



Bid 622
**Rancho Campana High School HVAC Modernization Project for Oxnard
Union High School District**

ADDENDUM #2

Dated: June 12th, 2020

All interested parties seeking to submit responses to the Oxnard Union High School District's Bid #622 shall execute the certification at the end of this addendum and shall attach the addendum to the documents submitted to the District.

The Oxnard Union High School District hereby amends Bid622 Rancho Campana High School HVAC Modernization Project as follows:

1) Question: Is a specific scheduling program required for the project?

Answer: Yes in part, the Contractor shall provide weekly 3-week look ahead schedules using excel or the following. Baseline and Critical Path and Monthly updates shall be either MS Project, P3 or P6 or a Published Scheduling Program compatible with MS Project, P3 or P6. Excel is not an acceptable product for either baseline or critical path.

2) Question: There are existing Skylight Shades in numerous areas, do they get removed?

Answer: Yes, any and all existing skylight shade are to be removed.

3) Question: Is a Document Control System Required?

Answer: Yes, the awarded contractor will provide a document control system. The specific system is noted within the following. Centralizing Data and Document Management is critical to the success of construction projects. The Contractor, District, Architect and Construction Manager will have access along with all associated team members.

The Contractor will implement the use of the following project documentation system. The system license will be purchased by the Contractor for the duration of the project: Duration 24 Months; Project Rancho Campana, Oxnard Union High School District, Construction Manager Bernards. Each General Contractor (Bidder) is to incorporate within their proposal a value of (\$5,500.00) fifty five hundred dollars and zero cents a year for the use of the system listed below. The system will be accessible to all parties related to the project, with the Contractor Manager.

The contractor will also provide an electronic copy of the entire documentation of the project to OUHSD as a portion of the closeout documents.

System provider information listed:

Owner Insite, LLC. Contact: Phil Burke; Main: 888-336-3393; Direct: 512-637-6369. www.owner-insite.com

- 4) **Question: RFI #01 United Mechanical Contractors, Inc.:** *Ref E2.01 but typical for power plans.* On the power plans, the cassette type FCU units show having (2) motor rated switches. The Attached product data sheet for the scheduled equipment seems to indicate (1) is required. Please clarify, as this seems as if is an error on the drawings.

Answer: See Response by Architect in Attachment A

5) **Question: Viola RFI #01**

- a) Roof reconstruct Note such as 7/A2.21 & 7/A2.22 state to "Patch and repair existing roof to like new condition" Roof plan Demo notes 3, 6/A2.17 are the only reference that the existing roofing is Tremco. Currently there are no roof specifications in the project manual, can these specifications be provided so the scope is properly bid?
- b) Ceiling Demo keynote 6/A2.11 states to reference "Extend (E) fire sprinkler heads to new indicated ceilings/ceiling height" General Note 1/A2.14 & A2.16 also mention to adjust and extend heads. I found the fire sprinkler system briefly referenced in section 22 05 00 pipe testing. 22 05 53 identification, and 28 31 00 fire detection and alarm. Are these the only specifications for the fire sprinkler system?

Answer: See Response by Architect in Attachment B

- 6) **Question: Los Angeles Air Conditioning, Inc. RFI #01 Referencing: Bldg. C3, Computer lab C3-104.** The above room is full of computer stations, who is responsible for disconnecting / reinstalling all of these computers from the network and removing out of the work area?

Answer: District will move all personal, books and computer system from Building to Relocatable Classrooms and Back to original location after Contractor has completed work and disinfected. See Attachment C

- 7) **Question: Viola RFI #02: Ref Bid Form, Instructions to Bidders, and Notice to Proceed:** Paragraph S. in Bid Form calls for Prime Contractor will pay for each classroom contents to be removed, stored, and returned to same permanent and provide (3) 10' x 40' weather tight storage containers for all miscellaneous FF&E.
- a) Please clarify the material and quantity so that we can quantify price.
- b) Please clarify if Phasing affect the number of moves.
- c) Please clarify location where bins are to be stored to quantify distance and time needed to move from classrooms to storage.

Answer: See Response in Attachment D

- 8) **Question: Los Angeles Air Conditioning, Inc. RFI #02 Referencing: Bldg. E piping enclosure drawing M4.03 at Grids (E-F) x (E-17.3).** At this location you have a glass window and we don't think the pipe will fit above this window. If this is your intent, please show a detail and direction on how to build this pipe chase alongside this window.

Answer: See Response by Architect in Attachment E

9) Question: Los Angeles Air Conditioning, Inc. RFI #03.

- 3. Please provide sequence of Operation regarding Building demo and reconstruction.
- 4. Please clarify will The District Maintenance and Operations provide direction of where salvageable items during demo will be stored for district use.
- 5. Below snip-it is Drawing A1.04 detail 3 reflects double wall please clarify if double wall is what is to be provided or if new detail will be provided.
- 6. Please provide trench details (WxD) for plumbing CHW S&R underground lines.
 - What materials are to be used at backfill of trenches (native or slurry)?
- 7. M2.01 Demo detail note M – remove OSA Damper – will this require any re-fabrication to support new relief damper?
- 8. What is required on roof top for new gravity vents to be installed by Mech.
- 9. What is required on roof top for new Exhaust Fans to be installed by Mech?
- 10. What is required on roof top for new OSA to be installed by Mech?
- 11. Who will be covering Special inspections – concrete / welded stud framing?
- 12. Will CMU caps be acceptable to be used at top of CMU walls opposed to 2" poured in place concrete? network and removing out of the work area?

Answer: See Response by Architect in Attachment F

10) Question: Classroom Cleaning and Disinfect prior to occupancy by others?

Answer: All classrooms shall be cleaned per contract documents. In addition the Contractor will be required to disinfect by the use of a manufactured Alcohol product that contains a minimum of 70% alcohol or meets the CDC guidelines for cleaning and disinfecting facilities. The Project Manager shall be required to witness and signoff for each area disinfected. See attached CDC Cleaning and Disinfecting your facility (3) page document in attachment G.

11) Question: Time for Completion Clarification. Please confirm project completion date.

Answer: Final Work / Closeout Completion Date of March 24th, 2022.

12) See attachments (A - K) documents revising present information.

BIDDER’S CERTIFICATION

I acknowledge receipt of the foregoing Addendum # 2 and accept all conditions contained herein.

Dated: _____ **BIDDER:** _____
(Company/Entity)

By: _____ **Printed Name:** _____
(Authorized representative signature)

Title: _____

Attachment A

RFI

No. 001



Attachment A

PROJECT NAME:	HVAC Modernization for Rancho Campana HS
PROJECT #:	Bid 622
DATE:	6/1/2020
ATTENTION:	Deanna Rantz

TITLE:	Motor rated switch clarifications
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REQUEST:

E2.01, but typical for all power plans

On the power plans, the cassette type FCU units show having (2) motor rated switches. The attached product data sheet for the scheduled equipment seems to indicate (1) is required. Please clarify as this seems as if it is an error on the drawings.

RESPONSE:

Provide (2) motor rated switches, (1) for FCU and (1) for condensate pump per plan.
Ali Hourai
Budlong and Associates

X

Jeremy Yablan
Officer



MHCFC4W-04-1 Chilled/Hot Water Cassette Fan Coil

4-Pipe Heat / Cool Fan Coil 12,000 BTUH

*These specifications are subject to change without notice.
Check www.multiaqua.com for latest published information.*

Rev. 1.4



HVAC Guide Specifications

Chilled and Hot Water Cassette Fan Coil

4-Pipe

Nominal Size:

12,000 BTUH

MultiAqua Model Number:

MHCFC4W-04-1

Part 1 - General

1.01 System Description:

MultiAqua Chilled Water Fan Coils are manufactured with galvanized steel and high impact molded polymers.

1.02 Quality Assurance:

- A. ETL Certified in accordance with U.L. Standard 95, latest version (U.S.A.).
- B. Manufactured in a facility registered to ISO 9002, Manufacturing Quality Standard.
- C. Fully load tested at the factory.
- D. Damage resistant packaging.

1.03 Delivery, Storage and Handling:

- A. Packaged and readied for shipment from the factory.
- B. Controls shall be capable of withstanding 150°F storage temperatures in the control compartment.

Part 2 - Product

2.01 Equipment:

- A. General:
 1. Unit shall be a factory assembled and tested water fan coil.
 2. Unit shall be assembled with high quality.
 3. Contained within the unit shall be all factory wiring, piping, and associated controls.
- B. Unit Cabinet and Cover:
 1. Cabinet is constructed of galvanized sheet metal.
 2. Cover composed of high impact polymers.
 3. Internally and externally insulated to ensure quiet operation.
- C. Fan Motor and Blower Wheels:
 1. Available in 208/230-1-50/60 VAC.
 2. Fan motor shall be three speed, direct drive, and PSC type.
 3. Fan motor shall be totally enclosed.
 4. Fan motor shall be internal overload protected.
 5. Radial blower wheel is dynamically balanced.
- D. Air Distribution:
 1. Unit contains four manually adjustable discharge air louvers.
- E. Water Coil:
 1. Manufactured with water coils containing copper tubing mechanically bonded to aluminum fins.
 2. Maximum operating pressure is 200 psig.
 3. Coils are designed to accept an entering water temperature not to exceed 160°F
 4. Pressure independent flow control required on both coils to not exceed max flow for each coil.
Consult primary coil and secondary coil data for proper sizing
- F. Drain Pan:
 1. Constructed of injected molded polystyrene.



G. Filters:

1. Unit shall contain a woven panel washable filter.

H. Fresh Air:

1. Unit shall be able to receive up to 50% filtered fresh air.
2. Fresh air introduced shall be externally fan forced and externally controlled.

Part 3 - Controls and Safeties**3.01 Controls:**

- A. Fan coils are factory wired and tested.
- B. Unit includes a terminal block that is capable of incorporating a 24 vac, field supplied, hard wired thermostat.

3.02 Safeties:

- A. Fan coil contains a renewable fuse on the low voltage side of the transformer.
- B. Coils shall be designed to accept an entering water temperature not to exceed 160°F

Part 4 - Operating Characteristics**4.01 Electrical Requirements**

- A. Electrical line voltage connections shall be made at the factory supplied terminal block.
- B. Factory wiring shall be rated according to UL listing at the time of manufacturing.

4.02 Installation in high ambient/high humidity environments

- A. Cabinets are internally insulated from the factory. However, when these units are installed in high ambient/high humidity environments, additional external cabinet insulation may be required.

Part 5- Definitions**5.01 Abbreviations:**

CFM = Cubic Feet per Minute
 DB = Dry Bulb Temperature
 EWT = Entering Water Temperature
 GPM = US Gallons Per Minute
 MBH = BTU X 1000
 SC = Sensible Cooling
 TC = Total Cooling = Sensible + Latent
 WB = Wet Bulb Temperature
 WPD = Water Pressure Drop in feet of head
 dB = Decibel Level
 m = Meter
 In = Inches
 FP I= Fins per Inch
 OD = Outside Diameter
 ID = Inside Diameter
 MCA = Minimum Circuit Amps
 MOP = Maximum Over current Protection
 LBS = Pounds U.S.

5.02 Measurements

- A. All measurements with regard to length, width, and height shall be in inches.



MHCFC4W-04-1

Product Specifications

Physical Data								
Model Number	Overall Height (in)	Overall Width* (in)	Width** (in)	Weight (lbs.)	Cooling Rows FPI	Heating Rows FPI	Water Inlet/Outlet (in)	Drain (in)
MHCFC4W-04-1	16.8	26.8	22.8	50.7	2/14	1/14	¾" FPT	1" Barb

*Units are Square. Overall width is the cover dimension. See IOM for drawing details.

** Units are Square. Width is the cabinet dimension. See IOM for drawing details.

Electrical Data***							
Model Number	CFM	Volts/Phase/Hertz	Motor Watts	Full Load Amps	Fuse or HACR Circuit Breaker or Glass Fuse Per Circuit		
					MCA	MOP	
MHCFC4W-04-1	380	208/230-1 50/60	80	.4	1	1	

*All Electric Data Shown is at 60 hz

MHCFC4W-04-1 Chilled Water Performance Data

MHCFC4W-04-1 COOLING CAPACITIES (Primary Coil)				
CFM	EWT (°F)	GPM	ENTERING AIR TEMPERATURE (F)	
				80° D.B. / 67° W.B.
380*	42	1.5	TC	10898
			SC	8409
			WPD	4.5
		2.0	TC	12481
			SC	9078
			WPD	7.6
		3.0	TC	14649
			SC	9964
			WPD	16.1
		3.75	TC	15635
			SC	10377
			WPD	24.3

***High Speed**

MHCFC4W-04-1 COOLING CAPACITIES (Primary Coil)				
CFM	EWT (°F)	GPM	ENTERING AIR TEMPERATURE (F)	
				80° D.B. / 67° W.B.
380*	45	1.5	TC	9786
			SC	7942
			WPD	4.5
		2.0	TC	11183
			SC	8552
			WPD	7.6
		3.0	TC	13022
			SC	9307
			WPD	16.0
		3.75	TC	13902
			SC	9660
			WPD	24.1

***High Speed**

Recommended minimum flow rate for the primary coil at ≥ 2 fps is 1.5 gpm

Recommended maximum flow rate for the primary coil at ≤ 6 fps is 3.75 gpm

MHCFC4W-04-1 Hot Water Performance Data

This heating performance data is at dry bulb temperature indicated / wet bulb temperature not considered

MHCFC4W-04-1 HOT WATER CAPACITIES (Primary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
50	380	1.5	4.2	10614	13282	15960	18646	21338	24034	26733	29435
		2.0	7.0	11318	14162	17016	19878	22745	25617	28492	31370
		3.0	14.7	12084	15118	18160	21208	24261	27317	30377	33438
		3.75	22.1	12412	15526	18646	21772	24903	28037	31173	34311

MHCFC4W-04-1 HOT WATER CAPACITIES (Primary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
60	380	1.5	4.1	7993	10655	13327	16008	18695	21388	24084	26782
		2.0	7.0	8516	11354	14202	17059	19922	22790	25662	28536
		3.0	14.7	9085	12113	15150	18194	21243	24296	27353	30411
		3.75	22.1	9329	12437	15554	18676	21803	24934	28068	31203

MHCFC4W-04-1 HOT WATER CAPACITIES (Primary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
70	380	1.5	4.1	5366	8022	10689	13365	16048	18737	21430	24125
		2.0	7.0	5710	8542	11385	14236	17095	19959	22828	25699
		3.0	14.6	6084	9106	12138	15177	18222	21272	24326	27382
		3.75	22.0	6244	9347	12459	15577	18701	21828	24959	28093

MHCFC4W-04-1 HOT WATER CAPACITIES (Primary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
80	380	1.5	4.1	2735	5385	8047	10719	13398	16083	18773	21466
		2.0	6.9	2900	5727	8565	11412	14266	17127	19992	22861
		3.0	14.6	3080	6097	9125	12160	15201	18248	21299	24352
		3.75	22.0	3157	6256	9363	12478	15598	18723	21851	24983

Heating at ANSI/AHRI 440 with addendum 1, 6.3.2 Table 1 as follows:

MHCFC4W-04-1 HOT WATER CAPACITY (Primary coil)		
ENTERING AIR TEMPERATURE	GPM	ENTERING WATER TEMPERATURE 140F
70F DB / 60F WB	1.5	18863
	2.0	20110
	3.0	21449
	3.75	22017

These specifications are subject to change without notice.
Check www.multiaqua.com for the latest information.

MHCFC4W-04-1 Chilled Water Performance Data

MHCFC4W-04-1 COOLING CAPACITIES (Secondary Coil)				
CFM	EWT (°F)	GPM	ENTERING AIR TEMPERATURE (F)	
				80° D.B. / 67° W.B.
380*	42	.75	TC	6133
			SC	5263
			WPD	4.8
		1.0	TC	7118
			SC	5740
			WPD	8.1
		1.25	TC	8002
			SC	6079
			WPD	12.2
		1.5	TC	8755
			SC	6360
			WPD	17.1

***High Speed**

MHCFC4W-04-1 COOLING CAPACITIES (Secondary Coil)				
CFM	EWT (°F)	GPM	ENTERING AIR TEMPERATURE (F)	
				80° D.B. / 67° W.B.
380*	45	.75	TC	5550
			SC	4988
			WPD	4.8
		1.0	TC	6380
			SC	5442
			WPD	8.1
		1.25	TC	7107
			SC	5758
			WPD	12.2
		1.5	TC	7704
			SC	5983
			WPD	17.0

***High Speed**

Recommended minimum flow rate for the secondary coil at ≥ 2 fps is .75 gpm

Recommended maximum flow rate for the secondary coil at ≤ 6 fps is 1.75 gpm

MHCFC4W-04-1 Hot Water Performance Data

This heating performance data is at dry bulb temperature indicated / wet bulb temperature not considered

MHCFC4W-04-1 HOT WATER CAPACITIES (Secondary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
50	380	.75	4.5	6725	8393	10069	11750	13436	15125	16816	18509
		1.0	7.5	7317	9136	10962	12795	14632	16473	18316	20161
		1.25	11.2	7716	9636	11563	13495	15433	17373	19316	21261
		1.5	15.6	8006	9998	11997	14002	16011	18023	20037	22053

MHCFC4W-04-1 HOT WATER CAPACITIES (Secondary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
60	380	.75	4.4	5092	6756	8428	10106	11789	13475	15164	16855
		1.0	7.5	5532	7346	9169	10988	12832	14669	16510	18353
		1.25	11.2	5828	7743	9666	11595	13529	15467	17407	19349
		1.5	15.6	6044	8031	10026	12027	14033	16402	18054	20068

MHCFC4W-04-1 HOT WATER CAPACITIES (Secondary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
70	380	.75	4.4	3454	5114	6783	8458	10138	11822	13509	15197
		1.0	7.4	3743	5553	7371	9197	11028	12863	14701	16541
		1.25	11.1	3937	5848	7767	9692	11623	13558	15496	17436
		1.5	15.5	4079	6062	8053	10050	12053	14059	16069	18080

MHCFC4W-04-1 HOT WATER CAPACITIES (Secondary Coil)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
80	380	.75	4.4	1811	3468	5133	6806	8483	10165	11850	13537
		1.0	7.4	1950	3756	5571	7393	9221	11054	12890	14728
		1.25	11.1	2044	3950	5865	7787	9715	11647	13583	15521
		1.5	15.5	2112	4091	6078	8072	10072	12075	14082	16092

Heating at ANSI/AHRI 440 with addendum 1, 6.3.2 Table 1 as follows:

MHCFC4W-04-1 HOT WATER CAPACITY (Secondary Coil)		
ENTERING AIR TEMPERATURE	GPM	ENTERING WATER TEMPERATURE 140F
70F DB / 60F WB	.75	11865
	1.0	12917
	1.25	13619
	1.5	14126

MHCFC4W-04-1 Chilled Water Performance Data

MHCFC4W-04-1 COOLING CAPACITIES (Both Coils)				
CFM	EWT (°F)	GPM	ENTERING AIR TEMPERATURE (F)	
				80° D.B. / 67° W.B.
380*	42	2.5	TC	15591
			SC	10813
			WPD	5.7
		3.5	TC	17635
			SC	11692
			WPD	10.6
		4.5	TC	18992
			SC	12278
			WPD	16.9
		5.5	TC	19851
			SC	12658
			WPD	24.4

***High Speed**

MHCFC4W-04-1 COOLING CAPACITIES (Both Coils)				
CFM	EWT (°F)	GPM	ENTERING AIR TEMPERATURE (F)	
				80° D.B. / 67° W.B.
380*	45	2.5	TC	13974
			SC	10138
			WPD	5.7
		3.5	TC	15796
			SC	10905
			WPD	10.6
		4.5	TC	16961
			SC	11396
			WPD	16.8
		5.5	TC	17724
			SC	11719
			WPD	24.3

***High Speed**

**Pressure independent flow control required on both coils to not exceed max flow for each coil
Consult primary coil and secondary coil data for proper sizing**

Recommended minimum flow rate for both coils piped in parallel at \geq 2fps is 2.0 gpm

Recommended minimum flow rate for both coils piped in parallel at \leq 6fps is 5.75 gpm



MHCFC4W-04-1 Hot Water Performance Data

This heating performance data is at dry bulb temperature indicated / wet bulb temperature not considered

MHCFC4W-04-1 HOT WATER CAPACITIES (Both Coils)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
50	380	2.5	5.3	13350	16706	20071	23443	26819	30199	33580	36964
		3.5	9.7	13978	17489	21007	24530	28057	31588	35120	38588
		4.5	15.4	14330	17927	21529	25135	28745	32358	35973	39588
		5.5	22.2	14554	18204	21859	25518	29180	32844	36509	40176

MHCFC4W-04-1 HOT WATER CAPACITIES (Both Coils)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
60	380	2.5	5.2	10031	13382	16742	20109	23481	26858	30237	33618
		3.5	9.7	10498	14004	17517	21037	24561	28088	31318	35150
		4.5	15.3	10759	14352	17950	21554	25161	28771	32384	35998
		5.5	22.1	10926	14572	18224	21880	25540	29202	32866	36531

MHCFC4W-04-1 HOT WATER CAPACITIES (Both Coils)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
70	380	2.5	5.2	6708	10053	13408	16771	20140	23513	26889	30267
		3.5	9.7	7014	10516	14025	17541	21061	24586	28113	31643
		4.5	15.3	7186	10774	14369	17969	21574	25181	28791	32403
		5.5	22.1	7296	10938	14587	18240	21897	25557	29219	32882

MHCFC4W-04-1 HOT WATER CAPACITIES (Both Coils)											
ENTERING AIR (°F)	NOMINAL CFM	GPM	WPD	ENTERING WATER TEMPERATURE (°F)							
				90°	100°	110°	120°	130°	140°	150°	160°
80	380	2.5	5.2	3382	6723	10073	13432	16798	20168	23541	26917
		3.5	9.6	3530	7026	10532	14044	17562	21084	24609	28136
		4.5	15.3	3612	7196	10788	14385	17987	21592	25201	28811
		5.5	22.1	3665	7304	10950	14601	18255	21913	25573	29236

Heating at ANSI/AHRI 440 with addendum 1, 6.3.2 Table 1 as follows:

MHCFC4W-04-1 HOT WATER CAPACITY (Both Coils)		
ENTERING AIR TEMPERATURE	GPM	ENTERING WATER TEMPERATURE 140F
70F DB / 60F WB	2.5	23741
	3.5	24847
	4.5	25461
	5.5	25850

*These specifications are subject to change without notice.
Check www.multiaqua.com for latest published information.*



MHCFC4W-04-1 CFM Data

MODEL #	MHCFC4W-04-1
Fan Speed	CFM
L	320
M	350
H	380
Wattage @ High Speed	80

*These specifications are subject to change without notice.
Check www.multiaqua.com for latest published information.*



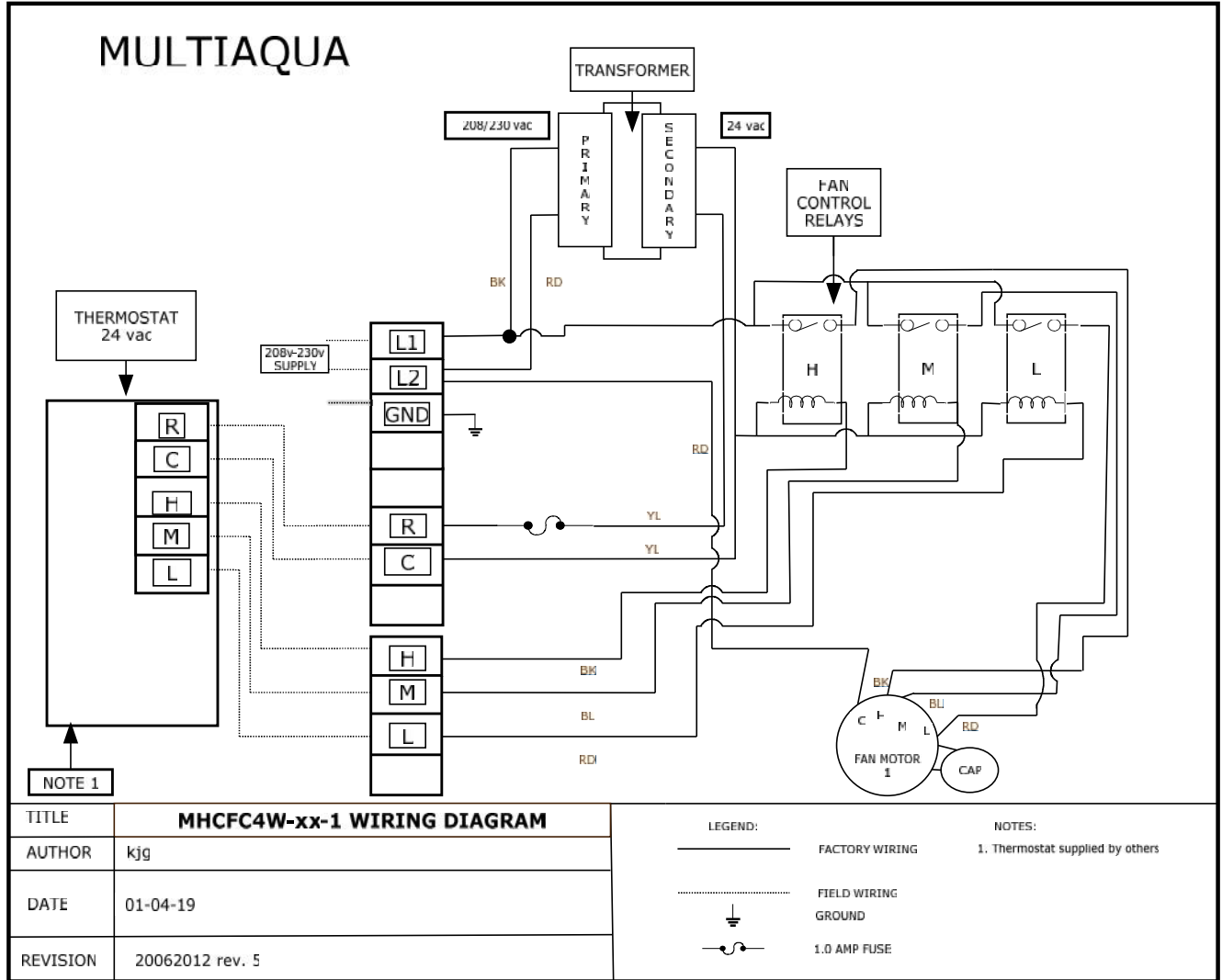
MHCFC4W-04-1 Sound Data

MODEL #	MHCFC4W-04-1
Fan Speed	dB @ 1 m
H	41
M	38
L	35

*These specifications are subject to change without notice.
Check www.multiaqua.com for latest published information.*



MHCFC4W-04-1 Wiring Diagram



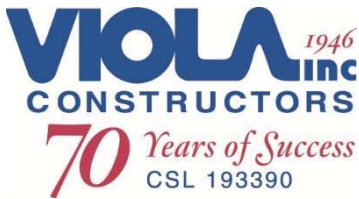
*These specifications are subject to change without notice.
Check www.multiaqua.com for latest published information.*



See Installation and Operation Manual
for Dimensional Drawings



Attachment B

**RFI BID CLARIFICATION REQUEST**RFI # 001REQUESTED BY: Tim ViolaDATE: 6/3/2020PROJECT NAME: Bid 622 Rancho Campana HS HVAC ModernizationSpec #: 075000, 21000SUBMITTED TO: Oxnard Union High School DistrictPGS: 1ATTENTION: Arvind Balaji & Karl AldridgeEMAIL: abalaji@bernards.com,
kaldridge@bernards.com

FAX: _____

YOUR RESPONSE TO THE FOLLOWING BID CLARIFICATION REQUEST IS REQUIRED BY ASAP

- A) Roof Reconstruction Notes such as 7/A2.21 & 7/A2.22 state to: "Patch and repair existing roof to like new condition..." Roof Plan Demo Notes 3, 6/A2.17 are the only references that the existing roofing is Tremco. Currently there are no roofing specifications in the project manual, can these specs be provided so this scope is properly bid?
- B) Ceiling Demo Key Note 6/A2.11 states to: "Extend (E) Fire Sprinkler head to new indicated ceiling/or ceiling height..." General Notes 1/A2.14 & A2.16 also mention to adjust and extend heads. I found the fire sprinkler system briefly referenced in sections 22 05 00 Pipe Testing, 22 05 53 Identification, and 28 31 00 Fire Detection and Alarm. Are these the only specifications for the fire sprinkler system?

