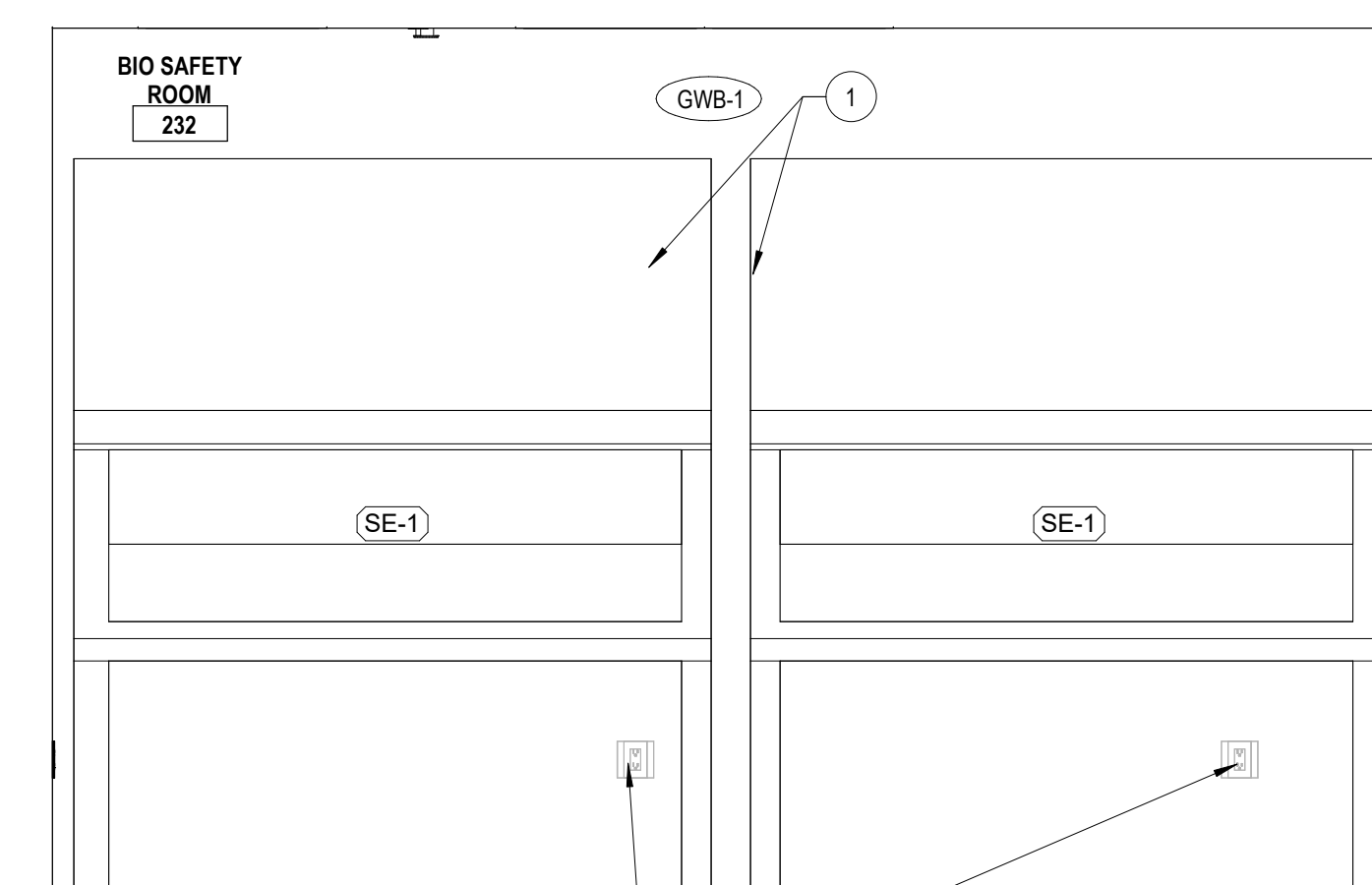
14 LEVEL 2 COPY/SUPPLIES - PROJECT SOUTH
SCALE: 1/2" = 1'-0"



15 OFFICE 236 - PROJECT EAST
SCALE: 1/2" = 1'-0"



16 BIOSAFETY ROOM 232 - PROJECT NORTH
SCALE: 1/2" = 1'-0"



17 BIOSAFETY ROOM 232 - PROJECT SOUTH
SCALE: 1/2" = 1'-0"

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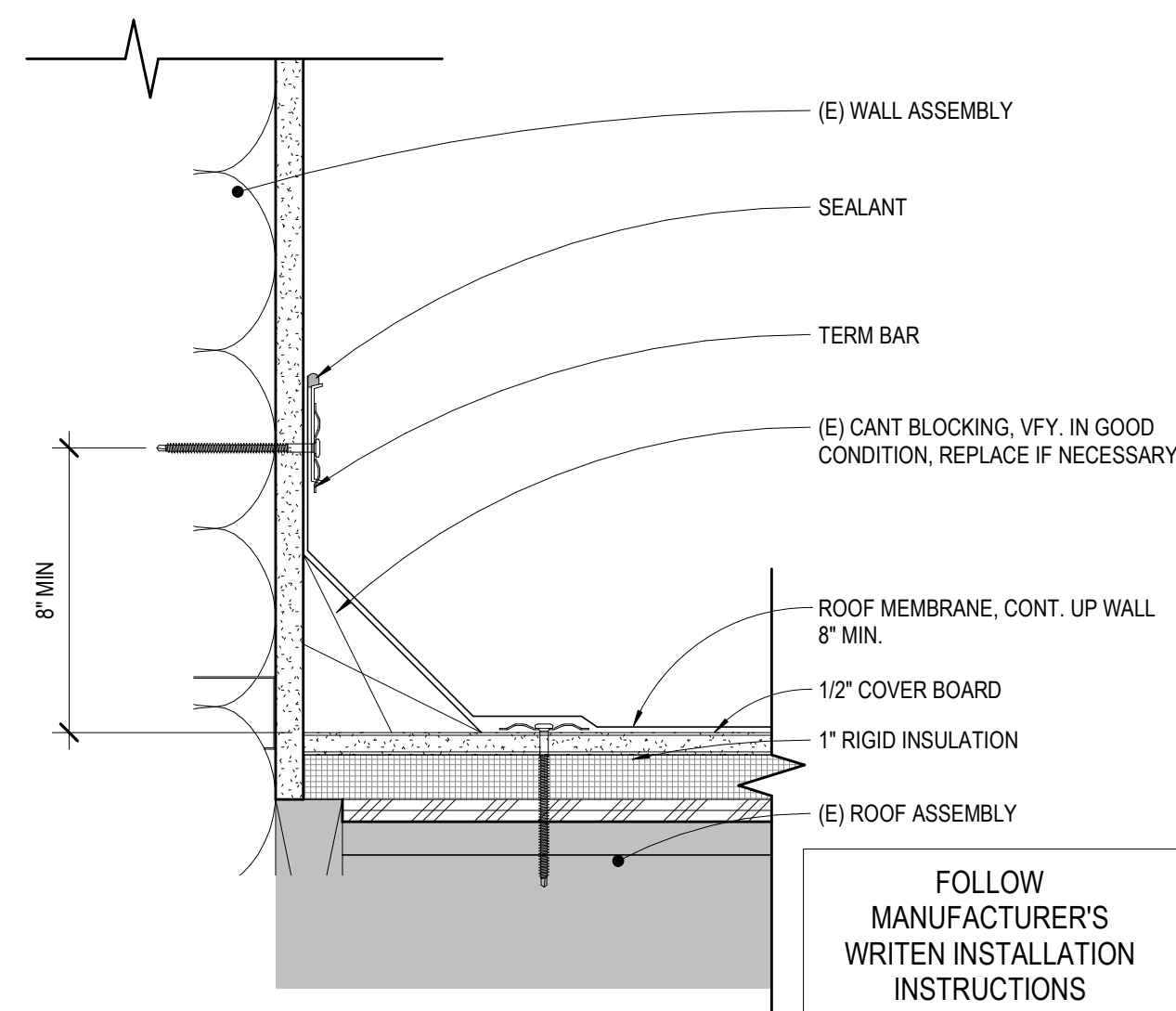
MOLECULAR BIOSCIENCE
BUILDING

BECHTLE
ARCHITECTS
4515 Valley Commons Drive #201
Bozeman, MT 59718
406.585.4161 ph 406.585.6919 fax

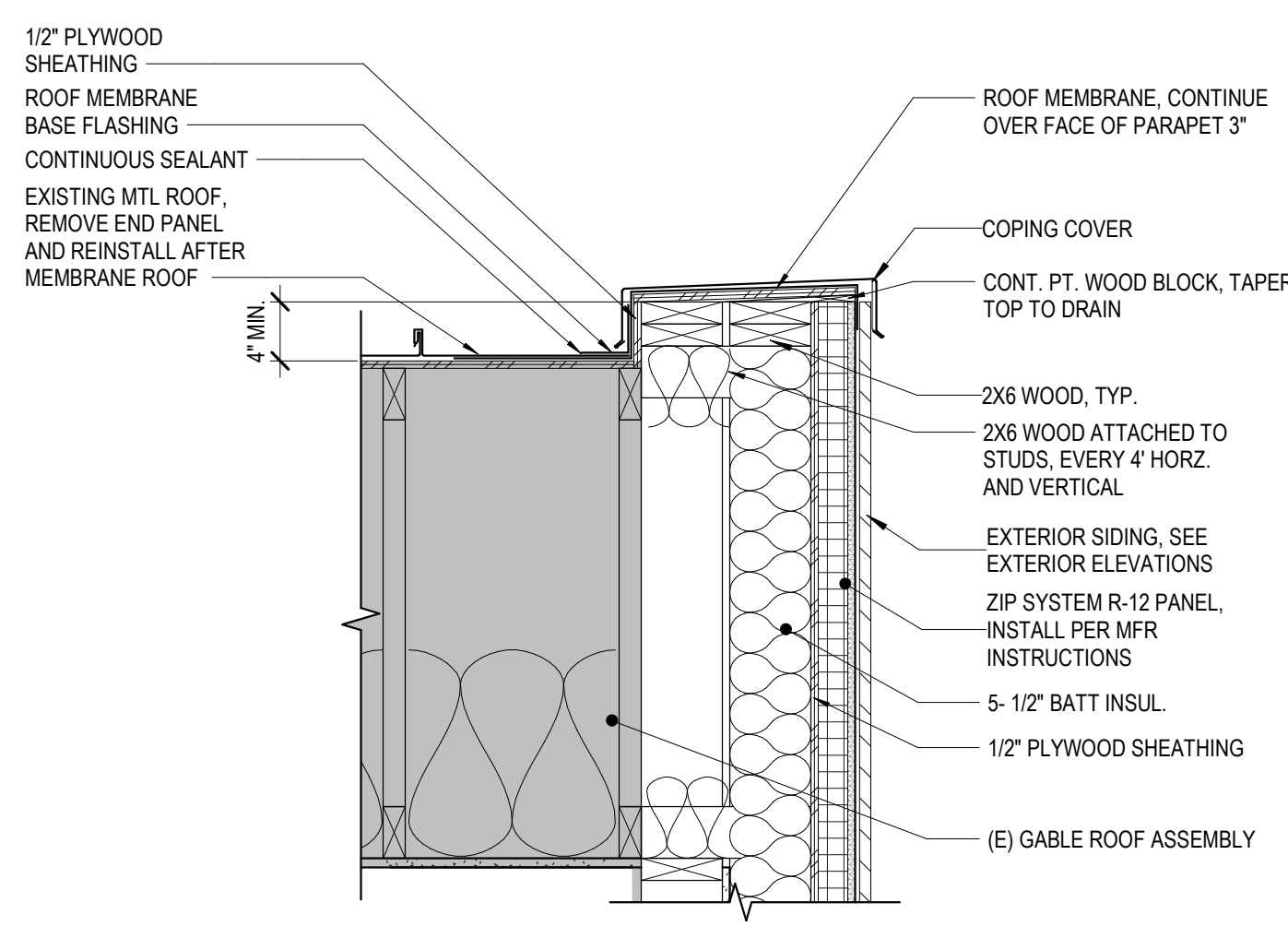
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REVIEWED BY: Checker
REV. DESCRIPTION DATE
A ADD#1 8.20.26