Check here if additional pages attached **PROPOSED SOLUTION**

Provide appropriate specifications.

Check here if additional pages attached

The following information is provided in response to your bid clarification request above. This is not a change order or an approval for extra work

A) Actually the existing roofing on this project is Sarnafil and not Tremco. There will be a spec. sec. 07 54 16 (See attachment J) provided for patching and repairing of existing roof as part of addendum to be issued.
Sam Sahand - Flewelling & Moody - 06/05/2020.

B) No other specifications are required
Serj Marjaryan - Budlong & Associates - 06/04/2020

By: _____

Check here if additional pages attached

Name: _____ Title: _____ Date: _____

Attachment C



Los Angeles Air Conditioning, Inc.

STATE LICENSE NO. 208872

1714 LINDBERGH COURT, LA VERNE, CA 91750

(909) 596-7077 FAX: (909) 596-6657

Request for Information

Date: June 5, 2020

To: Bernards

Attention: Arvind, Karl

Project: Bid 622 Rancho Campana High School HVAC Modernization

RFI #: 001

Question:

Referencing: Bldg. C3, Computer lab C3-104

The above room is full of computer stations, who is responsible for disconnecting / reinstalling all of these computers from the net work and removing out of the work area?

Cost Impact: N/A

Schedule Impact: N/A

Submitted by: Mohammad Alkhuder

Response:

The District will move all personal items, books and computer systems from each building to relocatable classrooms and back to original location after contractor has completed all work and disinfected.

Response by: Karl Aldridge

Date: 6/5/2020

Attachment D



RFI BID CLARIFICATION REQUEST

RFI # 002

REQUESTED BY: Tim Viola

DATE: 6/5/2020

PROJECT NAME: Bid 622 Rancho Campana HS HVAC Modernization

Spec #: 004113/007213 & 00 55 00

SUBMITTED TO: Oxnard Union High School District

PGS: 1

ATTENTION: Arvind Balaji & Karl Aldridge

EMAIL: abalaji@bernards.com, kaldridge@bernards.com

FAX: _____

YOUR RESPONSE TO THE FOLLOWING BID CLARIFICATION REQUEST IS REQUIRED BY ASAP

Ref Bid Form, Instructions to Bidders, and Notice to Proceed:

Paragraph S. in Bid Form calls for Prime Contractor will pay for each classroom contents to be removed, stored, and returned to same permanent and provide (3) 10' x 40' weather tight storage containers for all miscellaneous FF&E.

- A) Please clarify the material and quantity so that we can quantify price.
- B) Please clarify if Phasing affect the number of moves.
- C) Please clarify location where bins are to be stored to quantify distance and time needed to move from classrooms to storage.

Check here if additional pages attached

PROPOSED SOLUTION

It will be more cost effective if the contractor provides storage containers for specific period of time and District provide the moving of contents.

Check here if additional pages attached

The following information is provided in response to your bid clarification request above. This is not a change order or an approval for extra work

a) Contractor will move and store all materials needed to successfully perform work, quantity pending coordination. Personal items and computers will be boxed, move and stored by district. b) Phasing indicates number of phases and number of moves based on phases, no phase will start prior to completion of prior phase. c) Next to Cafeteria Building (D).

By: Karl P. Aldridge Digitally signed by Karl P. Aldridge
DN: C=US, E=kaldridge@bernards.com, O=Bernards,
CN=Karl P. Aldridge
Date: 2020.06.08 13:32:59-07'00

Check here if additional pages attached

Name: Karl Aldridge **Title:** Project Manager **Date:** 6/8/2020

Attachment E



Los Angeles Air Conditioning, Inc.

STATE LICENSE NO. 208872

1714 LINDBERGH COURT, LA VERNE, CA 91750

(909) 596-7077 FAX: (909) 596-6657

Request for Information

Date: June 5, 2020

To: Bernards

Attention: Arvind, Karl

Project: Bid 622 Rancho Campana High School HVAC Modernization

RFI #: 002

Question:

Referencing: Bldg. E piping enclosure drawing M4.03 at Grids (E-F) x (E-17.3)
At this location you have a glass window and we don't think the pipe will fit above this window.
If this is your intent, please show a detail and direction on how to build this pipe chase alongside this window?

Cost Impact:

Schedule Impact:

Submitted by: Mohammad Alkhuder

Response:

New detail and information will be provided as part of Addendum to be issued. (See attachment I)
Sam Sahand - Flewelling & Moody - 06/05/2020.

Response by: _____

Date: _____

Attachment F



Los Angeles Air Conditioning, Inc.

STATE LICENSE NO. 208872

1714 LINDBERGH COURT, LA VERNE, CA 91750

(909) 596-7077 FAX: (909) 596-6657

Request for Information

Date: June 5, 2020

To: Bernards

Attention: Arvind, Karl

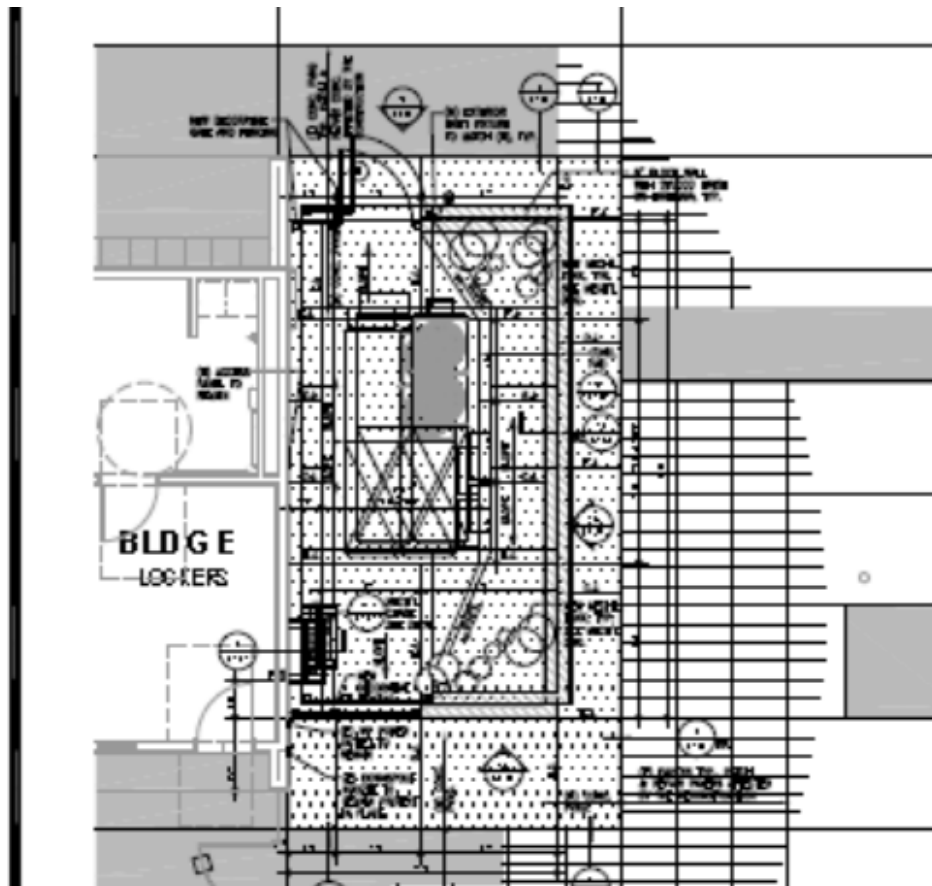
Project: Bid 622 Rancho Campana High School HVAC Modernization

RFI #: 003 to 012

Question:

3. Please provide sequence of Operation regarding Building demo and reconstruction.
BB to provide this information. BB: Phasing, Sequencing and Duration provided in bid documents Attachments
4. Please clarify will The District Maintenance and Operations provide direction of where salvageable items during demo will be stored for district use.
BB to provide this information from District. BB: Noted in the bid documents 3-10X 40' Bins
5. Below snip-it is Drawing A1.04 detail 3 reflects double wall please clarify if double wall is what is to be provided or if new detail will be provided.

This is a graphic issue and only one set is required not double. This will be addressed in the addendum to be issued. (See attachment I)





Los Angeles Air Conditioning, Inc.

STATE LICENSE NO. 208872

1714 LINDBERGH COURT, LA VERNE, CA 91750

(909) 596-7077 FAX: (909) 596-6657

6. Please provide trench details (WxD) for plumbing CHW S&R underground lines.
 B&A Response: Install per code and manufacturer's recommendations.
 - What materials are to be used at backfill of trenches (native or slurry)?
 Also see spec. sec. 02 31 00 (Attachment H) excavating, backfilling & compacting for utilities to be issued with add.
7. M2.01 Demo detail note M – remove OSA Damper – will this require any re-fabrication to support new relief damper? B&A Response: Yes.
8. What is required on roof top for new gravity vents to be installed by Mech.
 B&A Response: See Addendum and detail 3/M7.05. See Architectural for roof patching and flashing. (See attachment I)
9. What is required on roof top for new Exhaust Fans to be installed by Mech?
 B&A Response: No new exhaust fans are being installed.
10. What is required on roof top for new OSA to be installed by Mech?
 B&A Response: See Addendum and detail 3/M7.05. See Architectural for roof patching and flashing. (See attachment I)
11. Who will be covering Special inspections – concrete / welded stud framing?
 Combination of IOR and an outside inspection agency hired by District.
12. Will CMU caps be acceptable to be used at top of CMU walls opposed to 2" poured in place concrete?
 No, provide as per plan. This is a precast conc. cap and not poured in place.

Cost Impact:

Schedule Impact:

Submitted by: Mohammad Alkhuder

Response:

B&A Responses by Patrick Fitzsimmons -
06/08/20

F&M Responses by Sam Sahand
06/08/2020

BB Response by Karl Aldridge
6/9/2020

Response by: _____

Date: _____

Attachment G

Cleaning And Disinfecting Your Facility

Everyday Steps, Steps When Someone is Sick, and Considerations for Employers

How to clean and disinfect

Wear disposable gloves to clean and disinfect.

Clean

- **Clean surfaces using soap and water.** Practice routine cleaning of frequently touched surfaces.



High touch surfaces include:

Tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, sinks, etc.



Disinfect

- Clean the area or item with soap and water or another detergent if it is dirty. Then, use a household disinfectant.
- **Recommend use of EPA-registered household disinfectant.** **Follow the instructions on the label** to ensure safe and effective use of the product.

Many products recommend:

- Keeping surface wet for a period of time (see product label).
- Precautions such as wearing gloves and making sure you have good ventilation during use of the product.

- **Diluted household bleach solutions may also be used** if appropriate for the surface. Check to ensure the product is not past its expiration date. Unexpired household bleach will be effective against coronaviruses when properly diluted.

Follow manufacturer's instructions for application and proper ventilation. Never mix household bleach with ammonia or any other cleanser.

Leave solution on the surface for **at least 1 minute**

Bleach solutions will be **effective** for disinfection **up to 24 hours**.

To make a bleach solution, mix:

- 5 tablespoons (1/3rd cup) bleach per gallon of water

OR

- 4 teaspoons bleach per quart of water

- **Alcohol solutions with at least 70% alcohol.**



Soft surfaces

For soft surfaces such as **carpeted floor, rugs, and drapes**

- **Clean the surface using soap and water** or with cleaners appropriate for use on these surfaces.



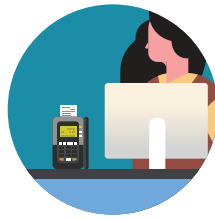
- **Launder items** (if possible) according to the manufacturer's instructions. Use the warmest appropriate water setting and dry items completely.

OR

- **Disinfect with an EPA-registered household disinfectant.** [These disinfectants](#) meet EPA's criteria for use against COVID-19.

Electronics

- For electronics, such as **tablets, touch screens, keyboards, remote controls, and ATM machines**
- Consider putting a **wipeable** cover on electronics.
- **Follow manufacturer's instruction** for cleaning and disinfecting.
 - If no guidance, **use alcohol-based wipes or sprays containing at least 70% alcohol.** Dry surface thoroughly.



Laundry

For clothing, towels, linens and other items

- Launder items according to the manufacturer's instructions. Use the **warmest appropriate water setting** and dry items completely.
- **Wear disposable gloves** when handling dirty laundry from a person who is sick.
- Dirty laundry from a person who is sick **can be washed with other people's items.**
- **Do not shake** dirty laundry.
- Clean and **disinfect clothes hampers** according to guidance above for surfaces.
- **Remove gloves,** and wash hands right away.



Cleaning and disinfecting your building or facility if someone is sick

- **Close off areas** used by the person who is sick.
- **Open outside doors and windows** to increase air circulation in the area. **Wait 24 hours** before you clean or disinfect. If 24 hours is not feasible, wait as long as possible.
- Clean and disinfect **all areas used by the person who is sick**, such as offices, bathrooms, common areas, shared electronic equipment like tablets, touch screens, keyboards, remote controls, and ATM machines.
- If **more than 7 days** since the person who is sick visited or used the facility, additional cleaning and disinfection is not necessary.
 - Continue routine cleaning and disinfection.



When cleaning

- **Wear disposable gloves and gowns for all tasks in the cleaning process, including handling trash.**
 - Additional personal protective equipment (PPE) might be required based on the cleaning/disinfectant products being used and whether there is a risk of splash.
 - Gloves and gowns should be removed carefully to avoid contamination of the wearer and the surrounding area.
- **Wash your hands often** with soap and water for 20 seconds.
 - Always wash immediately after removing gloves and after contact with a person who is sick.



- Hand sanitizer: If soap and water are not available and hands are not visibly dirty, an alcohol-based hand sanitizer that contains at least 60% alcohol may be used. However, if hands are visibly dirty, always wash hands with soap and water.
- **Additional key times to wash hands** include:
 - After blowing one's nose, coughing, or sneezing.
 - After using the restroom.
 - Before eating or preparing food.
 - After contact with animals or pets.
 - Before and after providing routine care for another person who needs assistance (e.g., a child).

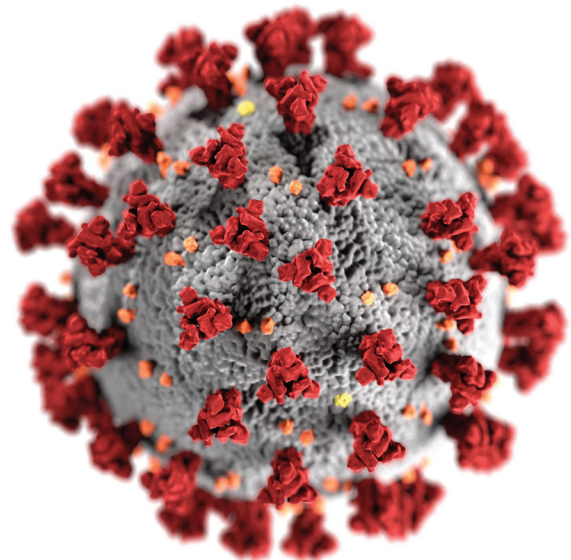
Additional Considerations for Employers



- **Educate workers** performing cleaning, laundry, and trash pick-up to recognize the symptoms of COVID-19.
- Provide instructions **on what to do if they develop symptoms within 14 days** after their last possible exposure to the virus.
- Develop **policies for worker protection and provide training** to all cleaning staff on site prior to providing cleaning tasks.
 - Training should include when to use PPE, what PPE is necessary, how to properly don (put on), use, and doff (take off) PPE, and how to properly dispose of PPE.
- Ensure workers are **trained on the hazards of the cleaning chemicals** used in the workplace in accordance with OSHA's Hazard Communication standard ([29 CFR 1910.1200](#)).
- **Comply** with OSHA's standards on Bloodborne Pathogens ([29 CFR 1910.1030](#)), including proper disposal of regulated waste, and PPE ([29 CFR 1910.132](#)).

For facilities that house people overnight:

- Follow CDC's guidance for [colleges and universities](#). Work with state and local health officials to determine the best way to isolate people who are sick and if temporary housing is needed.
- For guidance on cleaning and disinfecting the bedroom/bathroom for someone who is sick, review CDC's guidance on [disinfecting your home if someone is sick](#).

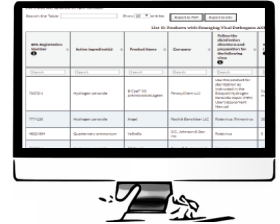


6 Steps for Safe & Effective Disinfectant Use



Step 1: Check that your product is EPA-approved

Find the EPA registration number on the product. Then, check to see if it is on EPA's list of approved disinfectants at: [epa.gov/listn](https://www.epa.gov/listn)



Step 2: Read the directions

Follow the product's directions. Check "use sites" and "surface types" to see where you can use the product. Read the "precautionary statements."

Step 3: Pre-clean the surface

Make sure to wash the surface with soap and water if the directions mention pre-cleaning or if the surface is visibly dirty.



Step 4: Follow the contact time

You can find the contact time in the directions. The surface should remain wet the whole time to ensure the product is effective.

Step 5: Wear gloves and wash your hands

For disposable gloves, discard them after each cleaning. For reusable gloves, dedicate a pair to disinfecting COVID-19. Wash your hands after removing the gloves.



Step 6: Lock it up

Keep lids tightly closed and store out of reach of children.

Attachment H

**SECTION 02 31 00
EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES
BID ADDENDUM**

1.00 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION

- A. Principal work in this Section:

1. Trenching, backfilling and compacting for utilities.
2. Bedding material for pipes.

- B. Related work:

1. Earthwork: Section 02 22 20 - Excavation and Backfill for Structures.
2. Installation and tests of utilities: Divisions 15 and 16.

1.03 QUALITY ASSURANCE

- A. General: Obtain Geotechnical Engineer's approval of backfill materials, method of placement, and of the completed work of this Section.
- B. Reference data: Maps, soil investigation reports, and similar reference data are made available to Contractor for information only. District and Architect assume no responsibility for conclusions the Contractor may draw therefrom.
- C. Reference standard:
1. Perform all work in compliance with applicable provisions of "Standard Specifications for Public Works Construction" (SSPWC). Mention herein of section numbers refers to sections of the reference standard.
 2. Where reference standard refers to "Agency," substitute the word "District." Where reference standard is in conflict with these Specifications, these Specifications govern.

1.04 WARRANTY

- A. Any settling of backfill in trenches which may occur during the one year period after Substantial Completion shall be repaired to District's satisfaction by Contractor without expense to District, including complete restoration of damaged paving, walks, and other materials or installations of every kind.

2.00 PRODUCTS

2.01 IMPORTED MATERIAL

- A. Imported fill:
 1. Non-expansive granular material with an expansion index of less than 35.
 2. Material shall not contain fines in excess of 40% passing No. 200 sieve, but it shall include sufficient fines (binder material) to produce a compacted fill which will not rut under construction traffic, and remain stable in shallow trenches.
 3. Imported fill is subject to Geotechnical Engineer's approval before transporting to site.

2.02 ONSITE MATERIALS

- A. Materials from cuts or excavations, approved by the Geotechnical Engineer, free of debris and without soft, spongy, organic and other deleterious materials.
 1. Do not use cobbles or boulders larger than 4 in. in largest dimensions at any depth.
 2. Do not use rocks greater than 2-1/2 in. in largest dimension in backfill within 12 in. of the top of pipe or structure, and within 12 in. of the top of pavement subgrade.
 3. Where rocks are included in backfill, mix with suitable materials to eliminate voids.

2.03 BEDDING MATERIALS

- A. Complying with section 306.1.2.1, Bedding, of the reference standard.

3.00 EXECUTION

3.01 INSPECTION

- A. Verify conditions and measurements affecting the work of this Section at site. Make sure that detrimental conditions are corrected before proceeding with installation.

3.02 PROTECTIVE MEASURES

- A. General: Comply with the following:
 1. Utilities: Protect existing utility lines.
 2. Settlement:
 - a. In areas where compacted backfill has been placed, additional consolidation will occur after completion due to changes in moisture content and surcharge.
 - b. Install utility connections crossing this backfill to the building, and improvements adjoining the building at the backfill line, to take into account this additional consolidation, or schedule sufficient time between backfilling operations and such improvements to allow this consolidation to take place.

3.03 COMPACTION CONTROL

- A. Notification: Notify the Geotechnical Engineer whenever trench backfill work is being performed as part of this Section.
- B. Replacement: Geotechnical Engineer will determine if work performed without inspection meets the requirements of these Specifications. Where directed by Geotechnical Engineer, uncover and replace work performed without inspection at no additional cost to the District.

3.04 TRENCH EXCAVATION

- A. Before opening any new excavations, uncover all intersecting existing utility lines located between the ground surface and one foot below the bottom of the new trench line.
 - 1. General:
 - a. Where unidentified existing utilities are encountered, determine whether these are active or abandoned.
 - b. Remove interfering portions of abandoned utilities and cap or plug open ends of pipe to remain.
 - c. The cap or plug must seal the opening in such a manner that would permit remaining portion of the utility to be reactivated.
 - d. Notify Architect for instructions on utilities which are determined to be active. Any relocation work performed on an active utility without obtaining prior approval of Architect will be done at the Contractor's risk and expense.
 - e. Do not proceed without instructions, except to correct an immediate hazard or emergency condition.
 - 2. Trench width:
 - a. Maximum width of trench shall be 20 in. more than greatest diameter of pipe up to a point 6 in. above top of the pipe, except that it may be widened enough to place sheeting.
 - b. Make trenches at least 12 in. wider than greatest exterior diameter of pipe or conduit except that trenches for concrete encased ducts may be the same width as duct encasement.
 - 3. Dimensional tolerance:
 - a. Maintain accuracy of gravity utility lines designated for gradients less than 1% to 1/8 in. at any point and cumulative within 1/2 in./100 ft.
 - b. For all gravity lines, check each section of pipe for proper gravity slope direction with a string line set over the pipe by a surveyor.
 - c. Non-gravity utility line subgrades shall be accurate within +2 in.

3.05 PIPE BEDDING

- A. Where bedding is required, provide a minimum of 4 in. of bedding material in the bottom of the trench, in addition to the requirements of section 3061.2.1 of the reference standard, before installing pipes or conduits.
- B. Prior to jetting the bedding material, where jetting is permitted by the Geotechnical Engineer, make provisions at the downstream end of the trench to remove the excess water.
- C. Do not allow water to accumulate in the trench.

3.06 DEWATERING

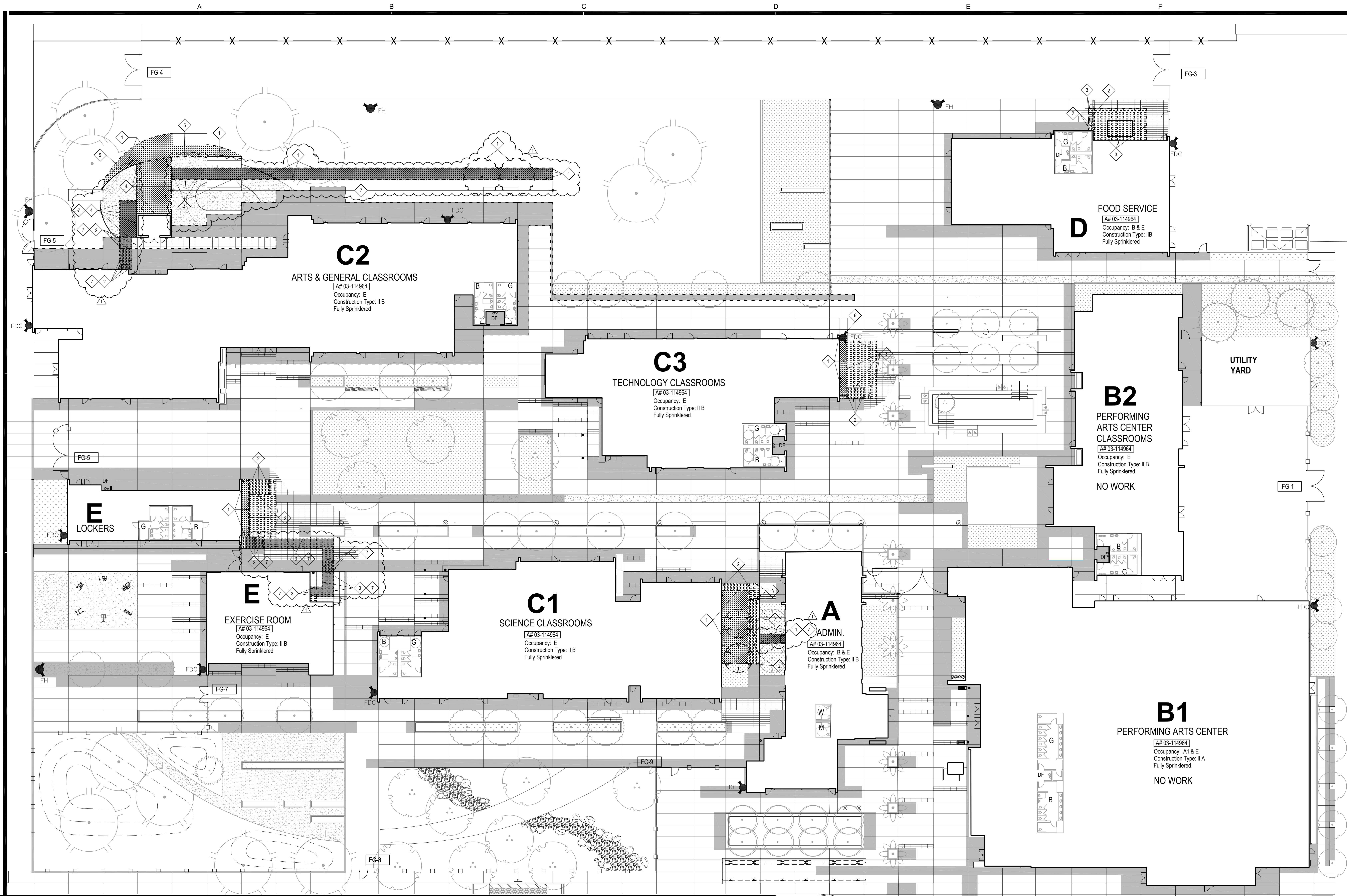
- A. At no time shall water be allowed to back up into pipe in place. Securely plug terminal ends of pipe before work is abandoned at end of day or when laying is interrupted.