PPA#22-0045
A/E#00-00-00
BA# 2326
SHEET TITLE
REMODEL INT
ELEVATIONS

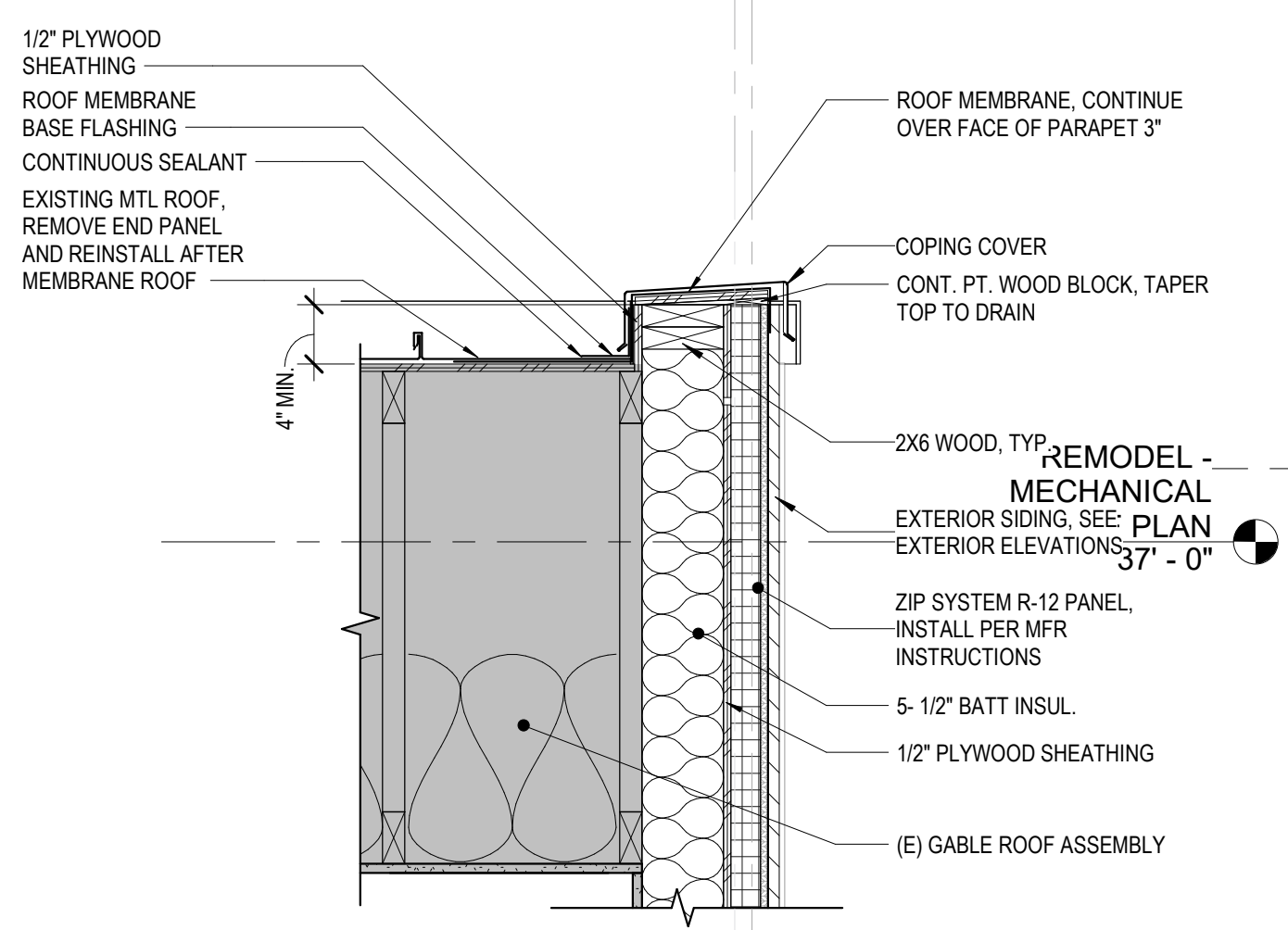
A401
DATE
JUN. 03, 2026



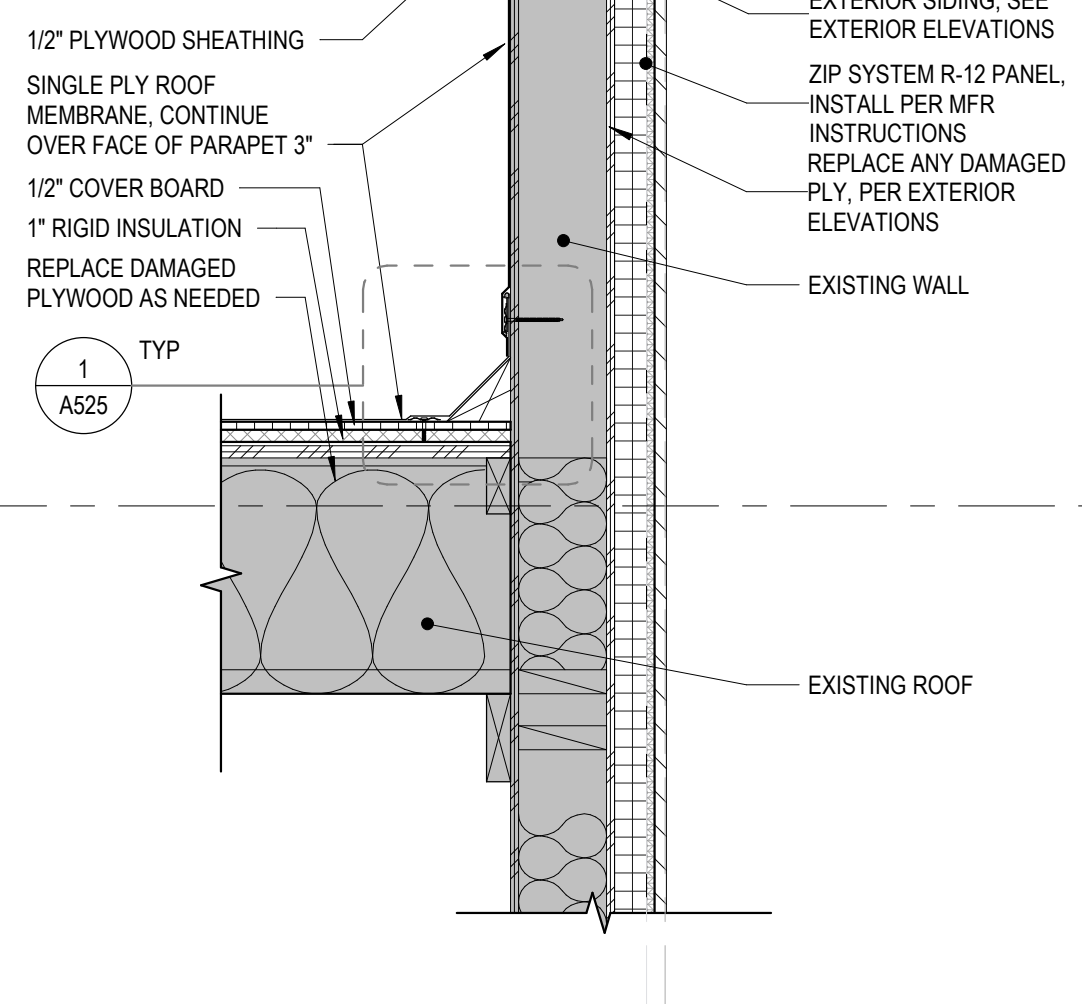
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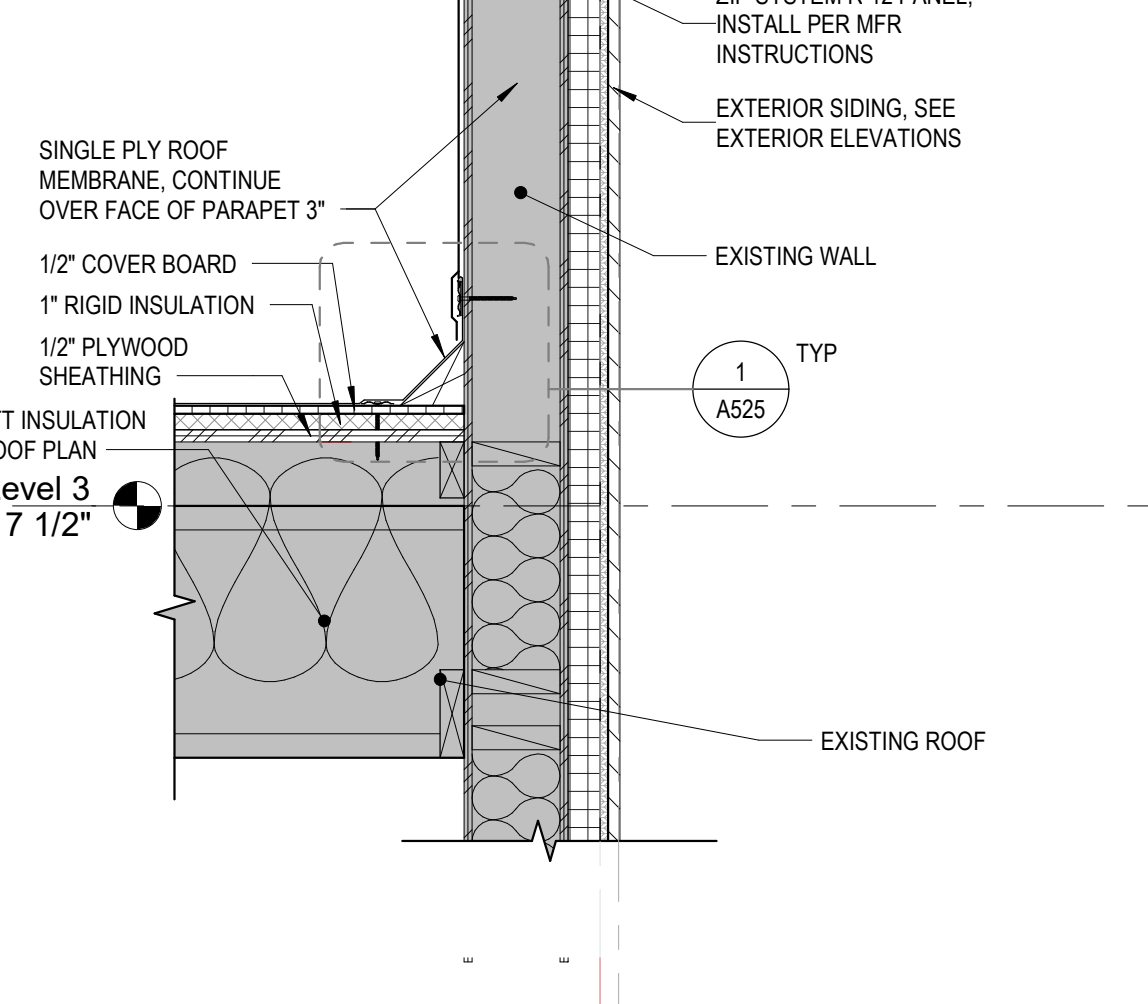
2 GABLE ROOF TO PARAPET WIDE GAP DETAIL Copy 1
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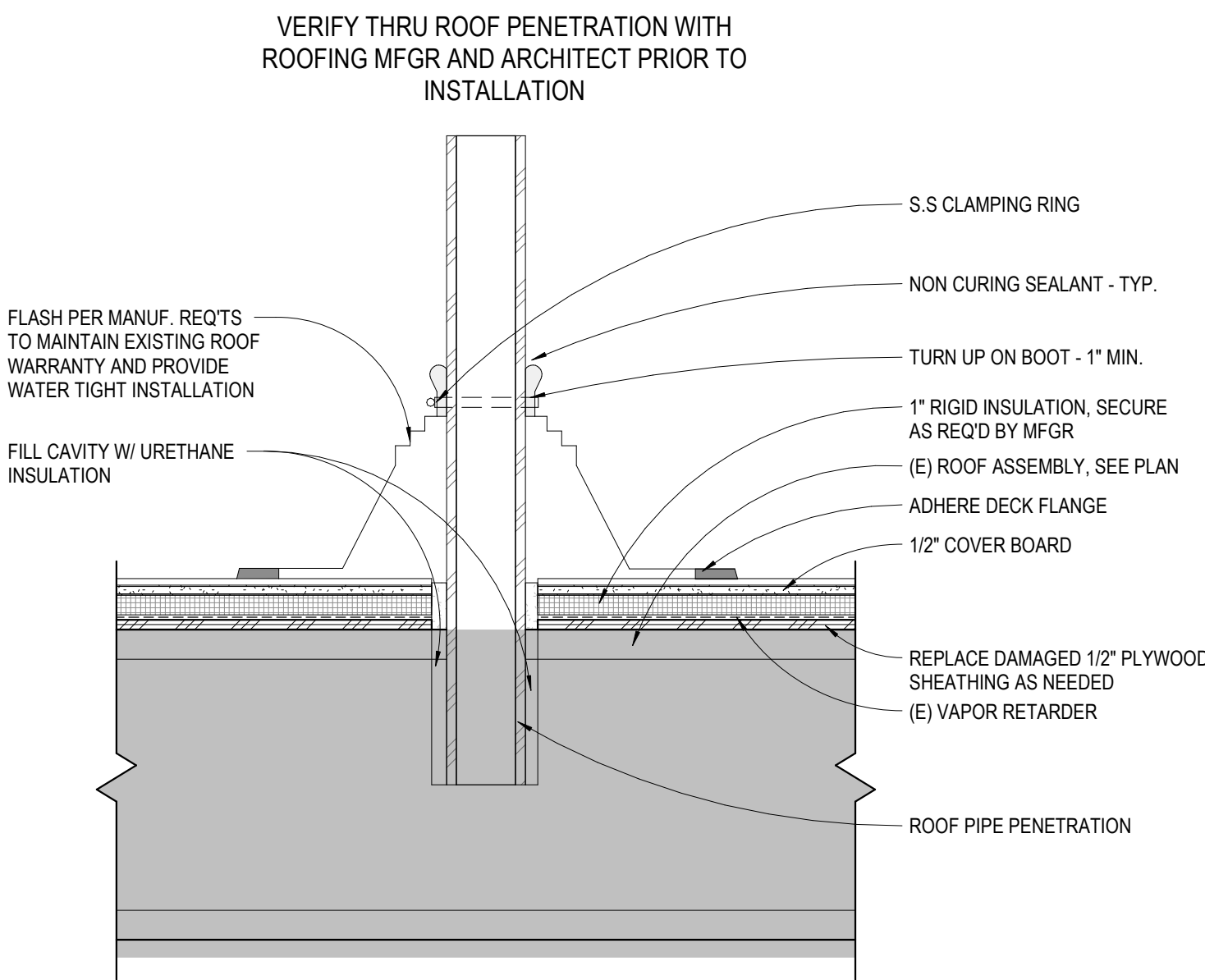
3 GABLE ROOF TO PARAPET DETAIL Copy 1
SCALE: 1" = 1'-0"



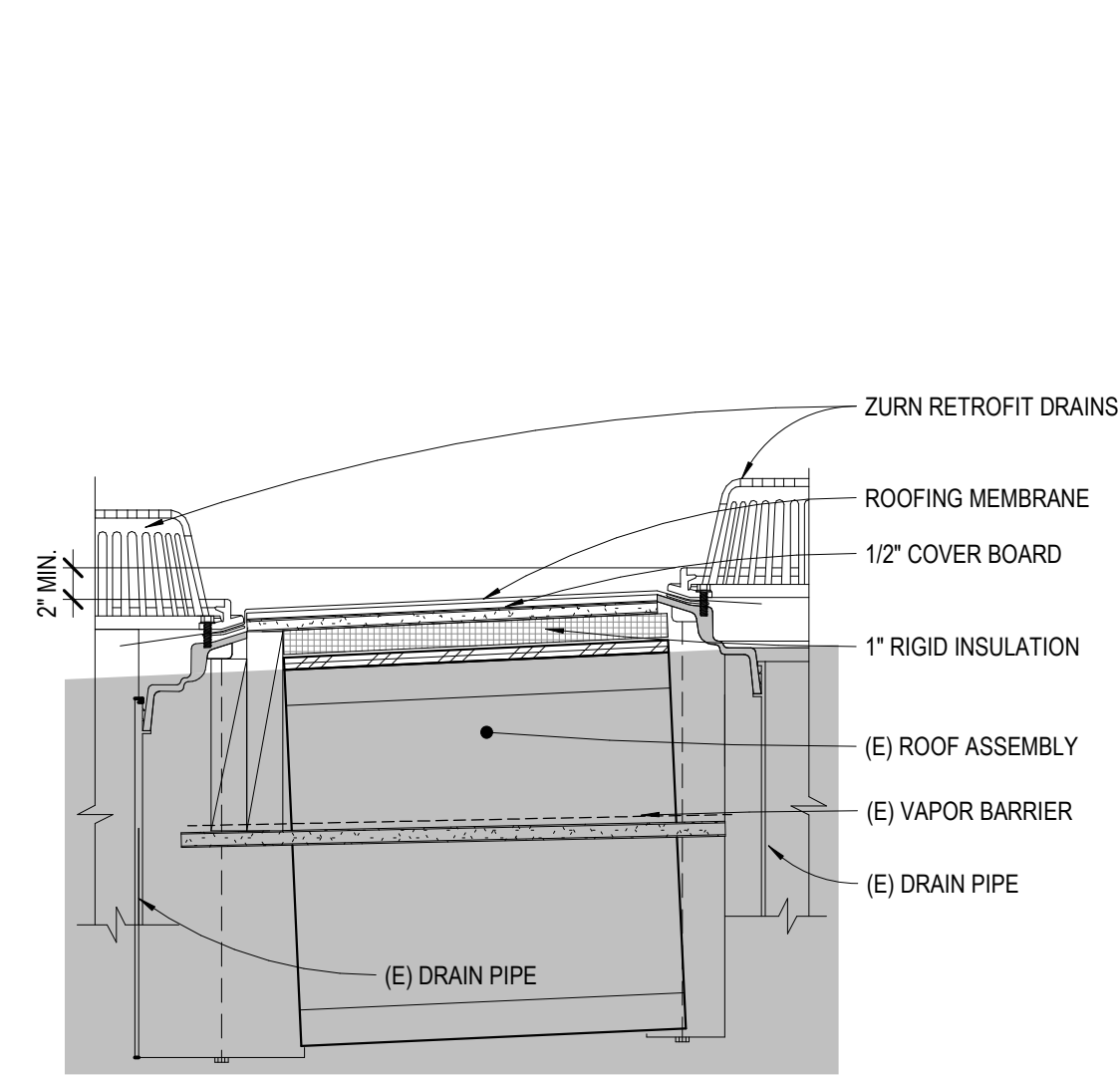
4 PARAPET DETAIL Copy 1
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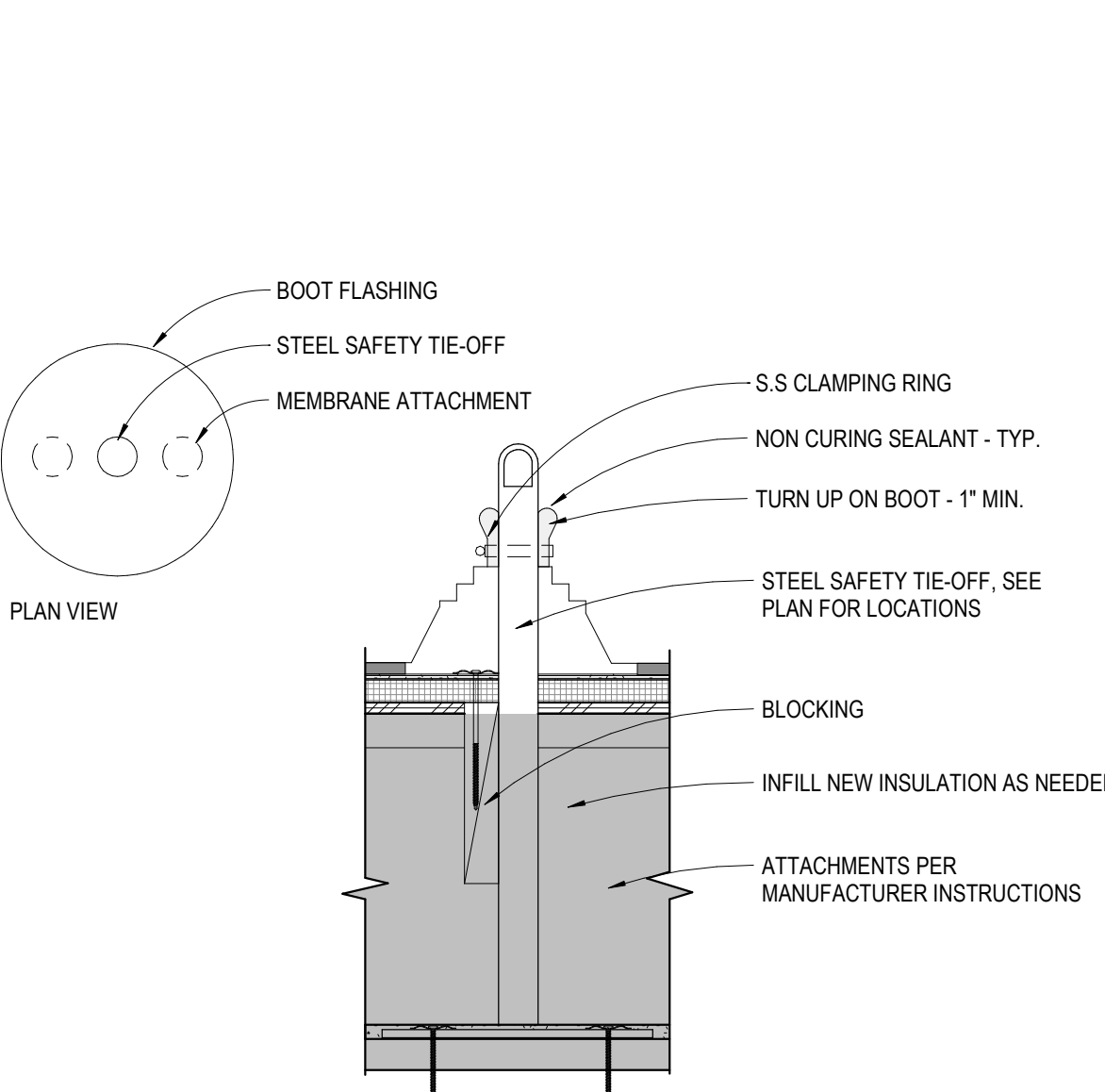
5 HIGH PARAPET DETAIL Copy 1
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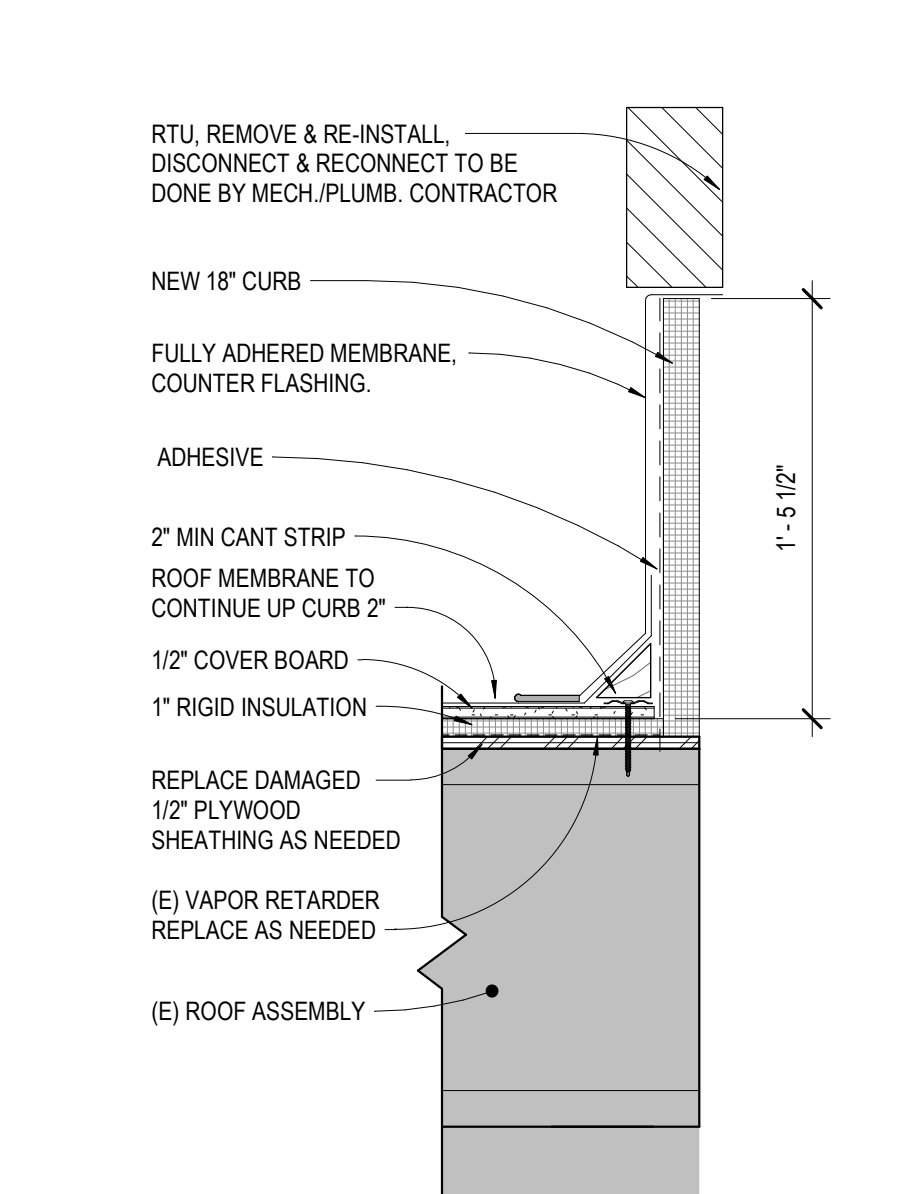
6 ROOF PENETRATION DETAIL Copy 1
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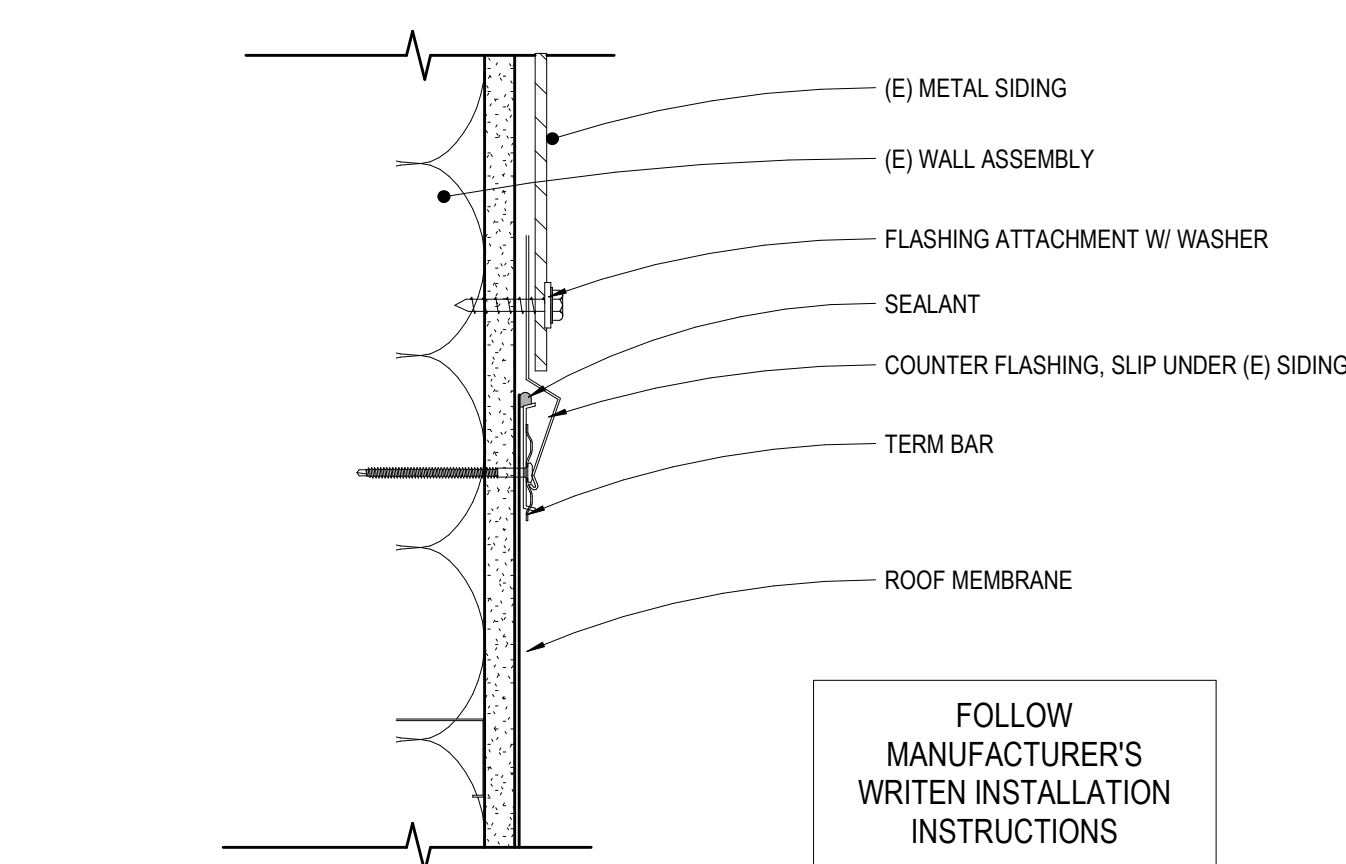
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8 ROOF TIE-OFF DETAIL Copy 1
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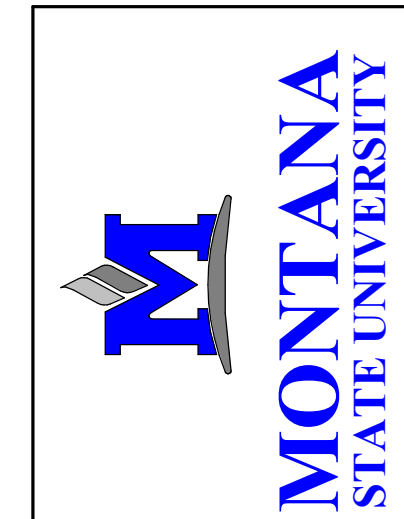


9 ROOF CURB DETAIL Copy 1
SCALE: 1 1/2" = 1'-0"



10 FLASHING DETAIL Copy 1
SCALE: 3" = 1'-0"

B
8.20.26



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ARCHITECTS
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Bozeman, MT 59718
406.585.4161 ph 406.585.6919 fax

DRAWN BY: JS/NB		
REVIEWED BY: NF		
REV.	DESCRIPTION	DATE
B	ADD#1	8.20.26

PPA#22-0045
A/E#00-00-00
BA# 2326
SHEET TITLE
ROOF DETAILS
Copy 1

A526
DATE
JUN. 03, 2026



August 29, 2024

Mr. Donald Beebe
Project Manager, PDC
Facilities Management
Montana State University
P.O. Box 170510
Bozeman, Montana 59717-0510

Delivered via email: donald.beebe@montana.edu

**SUBJECT: Asbestos Inspection Report
Molecular Bioscience Building
960 Technology Boulevard
Montana State University
Bozeman, Montana
Tetra Tech Project No. 117-001068-24024**

Dear Mr. Beebe:

On May 28-31, 2024, Tetra Tech, Inc. (Tetra Tech) conducted an asbestos inspection at the above referenced site. Based on correspondence with you before the commencement of the project, Tetra Tech was instructed to conduct an inspection for suspect asbestos-containing materials (ACM) for information purposes. Details of our inspection are provided below.