3.07 TRENCH BACKFILL

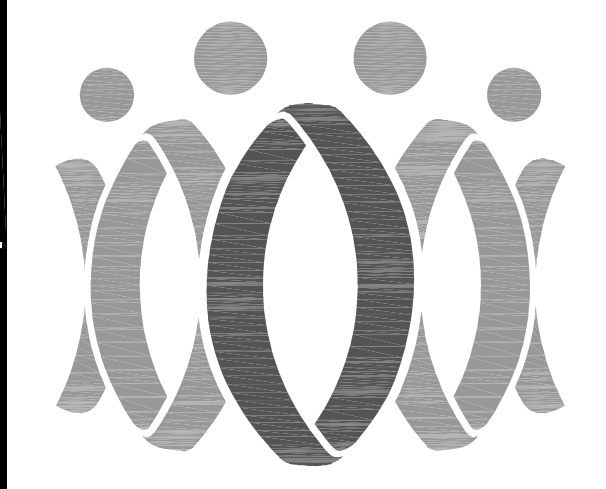
- A. Backfilling of utility trenches shall not be undertaken (1) for 24 hours after Geotechnical Engineer has been notified of same, (2) until required tests and inspections have been completed, and (3) until "as-built" location notes have been recorded.
- B. Place backfill material in compliance with section 3061.3.2 of the reference standard, and to achieve at least 90% of the maximum density in compliance with ASTM D 1557. The top 12 in. of backfill in the building and under paved areas shall be compacted to 95% of maximum density.
- C. Unless otherwise authorized by the Geotechnical Engineer, compaction by ponding or flooding will not be permitted.
- D. Remove surplus earth left after backfilling, and grade top of trench to match adjacent grades.
- E. Backfill voids left by removal of sheeting, piles, and similar sheeting supports immediately with clean sand to assure dense and complete filling of voids.

END OF SECTION

Attachment I



PTN_ 72546-80 APPL_ 03-120038



FLEWELLING & MOODY
architecture planning interiors

HEADQUARTERS OFFICE:
815 Colorado Blvd, Suite 200
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ANTELOPE VALLEY OFFICE:
1035 West Lancaster Boulevard
Lancaster, California 93534
661.949.0771
E-Mail: fm-lancaster@flewelling-moody.com

An Employee Owned Corporation



CONSULTANT

BID SET (06-12-20)

Drawn by _____
Checked by _____

Revisions	No.	Date	Description
	1		BID ADDENDUM

All dimensions must be checked at the job by the contractor who accepts full responsibility for their accuracy under the contract. These plans & the specifications in connection therewith have been prepared for a specific site. Any and all responsibility for their use in whole or in part on any other site is hereby disclaimed by Flewelling & Moody.

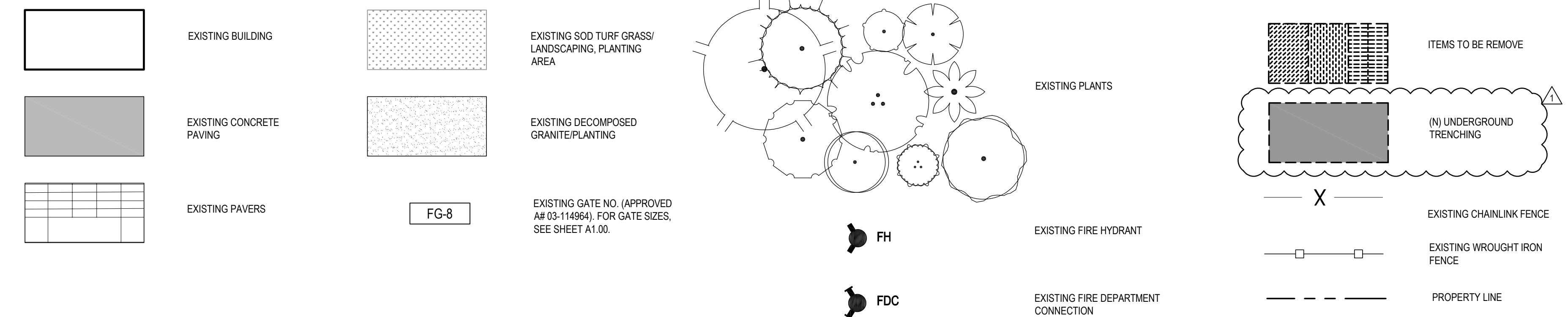
OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

PARTIAL DEMOLITION
SITE PLAN

Job No.
2841.100
Date
08-07-2019
A1.01

LEGEND

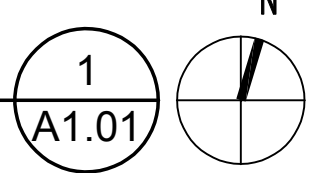


DEMOLITION SITE KEY NOTES

- 1 REMOVE (E) LANDSCAPE, TURF, DECORATIVE STONES/TREES AND PLANTING. THIS INCLUDES CONCRETE PLANTER CURBS AND ASSOCIATED IRRIGATION IN ITS ENTIRETY.
- 2 REMOVE PORTION OF (E) CONCRETE PAVING AFFECTED BY THE RECONSTRUCTION. PATCH AND REPAIR (E) CONCRETE PAVING TO REMAIN AS NEEDED.
- 3 REMOVE PORTION OF (E) PAVERS AFFECTED BY THE RECONSTRUCTION. PATCH AND REPAIR (E) PAVERS TO REMAIN.
- 4 REMOVE (E) DECOMPOSED GRANITE.
- 5 REMOVE (E) ALUMINUM EDGING IN ITS ENTIRETY.
- 6 (E) FIRE DEPARTMENT CONNECTION TO REMAIN, PROTECT IN PLACE.
- 7 (N) UNDERGROUND TRENCHING FOR PIPING UTILITIES. COORDINATE WIDTH & DEPTH OF TRENCHING WITH MECHANICAL, PLUMBING & ELECTRICAL DRAWINGS. REMOVE (E) PAVING AND REINSTALL PAVING AS NEEDED.

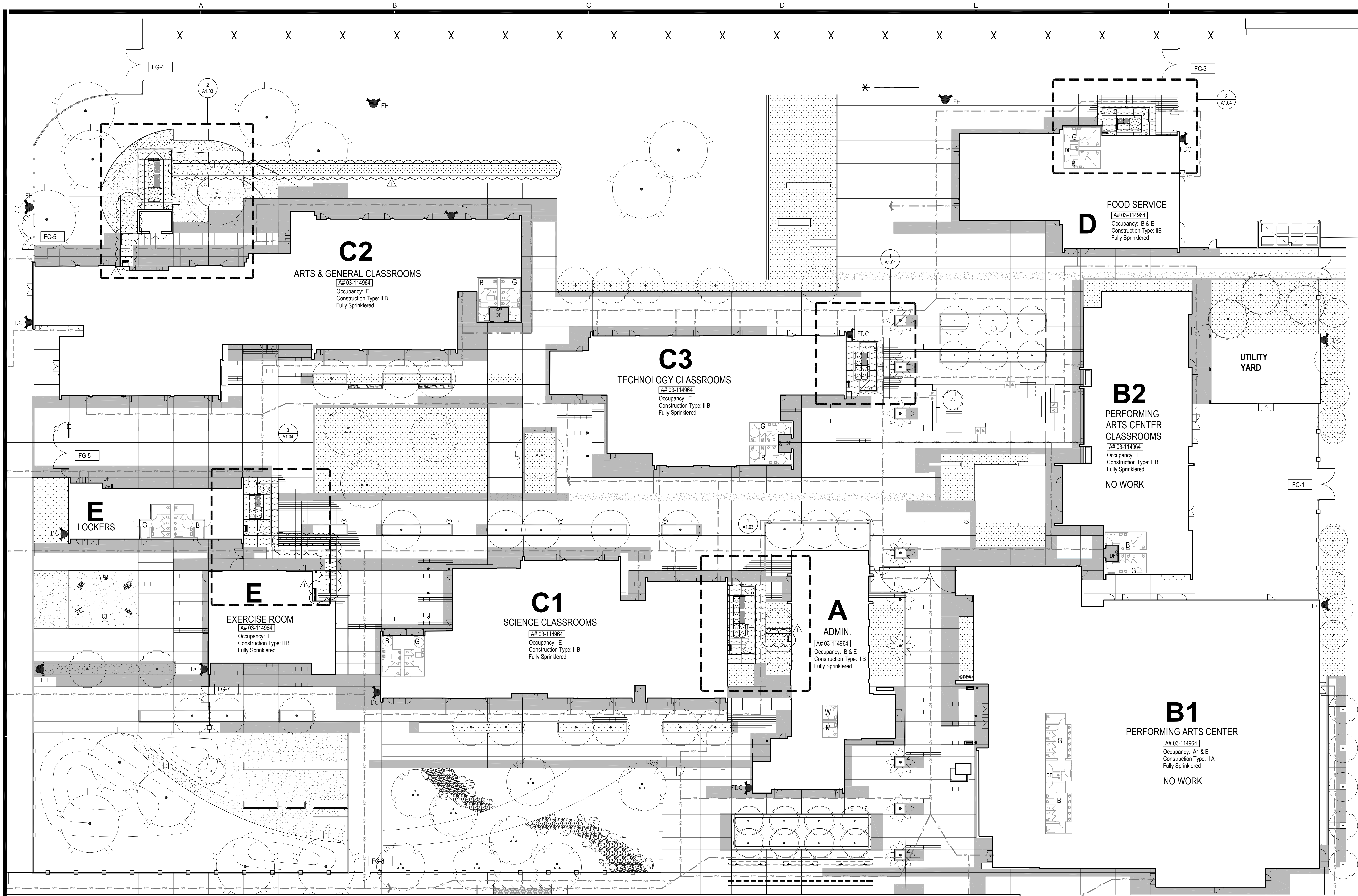
PARTIAL DEMOLITION SITE PLAN

SCALE: 1"=20'-0"

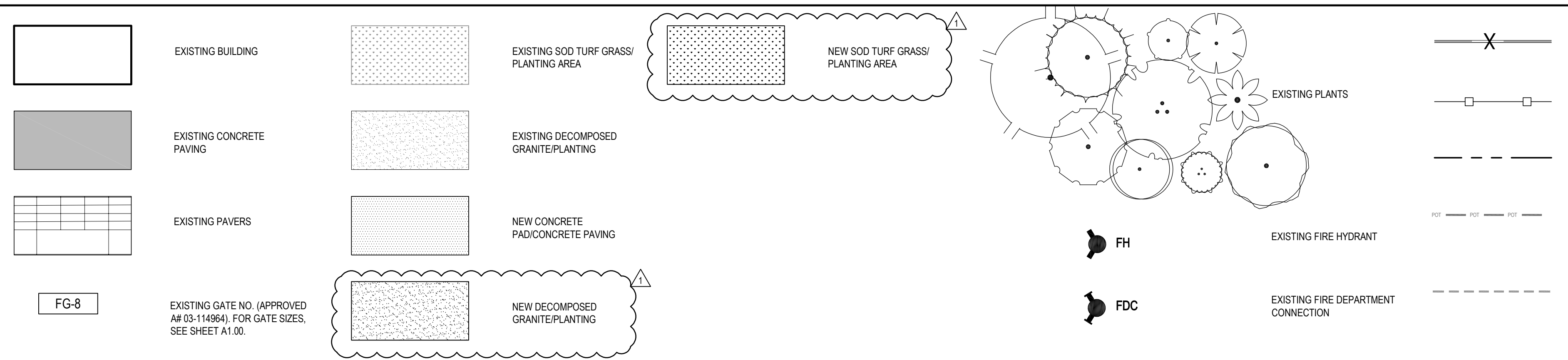


DEMOLITION GENERAL NOTES:

1. NO DEMOLITION SHALL BEGIN UNTIL PLANS HAVE BEEN APPROVED BY DSA.
2. ALL ITEMS TO BE DEMOLISHED SHALL BE VERIFIED WITH THE DISTRICT (MAINTENANCE AND OPERATION) FOR SALVAGE, PRIOR TO DISPERSAL.
3. REMOVE CONCRETE PAVING TO THE NEAREST JOINT LINE.



LEGEND



PARTIAL RECONSTRUCTION SITE PLAN

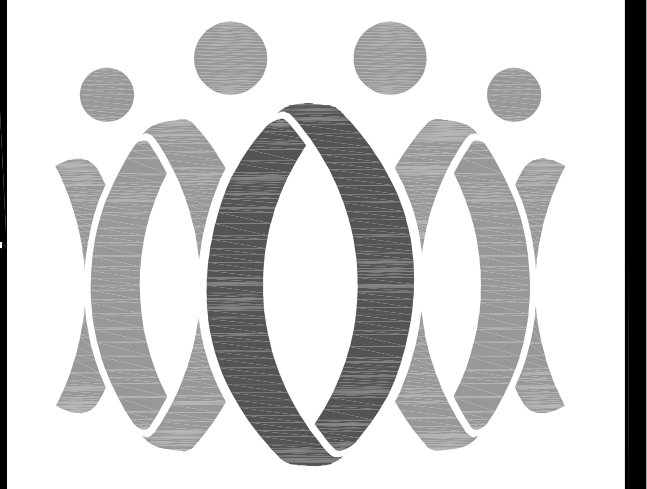
SCALE: 1/8"=1'-0"
 PROJECT NUMBER: 2020-001
 SHEET REFERENCE: A1.02

GENERAL RECONSTRUCTION NOTES

- PATCH AND REPAIR PAVING AFFECTED BY THE CONSTRUCTION OF THE HVAC ENCLOSURE.
- NEW PAVING TO MATCH EXISTING.

PATH OF TRAVEL (P.O.T.) IS A BARRIER FREE ACCESS ROUTE WITHOUT ANY ABRUPT VERTICAL CHANGES EXCEEDING 1/2" BEVELED AT 1:2 MAXIMUM SLOPE, EXCEPT THAT LEVEL CHANGES DO NOT EXCEED 1/2" VERTICAL AND IS AT LEAST 48" WIDE. SURFACE IS SLIP RESISTANT, STABLE, FIRM, AND SMOOTH. CROSS-SLOPE DOES NOT EXCEED 2% SLOPE IN THE DIRECTION OF TRAVEL. IS LESS THAN 5% UNLESS OTHERWISE INDICATED. (POT) SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTION TO 80" MINIMUM (1133B.8.2) AND ABOVE 27" AND LESS THAN 80" (1133B.8.6). CONTRACTOR TO VERIFY THAT ALL BARRIERS IN THE PATH OF TRAVEL HAVE BEEN REMOVED OR WILL BE REMOVED UNDER THIS PROJECT, AND PATH OF TRAVEL COMPLES WITH CBC 1133B.

PTN_72546-80 APPL_03-120038



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BID SET (06-12-20)

Drawn by	
Checked by	
Revisions	
No.	Date
1	
Description	BID ADDENDUM

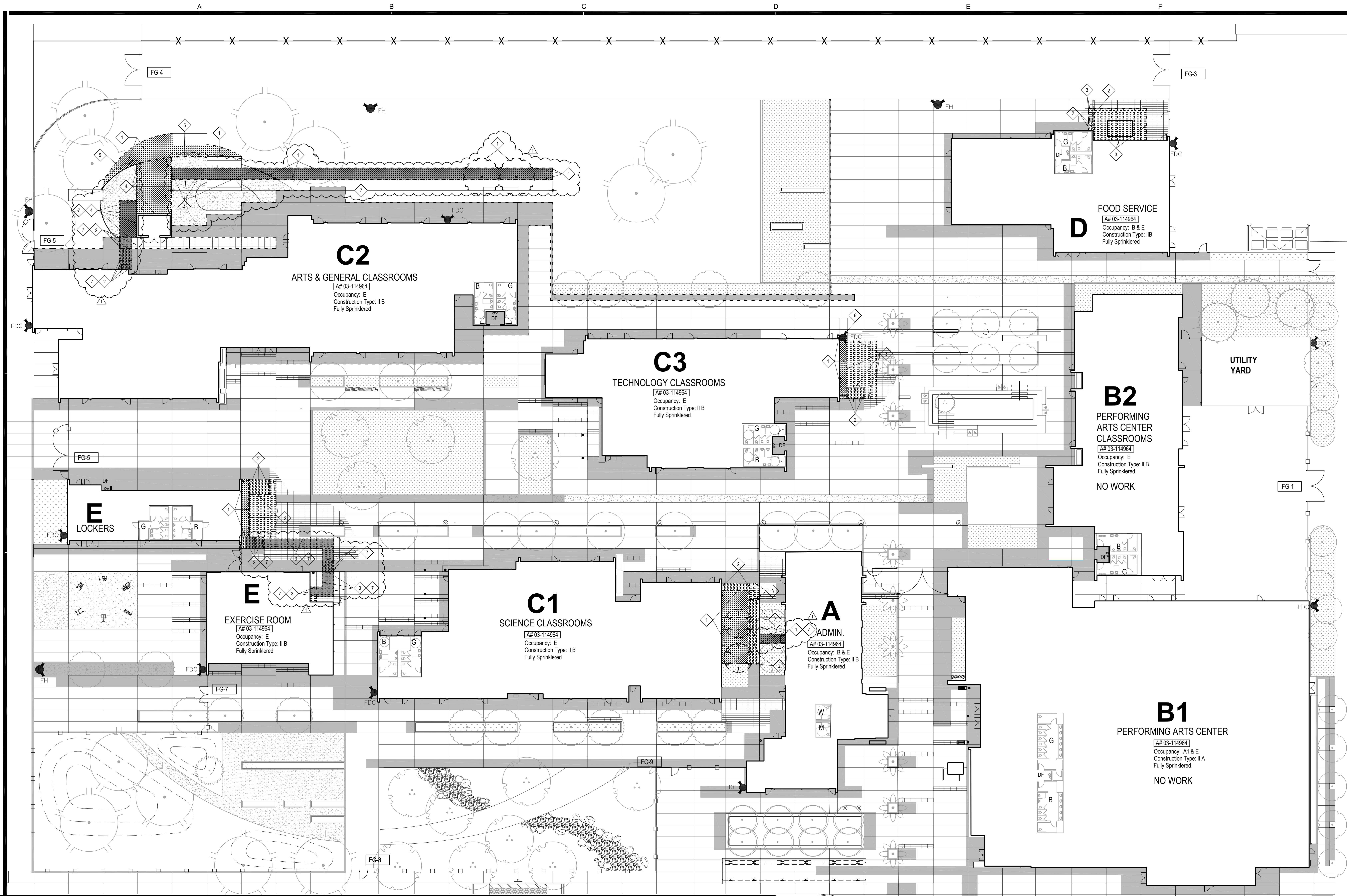
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OXNARD UNION HIGH SCHOOL DISTRICT
 RANCHO CAMPANA HIGH SCHOOL

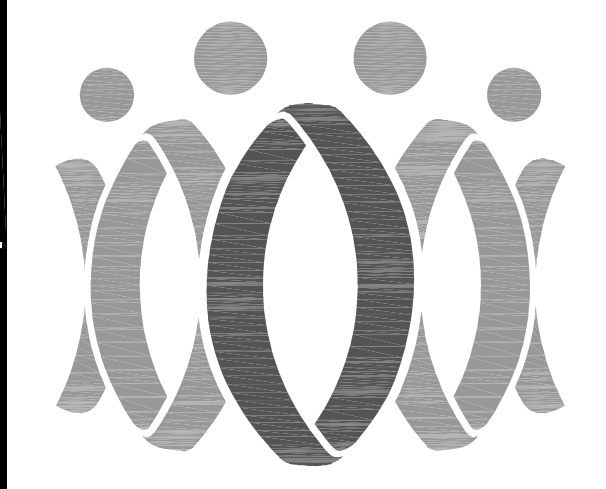
NEW HVAC SYSTEM
 4235 MAR VISTA DRIVE
 CAMARILLO, CA 93010

PARTIAL RECONSTRUCTION SITE PLAN

JOB NO.
 2841.100
 DATE
 08-07-2019
A1.02



PTN_ 72546-80 APPL_ 03-120038



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Drawn by _____
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			BID ADDENDUM

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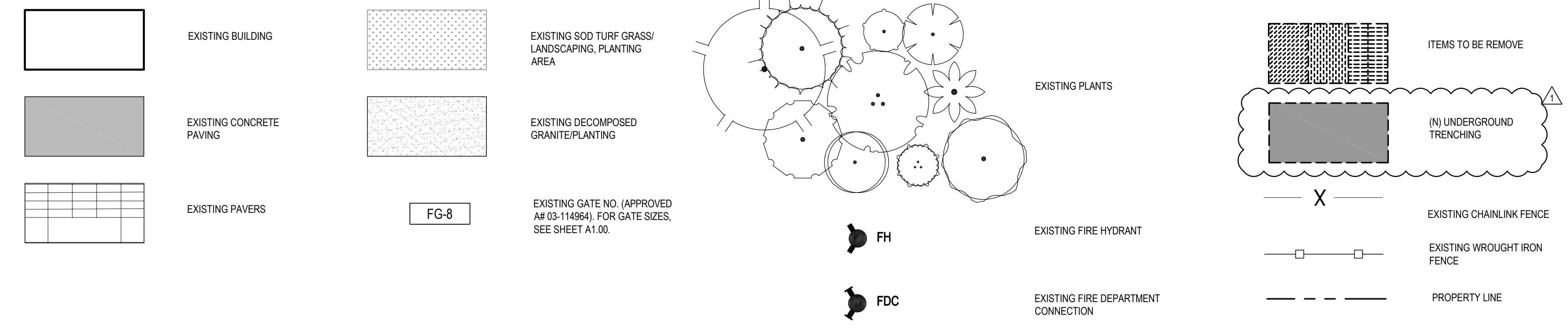
OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

PARTIAL DEMOLITION
SITE PLAN

Job No.
2841.100
Date
08-07-2019
A1.01

LEGEND

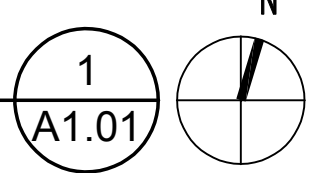


DEMOLITION SITE KEY NOTES

- 1 REMOVE (E) LANDSCAPE, TURF, DECORATIVE STONES/TREES AND PLANTING. THIS INCLUDES CONCRETE PLANTER CURBS AND ASSOCIATED IRRIGATION IN ITS ENTIRETY.
- 2 REMOVE PORTION OF (E) CONCRETE PAVING AFFECTED BY THE RECONSTRUCTION. PATCH AND REPAIR (E) CONCRETE PAVING TO REMAIN AS NEEDED.
- 3 REMOVE PORTION OF (E) PAVERS AFFECTED BY THE RECONSTRUCTION. PATCH AND REPAIR (E) PAVERS TO REMAIN.
- 4 REMOVE (E) DECOMPOSED GRANITE.
- 5 REMOVE (E) ALUMINUM EDGING IN ITS ENTIRETY.
- 6 (E) FIRE DEPARTMENT CONNECTION TO REMAIN, PROTECT IN PLACE.
- 7 (N) UNDERGROUND TRENCHING FOR PIPING UTILITIES. COORDINATE LOCATIONS OF TRENCHING WITH MECHANICAL, PLUMBING & ELECTRICAL. REMOVE (E) PAVING AND REINSTALL PAVING AS NEEDED.

PARTIAL DEMOLITION SITE PLAN

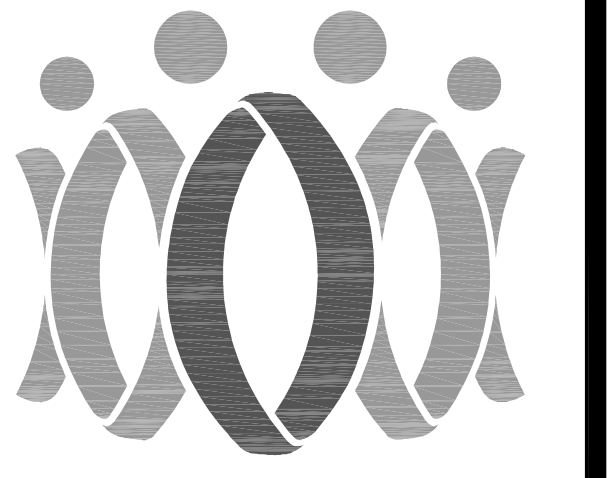
SCALE: 1"=20'-0"



DEMOLITION GENERAL NOTES:

1. NO DEMOLITION SHALL BEGIN UNTIL PLANS HAVE BEEN APPROVED BY DSA.
2. ALL ITEMS TO BE DEMOLISHED SHALL BE VERIFIED WITH THE DISTRICT (MAINTENANCE AND OPERATION) FOR SALVAGE, PRIOR TO DISPERSAL.
3. REMOVE CONCRETE PAVING TO THE NEAREST JOINT LINE.