ASBESTOS INSPECTION

The asbestos inspection was conducted in accordance with the Administrative Rules of Montana 17.74.354, using the currently recognized standard protocol developed under the National Emission Standards for Hazardous Air Pollutants (NESHAP) and the Asbestos Hazard Emergency Response Act (AHERA), as administered by the State of Montana Department of Environmental Quality (MDEQ).

Mr. Raistlin Contreras of Tetra Tech, an MDEQ Accredited Asbestos Inspector, collected samples of suspect ACM. His MDEQ Inspector Accreditation is presented in **Attachment A**.

The bulk samples were shipped, along with the completed chain of custody (COC) documentation, to Crisp Analytical of Carrollton, Texas for the analysis of asbestos fibers by polarized light microscopy (PLM) using U.S. Environmental Protection Agency (EPA) Methods described in 40 CFR Part 763 Appendix E Subpart E (Interim and EPA 600/R-93 / 116 (Improved)). A copy of the laboratory analysis report and COC is in **Attachment B**. Approximate sample collection locations are presented in **Figures 1 and 2**.

The following suspect ACMs sampled from the site were found not to be asbestos containing by laboratory analysis:

- 12-inch by 12-inch green vinyl floor tile and associated tan mastic located throughout except in Rooms 154, 155, 157-160, 166, 170, 224, 226, and 235 (MBB-F1.1A, B, C)
- 12-inch by 12-inch beige vinyl floor tile and associated tan mastic located in Rooms 154, 157-160, 170, 235, and hallways (MBB-F1.2A, B, C)
- Gray carpet and associated tan mastic located in Rooms 155, 166, 224, and 226 (MBB-F8.1A, B, C)
- White rubber roof membrane overlaying gypsum board located over roof field (MBB-M1.1A, B, C)
- Black felt sheet located under metal roof (MBB-M1.2A, B, C)
- Painted gypsum drywall and paper with associated joint compound located throughout (MBB-M3.1A, B, C)
- Troweled on textured gypsum drywall and paper with associated joint compound located in Rooms 100 and 103 (MBB-M3.2A, B, C)

TETRA TECH

7100 Commercial Avenue Suite 4, Billings, MT 59101
Tel +1. 406.248.9161 | **Fax** +1. 406.248.9282 | tetrattech.com

- 2-foot by 4-foot ceiling panels with punch marks and small pinholes located throughout (MBB-M5.1A, B, C)
- Gray sink undercoating located in Rooms 105, 123, 124, 130, 140, 152, 154, 156, 160, 210, 218, 214, 215, 218, 223, 227, 231, 234, 235, 242, 245, and 248 (MBB-F10.1A, B, C)
- 4-inch black rubber cove base and associated white mastic located in Rooms 119, 120, and 155 (MBB-M12.1A, B, C)
- 4-inch beige rubber cove base and associated tan mastic located throughout (MBB-M12.2A, B, C)
- 4-inch by 4-inch beige ceramic tile and associated gray grout located in the Mechanical Room (MBB-M16.1A, B, C)
- Gray concrete floor slab located throughout (MBB-M18.1A, B, C)
- Black duct seam mastic located above ceilings throughout (MBB-M25.1A, B, C)
- Green RFP wall panels and associated clear adhesive located in Room 144 and hallways on the second floor (MBB-F28.1A, B, C)
- Beige EFIS located on exterior walls (MBB-S7.1A, B, C, D, E, F, G)
- 2-inch white paper and foil-wrapped yellow fiberglass straight-run pipe insulation located throughout (RN-T3.1A, B, C)
- 4-inch white paper and foil-wrapped yellow fiberglass straight-run pipe insulation located throughout (MBB-T3.2A, B, C)

LIMITATIONS

Our opinions are intended exclusively for use by Montana State University. The scope of services performed by Tetra Tech may not be appropriate to satisfy the needs of other users, and any use or re-use of this document, or the findings presented herein is prohibited and at the sole risk of the user. No additions or deletions are permitted without Tetra Tech's express written consent. Furthermore, the opinions presented herein are limited by the requested scope of services and the site conditions existing at the time of our investigation. Therefore, our opinions and recommendations may not apply to future site conditions which we have not had the opportunity to evaluate.

It has been a pleasure assisting you with this project. If you have any questions or need additional information, please contact me in our Tetra Tech Billings, Montana office at (406) 248-9161.

Respectfully submitted,

TETRA TECH

Roger W. Herman, Jr.

Roger W. Herman, Jr.
Asbestos, Lead & IH Services Manager

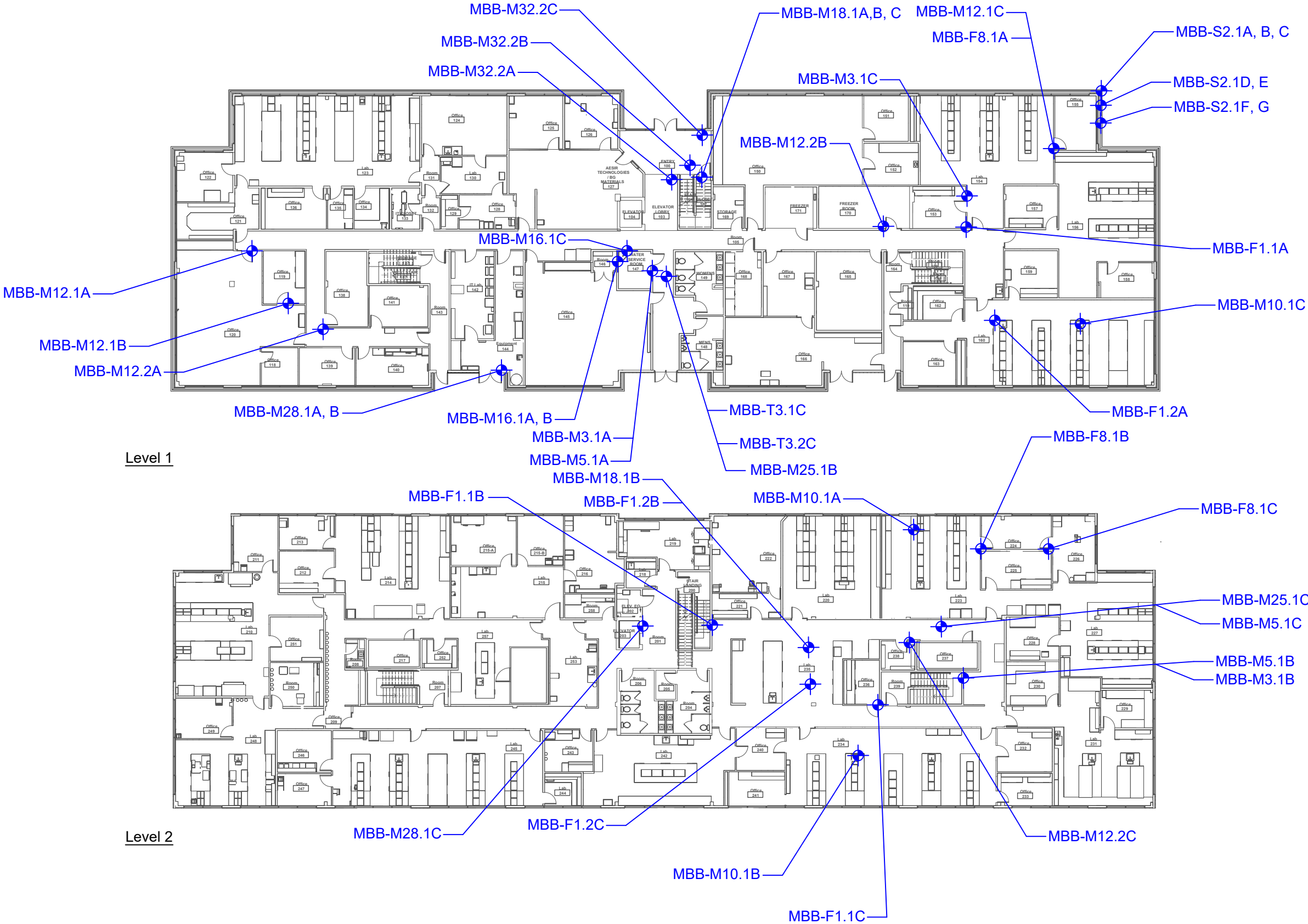
Figures

Attachment A – MDEQ Inspector Accreditation

Attachment B – Laboratory Analytical Report and COC

I:\H-M\Montana State University\117-001068-24024 - Molecular Science Bldg\05-Deliverables\Final\ACM\MSU-Molecular Bioscience Building-Asbestos Inspection Report.docx

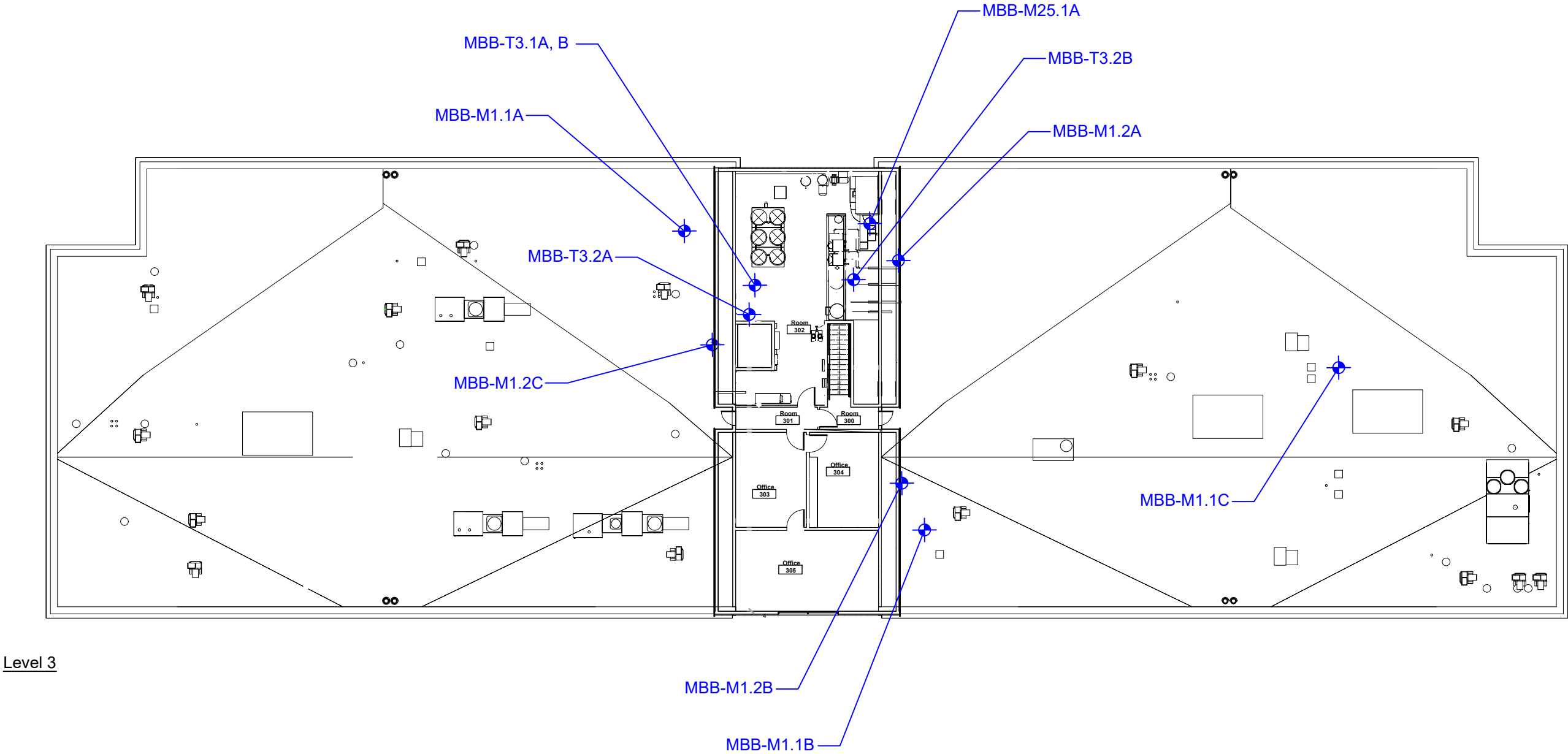
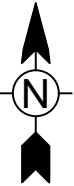
FIGURES



- Legend**
- 249 Room number
 - Sample location

TETRA TECH www.tetrattech.com 7100 Commercial Ave, Suite 4 Billings, Montana 59101 PHONE: 406-248-9161 FAX: 406-248-9282	Molecular Bioscience Building		Project No.: 117-001068-24024
	Asbestos Inspection Report Suspect ACM Sample Locations		Designed By: Tetra Tech
	Montana State University 960 Technology Boulevard Bozeman, Montana		Drawn By: NCW
			Checked By: RWH
			F-01

Not To Scale



- Legend
- 302 Room number
 -  Sample location

 TETRA TECH www.tetrattech.com 7100 Commercial Ave, Suite 4 Billings, Montana 59101 PHONE: 406-248-9161 FAX: 406-248-9282	Molecular Bioscience Building		Project No.: 117-001068-24024
	Asbestos Inspection Report Suspect ACM Sample Locations		Designed By: Tetra Tech
	Montana State University 960 Technology Boulevard Bozeman, Montana		Drawn By: NCW
			Checked By: RWH
F-02			

Not To Scale

ATTACHMENT A
MDEQ Inspector Accreditation

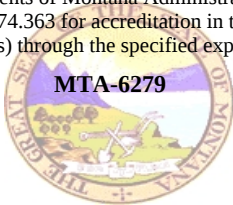
RAISTLIN A CONTRERAS

has met the requirements of Montana Administrative Rule 17.74.362 and/or 17.74.363 for accreditation in the following asbestos occupation(s) through the specified expiration date(s).

MTA-6279

Asbestos Inspector

07/26/2024

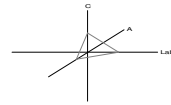


MT DEQ Asbestos Control Program

ATTACHMENT B
Laboratory Analytical Report and COC

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798



CA Labs, L.L.C.
12232 Industripex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Tetra Tech, Inc.

7100 Commercial Ave Suite 4
Billings, Montana 59101

Customer Project: MSU, Mold and ACM Inspection
Reference #: CAL24075224AS Date: 07/10/24

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are performed. Calibrated liquid refractive oils are used as liquid mounting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjunction with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Overview of Project Sample Material Containing Asbestos

Customer Project:			MSU, Mold and ACM Inspection		CA Labs Project #: CAL24075224AS
Laboratory	Sample #	Layer #	Analysts	Physical Description of Subsample	Asbestos type / calibrated visual estimate percent
Sample ID					List of Affected Building Material Types

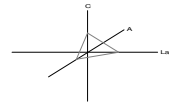
No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate	pe - perlite	fg - fiberglass	pa - palygorskite (clay)
gypsum - gypsum	qu - quartz	mw - mineral wool	
bi - binder		wo - wollastinite	
or - organic		ta - talc	
ma - matrix		sy - synthetic	
mi - mica		ce - cellulose	
ve - vermiculite		br - brucite	
ot - other		ka - kaolin (clay)	

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.



Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #		406-248-9161							
Fax #		406-248-9282							
Laboratory Sample ID	Sample #	Comment	Layer #	Analysts	Physical Description of Subsample	Homo-geneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
56463	MBB-F1.1A		F1.1A-1		gray floor tile	y	None Detected	100% qu,ca	
56463			F1.1A-2		tan mastic	y	None Detected	100% gy,bi	
56464	MBB-F1.1B		F1.1B-1		gray floor tile	y	None Detected	100% qu,ca	
56464			F1.1B-2		tan mastic	y	None Detected	100% gy,bi	
56465	MBB-F1.1C		F1.1C-1		gray floor tile	y	None Detected	100% qu,ca	
56465			F1.1C-2		tan mastic	y	None Detected	100% gy,bi	
56466	MBB-F1.2A		F1.2A-1		pink floor tile	y	None Detected	100% qu,ca	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

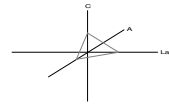
Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze

6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #	406-248-9161								
Fax #	406-248-9282								
Laboratory Sample ID	Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo-geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent	
56466			F1.2A-2	tan mastic	y	None Detected		100% gy,bi	
56467	MBB-F1.2B		F1.2B-1	pink floor tile	y	None Detected		100% qu,ca	
56467			F1.2B-2	tan mastic	y	None Detected		100% gy,bi	
56468	MBB-F1.2C		F1.2C-1	pink floor tile	y	None Detected		100% qu,ca	
56468			F1.2C-2	tan mastic	y	None Detected		100% gy,bi	
56469	MBB-F8.1A		F8.1A-1	blue carpeting	y	None Detected	100% sy		
56469			F8.1A-2	tan mastic	y	None Detected		100% gy,bi	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

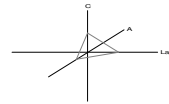
Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #	406-248-9161								
Fax #	406-248-9282								
Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent	
56470	MBB-F8.1B		F8.1B-1	blue carpeting	y	None Detected	100% sy		
56470			F8.1B-2	tan mastic	y	None Detected			100% gy,bi
56471	MBB-F8.1C		F8.1C-1	blue carpeting	y	None Detected	100% sy		
56471			F8.1C-2	tan mastic	y	None Detected			100% gy,bi
56472	MBB-M1.1A		M1.1 A-1	black rubber covering	y	None Detected			100% qu,ma,ot
56472			M1.1 A-2	white gypsum board	y	None Detected	10% fg 10% sy		80% qu,gy
56473	MBB-M1.1B		M1.1 B-1	black rubber covering	y	None Detected			100% qu,ma,ot

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

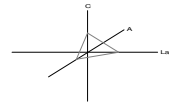
Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #	406-248-9161								
Fax #	406-248-9282								
Laboratory Sample ID	Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homoeo neous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent	
56473			M1.1 B-2	white gypsum board	y	None Detected	10% fg 10% sy	80% qu,gy	
56474	MBB-M1.1C		M1.1 C-1	black rubber covering	y	None Detected		100% qu,ma,ot	
56474			M1.1 C-2	white gypsum board	y	None Detected	10% fg 10% sy	80% qu,gy	
56475	MBB-M1.2A		M1.2 A-1	black felt	y	None Detected	30% ce	70% qu,bi	
56476	MBB-M1.2B		M1.2 B-1	black felt	y	None Detected	30% ce	70% qu,bi	
56477	MBB-M1.2C		M1.2 C-1	black felt	y	None Detected	30% ce	70% qu,bi	
56478	MBB-M3.1A		M3.1 A-1	white surfaced white compound	n	None Detected		100% qu,bi,ca	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
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bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

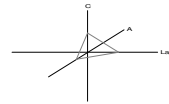
Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #		406-248-9161							
Fax #		406-248-9282							
Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent	
56478			M3.1 A-2	white compound (beneath tape)	y	None Detected		100% qu,ca	
56478			M3.1 A-3	white drywall with brown paper	n	None Detected	20% ce	80% qu,gy	
56479	MBB-M3.1B		M3.1 B-1	white surfaced white compound	n	None Detected		100% qu,bi,ca	
56479			M3.1 B-2	white compound (beneath tape)	y	None Detected		100% qu,ca	
56479			M3.1 B-3	white drywall with brown paper	n	None Detected	20% ce	80% qu,gy	
56480	MBB-M3.1C		M3.1 C-1	white surfaced white compound	n	None Detected		100% qu,bi,ca	
56480			M3.1 C-2	white compound (beneath tape)	y	None Detected		100% qu,ca	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

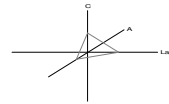
Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

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7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



Polarized Light Asbestiform Materials Characterization

Customer Info:		Attn:		Customer Project:		CA Labs Project #:		
Tetra Tech, Inc.				MSU, Mold and ACM Inspection		CAL24075224AS		
7100 Commercial Ave Suite 4 Billings, Montana 59101				Turnaround Time: 5 Days		Date: 7/10/2024		
Phone # 406-248-9161						Samples Rec'd: 7/3/24 10:30AM		
Fax # 406-248-9282						Date Of Sampling: 5/28/2024		
						Purchase Order #:		
Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homo-geneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
56480			M3.1 C-3	white drywall with brown paper	n	None Detected	20% ce	80% qu,gy
56481	MBB-M3.2A		M3.2 A-1	white surfaced white compound	n	None Detected		100% qu,bi,ca
56481			M3.2 A-2	white compound (beneath tape)	y	None Detected		100% qu,ca
56481			M3.2 A-3	white drywall with brown paper	n	None Detected	20% ce	80% qu,gy
56482	MBB-M3.2B		M3.2 B-1	white surfaced white compound	n	None Detected		100% qu,bi,ca
56482			M3.2 B-2	white compound (beneath tape)	y	None Detected		100% qu,ca
56482			M3.2 B-3	white drywall with brown paper	n	None Detected	20% ce	80% qu,gy

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

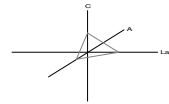
Julio Robles
Analyst

Technical Manager
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Senior Analyst
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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
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10. TEM analysis suggested



Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #	406-248-9161								
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Laboratory Sample ID	Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo-geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent	
56483	MBB-M3.2C		M3.2 C-1	white surfaced white compound	n	None Detected		100% qu,bi,ca	
56483			M3.2 C-2	white compound (beneath tape)	y	None Detected		100% qu,ca	
56483			M3.2 C-3	white drywall with brown paper	n	None Detected	20% ce	80% qu,gy	
56484	MBB-M5.1A		M5.1 A-1	white surfacing	y	None Detected		100% qu,bi	
56484			M5.1 A-2	off-white ceiling tile	y	None Detected	35% ce 35% fg	30% qu,pe,ca	
56485	MBB-M5.1B		M5.1 B-1	white surfacing	y	None Detected		100% qu,bi	
56485			M5.1 B-2	off-white ceiling tile	y	None Detected	35% ce 35% fg	30% qu,pe,ca	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

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Approved Signatories:

Josh Strange
Analyst

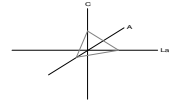
Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
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Polarized Light Asbestiform Materials Characterization

Customer Info:		Attn:		Customer Project:		CA Labs Project #:		
Tetra Tech, Inc.				MSU, Mold and ACM Inspection		CAL24075224AS		
7100 Commercial Ave Suite 4 Billings, Montana 59101				Turnaround Time:		Date: 7/10/2024		
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Phone #	406-248-9161					Date Of Sampling: 5/28/2024		
Fax #	406-248-9282					Purchase Order #:		
Laboratory Sample ID	Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non- fibrous type / percent
56486	MBB-M5.1C		M5.1 C-1	white surfacing	y	None Detected		100% qu,bi
56486			M5.1 C-2	off-white ceiling tile	y	None Detected	35% ce 35% fg	30% qu,pe,ca
56487	MBB-M10.1A		M10.1 A-1	gray sealant	y	None Detected		100% qu,gy,bi
56488	MBB-M10.1B		M10.1 B-1	gray sealant	y	None Detected		100% qu,gy,bi
56489	MBB-M10.1C		M10.1 C-1	gray sealant	y	None Detected		100% qu,gy,bi
56490	MBB-M12.1A		M12.1 A-1	black baseboard	y	None Detected		100% gy,ma
56490			M12.1 A-2	tan mastic	y	None Detected		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

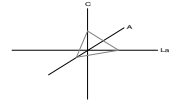
Julio Robles
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

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9. < 1% Result point counted positive
10. TEM analysis suggested



Polarized Light Asbestiform Materials Characterization

Customer Info:		Attn:		Customer Project:		CA Labs Project #:		
Tetra Tech, Inc.				MSU, Mold and ACM Inspection		CAL24075224AS		
7100 Commercial Ave Suite 4 Billings, Montana 59101				Turnaround Time:		Date: 7/10/2024		
				5 Days		Samples Rec'd: 7/3/24 10:30AM		
Phone #		406-248-9161				Date Of Sampling: 5/28/2024		
Fax #		406-248-9282				Purchase Order #:		
Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
56491	MBB-M12.1B		M12.1 B-1	black baseboard	y	None Detected		100% gy,ma
56491			M12.1 B-2	tan mastic	y	None Detected		100% gy,bi
56492	MBB-M12.1C		M12.1 C-1	black baseboard	y	None Detected		100% gy,ma
56492			M12.1 C-2	tan mastic	y	None Detected		100% gy,bi
56493	MBB-M12.2A		M12.2 A-1	tan baseboard	y	None Detected		100% gy,ma
56493			M12.2 A-2	tan mastic	y	None Detected		100% gy,bi
56494	MBB-M12.2B		M12.2 B-1	tan baseboard	y	None Detected		100% gy,ma

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

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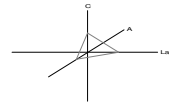
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Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #	406-248-9161								
Fax #	406-248-9282								
Laboratory Sample ID	Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent	
56494			M12.2 B-2	tan mastic	y	None Detected	100% gy,bi		
56495	MBB-M12.2C		M12.2 C-1	tan baseboard	y	None Detected	100% gy,ma		
56495			M12.2 C-2	tan mastic	y	None Detected	100% gy,bi		
56496	MBB-M16.1A		M16.1 A-1	white ceramic tile	y	None Detected	100% qu,ot		
56496			M16.1 A-2	gray grouting	y	None Detected	100% qu,ca		
56496			M16.1 A-3	tan mastic	y	None Detected	100% gy,bi		
56497	MBB-M16.1B		M16.1 B-1	white ceramic tile	y	None Detected	100% qu,ot		

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

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Josh Strange
Analyst

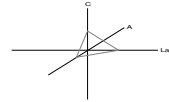
Julio Robles
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Technical Manager
Tanner Rasmussen

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Polarized Light Asbestiform Materials Characterization

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Tetra Tech, Inc.				MSU, Mold and ACM Inspection		CAL24075224AS		
7100 Commercial Ave Suite 4 Billings, Montana 59101				Turnaround Time: 5 Days		Date: 7/10/2024		
Phone # 406-248-9161						Samples Rec'd: 7/3/24 10:30AM		
Fax # 406-248-9282						Date Of Sampling: 5/28/2024		
						Purchase Order #:		
Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homo-geneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
56497			M16.1 B-2	gray grouting	y	None Detected	100% qu,ca	
56497			M16.1 B-3	tan mastic	y	None Detected	100% gy,bi	
56498	MBB-M16.1C		M16.1 C-1	white ceramic tile	y	None Detected	100% qu,ot	
56498			M16.1 C-2	gray grouting	y	None Detected	100% qu,ca	
56498			M16.1 C-3	tan mastic	y	None Detected	100% gy,bi	
56499	MBB-M18.1A		M18.1 A-1	gray cement	y	None Detected	100% qu,ca,ot	
56500	MBB-M18.1B		M18.1 B-1	gray cement	y	None Detected	100% qu,ca,ot	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

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Josh Strange
Analyst

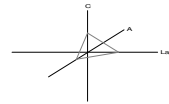
Julio Robles
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Technical Manager
Tanner Rasmussen

Senior Analyst
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Polarized Light Asbestiform Materials Characterization

Customer Info: Tetra Tech, Inc. 7100 Commercial Ave Suite 4 Billings, Montana 59101				Attn:		Customer Project: MSU, Mold and ACM Inspection Turnaround Time: 5 Days		CA Labs Project #: CAL24075224AS Date: 7/10/2024 Samples Rec'd: 7/3/24 10:30AM Date Of Sampling: 5/28/2024 Purchase Order #:	
Phone #	406-248-9161								
Fax #	406-248-9282								
Laboratory Sample ID	Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent	
56501	MBB-M18.1C		M18.1 C-1	gray cement	y	None Detected	100% qu,ca,ot		
56502	MBB-M25.1A		M25.1 A-1	gray sealant	y	None Detected	100% qu,bi		
56503	MBB-M25.1B		M25.1 B-1	gray sealant	y	None Detected	100% qu,bi		
56504	MBB-M25.1C		M25.1 C-1	gray sealant	y	None Detected	100% qu,bi		
56505	MBB-M28.1A		M28.1 A-1	gray surfacing with clear mastic	n	None Detected	100% qu,gy,bi		
56506	MBB-M28.1B		M28.1 B-1	gray surfacing with clear mastic	n	None Detected	100% qu,gy,bi		
56507	MBB-M28.1C		M28.1 C-1	gray surfacing with clear mastic	n	None Detected	100% qu,gy,bi		

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

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Approved Signatories:

Josh Strange
Analyst

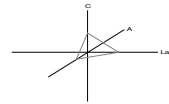
Julio Robles
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Polarized Light Asbestiform Materials Characterization

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56508	MBB-S7.1A		1	S7.1A- gray stucco with white foam insulation	n	None Detected	4% fg	96% qu,bi,ca,ot
56509	MBB-S7.1B		1	S7.1B- gray stucco with white foam insulation	n	None Detected	4% fg	96% qu,bi,ca,ot
56510	MBB-S7.1C		1	S7.1C- gray stucco with white foam insulation	n	None Detected	3% fg	97% qu,bi,ca,ot
56511	MBB-S7.1D		1	S7.1D- gray stucco with white foam insulation	n	None Detected	3% fg	97% qu,bi,ca,ot
56512	MBB-S7.1E		1	S7.1E- gray stucco with white foam insulation	n	None Detected	3% fg	97% qu,bi,ca,ot
56513	MBB-S7.1F		1	S7.1F- gray stucco with white foam insulation	n	None Detected	4% fg	96% qu,bi,ca,ot
56514	MBB-S7.1G		1	S7.1G- gray stucco with white foam insulation	n	None Detected	3% fg	97% qu,bi,ca,ot

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.

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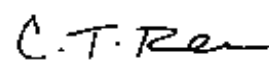
Approved Signatories:



Josh Strange
Analyst



Julio Robles
Analyst

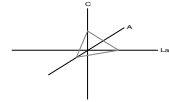


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Laboratory Sample ID	Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non- fibrous type / percent
56515	MBB-T3.1A		T3.1A- 1	white insulation with foil	n	None Detected	30% ce 10% fg	60% qu,bi,ot
56515			T3.1A- 2	yellow insulation	y	None Detected	100% fg	
56516	MBB-T3.1B		T3.1B- 1	white insulation with foil	n	None Detected	30% ce 10% fg	60% qu,bi,ot
56516			T3.1B- 2	yellow insulation	y	None Detected	100% fg	
56517	MBB-T3.1C		T3.1C- 1	white insulation with foil	n	None Detected	30% ce 10% fg	60% qu,bi,ot
56517			T3.1C- 2	yellow insulation	y	None Detected	100% fg	
56518	MBB-T3.2A		T3.2A- 1	white insulation with foil	n	None Detected	40% ce 10% fg	50% qu,bi,ot

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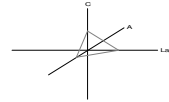
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56518			T3.2A-2	yellow insulation	y	None Detected			100% fg			
56519	MBB-T3.2B		T3.2B-1	white insulation with foil	n	None Detected			40% ce 10% fg		50% qu,bi,ot	
56519			T3.2B-2	yellow insulation	y	None Detected			100% fg			
56520	MBB-T3.2C		T3.2C-1	white insulation with foil	n	None Detected			40% ce 10% fg		50% qu,bi,ot	
56520			T3.2C-2	yellow insulation	y	None Detected			100% fg			

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7100 Commercial Avenue Suite 4
Billings, Montana 59101
Phone: 406.248.9161 Fax 406.248.9282

AL24075224

CONTACT INFORMATION

COMPANY: Tetra Tech, Inc.
Primary Contact Raistlin Contreras
Additional Contact Roger W. Herman, Jr.
Sampler Name(s) Raistlin Contreras
Date of Inspection: 05/28-31/24
Phone: 406.248.9161
Phone / Email: race.contreras@tetratech.com cell- 406.601.0936
Phone / Email: roger.herman@tetratech.com cell – 406.670.4844
Sampler Signature(s): 

PROJECT INFORMATION

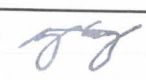
Client
Project Location MSU
Molecular Bioscience Building
Project Name Mold and ACM Inspection
Project Number

PLM INSTRUCTIONS

- ☒ PLM EPA 600/R-93/116 ☐ PLM CARB 435 (rock/soil) ☐ TEM CHATFIELD ☐ TEM NOB 198.4 ☐ TEM CARB 435 (rock/soil)
- ☒ PLM Point Count, PC 400 Points (All samples greater than 0%, but less than 2%)
- ☒ Multi-Layered Samples:
- ☒ Analyze and Report All Separable Layers per EPA 600 ☐ Report Composite for Drywall System per NESHAP (where applicable) ☐ Only Analyze sepecifically noted layer
- ☒ Analyze Until Positive Stop by Material Type as Noted

TURNAROUND TIME

- ☐ 10 Day ☒ 5 Day ☐ 3 Day ☐ 2 Day ☐ Same Day ☐ 1 Day ☐ Rush Results by:

Relinquished By	Date & Time	VIA	Received By	Date & Time
Raistlin Contreras	07/02/24		By 30AM	
			JUL 03 2024	
				

CHAIN OF CUSTODY -BULK ASBESTOS-

AL24075224

PROJECT INFORMATION

Project Name

Mold and ACM Inspection

Project Number 0

Project Identifier

Bulk Sample #	HA ID	Sample Material Description	Material Location	Notes
A B C	MBB F 1.1	12-inch by 12-inch green vinyl floor tile and associated tan mastic	Throughout except in rooms 154, 155, 157, 158, 159, 160, 166, 170, 224, 226, and 235	
A B C	MBB F 1.2	12-inch by 12-inch beige vinyl floor tile and associated tan and green mastic	154, 157, 158, 159, 160, 170, 235, and hallways	
A B C	MBB F 8.1	Gray carpet and associated tan mastic	155, 166, 224, 226	
A B C	MBB M 1.1	White rubber roof membrane overlaying gypsum board	Over roof field	
A B C	MBB M 1.2	Black felt sheet under metal roof	Under metal roof sheeting	
A B C	MBB M 3.1	Painted gypsum drywall and paper with associated joint compound	Throughout	
A B C	MBB M 3.2	Troweled on textured gypsum drywall and paper with associated joint compound	100 and 103	
A B C	MBB M 5.1	2-foot by 4-foot ceiling panels with punch marks and small pinholes	Throughout	
A B C	MBB M 10.1	Gray sink undercoating	105, 123, 124, 130, 140, 152, 154, 156, 160, 210, 218, 214, 215, 218, 223, 227, 231, 234, 235, 242, 245, and 248	10:30AM JUL 03 2024 

CHAIN OF CUSTODY -BULK ASBESTOS-

CAL241075224

PROJECT INFORMATION

Project Name Mold and ACM Inspection

Project Identifier _____

Project Number 0

Bulk Sample #	HA ID	Sample Material Description	Material Location	Notes
A B C	MBB M 12.1	4-inch black rubber covebase and associated white mastic	119, 120, and 155	
A B C	MBB M 12.2	4-inch beige rubber covebase and associated tan mastic	Throughout	
A B C	MBB M 16.1	4-inch by 4-inch beige ceramic tile and associated gray grout	Mech room	
A B C	MBB M 18.1	Gray concrete floor slab	throughout	
A B C	MBB M 25.1	Black duct seam mastic	associated with duct system above lay in ceiling throughout	
A B C	MBB M 28.1	Green FRP wall panel and associated clear adhesive	hallways on second floor, 144	
A B C D E F G	MBB S 7.1	Beige EFIS exterior	All exterior walls	10:30AM JUL 03 2024 
A B C	MBB T 3.1	2-inch white paper and foil wrapped yellow fiberglass straight pipe insulation	Throughout	



7100 Commercial Avenue Suite 4

Billings, Montana 59101

Phone: 406.248.9161 Fax 406.248.9282

0AL24075224

CHAIN OF CUSTODY -BULK ASBESTOS-

PROJECT INFORMATION

Project Name Mold and ACM Inspection

Project Identifier

Project Number 0

Bulk Sample #	HA ID	Sample Material Description	Material Location	Notes
A B C	MBB T 3.2	4-inch white paper and foil wrapped yellow fiberglass straight pipe insulation	Throughout	

10:30AM

JUL 03 2024

JS

Sliding Door for Wire Security Room - 4 x 8'



More Images & Video

BUILD-IT-YOURSELF

Protect and control access to inventory and equipment. Create enclosures and work areas to fit your specific needs.

- Combine posts, panels and doors.
- For limited spaces. Slides against room to avoid warehouse traffic.
- 10-gauge wire mesh door with 1 1/2" square openings.
- Doors include built-in cylinder lock and keys.
- Hardware included.
- Use with 8' Posts and 4 x 8' Panels, sold separately.

MODEL NO.	DESCRIPTION	WIDTH	HEIGHT	WT. (LBS.)	PRICE EACH		IN STOCK SHIPS TODAY	
					1	4+		
H-8306	Sliding Door	4'	8'	84	\$505	\$485	1	ADD

Door height is 2" shorter than listed.

SHIPS VIA MOTOR FREIGHT

[+ Additional Info](#) [+ Parts](#) [+ Shopping Lists](#) [Request a Catalog](#)

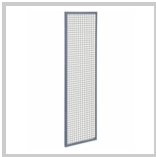
RELATED ITEMS



Post for Wire Security Room - 8'



Panel for Wire Security Room - 4 x 8'



Panel for Wire Security Room - 2 x 8'

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU - Molecular Bioscience - Phase 2

PPA No: 22-0045

Location: Bozeman, MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Vemco

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
<u>23 0541</u>	<u>Part 2</u>	<u>Noise & Vibration control for HVAC Piping & Equipment</u>

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
Vibro Acoustics

- What are the differences between the specified material, system, or equipment and the proposed substitution?
No Difference
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/**N**)
- Does the proposed substitution require changes to the Work of other trades? (Y/**N**)
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/**N**)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

Vemco

SUBMITTED BY (BIDDER / SUB-BIDDER)

Blake Buechler

AUTHORIZED AGENT



8/18/2026

DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)

AUTHORIZED AGENT

08/19/26
DATE

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU - Molecular Bioscience - Phase 2

PPA No: 22-0045

Location: Bozeman, MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Vemco

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
<u>23 2113</u>	<u>Part 2</u>	<u>Hydronic Piping, Flexible Pipe connectors</u>

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
Engineered Flexible Products (EFP)

IMI Flow Design

- What are the differences between the specified material, system, or equipment and the proposed substitution?
No Difference
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/**N**)
- Does the proposed substitution require changes to the Work of other trades? (Y/**N**)
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/**N**)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

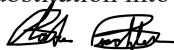
By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

Vemco

SUBMITTED BY (BIDDER / SUB-BIDDER)

Blake Buechler

AUTHORIZED AGENT



8/18/2026

DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)

AUTHORIZED AGENT

DATE



08/19/26

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU - Molecular Bioscience - Phase 2

PPA No: 22-0045

Location: Bozeman, MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Vemco

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
23 2113	Part 2	Hydronic Piping, Flow Balancing Valves

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
IMI Flow Design

- What are the differences between the specified material, system, or equipment and the proposed substitution?
No Difference
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y N)
- Does the proposed substitution require changes to the Work of other trades? (Y N)
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

Vemco
SUBMITTED BY (BIDDER / SUB-BIDDER)

Blake Buechler
AUTHORIZED AGENT



8/18/2026
DATE

Received: _____
DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)

AUTHORIZED AGENT

08/19/26
DATE



PLANNING, DESIGN & CONSTRUCTION

Sixth Avenue and Grant Street
PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: Molecular Bioscience Building Renovation

PPA No: 22-0045

Location: Bozeman MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Jensen Sales & Marketing

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

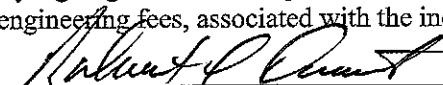
SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
Plumbing	AS-1&2	Taco 4906AD-125 & 4905AD-

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
American Wheatley Air Dirt Separator

- What are the differences between the specified material, system, or equipment and the proposed substitution?
Different Manufacturer
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N) No
- Does the proposed substitution require changes to the Work of other trades? (Y/N) No
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N) Yes

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.


SUBMITTED BY (BIDDER / SUB-BIDDER)

TRAVIS HURST
AUTHORIZED AGENT

8-13-26
DATE

Received:

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)


AUTHORIZED AGENT

08/18/26
DATE



Standard & High Velocity Air Dirt Separator

The American Wheatley HVAD high velocity and STAD standard velocity, coalescing type air & dirt separator is intended for use on commercial HVAC, Institutional, and industrial applications to remove entrained air and particulate from the system water. American Wheatley utilizes a coalescing media consisting of 304SS high performance saddle rings. All American Wheatley are designed and constructed to ASME Section VIII, Division 1 standard. The American Wheatley HVAD & STAD series coalescing type air & dirt separator is capable of removing 99.6% free air and 99% of the measurable entrained and dissolved air with continuous circulation. Solids to 20 microns can be eliminated within 100 passes continuous circulation.