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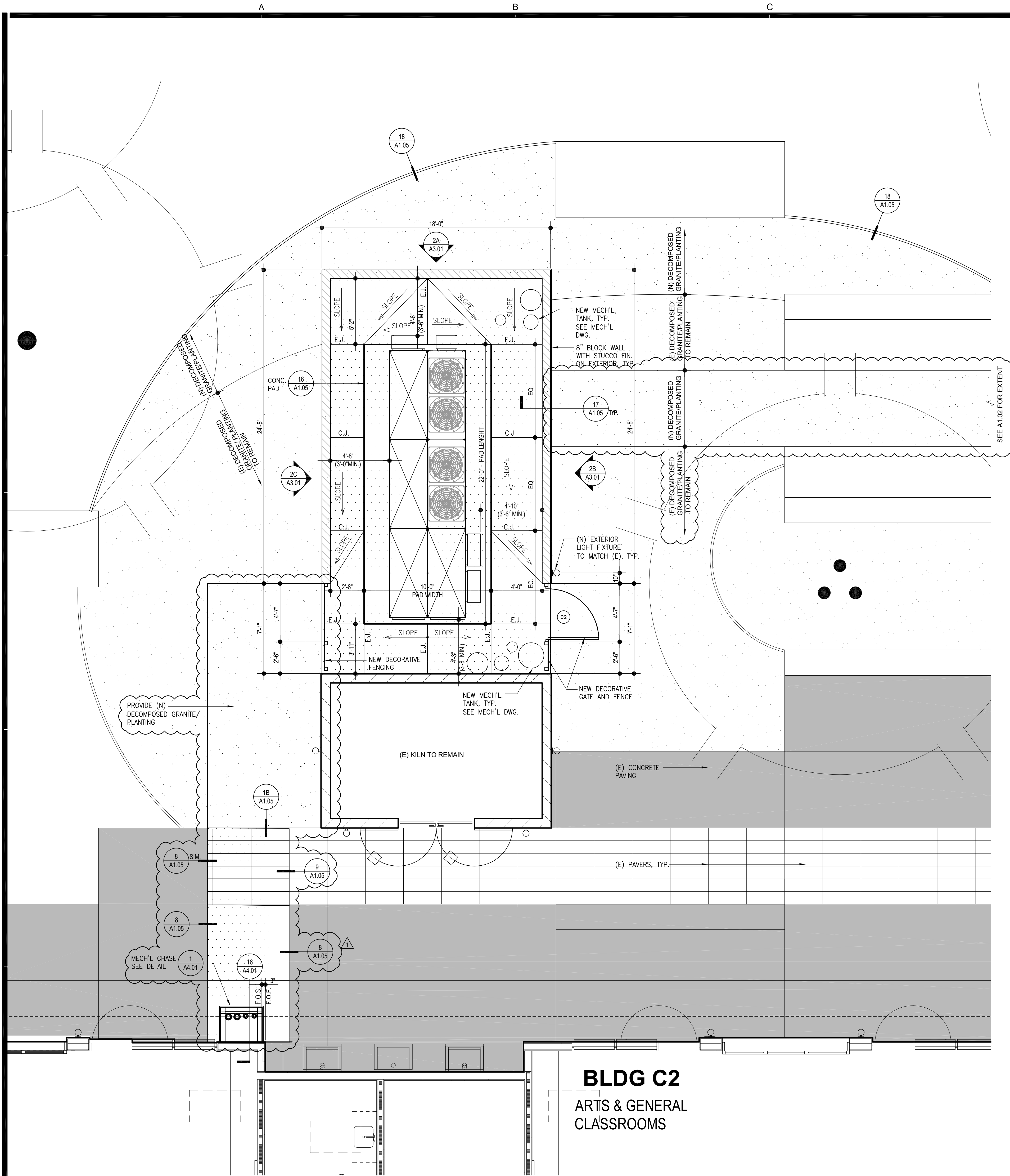
OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDINGS A/C1 & C2
ENLARGED HVAC
ENCLOSURE PLANS

Job No.
2841.100

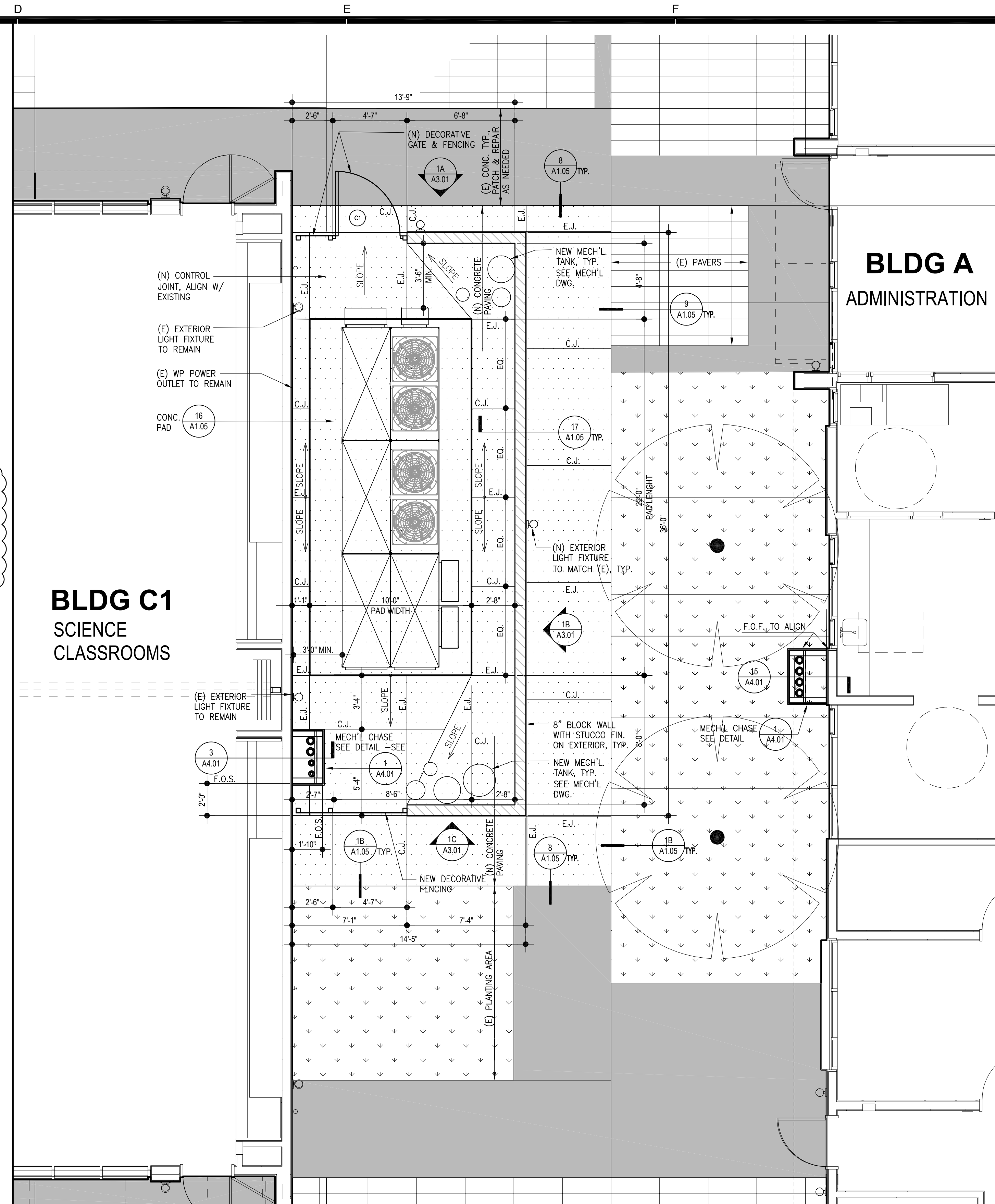
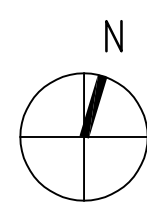
Date
08-07-2019
A1.03



BUILDING C2 - ENLARGED HVAC ENCLOSURE PLAN

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

2
A1.03

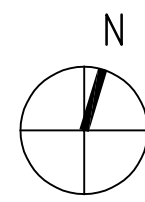


BLDG C1
SCIENCE
CLASSROOMS

BUILDING A & C1 - ENLARGED HVAC ENCLOSURE PLAN

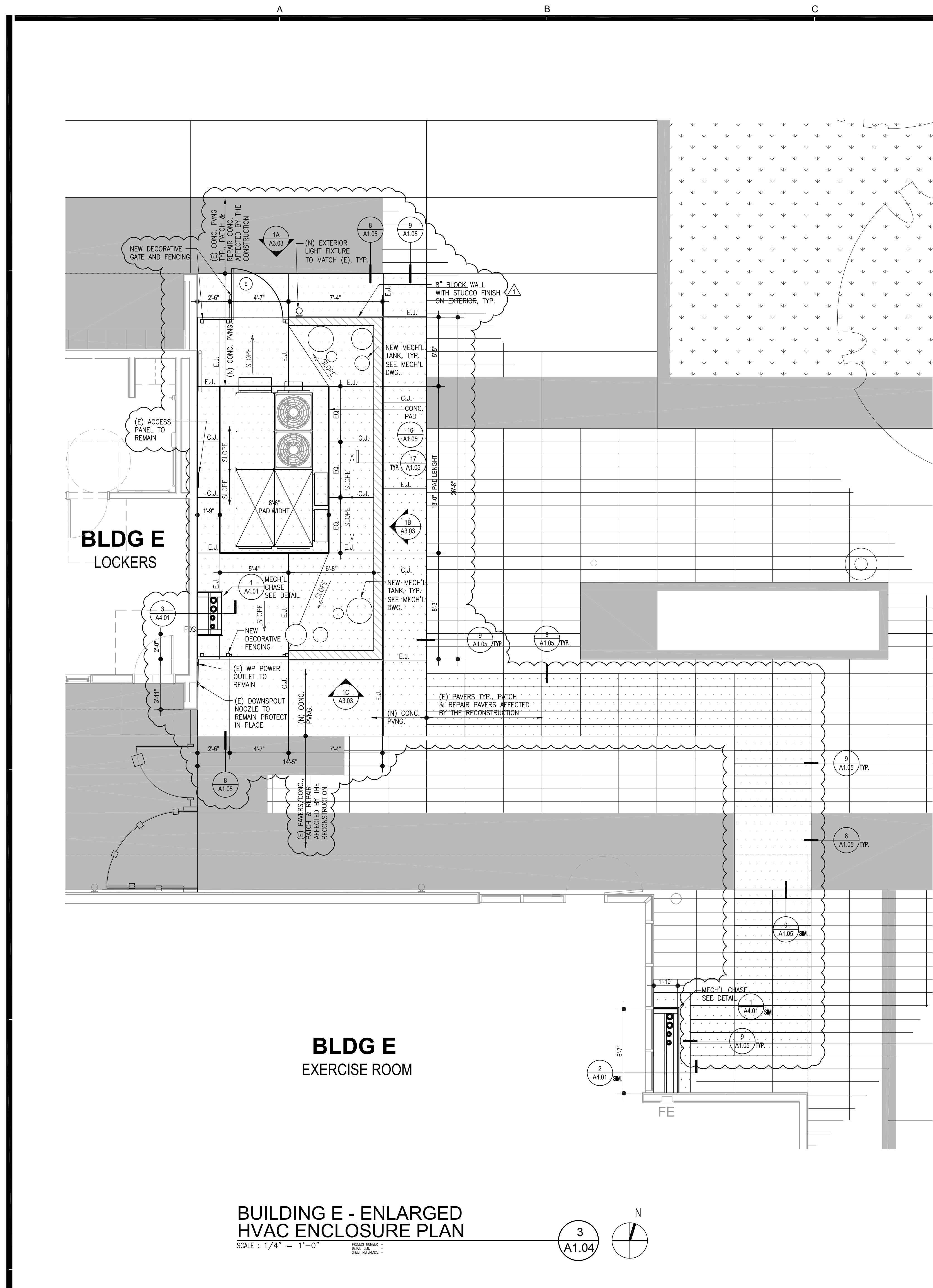
SCALE: 1/4" = 1'-0"

1
A1.03



LEGEND

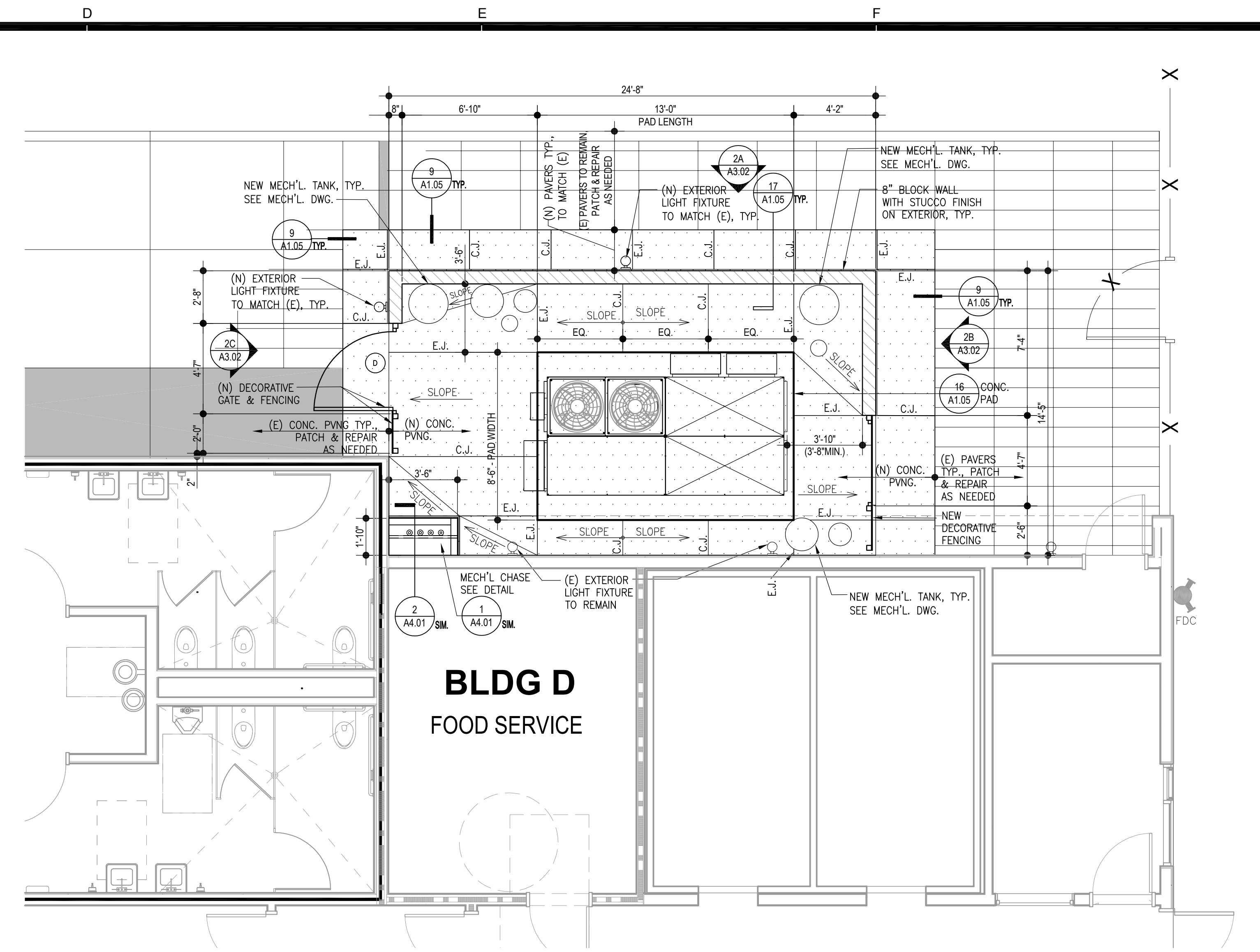
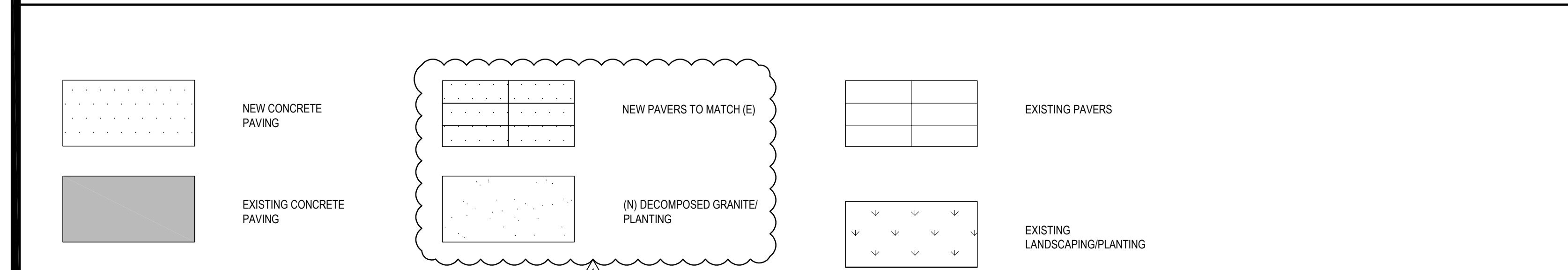
	NEW CONCRETE PAVING		EXISTING CONCRETE PAVING		EXISTING SOD TURF GRASS/ LANDSCAPING PLANTING AREA
	NEW PAVERS TO MATCH (E)		EXISTING PAVERS		EXISTING DECOMPOSED GRANITE
	(N) DECOMPOSED GRANITE/ PLANTING				
	(N) SOD TURF GRASS/ LANDSCAPING PLANTING AREA				



BUILDING E - ENLARGED HVAC ENCLOSURE PLAN
SCALE: 1/4" = 1'-0"

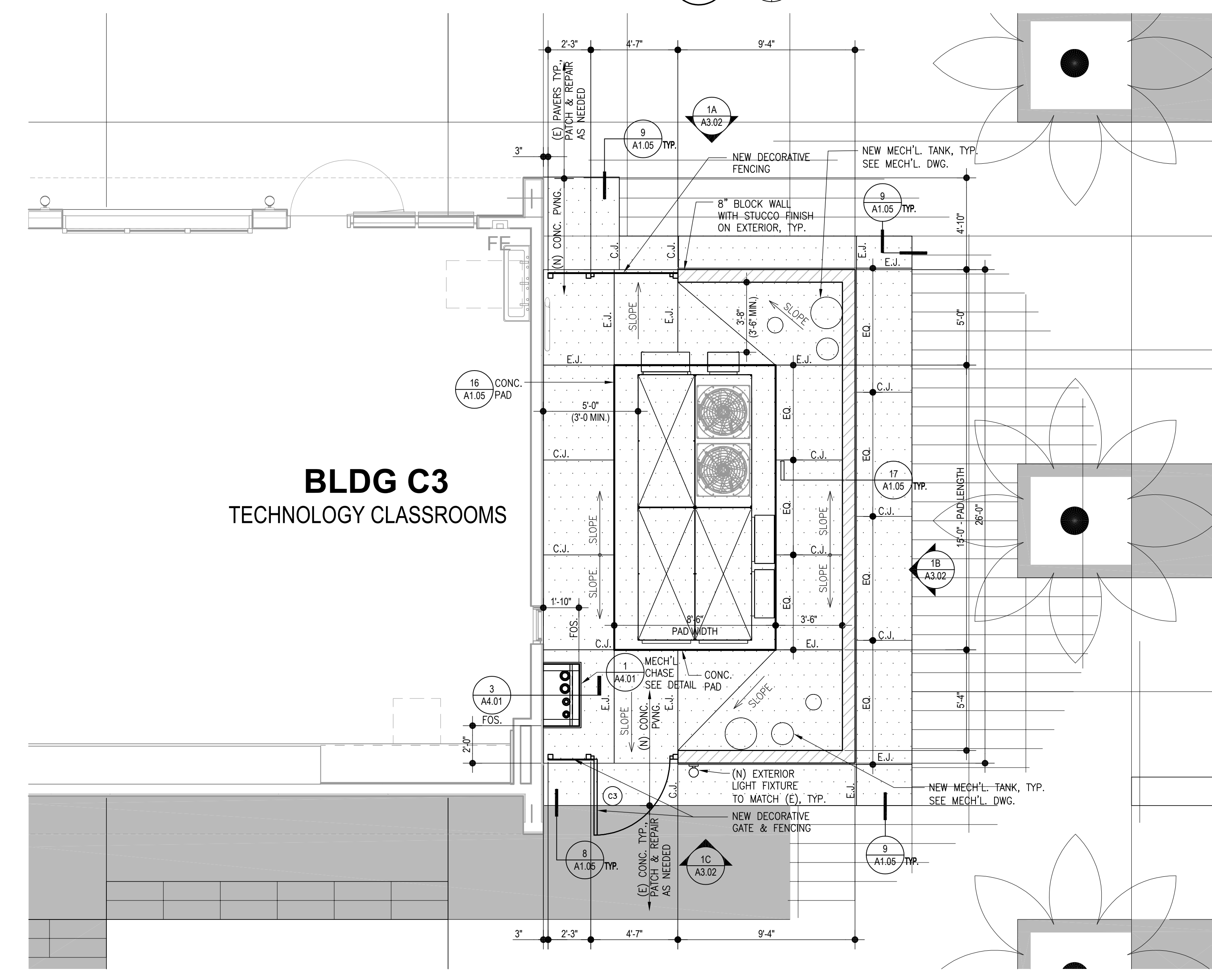
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A1.04

LEGEND



BUILDING D - ENLARGED HVAC ENCLOSURE PLAN
SCALE: 1/4" = 1'-0"

2
A1.04

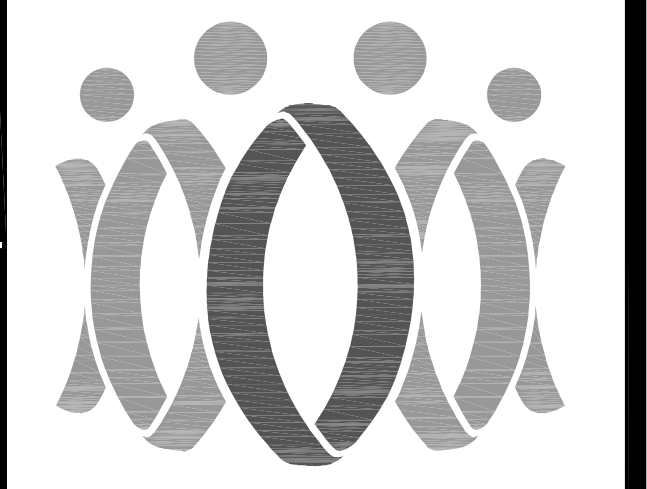


BLDG C3 TECHNOLOGY CLASSROOMS

BUILDING C3 - ENLARGED HVAC ENCLOSURE PLAN
SCALE: 1/4" = 1'-0"

1
A1.04

PTN_72546-80 APPL_03-120038



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OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

**BUILDINGS C3, D, & E
ENLARGED HVAC
ENCLOSURE PLANS**

Job No.
2841.100

Date
08-07-2019

A1.04

GATE NO.	SIZE	HEAD	JAMB (L)	JAMB (R)
C1	4'-7" X 8'-0"	3 / A1.05	2 / A1.05	7 / A 1.05
C2	4'-7" X 8'-0"	3 / A1.05	7 / A1.05 (SIM)	2 / A 1.05 (SIM)
C3	4'-7" X 8'-0"	3 / A1.05	7 / A1.05 (SIM)	2 / A 1.05 (SIM)
D	4'-7" X 8'-0"	3 / A1.05	2 / A1.05	7 / A 1.05
E	4'-7" X 8'-0"	3 / A1.05	2 / A1.05	7 / A 1.05

GATE - JAMB POST TO HAVE STEEL POSITIONED TO SERVE AS A POSITIVE STOP; GATE CANNOT SWING PAST HARDWARE STRIKES. WELDED MOUNTING PLATES AND GATE BOXES BY GATE MFG.
 PROVIDE EACH SGL GATE WITH THE FF:

QTY	DESCRIPTION	CATALOG NO.	FINISH MFR.
1 EA	PIVOTS		BY GATE MFR. B/O
1 EA	GATE CLOSER		BY GATE MFR. B/O
1 EA	SARGENT LOCKSET		630 SAR
1 EA	PERM CYLINDER TO MATCH BLDG. STANDARD		

BALANCE OF HARDWARE BY GATE MFR.
 FIELD VERIFY AND MATCH SCHOOL STANDARD

GATE SCHEDULE & HARDWARE

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

19
A1.05

PERFORATED METAL PANEL ATTACHMENT

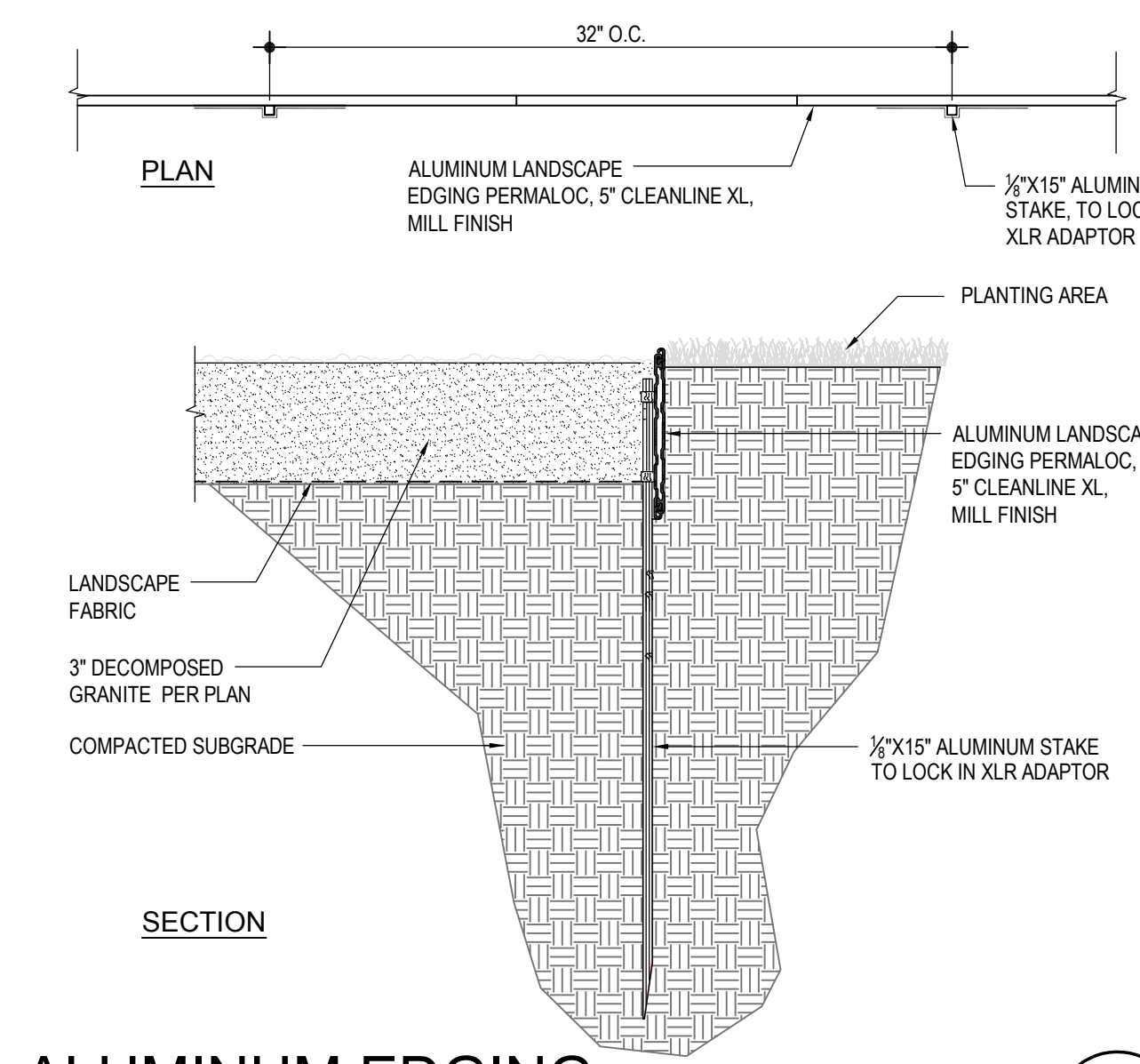
SCALE: 1-1/2"=1'-0"

12
A1.05

DECORATIVE METAL PANEL ATTACHMENT

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

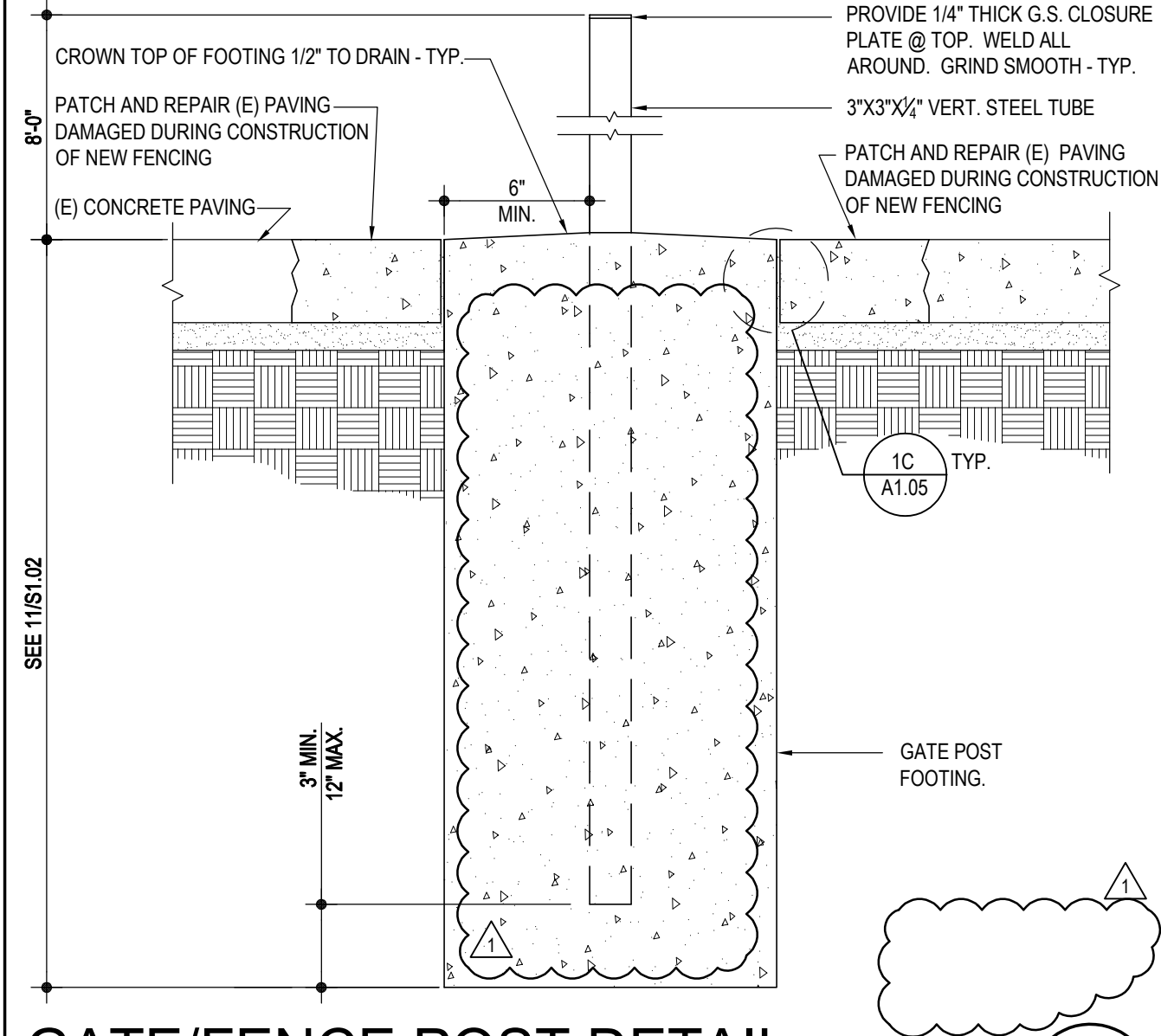
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A1.05



ALUMINUM EDGING

SCALE: 3"=1'-0"

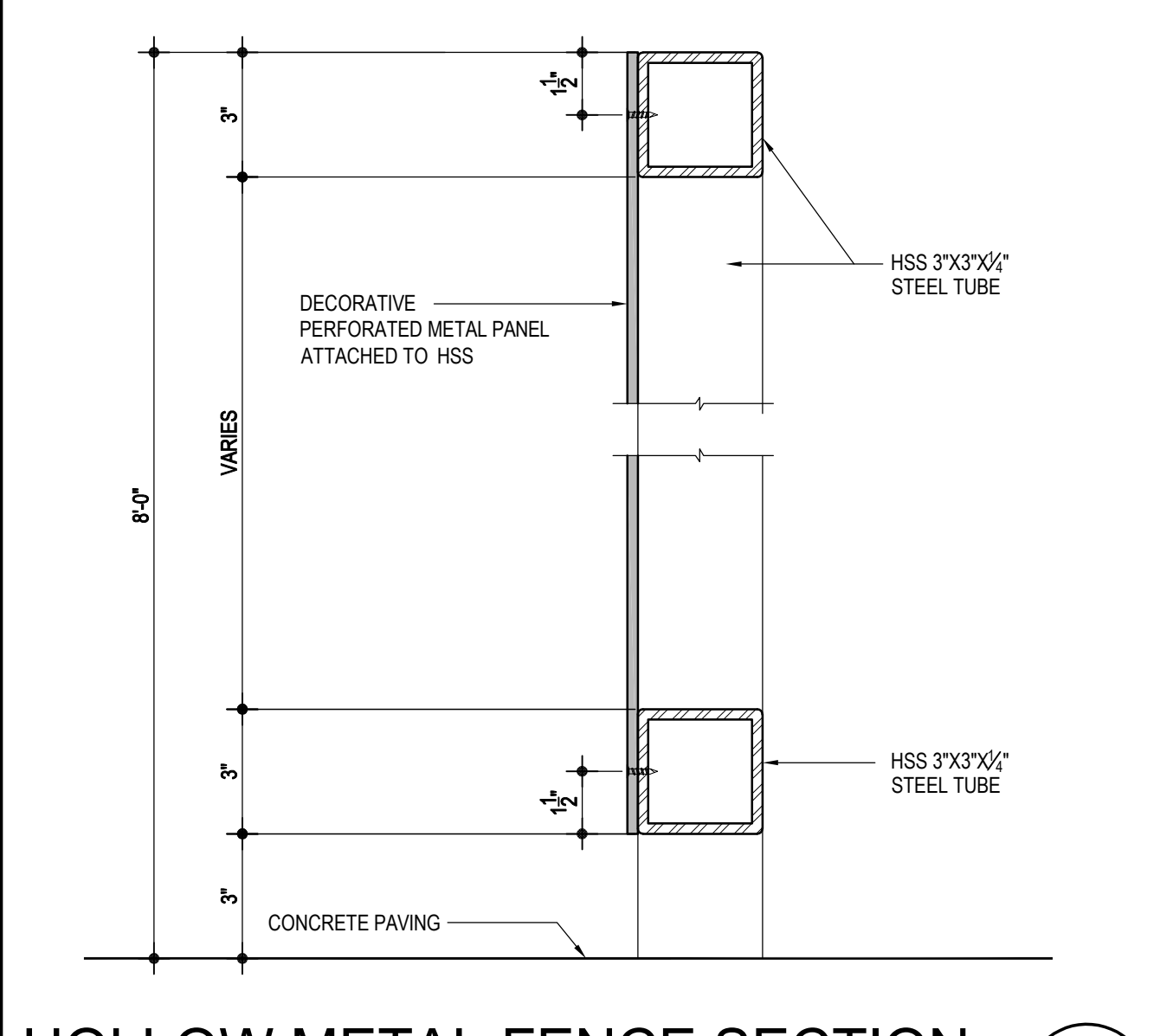
18
A1.05



GATE/FENCE POST DETAIL

SCALE: 1"=1'-0"

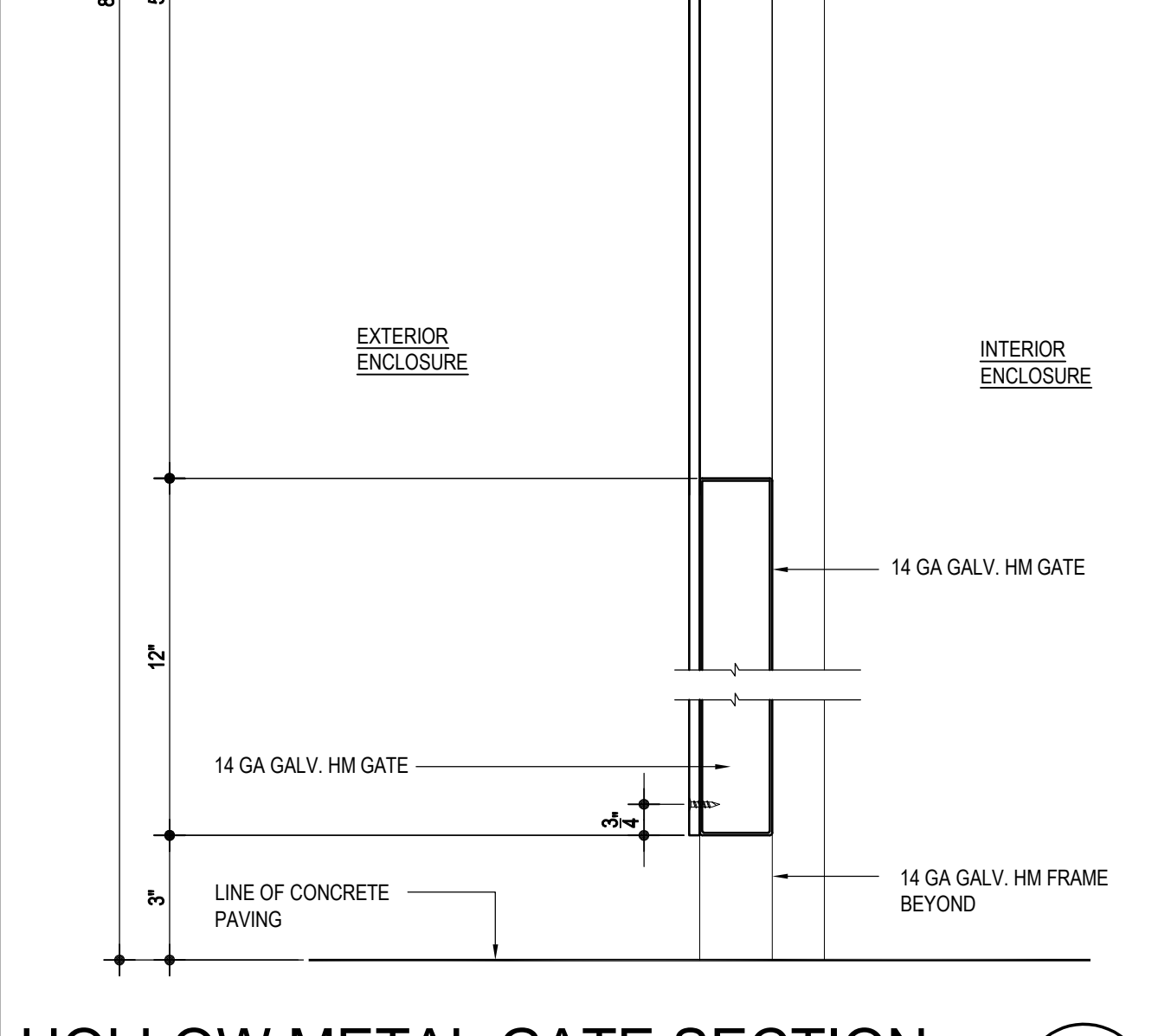
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A1.05



HOLLOW METAL FENCE SECTION

SCALE: 3"=1'-0"

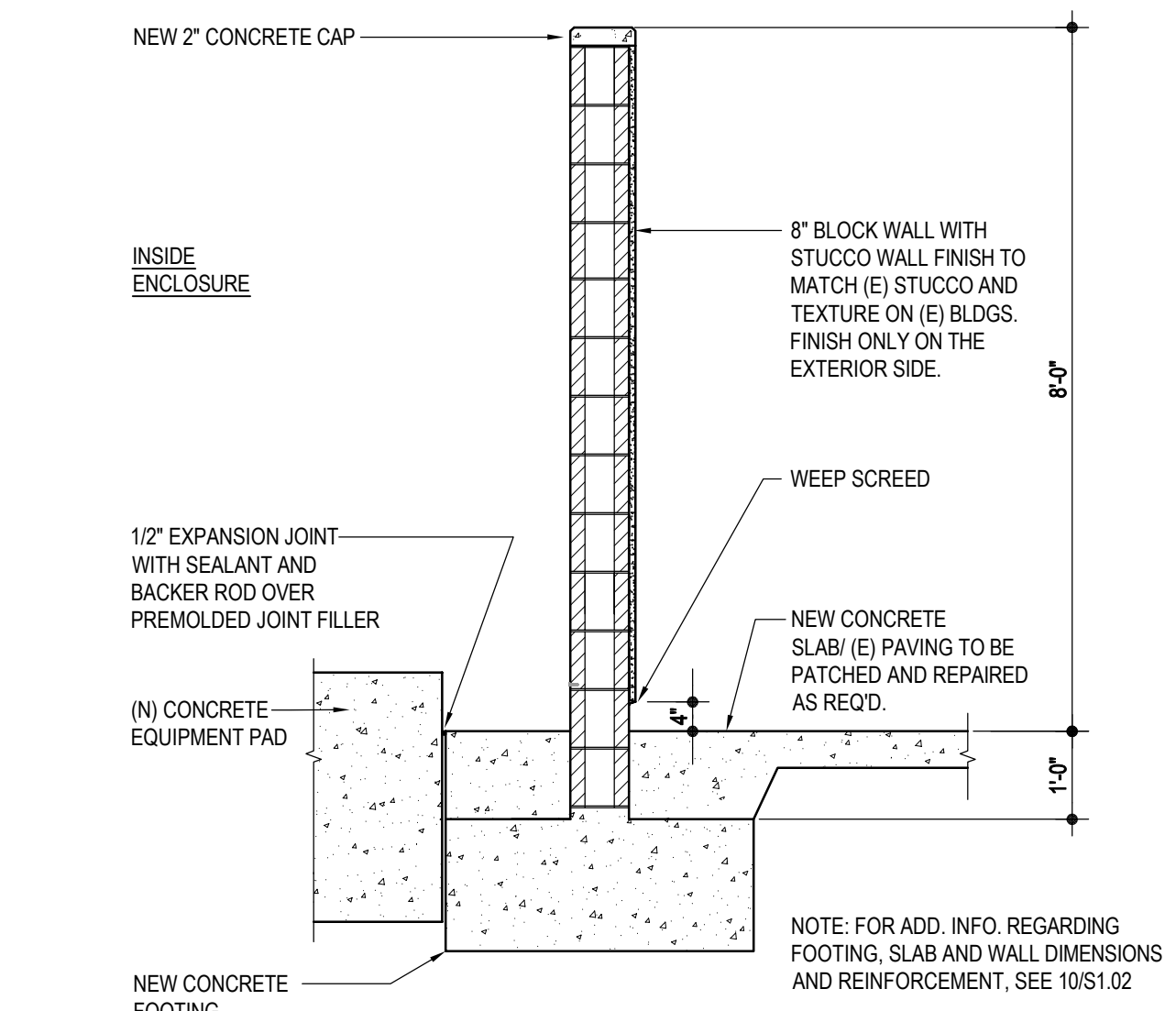
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A1.05



HOLLOW METAL GATE SECTION

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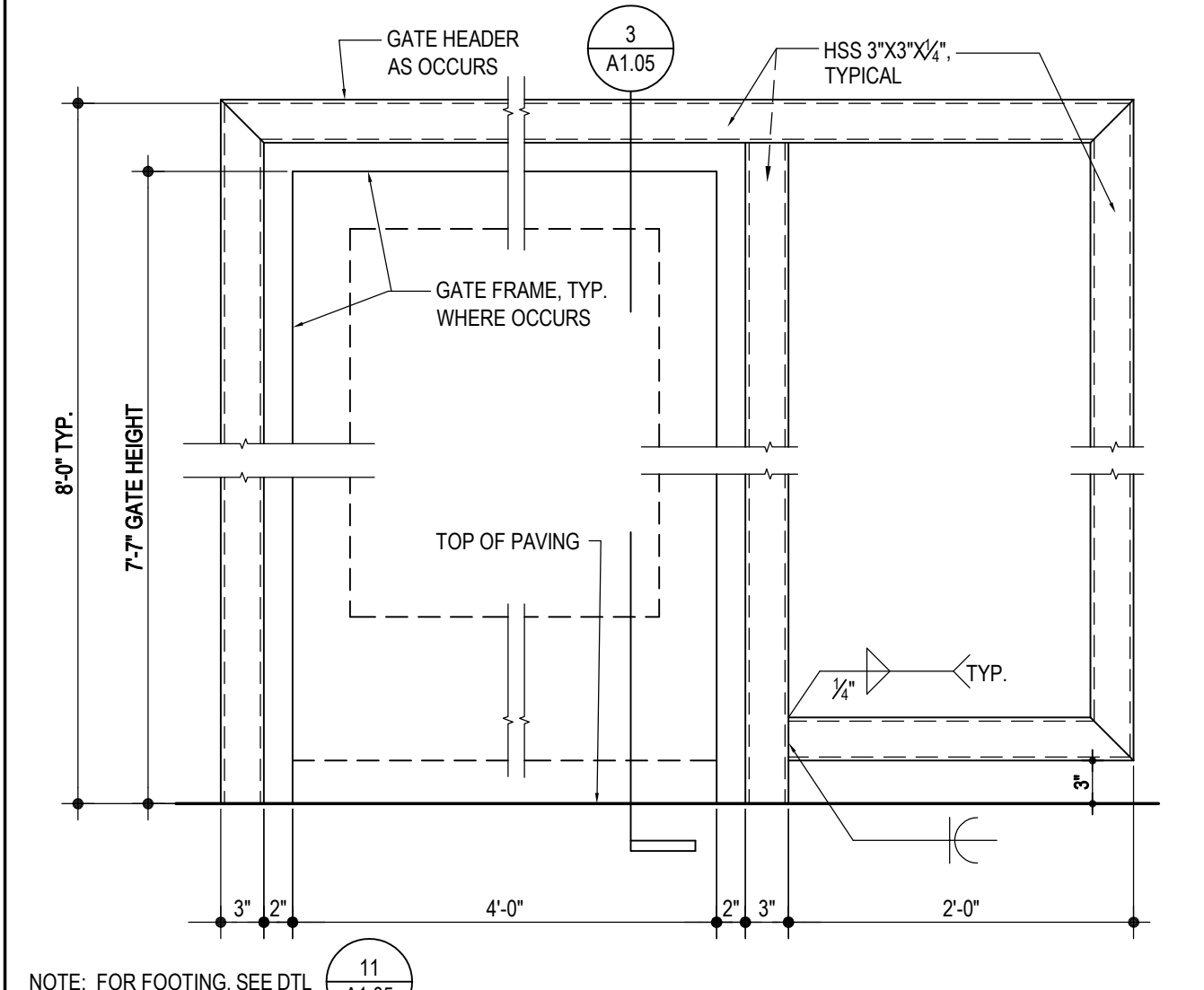
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A1.05



CONCRETE BLOCK WALL

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

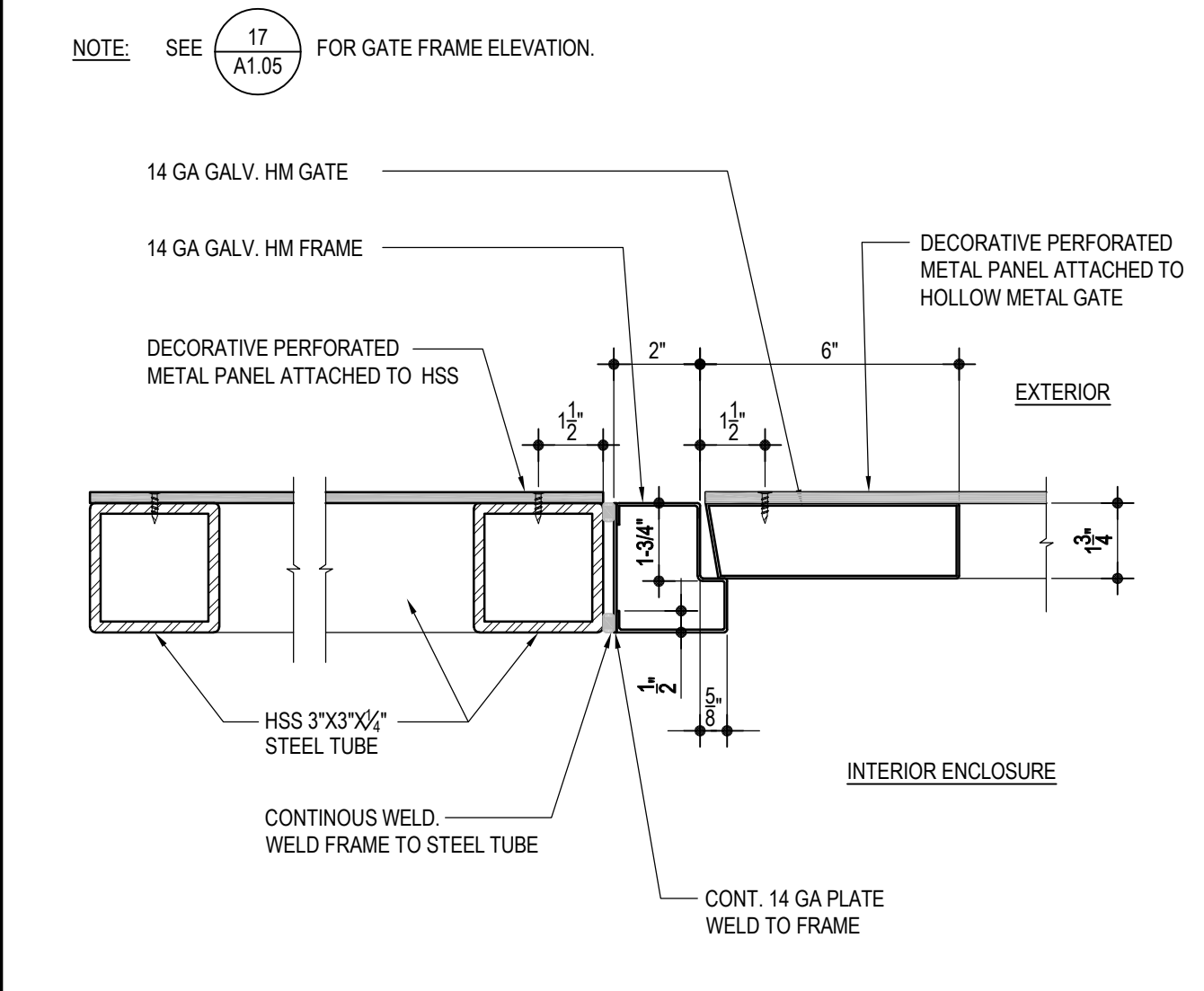
17
A1.05



GATE AND FENCE FRAME

SCALE: 1"=1'-0"

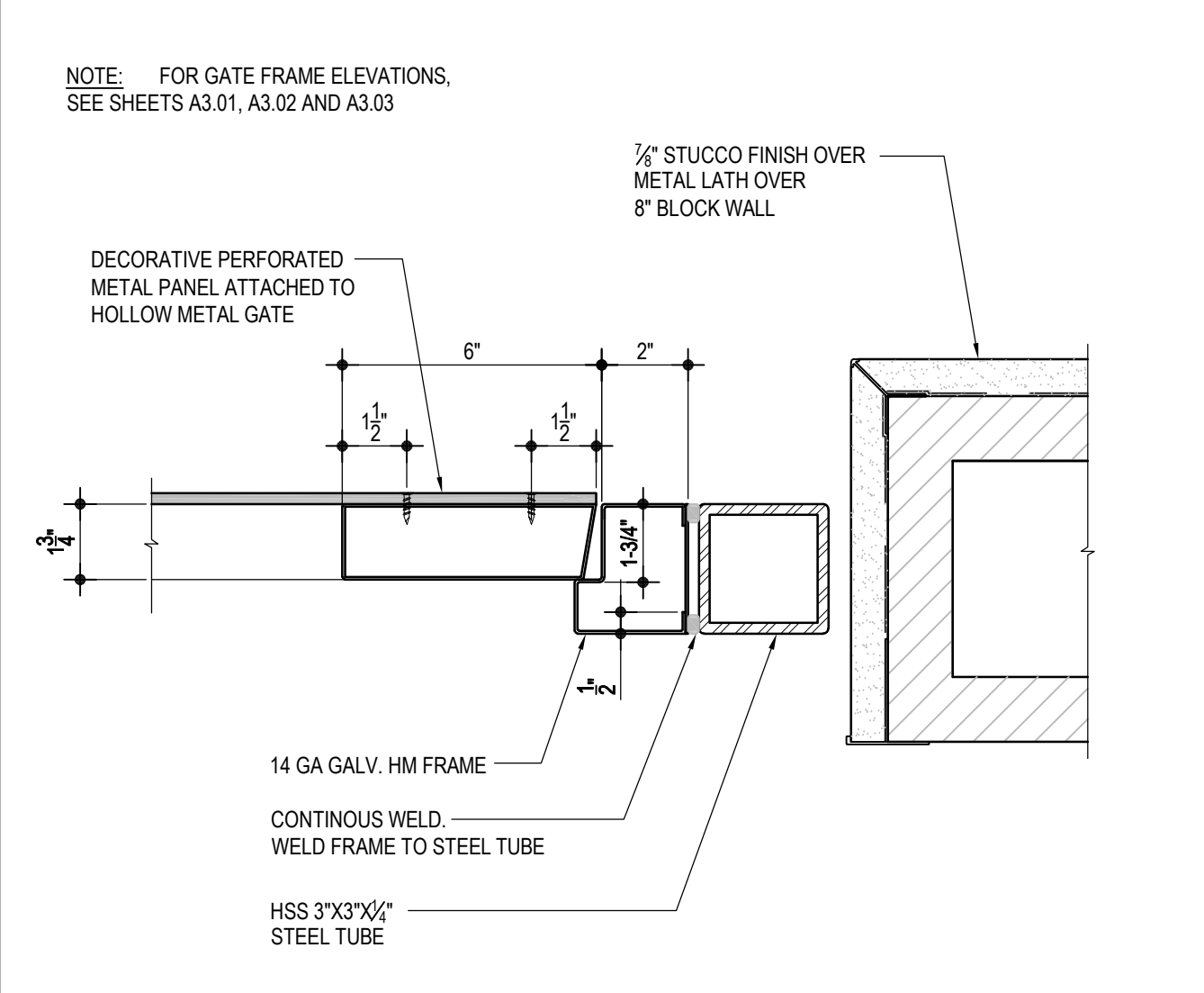
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A1.05



HOLLOW METAL FRAME AND GATE DETAILS

SCALE: 3"=1'-0"