Features:

- HVAD-High Velocity up to 6039 GPM
- STAD-Standard Velocity up to 2599 GPM
- Available with or without removable cover
- Stainless steel coalescing media
- Skim and drain valve connections standard
- Available 2" through 16", with larger sizes POA
- ASME rated 150PSI WP 2"-12", 125PSI WP 14"-16" with higher pressures available
- Designed and built in accordance with ASME Section VI 11, Division I, latest edition

Options:

- Stainless Steel Construction
- Other Alloy Construction
- Higher pressures available
- Painted surface top coat / Epoxy coats
- Magnetic Insert
- Ceiling clips/seismic clips

**NR-
Non Removable
Cover**



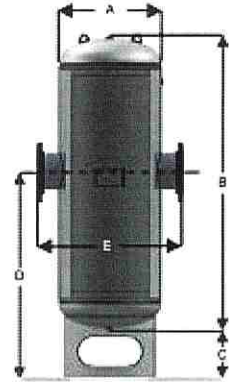
**RC-
Removable
Cover**



2701 W. Concord Street
Broken Arrow, Ok 74012
Toll Free: 866-204-5229 | PH: 918-317-0401
americanwheatley.com | sales@americanwheatley.com

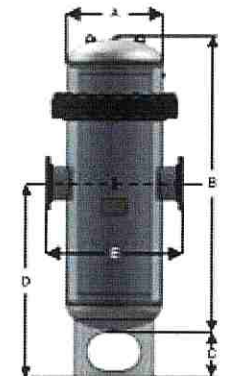
Standard Velocity with Non Removable Cover

MODEL NO	PIPE SIZE	DIA. A (INCH)	TANK HEIGHT B (INCH)	SKIRT HEIGHT C (INCH)	FLANG CRT TO FLOOR D (INCH)	FLANG CRT TO FLANG E (INCH)	SURFACE AREA (SQ. FT.)	OPTIMAL FLOW (GPM)	WEIGHT (LBS)
STAD-2-NR	2	14	24 13/16	6	15	21 3/4	64	50	85
STAD-2.5-NR	2 1/2	14	24 13/16	6	15	21 3/8	39	75	90
STAD-3-NR	3	14	28 7/16	6	15	21 1/4	51	115	100
STAD-4-NR	4	14	28 7/16	6	15	24	51	190	110
STAD-5-NR	5	20	39 13/16	6 3/4	18 3/4	30	106	300	190
STAD-6-NR	6	20	39 13/16	6 3/4	18 3/4	30	106	440	205
STAD-8-NR	8	24	47 1/4	7 1/16	21 1/16	34 5/8	187	750	430
STAD-10-NR	10	30	59 7/16	7 13/16	25 13/16	41 1/4	300	1,200	600
STAD-12-NR	12	30	59 7/16	7 13/16	25 13/16	42 3/4	300	1,700	650
STAD-14-NR	14	36	77 13/16	8 1/2	34 1/2	49 5/8	600	2,040	870
STAD-16-NR	16	36	77 13/16	8 1/2	34 1/2	51	600	2,599	870
STAD-18-NR	18	36	91	13 1/2	55 3/4	48	571.4	3,673	1,665
STAD-20-NR	20	42	100	12 3/4	58 1/2	54	839.4	4,561	2,430
STAD-22-NR	22	48	109	12 5/8	64 5/16	60	1,215.5	5,300	3,205
STAD-24-NR	24	48	118	12 5/8	66 1/8	60	1,295.7	6,346	3,375
STAD-30-NR	30	60	145	14	76 1/2	74	2,336.5	10,262	7,075
STAD-36-NR	36	72	172	15 3/4	92 1/8	90	3,993.1	14,905	12,050



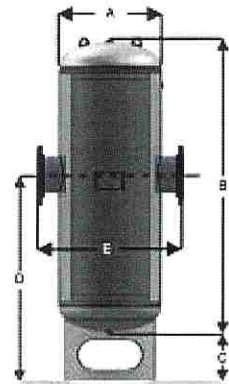
Standard Velocity with Removable Cover

MODEL NO	PIPE SIZE	DIA. A (INCH)	TANK HEIGHT B (INCH)	SKIRT HEIGHT C (INCH)	FLANG CRT TO FLOOR D (INCH)	FLANG CRT TO FLANG E (INCH)	SURFACE AREA (SQ. FT.)	OPTIMAL FLOW (GPM)	WEIGHT (LBS)
STAD-2-RC	2	14	27 1/8	6	15	21 3/4	38	50	265
STAD-2.5-RC	2 1/2	14	27 1/8	6	15	21 3/8	38	75	270
STAD-3-RC	3	14	30 11/16	6	15	21 1/4	51	115	280
STAD-4-RC	4	14	30 11/16	6	15	24	51	190	290
STAD-5-RC	5	20	44 1/16	6 3/4	18 3/4	30	106	300	520
STAD-6-RC	6	20	44 1/16	6 3/4	18 3/4	30	106	440	535
STAD-8-RC	8	24	52 1/2	7 1/16	21 1/16	34 5/8	187	750	870
STAD-10-RC	10	30	64 9/16	7 13/16	25 13/16	41 1/4	300	1,200	1,000
STAD-12-RC	12	30	64 9/16	7 13/16	25 13/16	42 3/4	300	1,700	1,050
STAD-14-RC	14	36	82 15/16	8 1/2	34 1/2	49 5/8	600	2,040	1,523
STAD-16-RC	16	36	82 15/16	8 1/2	34 1/2	51	600	2,599	1,553



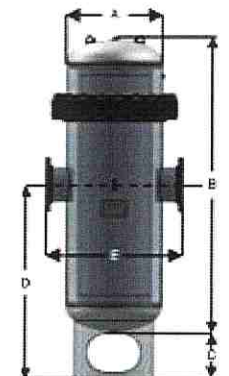
High Velocity with Non Removable Cover

MODEL NO	PIPE SIZE	DIA. A (INCH)	TANK HEIGHT B (INCH)	SKIRT HEIGHT C (INCH)	FLANG CRT TO FLOOR D (INCH)	FLANG CRT TO FLANG E (INCH)	SURFACE AREA (SQ. FT.)	OPTIMAL FLOW (GPM)	WEIGHT (LBS)
HVAD-2-NR	2	14	31 11/16	10 15/16	27 15/16	21 3/4	65.1	108	99
HVAD-2.5-NR	2 1/2	14	31 11/16	10 15/16	27 15/16	21 3/8	65.1	163	103
HVAD-3-NR	3	14	39 1/8	10 15/16	31 3/4	21 1/4	80.6	249	119
HVAD-4-NR	4	14	39 1/8	10 15/16	31 3/4	24	80.6	432	128
HVAD-5-NR	5	20	56 1/2	11 15/16	41 11/16	30	162.2	685	253
HVAD-6-NR	6	20	56 1/2	11 15/16	41 11/16	30	162.2	988	270
HVAD-8-NR	8	24	68 1/16	12 1/8	48 7/8	34 5/8	287	1,714	519
HVAD-10-NR	10	30	84 13/16	12 3/4	58 3/16	41 1/4	455	2,698	736
HVAD-12-NR	12	30	84 13/16	12 3/4	58 3/16	42 3/4	455	3,831	783
HVAD-14-NR	14	36	101 15/16	12 5/8	66 7/8	49 5/8	798.1	4,623	1,101
HVAD-16-NR	16	36	101 15/16	12 5/8	66 7/8	51	798.1	6,039	1,124
HVAD-18-NR	18	42	121	12 3/4	74 1/2	57	1,109.5	8,246	2,945
HVAD-20-NR	20	48	132	12 5/8	80 3/16	62	1,585	10,238	3,715
HVAD-22-NR	22	54	143	13 1/8	88 7/8	67	2,113.4	11,874	5,368
HVAD-24-NR	24	54	148	13 1/8	85 7/8	67	2,430.4	14,245	5,905
HVAD-30-NR	30	66	186	14 13/16	110 1/8	82	4,226.8	23,037	10,650
HVAD-36-NR	36	84	219	15 3/8	129 1/4	104	7,925.2	33,457	21,475



High Velocity with Removable Cover

MODEL NO	PIPE SIZE	DIA. A (INCH)	TANK HEIGHT B (INCH)	SKIRT HEIGHT C (INCH)	FLANG CRT TO FLOOR D (INCH)	FLANG CRT TO FLANG E (INCH)	SURFACE AREA (SQ. FT.)	OPTIMAL FLOW (GPM)	WEIGHT (LBS)
HVAD-2-RC	2	14	34 1/16	10 15/16	27 7/8	21 3/4	64.8	108	281
HVAD-2.5-RC	2 1/2	14	34 1/16	10 15/16	27 7/8	21 3/8	64.8	163	283
HVAD-3-RC	3	14	41 9/16	10 15/16	24 3/4	21 1/4	78.7	249	300
HVAD-4-RC	4	14	41 9/16	10 15/16	24 3/4	24	78.7	432	308
HVAD-5-RC	5	20	60 13/16	11 15/16	42 11/16	30	159	685	587
HVAD-6-RC	6	20	60 13/16	11 15/16	42 11/16	30	159	989	598
HVAD-8-RC	8	24	73 1/4	12 1/8	48 7/8	34 5/8	282.2	1,714	958
HVAD-10-RC	10	30	90 1/8	12 3/4	58 3/16	41 1/4	448.9	2,698	1,129
HVAD-12-RC	12	30	90 1/8	12 3/4	58 3/16	42 3/4	448.9	3,831	1,179
HVAD-14-RC	14	36	108 1/2	12 5/8	66 7/8	49 5/8	787.6	4,623	1,658
HVAD-16-RC	16	36	108 1/2	12 5/8	66 7/8	51	787.6	6,039	1,689





Air & Dirt Separator - Principles of Operation

The obvious function is to remove as much air and dirt from the system fluid so that it does not cause any adverse effects on system efficiency or its components, through continuous circulation. The Wheatley STAD and HVAD air & dirt separators utilize several physical actions to accomplish this. Micro- air bubbles pass through, over, around, above and below the many 304SS saddle rings contained in the coalescing basket. While trying to pass through the coalescing media, the micro-bubbles cling to the myriad of twists and turns required as they continue their journey through the coalescing basket. As these micro-bubbles collect, they join together and form larger air molecules which with then detach from the saddle rings and are expelled from the system through the automatic float type air vent located at the top of the air & dirt separator. As any system pollutants, or dirt, are circulated through the air & dirt separator coalescing basket, they too collide with the saddle rings and are separated from the water and subsequently expelled through periodic blow-down through the blow-down port on the bottom of the separator, or removal and cleaning of the coalescing basket if so equipped.

Separating impurities in the closed circuit hydronic system depends on a number of conditions.

- The capacity for separation increases as the size of the particulate increase
- The capacity for separation increases as the velocity decreases
- The capacity for separation increases with the number of passes through the separator with continuous circulation



Saddle Rings



**STAD/HVAD
NR - Non Removable Cover**



Coalescing Basket



Air In Water Solubility

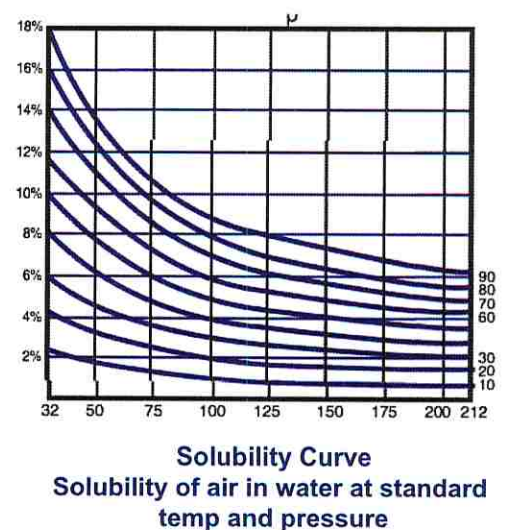
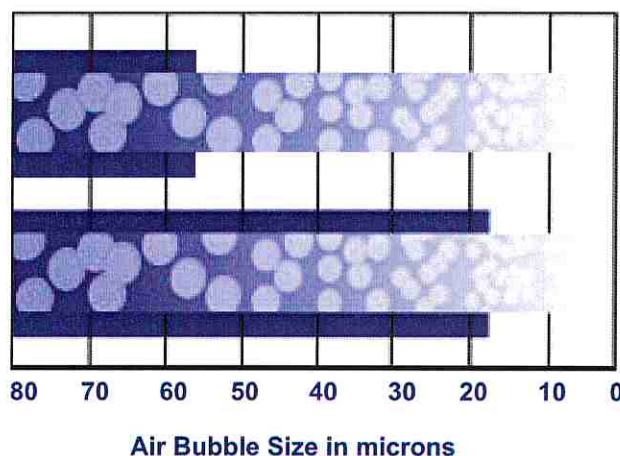
All water contains a certain amount of entrained air; this is commonly referred to as water solubility. As we all know, air is the single worst enemy to any hydronic heating system.

When the air is released from the solution, it can collect and create air pockets at the top of pipes and heating elements, also known "air locking" of a system. The air can also increase the corrosion rate of certain metals throughout the system.

To avoid these unwanted occurrences, air elimination devices are routinely used to remove most of the air trapped in the water molecules. The table shown below depicts the solubility curve for air contained in water.

As noted, increasing the temperature at a fixed or constant pressure reduces the amount of air that can be contained within the water molecule. In this example, at 50 PSIA and at a temperature of 50° F, the water can contain just below 8% air by volume.

Conversely then, at 200° F, the water molecule can contain approximately 3.5% air by volume. Therefore, as you can see, reducing the pressure while temperature remains constant reduces the amount of air that can be dissolved in solution. As indicated below, 125° F water at 80 PSIA would contain approximately 7% air by volume. For purposes of our example, that same 125° F water at 20 PSIA would contain less than 2% air by volume. Therefore, the conclusion must be made that the air contained within the water molecules is least soluble at the points of highest temperature and lowest pressure. The air separators should then be installed at this point in the system.

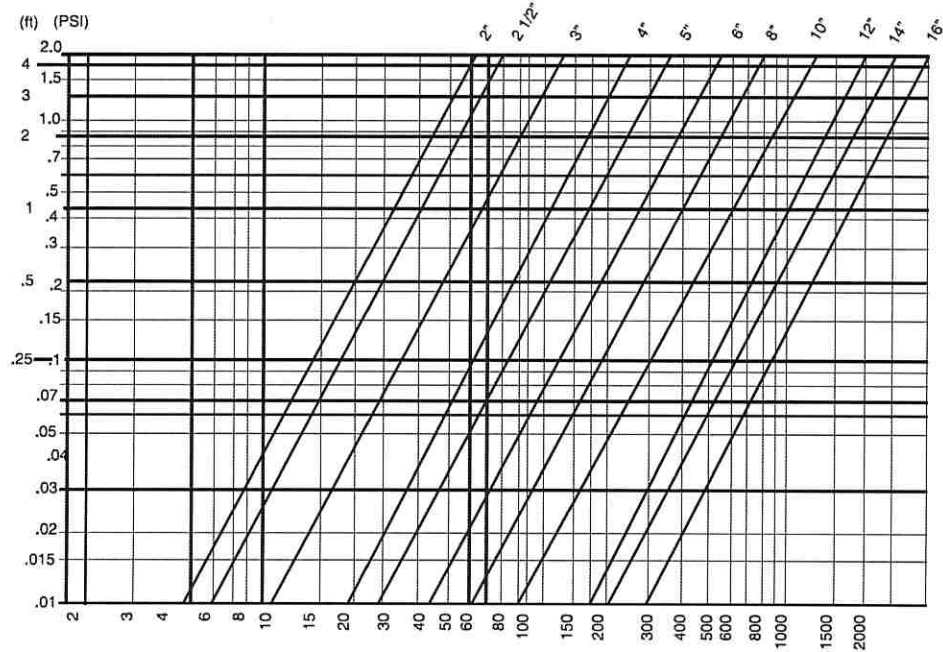




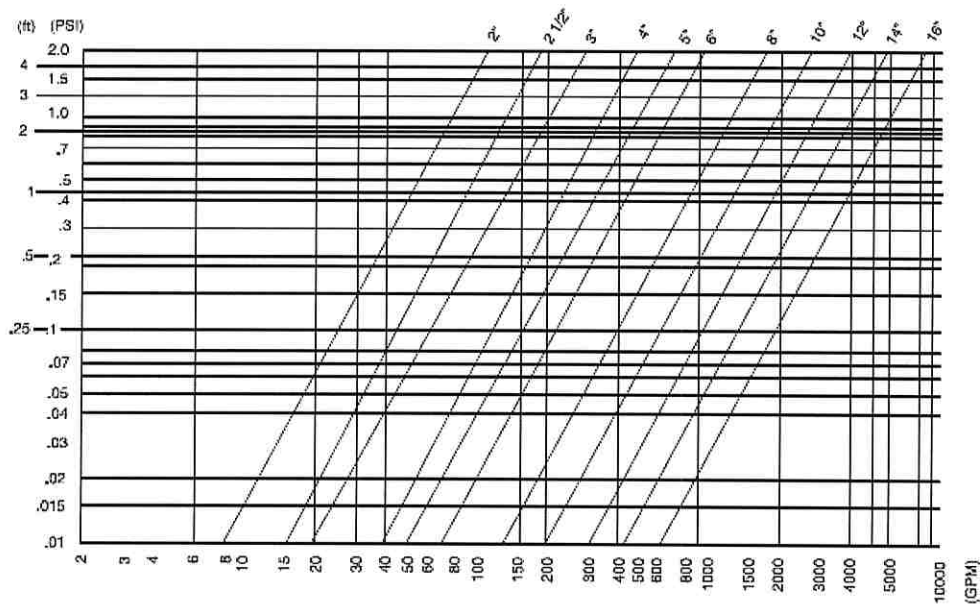
AMERICAN WHEATLEY

4.40.00 S&HV ADS 05-24

STAD PRESSURE DROP



HVAD PRESSURE DROP



2701 W. Concord Street
Broken Arrow, Ok 74012
Toll Free: 866-204-5229 | PH: 918-317-0401
americanwheatley.com | sales@americanwheatley.com





PLANNING, DESIGN & CONSTRUCTION

Sixth Avenue and Grant Street
PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: Molecular Bioscience Building Renovation

PPA No: 22-0045

Location: Bozeman MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Jensen Sales & Marketing

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
Plumbing	PET-1	ST-60V

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
American Wheatley BDT Series Expansion Tank

- What are the differences between the specified material, system, or equipment and the proposed substitution?
Different Manufacturer
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N) No
- Does the proposed substitution require changes to the Work of other trades? (Y/N) No
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N) Yes

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

[Signature]
SUBMITTED BY (BIDDER / SUB-BIDDER)

TRAVIS HURST
AUTHORIZED AGENT

8-13-26
DATE

Received:

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)

[Signature]
AUTHORIZED AGENT

08/18/26
DATE



PLANNING, DESIGN & CONSTRUCTION

Sixth Avenue and Grant Street
PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: Molecular Bioscience Building Renovation

PPA No: 22-0045

Location: Bozeman MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Jensen Sales & Marketing

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
Plumbing	ET-1&2	Taco CA300-125 & CA450-125

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
American Wheatley BDT Series Expansion Tank

- What are the differences between the specified material, system, or equipment and the proposed substitution?
Different Manufacturer
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N) No
- Does the proposed substitution require changes to the Work of other trades? (Y/N) No
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N) Yes

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Valentia Hunt
SUBMITTED BY (BIDDER / SUB-BIDDER)

TRAVIS HURST
AUTHORIZED AGENT

8-13-26
DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☐ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)

AUTHORIZED AGENT

DATE



AMERICAN WHEATLEY

3.00.00 BDT 06-24

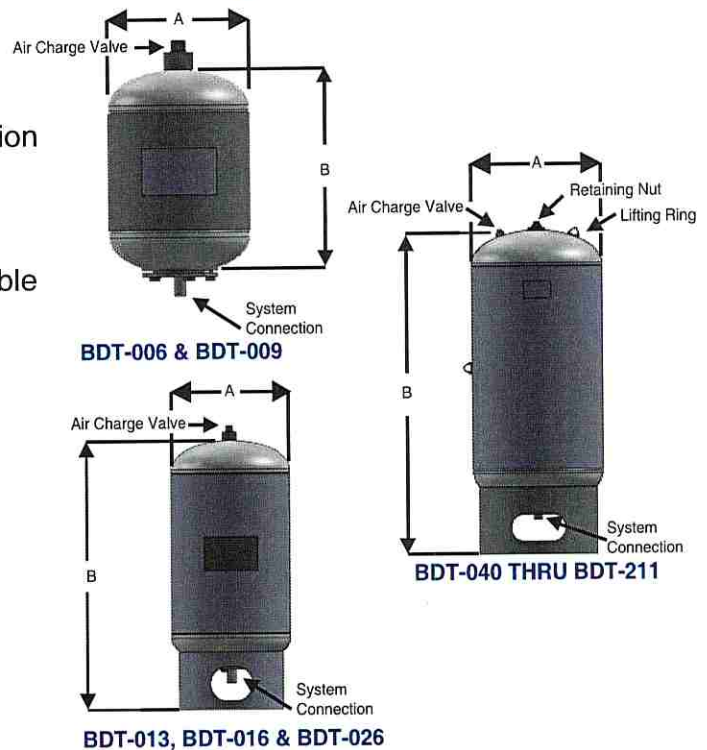
BDT Series ASME “Multi-Purpose” Expansion Tank

Features:

- Constructed in accordance with ASME Section VIII, Division I, Latest Edition
- Stainless Steel System Connection
- EPDM Bladder
- Full Acceptance Bladder Design / Replaceable
- Factory Air Charged to 12 P.S.I.
- Maximum Temperature 280°F Intermittent
- Safe for Potable Water
- Primed Exterior

Optional Features:

- Higher working pressures available
- Top entry
- “Bulls Eye” sight glass
- Seismic mounting (clips or legs)
- Painted Exterior, Epoxy Coatings



PART NUMBER	ACCEPTANCE VOLUME	DIAMETER A (IN.)	HEIGHT B (IN.)	SYSTEM CONNECT (IN.)	WEIGHT	WORKING PRESSURE
BDT-006	6 GALLON	12	12	3/4"	24	150 PSI
BDT-009	9 GALLON	12	17	3/4"	28	150 PSI
BDT-013	13 GALLON	14	28	3/4"	50	150 PSI
BDT-016	16 GALLON	14	32	3/4"	65	150 PSI
BDT-026	26 GALLON	16	40	3/4"	98	150 PSI
BDT-040	40 GALLON	20	41	1"	140	150 PSI
BDT-060	60 GALLON	24	48	1 1/2"	220	150 PSI
BDT-080	80 GALLON	24	50	1 1/2"	235	150 PSI
BDT-112	112 GALLON	30	52	1 1/2"	273	150 PSI
BDT-135	135 GALLON	30	59	1 1/2"	340	150 PSI
BDT-162	162 GALLON	30	61	1 1/2"	360	150 PSI
BDT-185	185 GALLON	30	80	1 1/2"	545	200 PSI
BDT-211	211 GALLON	32	71	1 1/2"	480	150 PSI

All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.
Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.