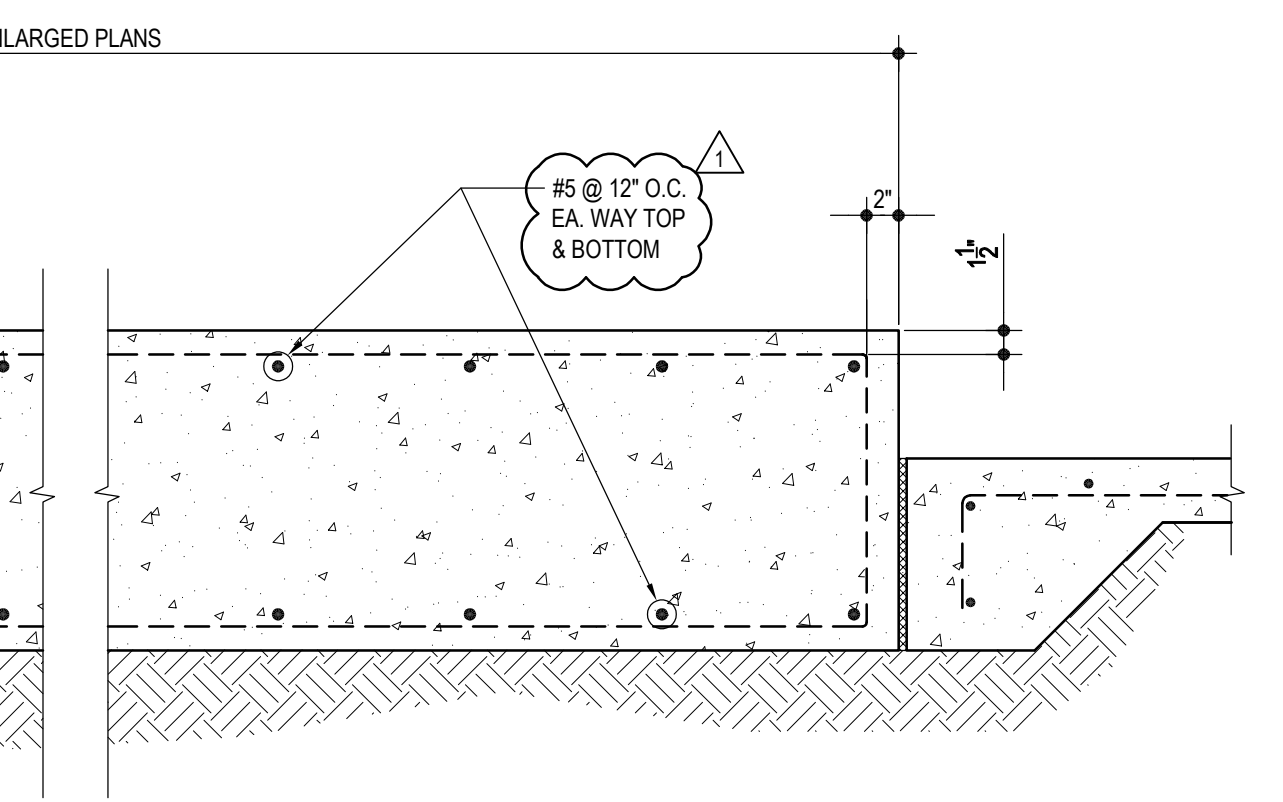
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A1.05



HOLLOW METAL FRAME AND GATE DETAILS

SCALE: 3"=1'-0"

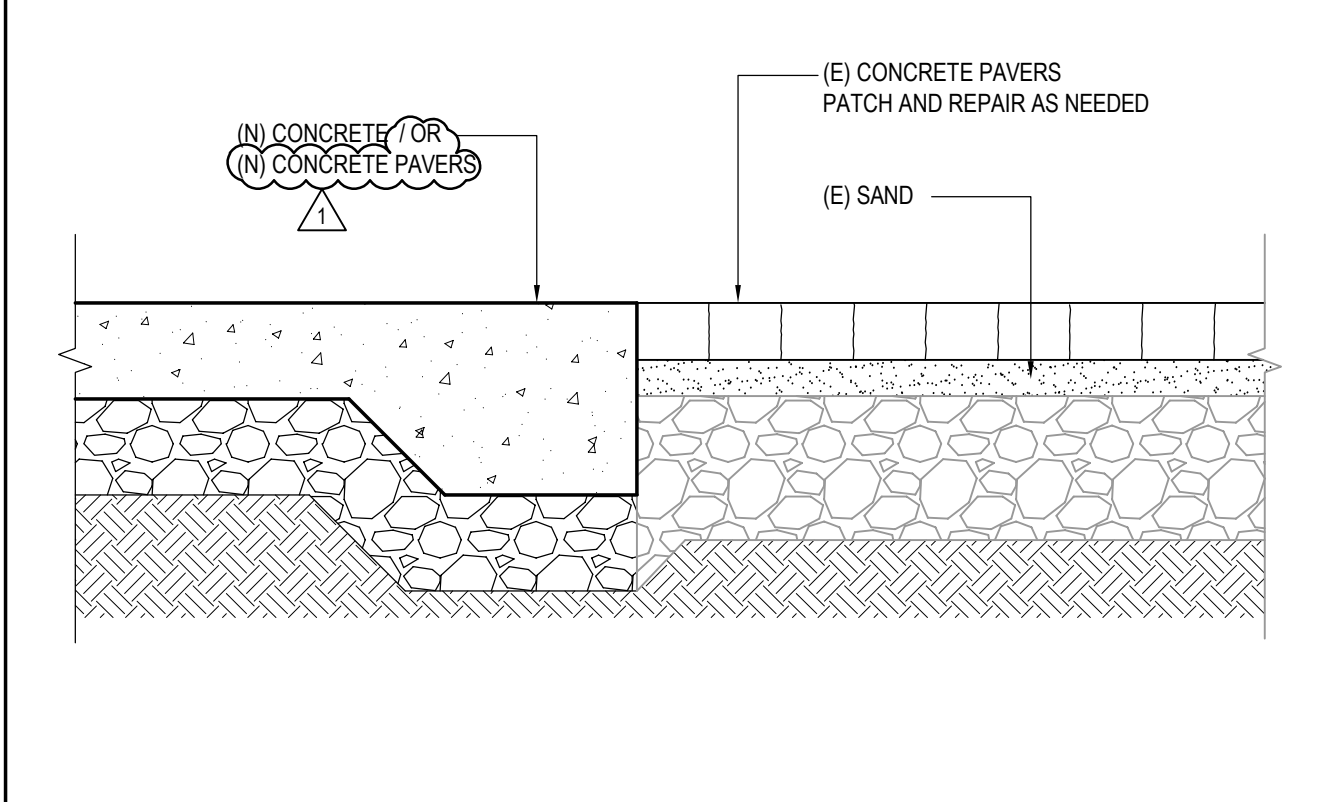
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A1.05



MECHANICAL CONCRETE CURB

SCALE: 1"=1'-0"

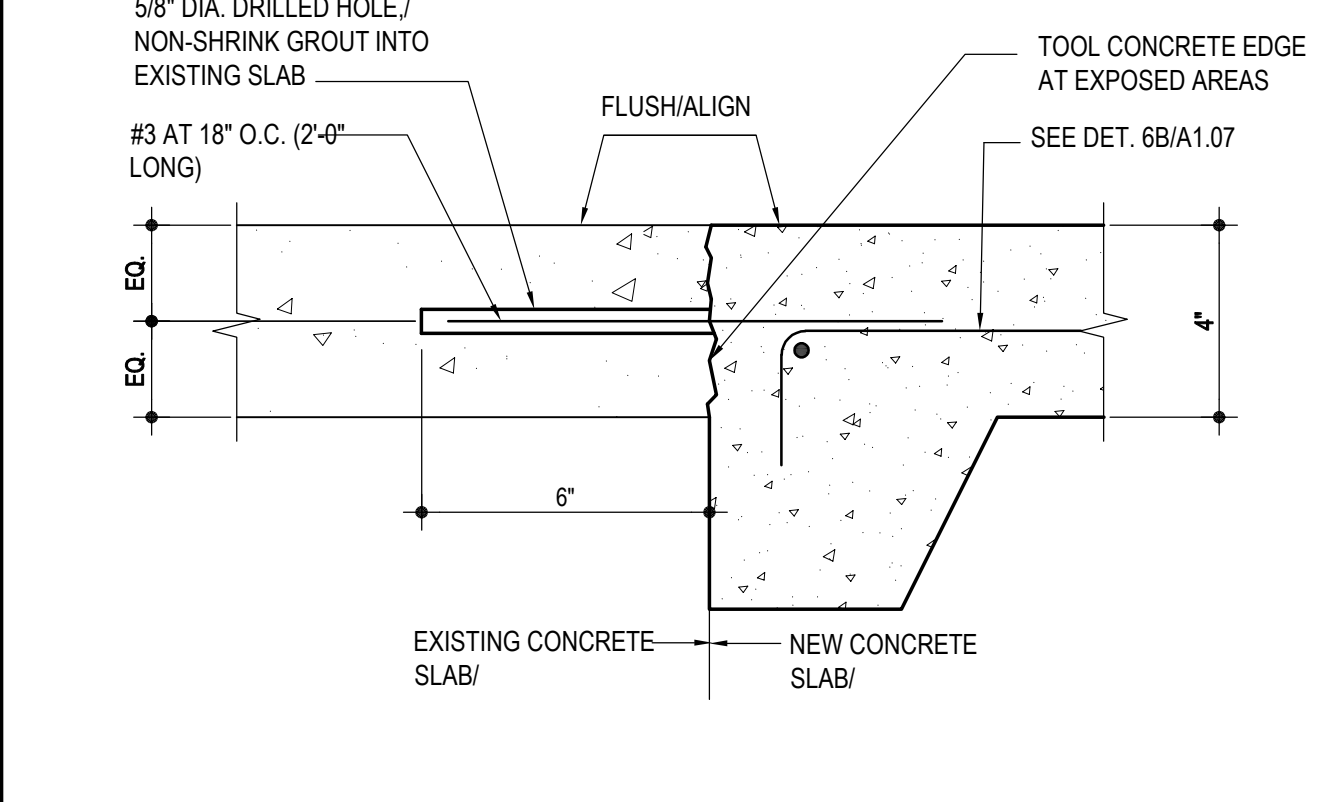
16
A1.05



NEW CONC. OR NEW CONC. PAVERS ADJACENT TO (E) CONC. PAVERS

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

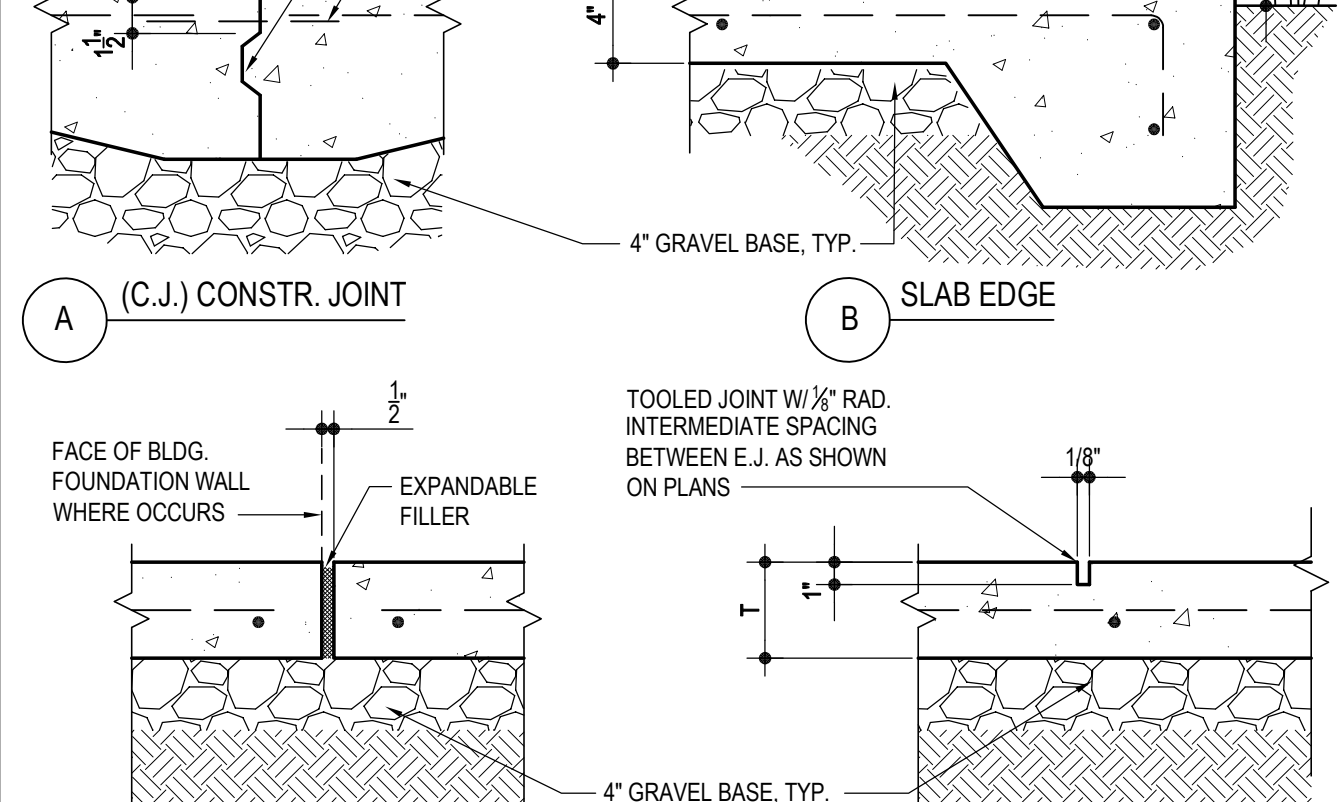
9
A1.05



CONNECTION OF NEW CONC. TO EXISTING CONC.

SCALE: 3"=1'-0"

8
A1.05

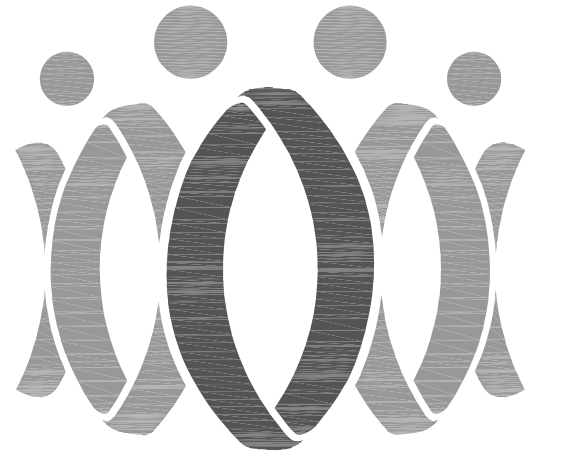


TYP. CONCRETE SLAB

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

1
A1.05

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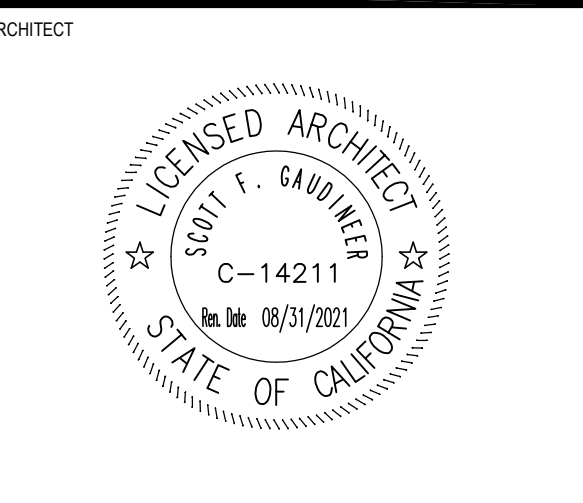


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OXNARD UNION HIGH SCHOOL DISTRICT
 RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
 4235 MAR VISTA DRIVE
 CAMARILLO, CA 93010

SITE DETAILS

Job No.

2841.100

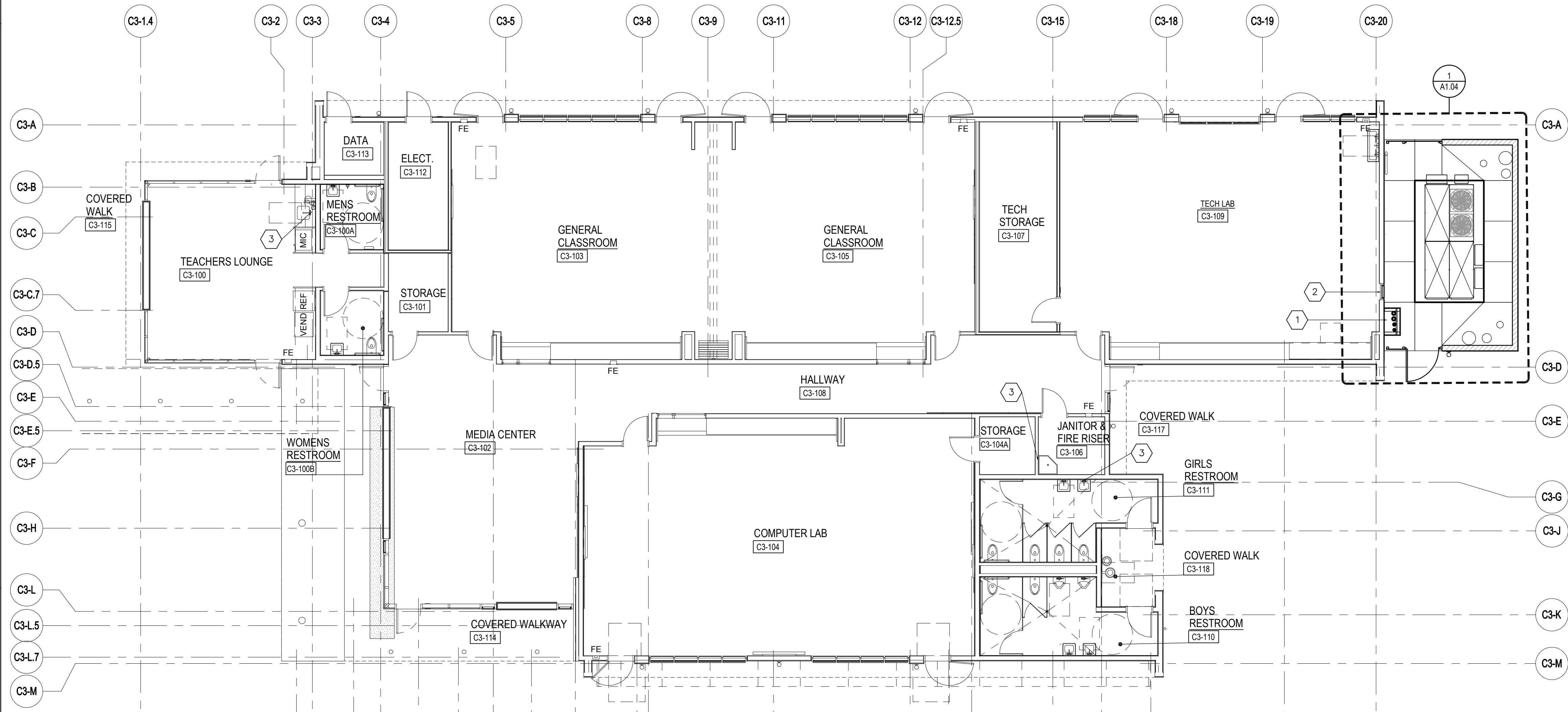
Date

08-07-2019

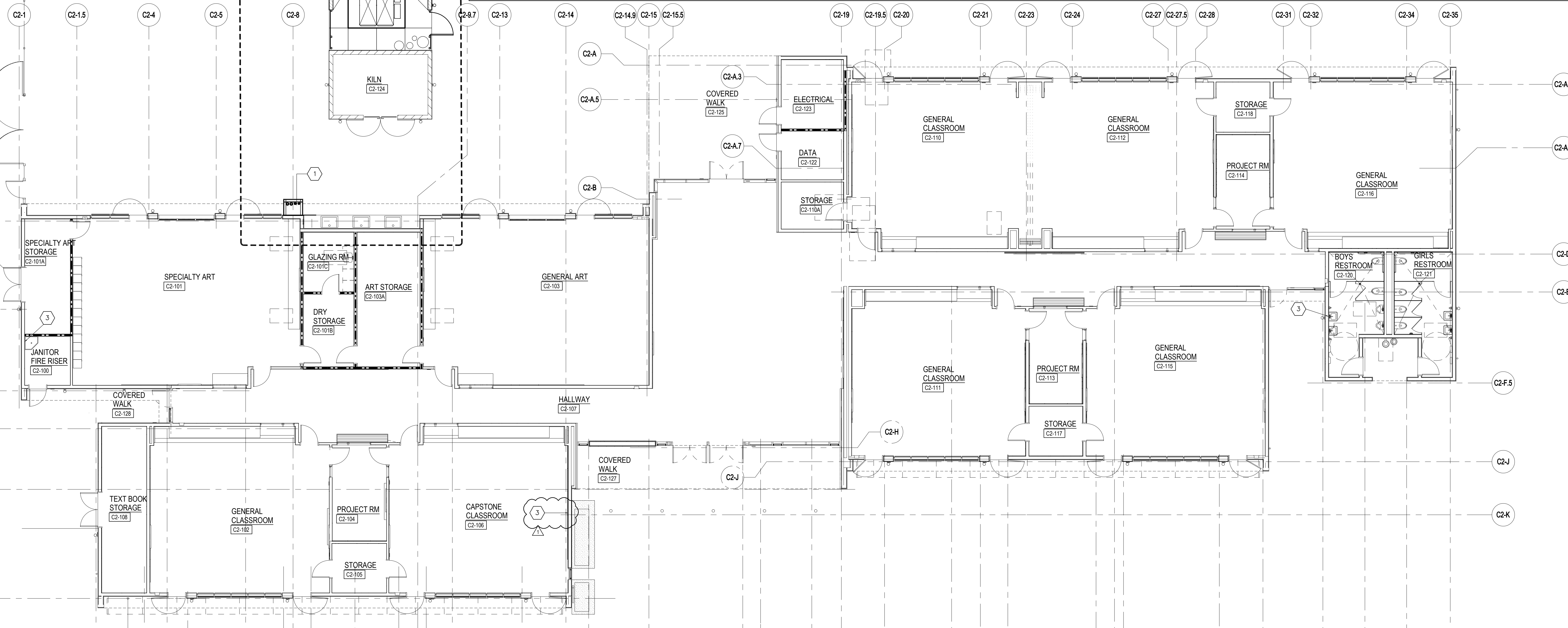
A1.05

RECONSTRUCTION PLAN KEY NOTES

- 1 NEW MECHANICAL CHASE - SEE DETAIL 1/A4.01
- 2 PROVIDE 3M FROSTED FILM ON INTERIOR WINDOW TO BLOCK VIEW INTO THE ENCLOSURE.
- 3 REMOVE PORTION OF (E) WALL FINISH TO ACCOMMODATE (N) DRAIN CONDENSATE TO BE TAPPED TO (E) SINK. SEE PLUMBING DRAWINGS FOR MORE INFORMATION. PATCH & REPAIR FINISH AS NEEDED. FINISH MATERIAL AND COLOR TO MATCH (E).

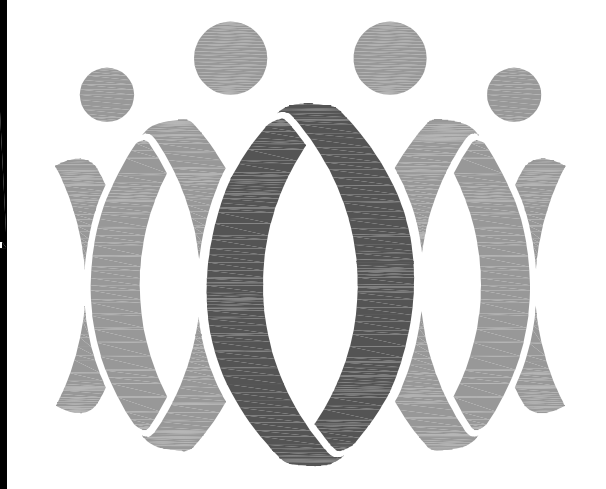


BUILDING C3 - RECONSTRUCTION FLOOR PLAN
 SCALE: 1/8" = 1'-0"
 PROJECT NUMBER: 2841.100
 DATE: 08/2019



BUILDING C2 - RECONSTRUCTION FLOOR PLAN
 SCALE: 1/8" = 1'-0"
 PROJECT NUMBER: 2841.100
 DATE: 08/2019

PTN_72546-80 APPL_03-120038



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NEW HVAC SYSTEM
 4235 MAR VISTA DRIVE
 CAMARILLO, CA 93010

BUILDINGS C2 & C3
RECONSTRUCTION
FLOOR PLANS

Job No.
 2841.100

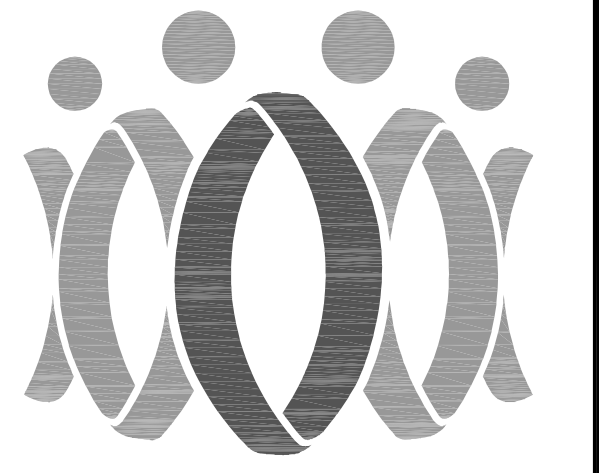
Date
 08-07-2019

A2.02

RECONSTRUCTION PLAN KEY NOTES

- ① NEW MECHANICAL CHASE - SEE DETAIL 1/A4.01
- ② REMOVE PORTION OF (E) WALL FINISH TO ACCOMMODATE (N) DRAIN CONDENSATE TO BE TAPPED TO (E) SINK. SEE PLUMBING DRAWINGS FOR MORE INFORMATION. PATCH & REPAIR FINISH AS NEEDED. FINISH MATERIAL AND COLOR TO MATCH (E).