2701 W. Concord Street
Broken Arrow, Ok 74012
Toll Free: 866-204-5229 | PH: 918-317-0401
www.americanwheatley.com | sales@americanwheatley.com

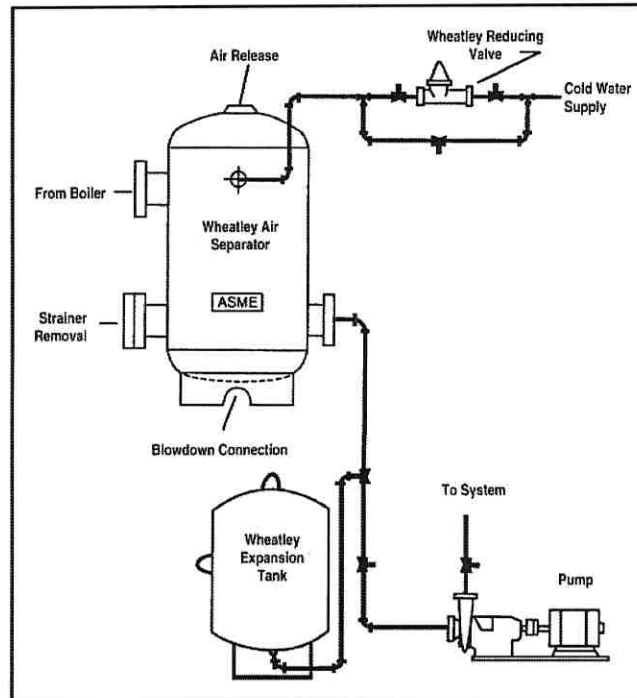
USE:

Designed to absorb expansion of fluids in typical hydronic systems. The BDT Tank is designed for pressure boost systems as well as typical cooling and heating applications. Bladder material is suitable for hot water applications. Installation of the tank will help eliminate constant pump use, prolonging pump life and unnecessary blowing of relief valves.

Specifications:

Furnish and install and shown on plans, American Wheatley BDT series, full acceptance expansion tank. Tank shall be constructed of carbon steel in accordance with ASME Section VIII, Division 1, latest edition. Tank shall incorporate a removable and replaceable heavy duty EPDM bladder. Tank shall be supplied with 12 psi factory air charge. Tanks shall be supplied on standard base ring unless otherwise specified. Tanks shall be constructed and ASME stamped for 150 psi working pressure at 240°F. Tanks shall be supplied with exterior high grade red oxide primer finish. Vertical or horizontal installation is acceptable. Non-replaceable diaphragm type tanks are not acceptable.

Typical Piping Details With Bladder Type Tanks (BDT Series)





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Phone: (406) 994-5413 • Fax: (406) 994-5665

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: Molecular Bioscience Building Renovation

PPA No: 22-0045

Location: Bozeman MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Jensen Sales & Marketing

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
Plumbing	GF-1	Advantage Controls GF-1A1A1G-C12

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
American Wheatley Simplex Glycol Feeder

- What are the differences between the specified material, system, or equipment and the proposed substitution?
Different Manufacturer
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N) No
- Does the proposed substitution require changes to the Work of other trades? (Y/N) No
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N) Yes

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

Robert C. Cline
SUBMITTED BY (BIDDER / SUB-BIDDER)

TRANS HURST
AUTHORIZED AGENT

8-13-26
DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

Provide digital unit.

REVIEWED BY (ARCHITECT) _____

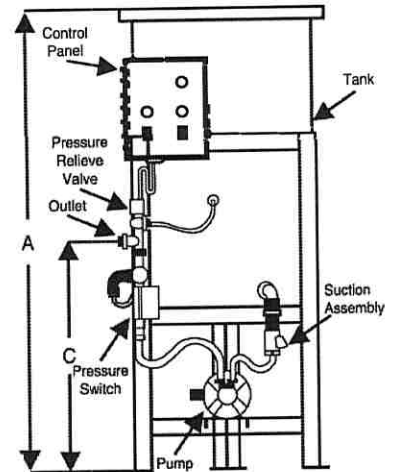
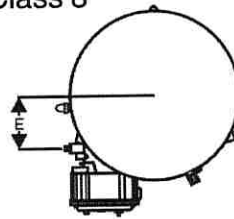
TRANS HURST
AUTHORIZED AGENT

08/18/26
DATE

Simplex SGL Series Glycol Pump System

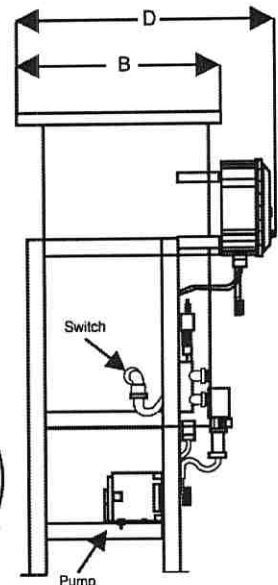
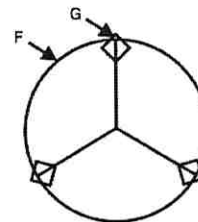
Features:

- Polyethylene tank, includes cover
- Carbon steel tank stand, coated with enamel paint
- 1/4 HP Split-phase Pump Motor, single phase, 115 VAC, 5 amp
- 1/4 HP Pump, brass rotary vane type, optional 1/2 HP Pump available
- Thermal protected motor, 1,725 RPM, Insulation Class 8
- Control Panel, 115 VAC, in-line fuse
- Led indicator lights
- Side entry low level switch, 12 amp relay
- NPT Pressure Switch standard 10 psi cut-in, 40 psi cut-out
- Brass pressure relief valve 20-150 PSI
- 100 PSI Max Pressure
- 150° F Max Temperature
- Pressure gauge, strainer, isolation valve, pressure relief valve



Optional Features:

- 1/2 HP Split-phase Pump Motor, 115/60/1
- Alarm, 95 decibel, with a silence switch
- PLC interface remote dry contact on low level
- Float switch, high level, with remote dry contact (PLC interface)
- Stainless Steel cover, hinge, hardware
- Discharge Steel Manifold with high temperature hoses
- Tank Stand Mounted Mixer, fan cooled, totally enclosed, with control switch
- Pump motor, fan cooled, totally enclosed
- Outdoor rated, fan cooled, totally enclosed pump
- Solid cover, bolted to tank
- Expansion tank



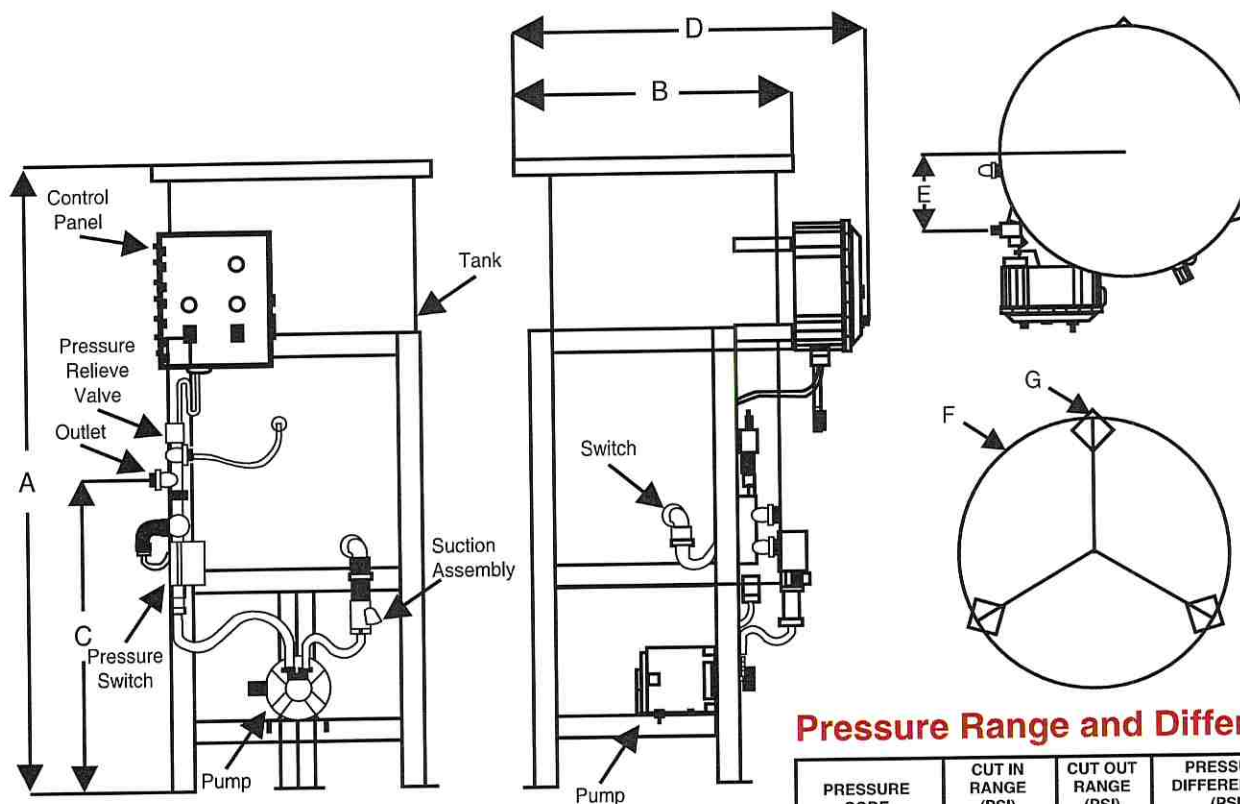
All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.

Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.

JOB NAME _____
LOCATION _____
CONTRACTOR _____
CONTRACTOR P.O. NO. _____

ITEMS	QUANTITY

2701 W. Concord Street
Broken Arrow, OK 74012
Toll Free: 866-204-5229
PH: 918-317-0401
www.americanwheatley.com
e-mail: sales@americanwheatley.com



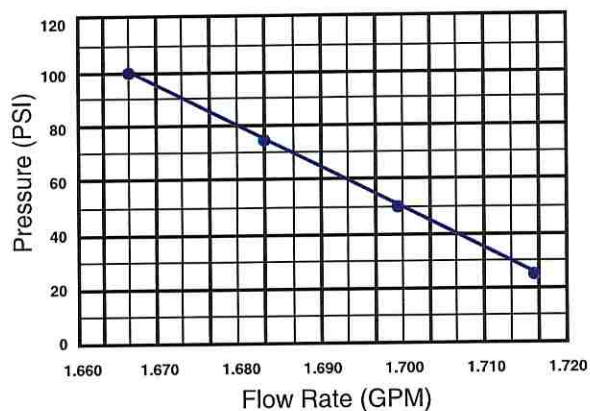
Pressure Range and Differentials

PRESSURE CODE	CUT IN RANGE (PSI)	CUT OUT RANGE (PSI)	PRESSURE DIFFERENTIAL (PSI)
STANDARD	10-45	20-60	10-30
OPTIONAL 1	40-80	65-100	20-40
OPTIONAL 2	3-10	9-30	6-20
DIGITAL	0-149	1-150	1-149

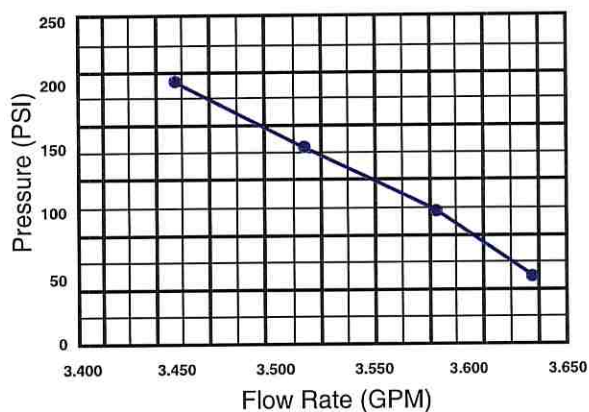
Dimensions

MODEL NO.	GALLONS	HEIGHT A (INCH)	PUMP WIDTH B (INCH)	OVERALL WIDTH C (INCH)	OUTLET TO BASE D (INCH)	OUTLET TO CENTER E (INCH)	DIAMETER F (INCH)	OUTLET G (INCH)	SHIPPING DIMENSIONS	SHIPPING WEIGHT
SGL-15-E-[-][-]	15	42 1/2"	17 3/8"	19 7/8"	25 1/2"	6"	20 1/4"	3/8"	31"X31"X50"	92 LBS
SGL-30-E-[-][-]	30	50 1/4"	20 5/16"	28"	28"	7"	23 5/8"	3/8"	31"X37"X56"	118 LBS
SGL-50-E-[-][-]	50	55 1/2"	24 7/8"	27 7/8"	31"	7 3/4"	27 1/8"	3/8"	31"X37"X62"	132 LBS
SGL-100-E-[-][-]	100	72 1/4"	30 3/8"	27 7/8"	36"	9"	32 1/8"	3/8"	38"X38"X70"	182 LBS

Standard 1/4 HP Pump
Pressure vs Flow



Optional 1/2 HP Pump
Pressure vs Flow



Dimensions are subject to change without notice, Please confirm actual dimensions with factory at time of order.

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SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: Molecular Bioscience Building Renovation

PPA No: 22-0045

Location: Bozeman MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Jensen Sales & Marketing

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

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SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
Mechanical	B-2&3	Lochinvar FTX-400N

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
Camus Valiant Condensing Boiler

- What are the differences between the specified material, system, or equipment and the proposed substitution?
Different Manufacturer
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N) No
- Does the proposed substitution require changes to the Work of other trades? (Y/N) No
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N) Yes

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

[Signature]
SUBMITTED BY (BIDDER / SUB-BIDDER)

TRAVIS HURST
AUTHORIZED AGENT

8-13-26
DATE

Received:

DATE

Architect's Action: ☒ Rejected

☐ Rejected – For reasons as follows:

Existing Lochinvar boiler are on site to be reused.
Boiler need to function together.

☐ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)

AUTHORIZED AGENT

DATE

Date: _____ Engineer: _____
 Job: _____ Contractor: _____
 Model #: _____ End User: _____
 Representative: _____ Prepared By: _____



VALIANT_{FT}

Condensing Boiler - Hydronic Heating

The Valiant-FT is a condensing residential/commercial boiler for hydronic heating system at working pressures up to 80PSI.

- ANSI Z21.13/CSA 4.9 Certified
- ASME Certified; "H" Stamp / National Board Listed
- Canadian Registration Number (CRN)
- CSD-1 Compliant



Standard Features

- ASME "H" stamped stainless steel heat exchangers
- Fully welded construction with stainless steel pressure vessel, combustion chamber, tubes, and tubesheets
- Modulating boiler with up to 10:1 turn-down
- 95% DOE AFUE efficiency (VA0080-VA0299)
- 97% thermal & combustion efficiency (VA0399)
- Natural gas or propane gas operation (Field Convertible)
- Standard wall-hung configuration
- Optional kit for floor-mount configuration
- Top and bottom water and gas connections
- 30PSI operating pressure (VA0080 to VA0155)
- 80PSI operating pressure (VA0199 to VA0399)
- Category IV venting (up to 100' of flue and 100' of air intake)
- Universal vent adapter with built-in combustion analyzer port
- Condensate trap
- Stainless steel knitted metal fiber premix burner
- Venturi for precise air/gas ratio control
- Low gas pressure operation
- Low air pressure switch
- Blocked flue switch
- Low NOx operation
- Direct spark ignition
- Flame sensor
- Direct vent - sealed combustion
- Built-in high limit with soft manual reset through touchscreen
- Return water temperatures as low as 40°F
- Inlet, outlet and stack sensors
- ASME relief valve
- Inherent O2 trim via air density response
- Flame viewport for visual inspection of ignition and boiler combustion during firing
- On/Off switch
- Condensate trap
- Zero clearances to combustible materials
- Factory test-fired and certified
- 10-year warranty on heat exchanger (see warranty details)
- 5-year warranty on burner (see warranty details)
- 1-year warranty on parts (see warranty details)



Date: _____ Engineer: _____
 Job: _____ Contractor: _____
 Model #: _____ End User: _____
 Representative: _____ Prepared By: _____



Standard Control Features

- Externally mounted 7" color touchscreen for user control
- Internally mounted digital screen for start-up and service
- Graphic representation of firing rate
- System temperature sensor
- Outdoor reset sensor
- Flue temperature sensor
- Enable/disable relay
- High limit with soft manual reset
- LWCO with soft manual reset
- Alarm contacts
- Pump enable contacts
- Air inlet damper (or damper) contacts
- Modbus standard, protocol translator available for other communication needs
- BAS Gateway: BACnet MSTP/IP, LonWorks or Metasys N2
- Freeze protection
- PWM (pulse width modulation) signal output for modulating fan speeds
- Service reminder
- 0-10VDC analog setpoint demand
- 0-10VDC modulation rate control
- Built-in cascade management for up to 64 boilers
- Lead-lag staging and auto-lead rotation
- Flame signal monitoring
- ΔT heat exchanger protection algorithm
- Indirect DHW
- Adjustable target temperature; inter-stage delay; anti-short cycle
- Display run hours
- Flame failure signal
- Molex connectors for ease of service
- Error message display in text
- Error history with cycle stamp
- Manual override of boiler modulation rate

Optional Features

- ☐ Condensate neutralization kit
- ☐ BMS gateway: BACnet MSTP/IP, LonWorks or Metasys N2
- ☐ Optional low gas pressure switch with manual reset
- ☐ Optional pressure relief valves: 30PSI, 45PSI, 50PSI, 60PSI, 75PSI, 80PSI
- ☐ Floor mount kit
- ☐ Outdoor installation kit (Consult Factory)

Venting Options

- Category IV venting
- Direct venting
- Room air
- Horizontal & vertical venting
- Outdoor venting (Consult Factory)

Venting Material

- Stainless steel or AL29-4C for all system applications
- Polypropylene for all system applications
- CPVC for select low temperature systems – consult factory
- PVC for select low temperature systems – consult factory

Minimum Power Requirements			
Model	Voltage Requirement	Full Load Amps	Maximum Over Protection
VA0080	115VAC, 60Hz, Single Phase	4	15
VA0110	115VAC, 60Hz, Single Phase	4	15
VA0155	115VAC, 60Hz, Single Phase	4	15
VA0199	115VAC, 60Hz, Single Phase	4	15
VA0250	115VAC, 60Hz, Single Phase	4	15
VA0299	115VAC, 60Hz, Single Phase	4	15
VA0399	115VAC, 60Hz, Single Phase	4	15

Date: _____ Engineer: _____
 Job: _____ Contractor: _____
 Model #: _____ End User: _____
 Representative: _____ Prepared By: _____