PTN_ 72546-80 APPL_ 03-120038



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RANCHO CAMPANA HIGH SCHOOL

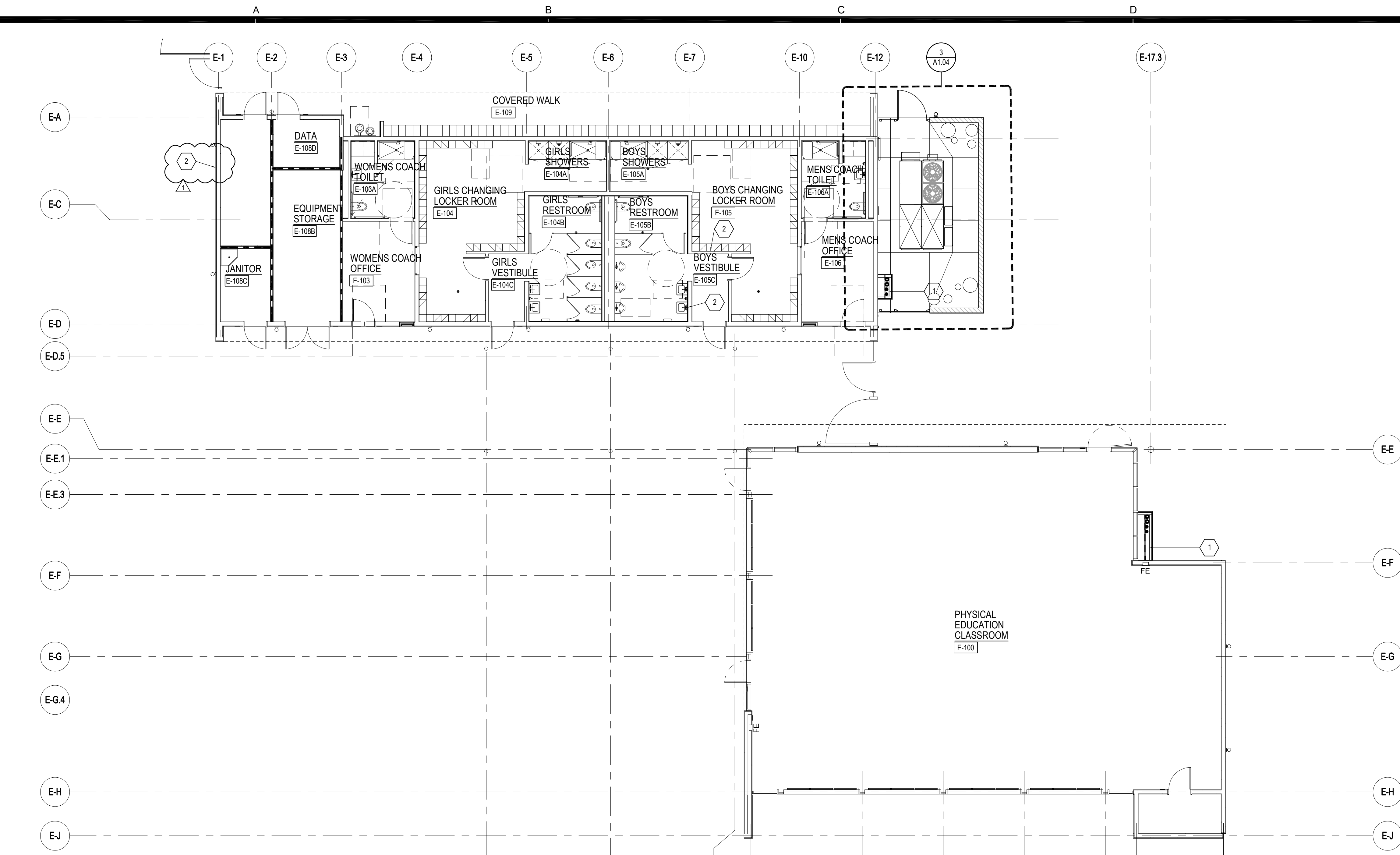
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BUILDINGS D & E
RECONSTRUCTION
FLOOR PLANS

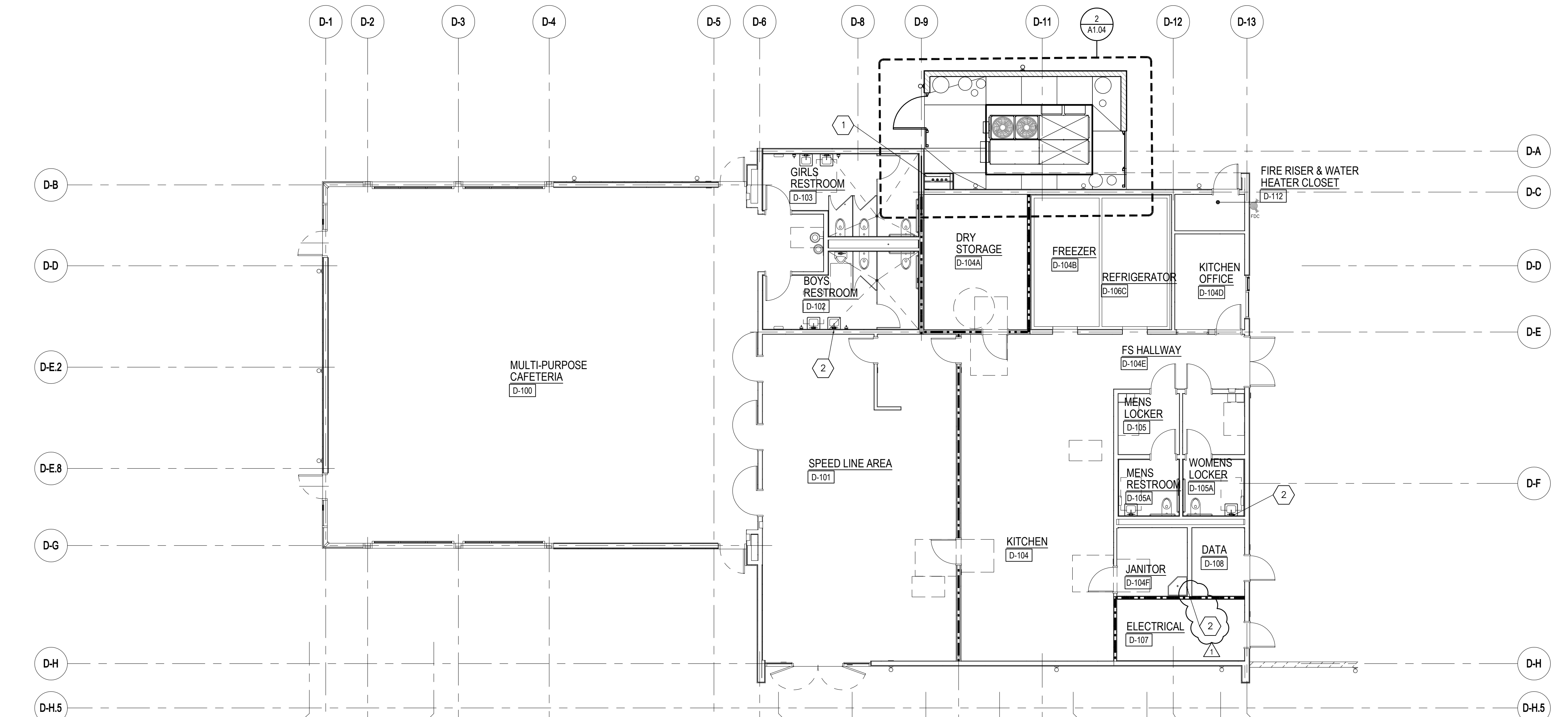
Job No. 2841.100

Date: 08-07-2019

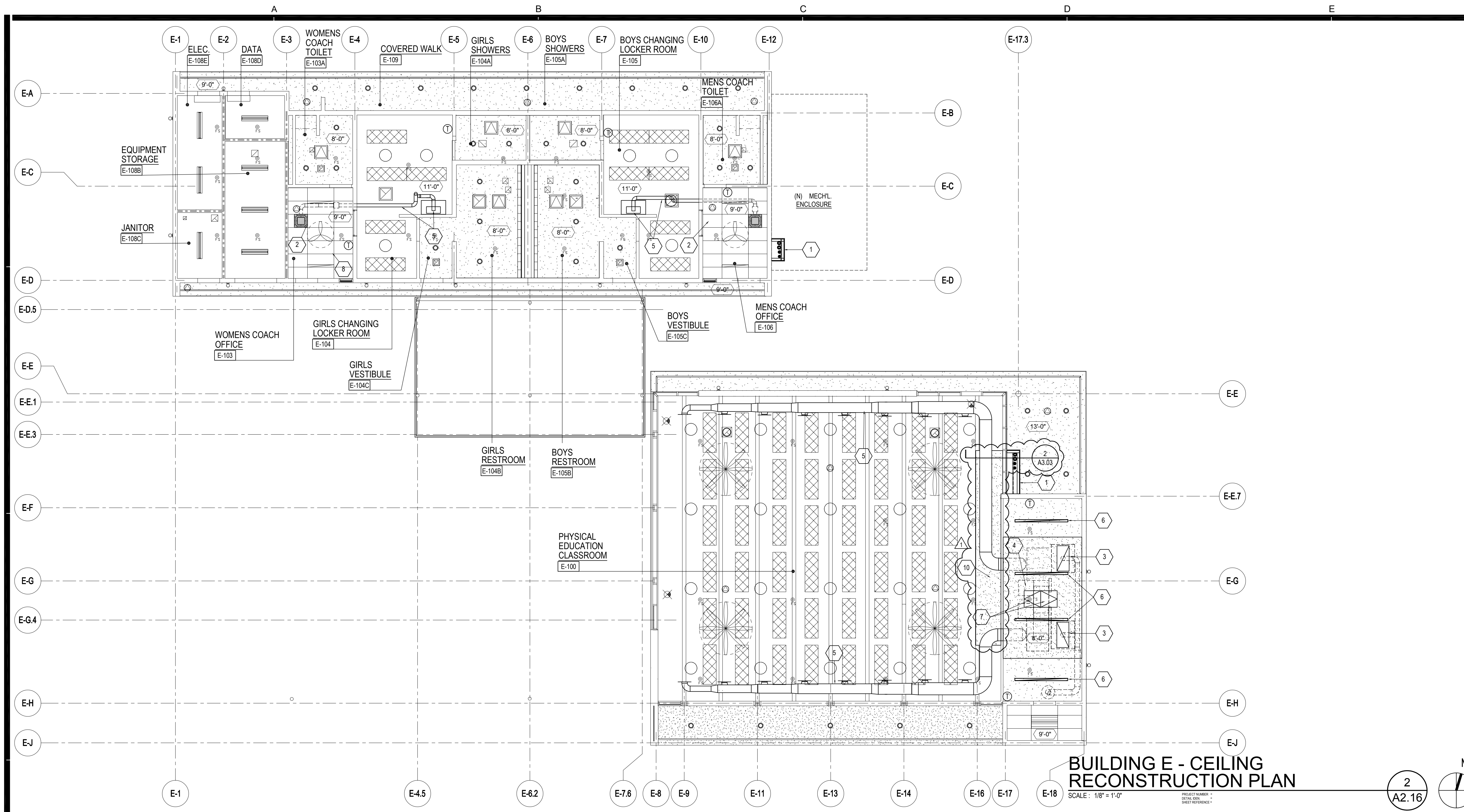
A2.03



BUILDING E - RECONSTRUCTION FLOOR PLAN
SCALE: 1/8" = 1'-0"
PROJECT NUMBER: 2841.100
DATE: 08/07/2019
A2.03

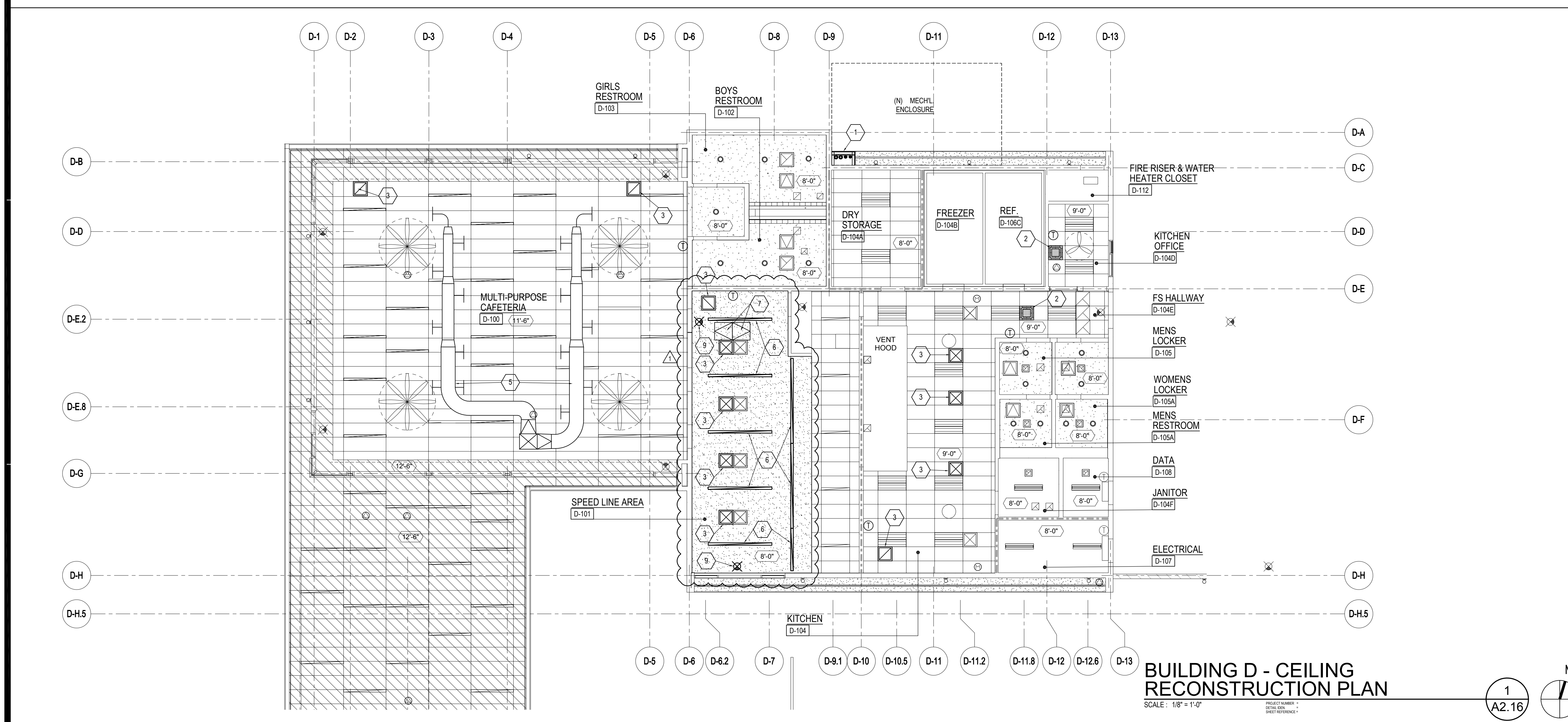


BUILDING D - RECONSTRUCTION FLOOR PLAN
SCALE: 1/8" = 1'-0"
PROJECT NUMBER: 2841.100
DATE: 08/07/2019
A2.03



BUILDING E - CEILING RECONSTRUCTION PLAN
SCALE: 1/8" = 1'-0"

2
A2.16



BUILDING D - CEILING RECONSTRUCTION PLAN
SCALE: 1/8" = 1'-0"

1
A2.16

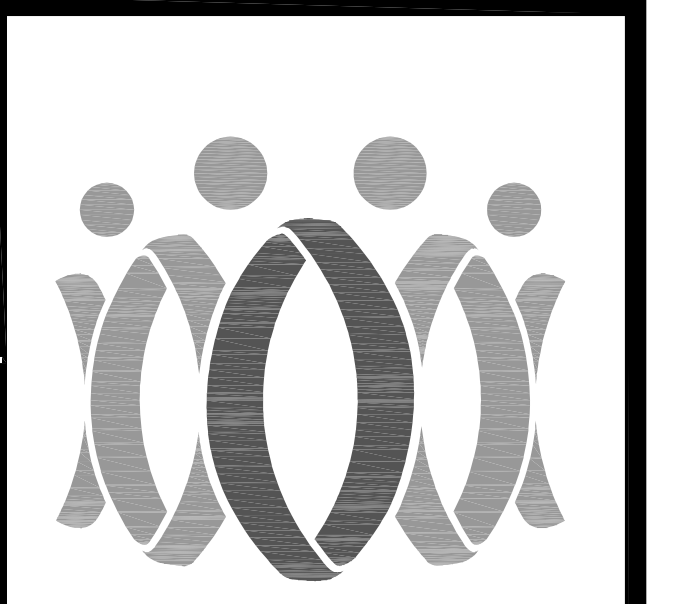
CEILING RECONSTRUCTION KEY NOTES

- GENERAL NOTE:
- ADJUST AND EXTEND SPRINKLER HEADS AS NEEDED TO ACCOMMODATE CLNG. CHANGES.
 - ADJUST FIRE ALARM SYSTEM AS NEEDED TO ACCOMMODATE CLNG. CHANGES.
 - ADJUST/ AND OR PROVIDE (N) CEILING TILES & (N) LINEAR WOOD CEILING SYSTEM AS NEEDED TO ACCOMMODATE (N) FCU'S, FCU CASSETTE DIFFUSERS & (N) REGISTERS. MATCH (E) TILE, LINEAR WOOD CEILING MANUFACTURER AND COLOR.

- ① (N) MECHANICAL CHASE FOR BLDGS. C1 & A. SEE DETAIL 8 A4.01
- ② (N) CASSETTE FAN COIL DIFFUSER. SEE ELECTRICAL DWGS.
- ③ (N) SUPPLY AND OR RETURN REGISTER.
- ④ (N) FAN COIL UNITS. SEE MECHANICAL DRAWINGS.
- ⑤ (N) EXPOSED MECHANICAL DUCTS/ DIFFUSERS / PIPINGS. SEE MECH. DWGS.
- ⑥ (E) REINSTALLED LINEAR RECESSED LIGHT FIXTURE.
- ⑦ (N) ACCESS PANEL DOOR.
- ⑧ (E) REINSTALLED CEILING FAN.
- ⑨ (E) REINSTALLED ILLUMINATED EXIT SIGN.
- ⑩ (N) MECHANICAL PIPING SOFFIT.

* SEE SHEET A2.14 FOR CEILING RECONSTRUCTION LEGEND.

AGENCY
PTN_ 72546-80 APPL_ 03-120038

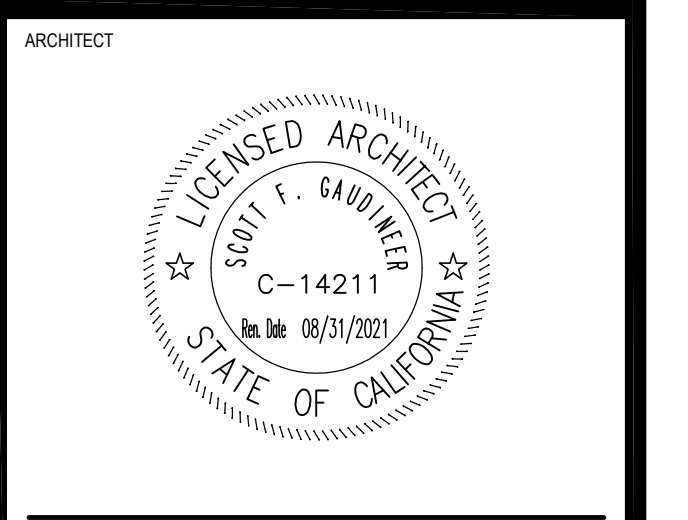


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(06-12-20)

Drawn by _____
Checked by _____

No.	Date	Description
1		BID ADDENDUM

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OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

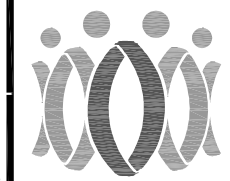
NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDINGS D & E
CEILING
RECONSTRUCTION PLANS

Job No.
2841.100
Date
08-07-2019

A2.16

PTN_72546-80 APPL_03-120038

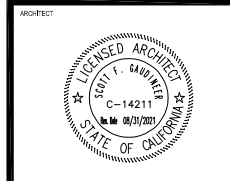


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Rev.	Description
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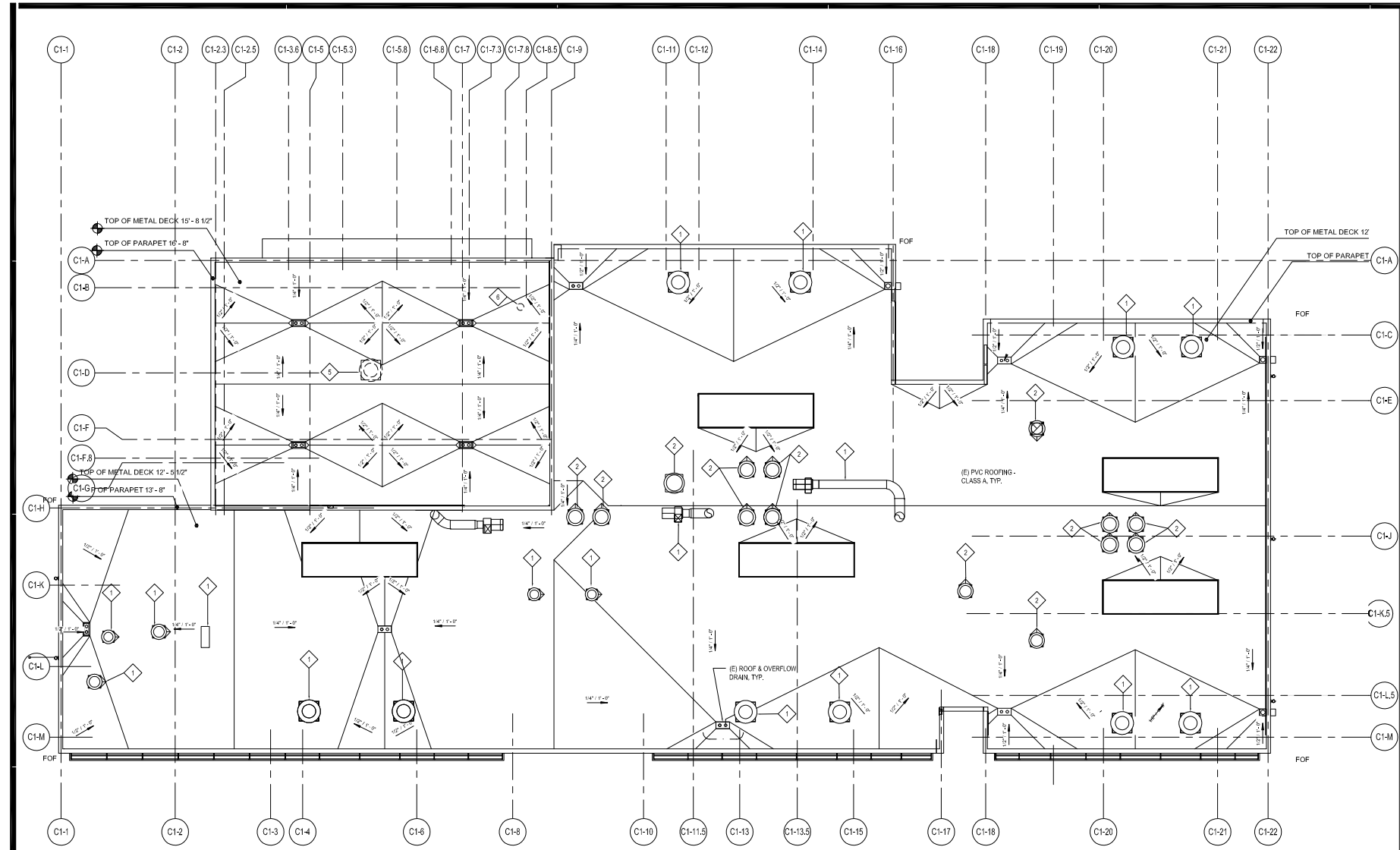
OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDINGS A & C1
DEMOLITION
ROOF PLANS

JOB NO.
2841.100
Date
08-07-2019

A2.17



**BUILDING C1 -
DEMOLITION ROOF PLAN**
SCALE: 1/8" = 1'-0"
PROJECT NUMBER: 2841.100
DATE: 08/07/2019

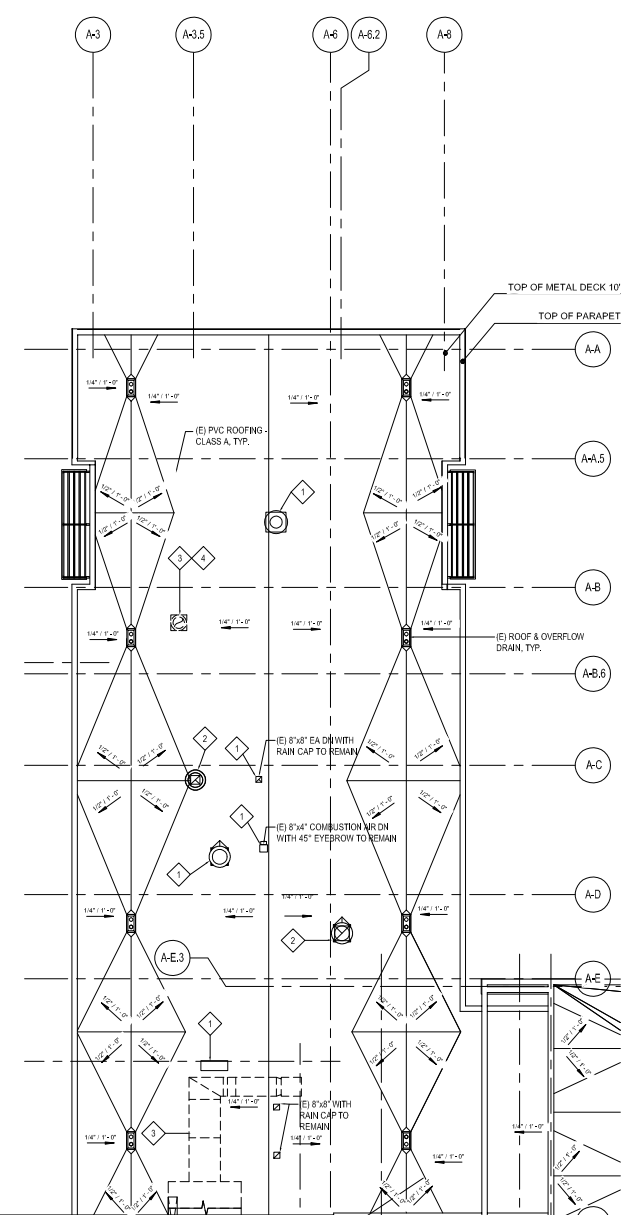
2
A2.17

ROOF PLAN DEMOLITION NOTES

- 1) THE ROOF PLAN SHOWS THE GENERAL LOCATION OF EXISTING ROOF ELEMENTS, NOT ALL CONDUITS AND DEVICES ARE SHOWN. G.C. SHALL FIELD VERIFY AND LOCATE ALL EXISTING ITEMS WITHIN THE AREAS OF WORK AND COORDINATE TO AVOID CONFLICT. WHERE SIGNIFICANT DISCREPANCIES OCCUR THE G.C. SHALL PROVIDE WRITTEN NOTICE TO THE ARCHITECT.
- 2) G.C. SHALL COORDINATE ALL REQUIRED SCOPE OF WORK FOR ALL TRADES PRIOR TO COMMENCING WORK. PROVIDE ALL DEMOLITION NECESSARY TO PROVIDE THE NEW WORK.
- 3) UNLESS SPECIFICALLY DETAILED AND SHOWN THESE PLANS, NO STRUCTURAL MEMBER SHALL BE CUT, DRILLED, OR REMOVED WITHOUT WRITTEN APPROVAL FROM THE ARCHITECT AND THE AUTHORITY HAVING JURISDICTION.
- 4) REMOVE ALL EXISTING ROOFTOP MECHANICAL EQUIPMENT AS SHOWN ON MECHANICAL PLANS.