Heat Exchanger Head Loss and Flow															
Model		VA0080		VA0110		VA0155		VA0199		VA0250		VA0299		VA0399	
Unit		GPM	ft-hd	GPM	ft-hd	GPM	ft-hd	GPM	ft-hd	GPM	ft-hd	GPM	ft-hd	GPM	ft-hd
Temperature Rise (°F)	20	7.59	1.66	10.44	2.56	14.71	4.99	18.89	2.69	23.73	4.32	28.38	3.23	38.67	4.91
	25	6.08	1.27	8.35	1.69	11.77	3.27	15.11	1.85	18.98	2.98	22.71	2.39	30.94	3.29
	30	5.06	0.98	6.96	1.44	9.81	2.45	12.59	1.45	15.82	2.30	18.92	1.62	25.78	2.45
	35	4.34	0.86	5.97	1.19	8.41	1.99	10.79	1.15	13.56	1.86	16.22	1.32	22.10	1.95
	40	3.80	0.64	5.22	0.94	7.36	1.70	9.44	1.00	11.87	1.55	14.19	1.13	19.34	1.60

Model	Maximum Flow	Minimum Flow	
		High Fire	Low Fire
	GPM	GPM	GPM
VA0080	17.0	3.0	1.0
VA0110	17.0	4.2	1.0
VA0155	17.0	5.9	1.0
VA0199	27.0	7.6	1.5
VA0250	27.0	9.5	1.5
VA0299	27.0	11.4	1.5
VA0399	38.0	15.5	4.5

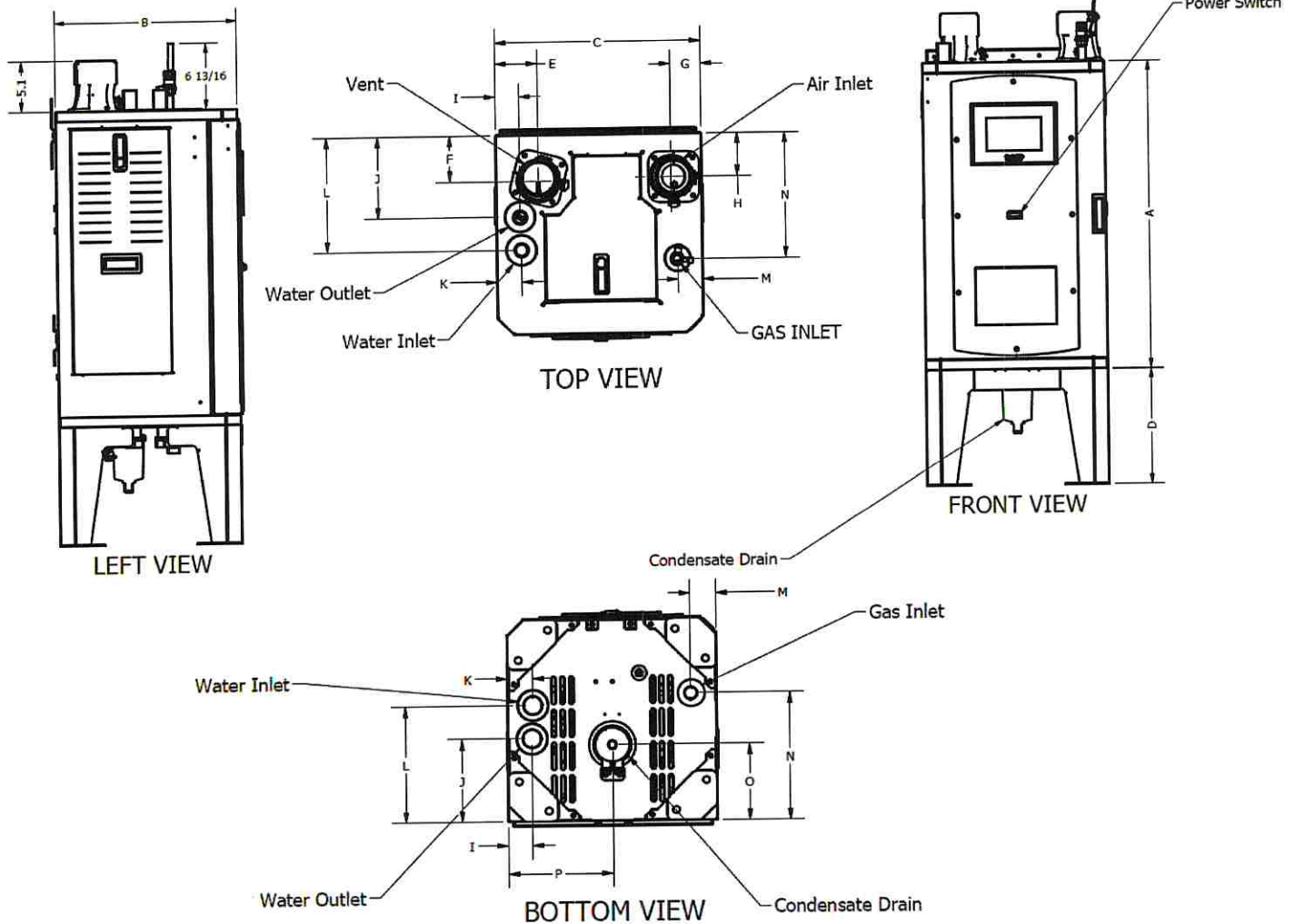
Shipping Weights	
Model	Weight lb. (kg)
VA0080	130 (60)
VA0110	130 (60)
VA0155	170 (77)
VA0199	200 (90)
VA0250	200 (90)
VA0299	240 (109)
VA0399	250 (113)

Input / Output / High Altitude								
Model	Max Input Btu/hr (kw)	Max Output Btu/hr (kw)	Min Input Btu/hr (kw)		Max Input > 2000 ft Btu/hr (kw)	Max Output > 2000 ft Btu/hr (kw)	Min Input > 2000 ft Btu/hr (kw)	
			NG	LP			NG	LP
VA0080	80,000 (23.4)	76,000 (22.2)	11,000 (3.2)	16,000 (4.6)	72,000 (21.1)	68,400 (20.0)	9,900 (2.9)	14,400 (4.2)
VA0110	110,000 (32.2)	104,500 (30.6)	11,000 (3.2)	22,000 (6.4)	99,000 (29.0)	94,050 (27.5)	9,900 (2.9)	19,800 (5.8)
VA0155	155,000 (45.4)	147,250 (43.1)	15,500 (4.5)	31,000 (9.0)	139,500 (40.8)	132,525 (38.8)	13,950 (4.0)	27,900 (8.1)
VA0199	199,000 (58.3)	189,050 (55.4)	19,900 (5.8)	39,800 (11.6)	179,100 (52.4)	170,145 (49.8)	17,910 (5.2)	35,820 (10.4)
VA0250	250,000 (73.2)	237,500 (69.6)	25,000 (7.3)	50,000 (14.6)	225,000 (65.9)	213,750 (62.6)	22,500 (6.5)	45,000 (13.1)
VA0299	299,000 (87.6)	284,050 (83.2)	29,900 (8.7)	59,800 (17.5)	269,100 (78.8)	255,645 (74.9)	26,910 (7.8)	53,820 (15.7)
VA0399	399,000 (116.9)	387,030 (113.0)	39,900 (11.6)	79,800 (23.3)	359,100 (105.2)	348,327 (102.0)	35,910 (10.5)	71,820 (21.0)

Minimum Service Clearance					
Model	Top	*Right	*Left	Back	Front
VA0080	12" (30cm)	None	None	None	24" (60cm)
VA0110	12" (30cm)	None	None	None	24" (60cm)
VA0155	12" (30cm)	None	None	None	24" (60cm)
VA0199	12" (30cm)	None	None	None	24" (60cm)
VA0250	12" (30cm)	None	None	None	24" (60cm)
VA0299	12" (30cm)	None	None	None	24" (60cm)
VA0399	12" (30cm)	None	None	None	24" (60cm)

*: Left and right panels can be easily removed to give extra access to the unit from the sides. This access is not necessary for servicing but if you require access to the sides, leave enough clearance on each side.

Date: _____ Engineer: _____
 Job: _____ Contractor: _____
 Model #: _____ End User: _____
 Representative: _____ Prepared By: _____



Dimensional Data							
Model	VA0080	VA0110	VA0155	VA0199	VA0250	VA0299	VA0399
A in. (mm)	32 (813)	32 (813)	32 (813)	33 1/2 (851)	33 1/2 (851)	35 1/2 (902)	35 1/2 (902)
B in. (mm)	18 1/2 (470)	18 1/2 (470)	18 1/2 (470)	18 1/2 (470)	18 1/2 (470)	21 (533)	21 (533)
C in. (mm)	19 (483)	19 (483)	19 (483)	21 (533)	21 (533)	23 (584)	23 (584)
D in. (mm)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
E in. (mm)	3 7/8 (98)	3 7/8 (98)	3 15/16 (100)	4 1/4 (108)	4 1/4 (108)	4 15/16 (125)	4 15/16 (125)
F in. (mm)	4 1/4 (108)	4 1/4 (108)	2 1/2 (63)	2 7/8 (73)	2 7/8 (73)	4 7/16 (113)	4 7/16 (113)
G in. (mm)	2 13/16 (71)	2 13/16 (71)	2 11/16 (68)	2 7/16 (62)	2 7/16 (62)	3 5/16 (84)	3 5/16 (84)
H in. (mm)	4 1/16 (103)	4 1/16 (103)	4 1/16 (103)	3 1/16 (78)	3 1/16 (78)	2 3/4 (70)	2 3/4 (70)
I in. (mm)	2 3/16 (56)	2 3/16 (56)	1 15/16 (49)	2 3/8 (60)	2 3/8 (60)	2 15/16 (75)	2 15/16 (75)
J in. (mm)	7 5/8 (194)	7 5/8 (194)	7 5/8 (194)	7 1/2 (190)	7 1/2 (190)	9 1/6 (233)	9 1/6 (233)
K in. (mm)	2 5/16 (59)	2 5/16 (59)	2 3/16 (56)	2 3/8 (60)	2 3/8 (60)	2 15/16 (59)	2 15/16 (59)
L in. (mm)	10 11/16 (271)	10 11/16 (271)	10 3/4 (273)	11 3/16 (284)	11 3/16 (284)	13 5/16 (338)	13 5/16 (338)
M in. (mm)	2 5/16 (59)	2 5/16 (59)	2 3/16 (56)	2 (51)	2 (51)	3 9/16 (90)	3 9/16 (90)
N in. (mm)	11 11/16 (297)	11 11/16 (297)	11 9/16 (294)	12 1/8 (308)	12 1/8 (308)	14 5/8 (371)	14 5/8 (371)
O in. (mm)	7 (178)	7 (178)	7 (178)	7 9/16 (192)	7 9/16 (192)	9 1/16 (230)	9 1/16 (230)
P in. (mm)	9 1/2 (241)	9 1/2 (241)	9 1/2 (241)	11 1/2 (292)	11 1/2 (292)	13 1/2 (343)	13 1/2 (343)
Air Inlet, in.	3	3	3	3	3	3	3
Flue Vent, in.	3	3	3	3	3	3	3
Water Conn. in. NPT	1	1	1	1 1/4	1 1/4	1 1/2	1 1/2
Gas Conn. in. NPT	1/2	1/2	1/2	1/2	3/4	3/4	3/4



PLANNING, DESIGN & CONSTRUCTION

Sixth Avenue and Grant Street
PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: Molecular Bioscience Building Renovation

PPA No: 22-0045

Location: Bozeman MT

Owner: MONTANA STATE UNIVERSITY Bidder (Sub-): Jensen Sales & Marketing

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
Plumbing	MV-1	Acorn ET71-3-BVS-OTG

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
Lawler 802 Thermostatic Water Controller (86008)

- What are the differences between the specified material, system, or equipment and the proposed substitution?
Different Manufacturer
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N) No
- Does the proposed substitution require changes to the Work of other trades? (Y/N) No
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N) Yes

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

[Signature]
SUBMITTED BY (BIDDER / SUB-BIDDER)

[Signature]
AUTHORIZED AGENT

8-13-26
DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)

[Signature]
AUTHORIZED AGENT

08/18/26
DATE



Model 802 Thermostatic Water Controller High-Low Water Mixer Eng. No. 86008

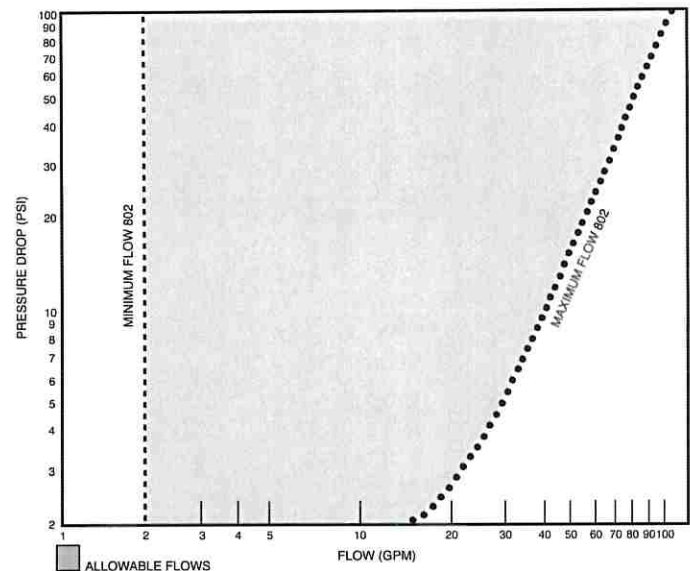
CAPACITIES – MODEL 802

Pressure Drop PSI	5	10	20	30	45	60	80
Valve Number	Capacity						
802-GPM	28	39	54	66	80	91	103
802-LPM	106	148	208	247	303	341	388

1/2 gpm when properly installed in recirculated system.

Master water mixing valve shall be of the thermostatic type with liquid-filled thermal motor. It shall have lead free brass body construction with replaceable corrosion-resistant components. Valve construction shall employ a sliding piston control mechanism. Sliding piston and liner shall be of stainless steel material. Valve shall come equipped with union end stop and check inlets with removable stainless steel strainers. Valve shall control temperature from a low flow of 2 GPM* up to a maximum flow rate for a given pressure differential. Valve shall provide protection against hot or cold supply line failure and thermostat failure.

Unit includes a dial thermometer and shut-off valve on tempered water outlet. Unit is assembled and tested with necessary fittings and nipples.



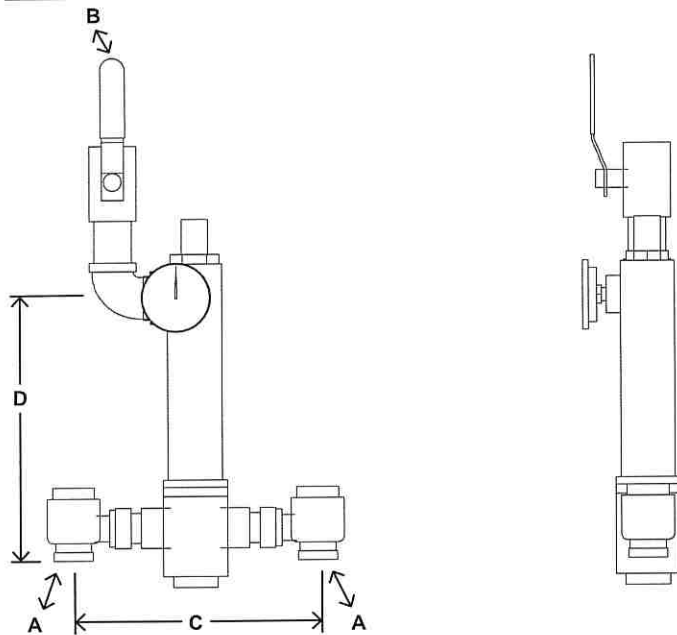
FINISH: Brass ☐
Rough Chrome ☐
Other ☐

TEMP. RANGE **SET POINT**

70° to 100°F 80°F ☐
90° to 120°F 110°F ☐
110° to 140°F 130°F ☐
Special _____ ☐

Optional Test Connection ☐
Including garden hose connection,
shut-off and thermometer.

Brass ☐
Rough Chrome ☐



DIMENSIONS

Valve Number	A	N.P.T.	B	N.P.T.	C	D
802	1"		1-1/4"		11"	12"

Dimensions are for reference purposes only. For rough-in dimensions please refer to Lawler's Revit/BIM models found at temperedwater.com.

Model 802 Eng. No. 86008

Typical Installation

Install the mixing valve below the hot water tank or heater. If this is not possible, pipe in a heat trap as shown in Figure 1 with an approximate 2' drop.

Connect a tempered water return line as shown in Figure 1. This allows flow through both ports of the mixing valve during periods of no draw.

If a dual temperature system is used, a separate recirculating loop and pump are required to return high temperature hot water to the water heater. See Figure 2.

Install an aquastat at the tempered water return pump.

Install the water heater per manufacturer's instructions.

Figure 1

When used in a single temperature recirculating system

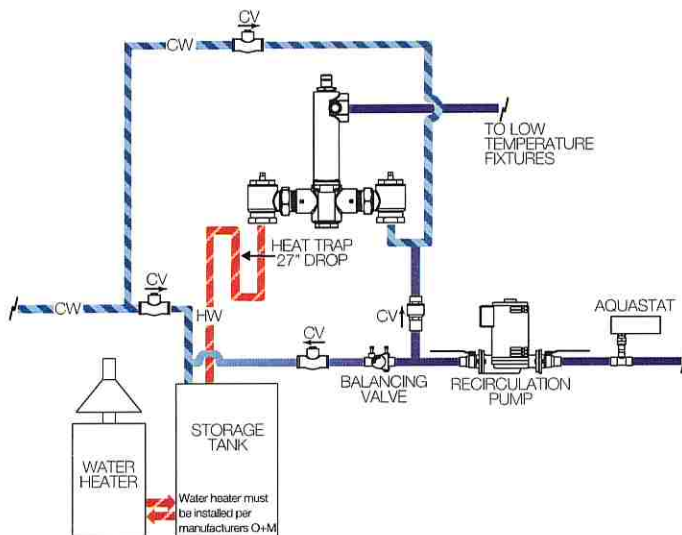
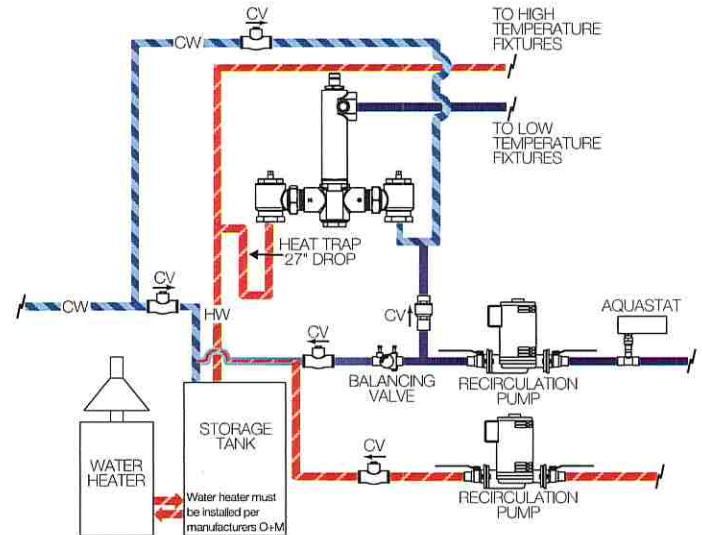


Figure 2

When used in a dual temperature recirculating system





PLANNING, DESIGN & CONSTRUCTION

Sixth Avenue and Grant Street
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Phone: (406) 994-5413 • Fax: (406) 994-5665

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: Molecular Bioscience Building Renovation

PPA No: 22-0045

Location: Bozeman MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Jensen Sales & Marketing

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
Plumbing	ES-1	Acorn S3120

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
Stingray T5510 Floor Mounted Combination Shower / Eye/ Face Wash
w/ SV125RB Thermostatic Mixing Valve

- What are the differences between the specified material, system, or equipment and the proposed substitution?
Different Manufacturer
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N) No
- Does the proposed substitution require changes to the Work of other trades? (Y/N) No
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N) Yes

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.


SUBMITTED BY (BIDDER / SUB-BIDDER)

TRAVIS HURST
AUTHORIZED AGENT

8.13.26
DATE

Received:

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)


AUTHORIZED AGENT

DATE

08/18/26



5330 East 25th Street
Indianapolis Indiana 46218
(888) 445-4142
www.tepid.com

ANSI/ISEA Z358.1 Certified
Patent Information:
tepid.com/patents

Stingray Systems T5510/T5515 Floor Mounted Combination Shower & Eye/Face Wash

The T5510 emergency combination shower and eye/face wash is a floor-mounted unit that includes an integrated mixing valve so that the plumbing can be run directly to the unit. The combination shower shall be manufactured of corrosion resistant materials. The integral valve assembly shall be nickel-plated brass unit with machined 1¼" connections with check valves for hot and cold-water inlet connections. It shall include a centrally located activator with universal ANSI compliant sign.

The integral valve assembly shall control outlet temperature over a wide range of flow and shall be suitable for combination shower applications in order to comply with the latest ANSI/ISEA Z358.1 requirements. Temperature adjustment shall be vandal resistant.

The control mechanism shall employ a liquid-filled thermostatic motor to drive the valve without additional power requirements. The control mechanism shall employ a stainless steel sliding piston control device with reverse seat closure and both fixed and variable cold-water bypass.

In the event of interruption of the cold water supply, the control mechanism closes off the hot water port, stopping all flow (POSITIVE HOT WATER SHUTOFF). In the event of interruption of the hot water supply, the control mechanism shall allow cold flow through both the fixed and variable bypass. In the event that the liquid motor fails, the control mechanism closes off the hot water port with the reverse seat and fully opens the internal variable bypass to allow cold-water flow.

The bowl assembly shall include a First Aid Red ABS or Stainless Steel bowl. The spray heads shall be PVC with dust caps and designed to flow at the specified flow rate. The spray heads shall be incorporated into a Quick Switch Eyewash Block that can be easily removed and serviced, allowing the supply piping to be flushed. The Quick Switch Eyewash Block shall be a single supply source eyewash to ensure symmetrical and equal flow through each spray head.

The unit shall include a First Aid Red ABS or Stainless Steel showerhead designed to give the user uniform and non-forceful flow over the entire coverage area at 20 gpm at 30psi. A stainless steel pull handle connected to the nickel-plated ball valve accomplishes activation of the shower.

The unit shall incorporate a ¼" thick base plate that is 8" in diameter and shall be secured to the floor with appropriate anchors. The piping of the unit shall be specified and will serve as the drainpipe to take water away from the eye/face wash portion of the fixture as well as to supply water to the showerhead portion of the fixture. It shall be at the correct length to get the individual components to the correct elevations per ANSI/ISEA Z358.1. The emergency combination station shall be installed level and be self-draining to hinder bacteria growth. The station shall also be independently certified to meet the latest ANSI/ISEA Z358.1 requirements.



Series: T5510/T5515

Model Number:

- ☐ T5510 Floor Mounted Standard Combo Eye/Face
- ☐ T5515 Floor Mounted Barrier-Free Eye/Face

Pipe Finish:

- ☐ Galvanized (GA)
- ☐ Epoxy Coated (EP)
- ☐ Stainless Steel (SS)

Quick Switch Eyewash Block Options:

- ☐ Filter (FLT)
- ☐ No Filter (NFT)

Bowl Showerhead Material Options:

- ☐ ABS Bowl/ABS Showerhead (AB/AB)
- ☐ Stainless Steel Bowl/ABS Showerhead (SS/AB)
- ☐ ABS Bowl/Stainless Steel Showerhead (AB/SS)
- ☐ Stainless Steel Bowl/Stainless Steel Showerhead (SS/SS)

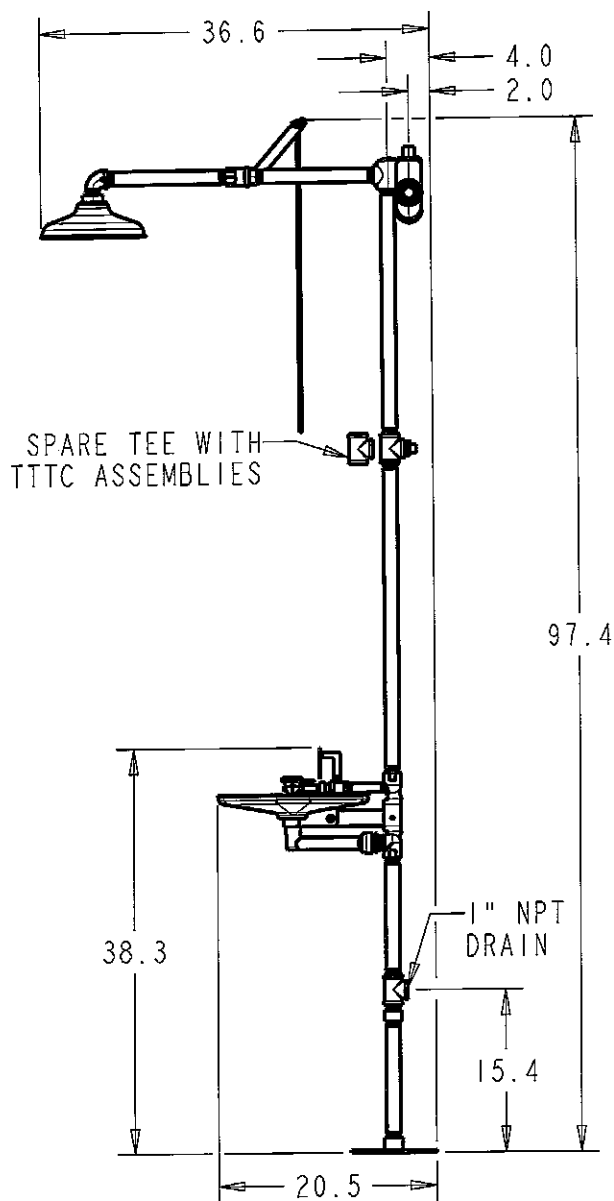


ASSE 1071 Approved

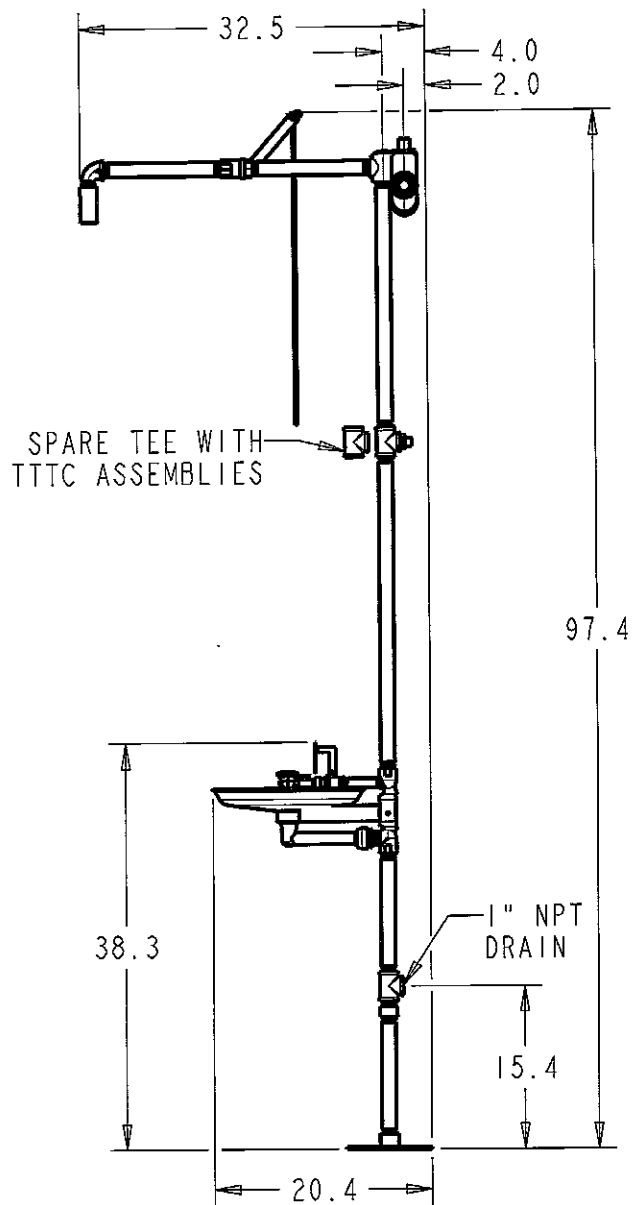


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Patent Information:
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Model: T5510 ABS

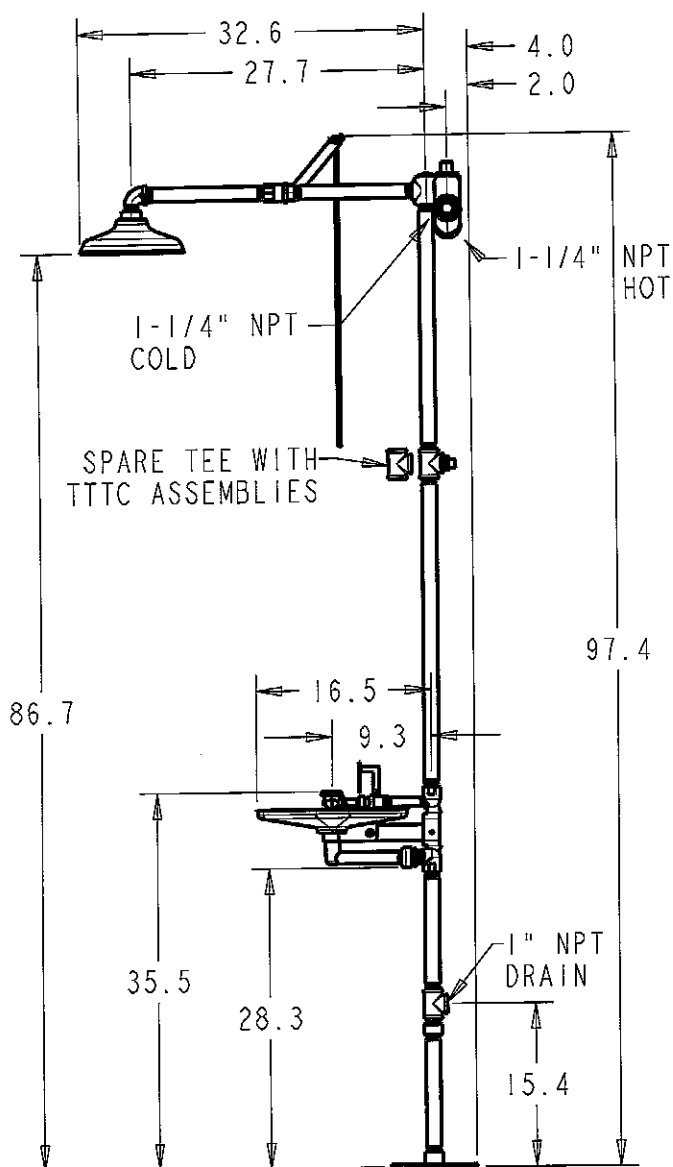


Model: T5510 SS

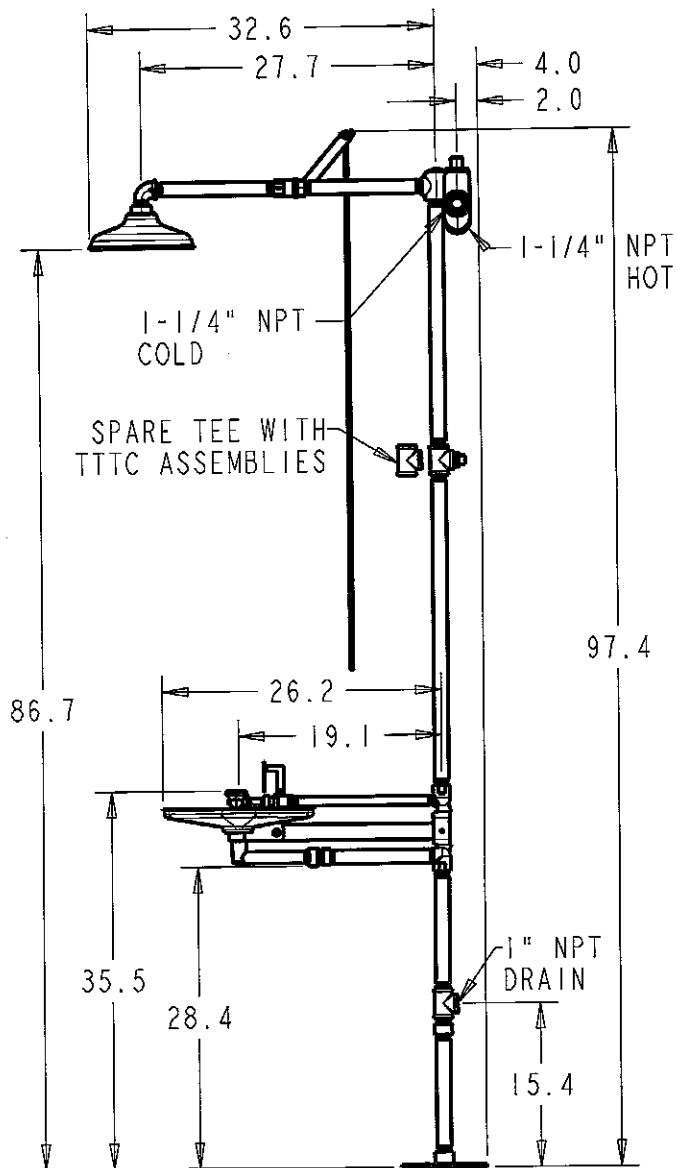


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Patent Information:
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Model: T5515 ABS



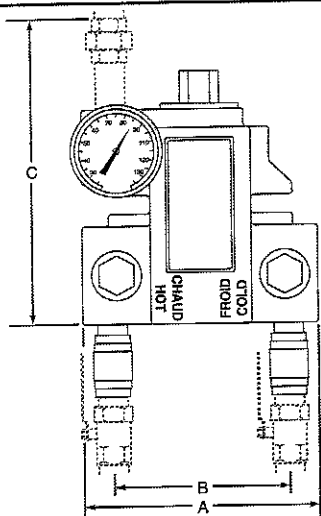
Model: T5515 SS

Illustrations shown with ABS Shower Head. Design and specification subject to change without notice.

Thermostatic Mixing Valve Model SV125 Emergency Shower Eyewash Unit No. 85808

ASSE Lead Free
CertifiedInlets & Outlet
are 1 1/4" NPT

ASSE 1071 Approved



The Emergency Shower and Eyewash Mixing Valve shall control outlet temperature over a wide range of flow and shall be suitable for a single shower or for single or multiple eyewash applications in order to comply with ANSI standard Z358.1-2014. The valve shall include a thermometer to measure the temperature of the stream. Temperature adjustment shall be vandal-resistant.

The control mechanism shall employ a liquid-filled thermostatic motor to drive the valve without additional power requirements. The control mechanism shall employ a stainless steel sliding piston control device with reverse seat closure and both fixed and variable cold water bypass.

In the event of interruption of the cold water supply, the control mechanism closes off the hot water port, stopping all flow. Positive hot water shut-off.

In the event of interruption of the hot water supply, the control mechanism shall allow cold flow through both the fixed and variable bypass.

In the event that the liquid motor fails, the control mechanism closes off the hot water port with the reverse seat and fully opens the internal variable bypass to allow cold water flow.

Maximum Inlet Pressure: 125 PSI.

Recommended Operating Pressure: 65 PSI.

Minimum Supply Pressure: 35 PSI.

Recommended Inlet Temperature: 120°F.*

VALVE FINISH

Rough Bronze ☐

Chrome Plate ☐

TEMP. RANGE

70° to 90°F

SET POINT

85°F ☐

*When supplying 140°F or greater, additional outlet controls should be used.

STINGRAY
systems

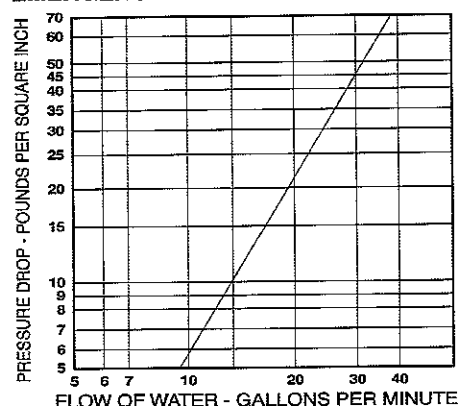
5330 East 25th Street
Indianapolis Indiana 46218
(888) 445-4142
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Helps meet
ANSI standard
Z358.1-2014

DIMENSIONS:

Valve Number	A	B	C
SV125	7"	5"	9"

CAPACITY OF TYPE SV125 THERMOSTATIC MIXING VALVE FOR EMERGENCY SHOWER AND EYEWASH



CAPACITIES - MODEL SV125

Pressure Drop PSI	5	10	20	30	45
Tempered Flow GPM	9	13	17	25	27
Tempered Flow LPM	34	49	64	94	102

BYPASS CAPACITIES - MODEL SV125

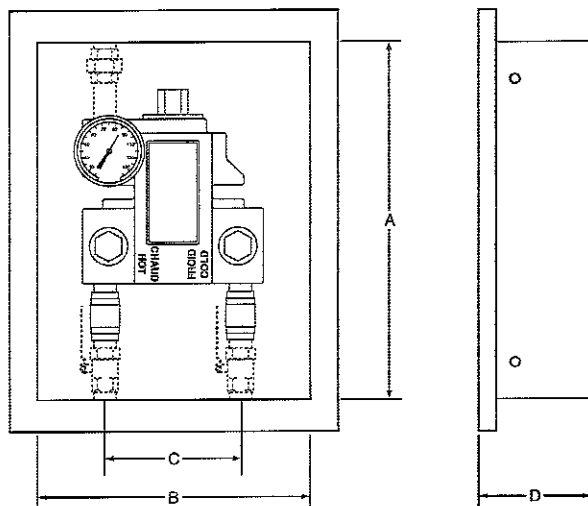
Pressure Drop PSI	5	10	20	30	45
Cold Bypass GPM	7	10	14	21	22
Cold Bypass LPM	26	37	53	79	83

Mounting Bracket ☐

Note: The mixing valve must be installed with inlet check valves and the shower or the Eyewash/Facewash fixture should be installed 4 to 10 feet from the mixing valve. Hot and cold water inlet pressures must be equal.

Provisions shall be made to thermally isolate the valve.

Design and specification subject to change without notice.



www.tepid.com

DATA SHEET

Patent Information:
tepid.com/patents

Thermostatic Mixing Valve Model SV125 Emergency Shower Eyewash Unit No. 85801

ASSE Lead Free
Certified



ASSE 1071 Approved

Inlets & Outlet
are 1 1/4" NPT

The Emergency Shower and Eyewash Mixing Valve shall control outlet temperature over a wide range of flow and shall be suitable for a single shower or for single or multiple eyewash applications in order to comply with ANSI standard Z358.1-2014. The valve shall include a thermometer to measure the temperature of the stream. Temperature adjustment shall be vandal-resistant.

The control mechanism shall employ a liquid-filled thermostatic motor to drive the valve without additional power requirements. The control mechanism shall employ a stainless steel sliding piston control device with reverse seat closure and both fixed and variable cold water bypass.

In the event of interruption of the cold water supply, the control mechanism closes off the hot water port, stopping all flow. Positive hot water shut-off.

In the event of interruption of the hot water supply, the control mechanism shall allow cold flow through both the fixed and variable bypass.

In the event that the liquid motor fails, the control mechanism closes off the hot water port with the reverse seat and fully opens the internal variable bypass to allow cold water flow.

Unit is completely assembled and tested. See below for cabinet specifications. Cabinet is supplied separately.

Maximum Inlet Pressure: 125 PSI.

Recommended Operating Pressure: 65 PSI.

Minimum Supply Pressure: 35 PSI.

Recommended Inlet Temperature: 120°F.*

VALVE FINISH

Rough Bronze ☐ Chrome Plate ☐

TEMP. RANGE

70° to 90°F

SET POINT

85°F ☐

*When supplying 140°F or greater, additional outlet controls should be used.

STINGRAY
systems

5330 East 25th Street
Indianapolis Indiana 46218

(888) 445-4142

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Helps meet
ANSI standard
Z358.1-2014

DIMENSIONS:

Cabinet Style	A	B	C	D
Recessed	23"	19"	5"	6 3/4"
Surface Mounted	23"	19"	5"	6 3/4"

General Purpose - Cabinet Specifications:

	STAINLESS	CARBON STEEL
Body:	18 Ga.	16 Ga.
Door:	18 Ga.	16 Ga.
Finish:	Type 304 with No. 4 Finish	Baked white enamel

VALVE FINISH

Rough Bronze ☐ Chrome Plate ☐

TYPE OF CABINET

Recessed ☐ Stainless ☐
Semi-Recessed ☐ Carbon Steel ☐
Surface ☐

MATERIAL

Cabinet includes lock with two keys.
Hinged left side, piano type.

CAPACITIES - MODEL SV125

Pressure Drop PSI	5	10	20	30	45
Tempered Flow GPM	9	13	17	25	27
Tempered Flow LPM	34	49	64	94	102

BYPASS CAPACITIES - MODEL SV125

Pressure Drop PSI	5	10	20	30	45
Cold Bypass GPM	7	10	14	21	22
Cold Bypass LPM	26	37	53	79	83

Mounting Bracket ☐

Note: The mixing valve must be installed with inlet check valves and the shower or the Eyewash/Facewash fixture should be installed 4 to 10 feet from the mixing valve. Hot and cold water inlet pressures must be equal.

Provisions shall be made to thermally isolate the valve.

Design and specification subject to change without notice.

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU - Molecular Bioscience - Phase 2

PPA No: 22-0045

Location: Bozeman, MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-): Vemco

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT
<u>22 xxxx</u>	<u>various</u>	<u>Seismic, Noise & Vibration control for plumbing Piping & Equipment</u>

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
Vibro Acoustics

- What are the differences between the specified material, system, or equipment and the proposed substitution?
No Difference
- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/**N**)
- Does the proposed substitution require changes to the Work of other trades? (Y/**N**)
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/**N**)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

Vemco

SUBMITTED BY (BIDDER / SUB-BIDDER)

Blake Buechler

AUTHORIZED AGENT



8/18/2026

DATE

Received: _____

DATE

Architect's Action: ☐ Rejected

☐ Rejected – For reasons as follows:

☒ Approved

☐ Approved as noted:

REVIEWED BY (ARCHITECT)


AUTHORIZED AGENT

08/19/26

DATE