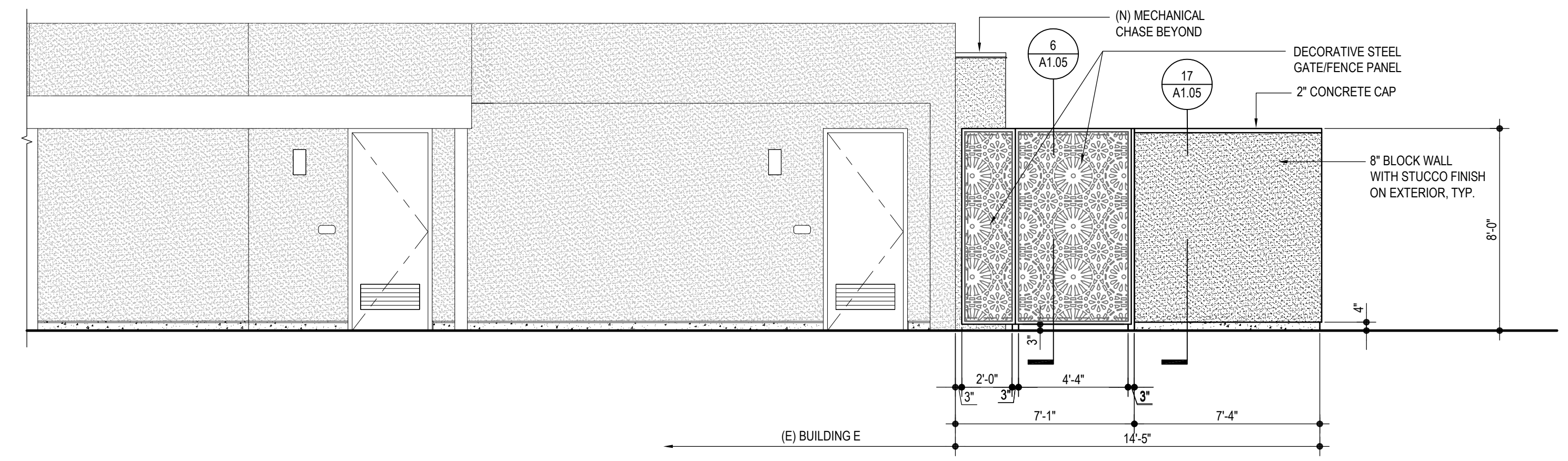
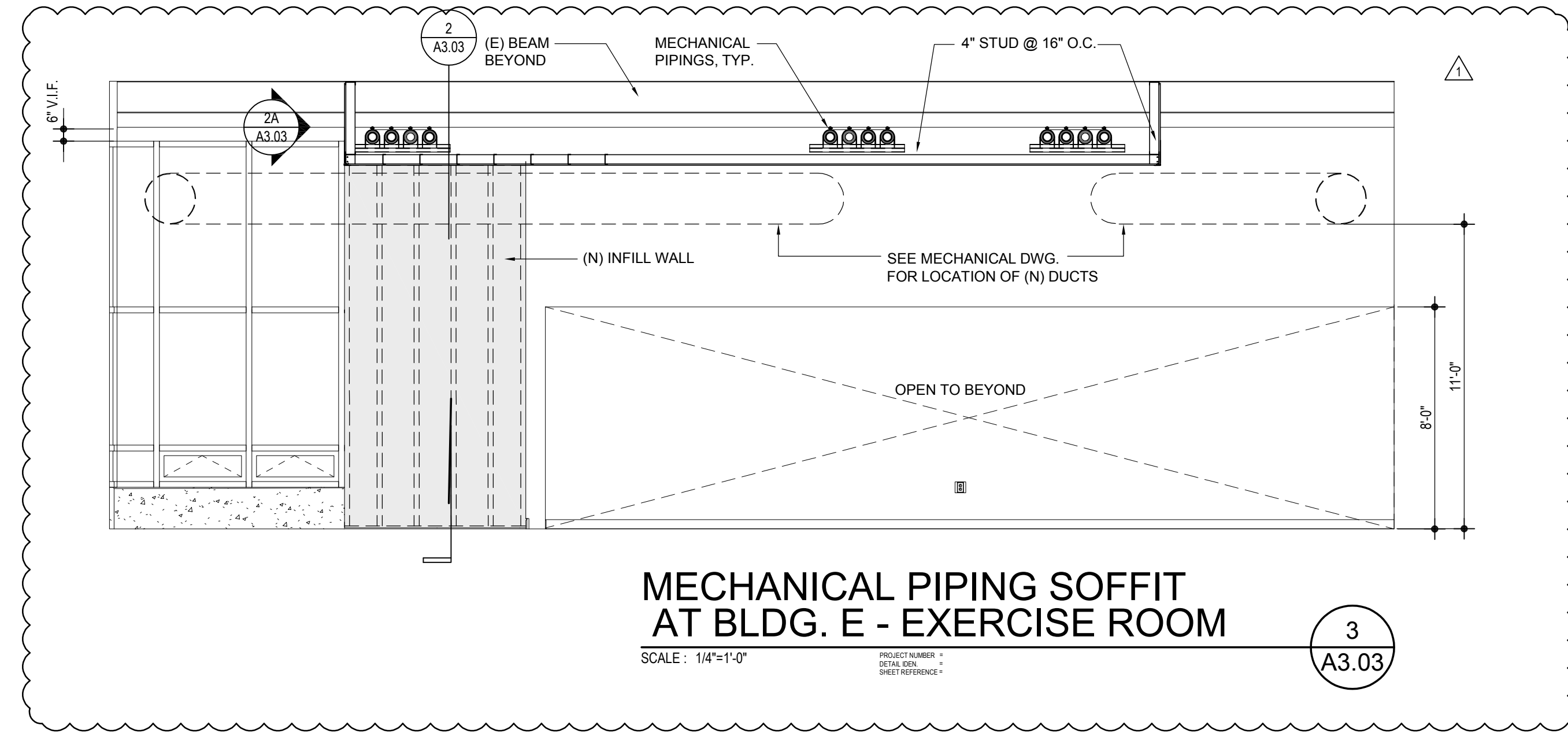
ROOF PLAN DEMOLITION KEY NOTES

- 1 EXISTING ITEMS/WORK TO REMAIN. CLEAN, ADJUST, & REPAIR AS REQUIRED TO REUSE.
- 2 EXISTING ITEMS/WORK TO BE ABANDONED, CAP OPENINGS 1'-0" BELOW.
- 3 REMOVE EXISTING EXHAUST FAN/ OR MECH EQUIPMENT AND ALL RELATED ACCESSORIES. PATCH & REPAIR ROOFING AS REQUIRED TO MAKE WATERTIGHT. (E) ROOF IS BY SARNAFIL, & THE (N) PATCH SHALL MATCH (E) ROOF TO MAINTAIN WARRANTY.
- 4 CUT AND CAP EXISTING DUCTWORK 1'-0" BELOW ROOF.
- 5 REMOVE (E) GRAVITY VENT. (E) ROOF IS BY SARNAFIL, & THE (N) PATCH SHALL MATCH (E) ROOF TO MAINTAIN WARRANTY.
- 6 REMOVE PORTION OF (E) ROOFING TO ACCOMMODATE (N) GRAVITY VENT. SEE MECHANICAL ROOF PLAN M2.20 FOR MORE INFORMATION. (E) ROOF IS BY SARNAFIL, & THE (N) PATCH SHALL MATCH (E) ROOF TO MAINTAIN WARRANTY.

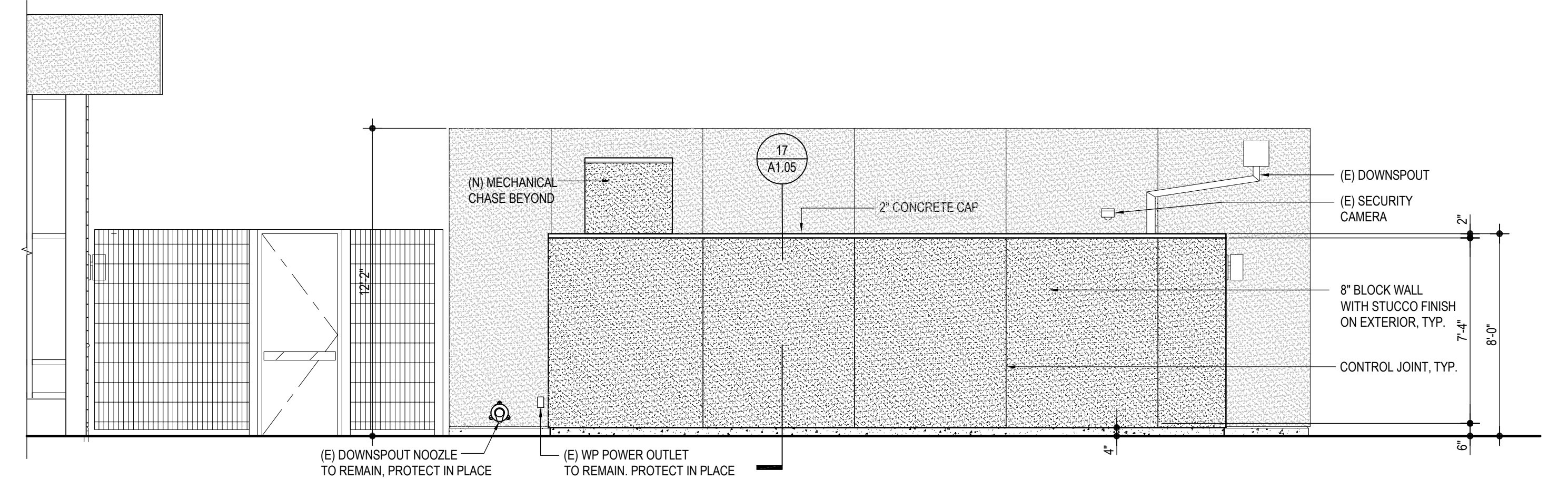


**BUILDING A -
DEMOLITION ROOF PLAN**
SCALE: 1/8" = 1'-0"
PROJECT NUMBER: 2841.100
DATE: 08/07/2019

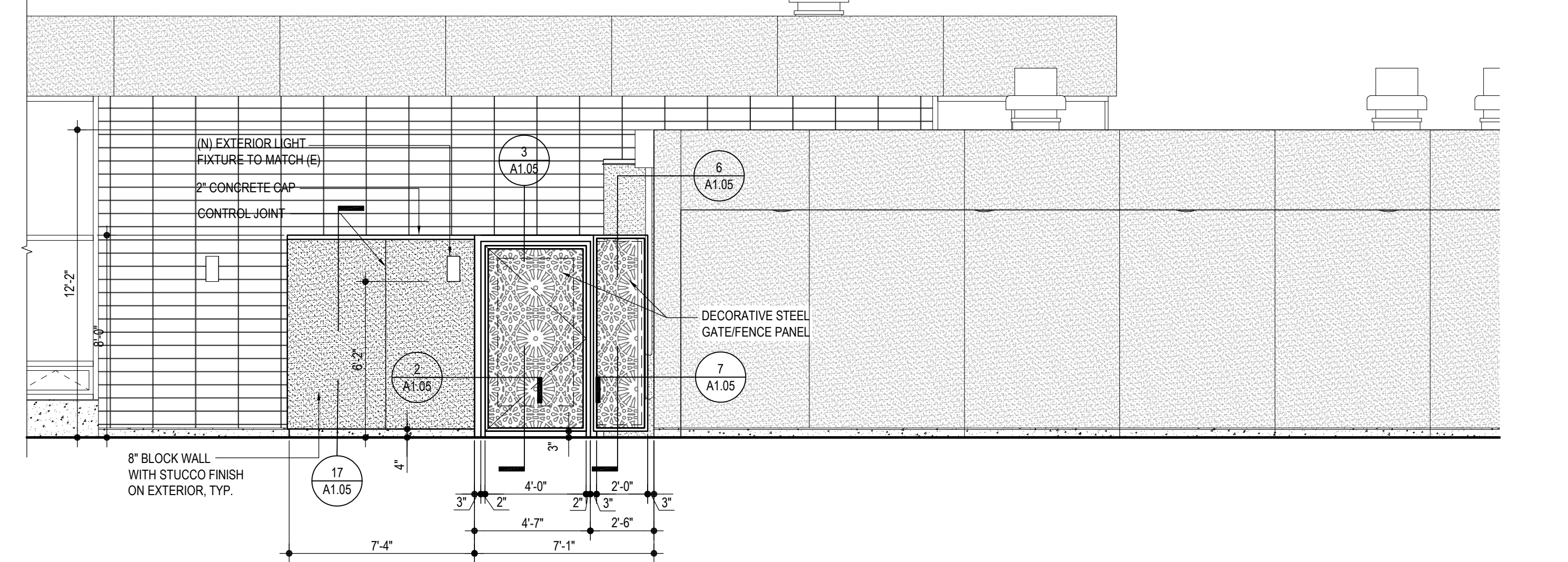
1
A2.17



C - SOUTH ELEVATION



E - EAST ELEVATION



A - NORTH ELEVATION

BUILDING E HVAC ENCLOSURE EXTERIOR ELEVATIONS

1
A3.03

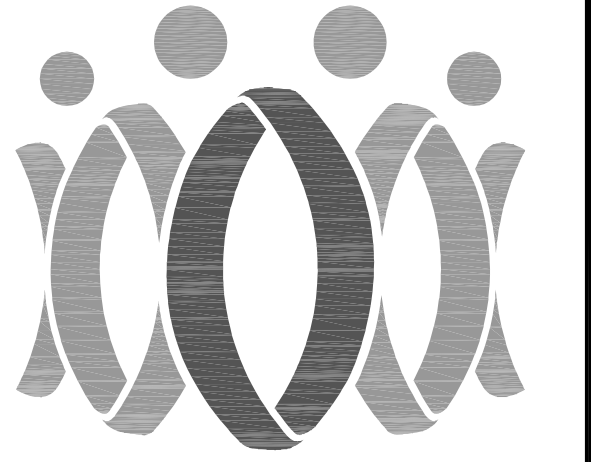
MECH'L. CHASE @ BLDG. E - EXERCISE ROOM

2
A3.03

SOFFIT ELEVATION

2A
A3.03

PTN_72546-80 APPL_03-120038

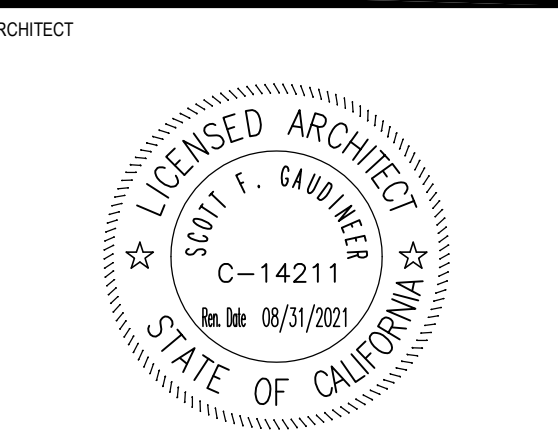


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Revisions		
No.	Date	Description
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OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

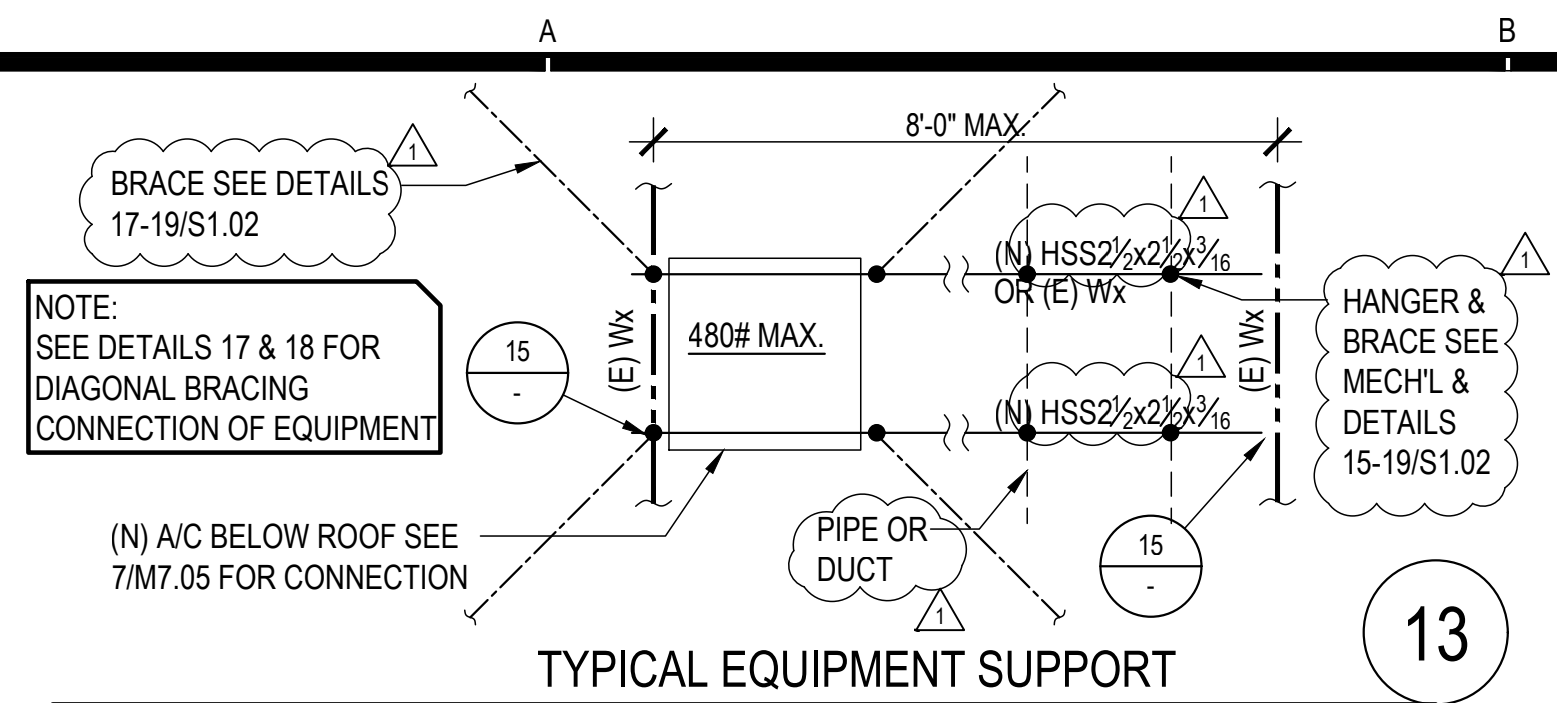
NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDING E
HVAC ENCLOSURE
EXTERIOR ELEVATIONS

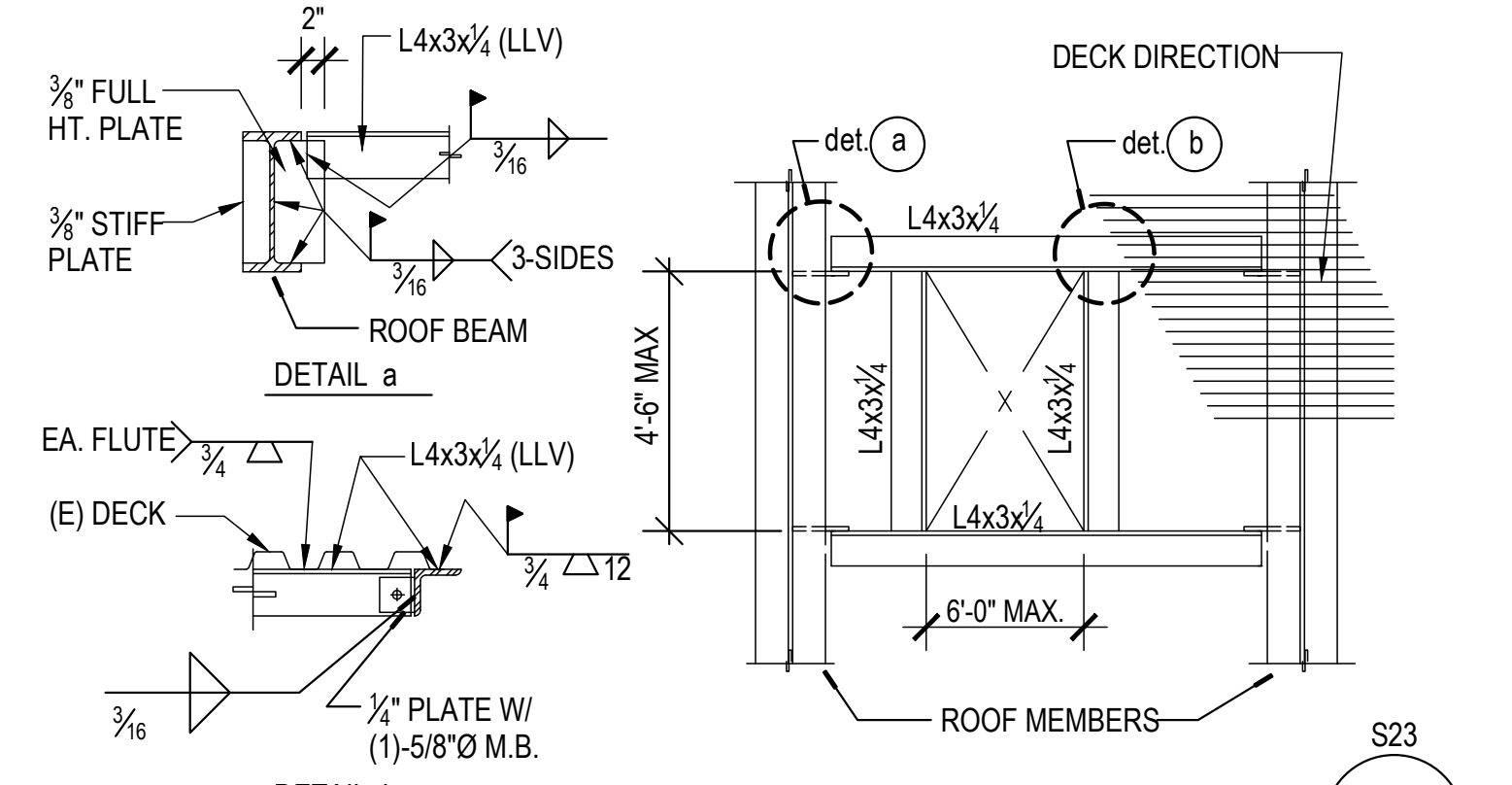
Job No:
2841.100

A3.03

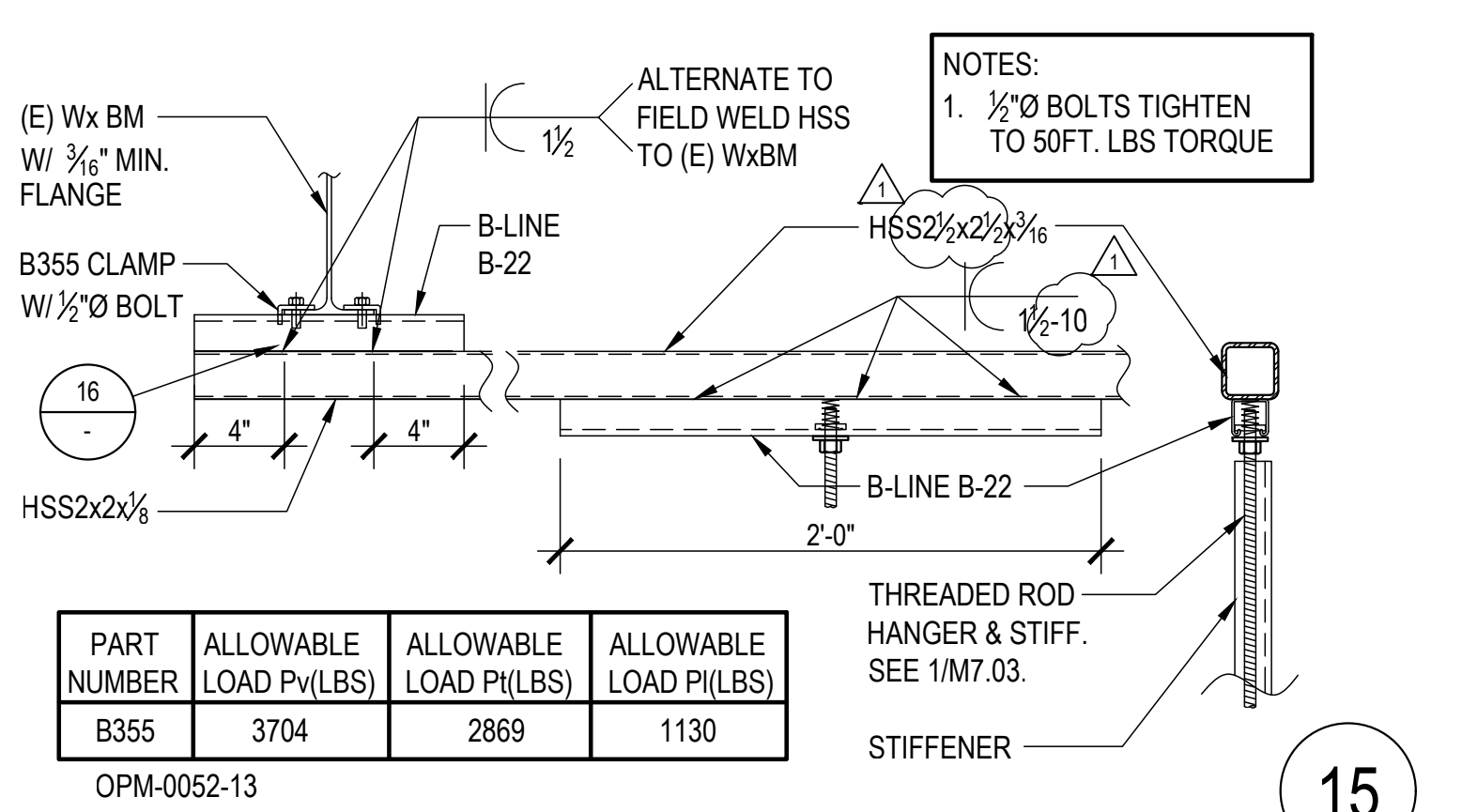
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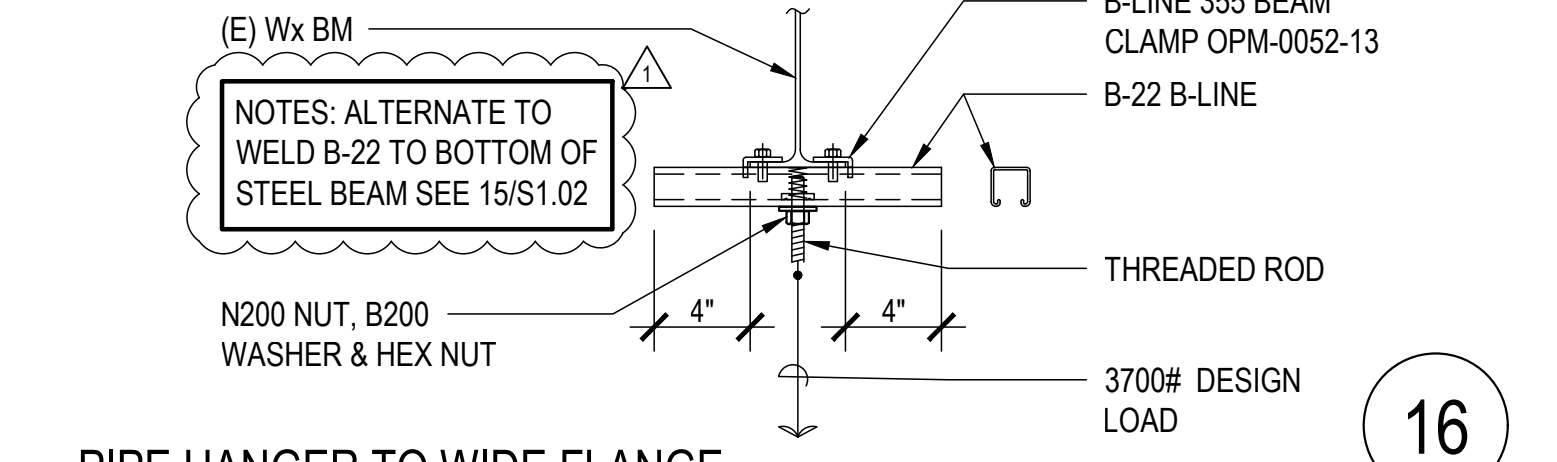
TYPICAL EQUIPMENT SUPPORT 13



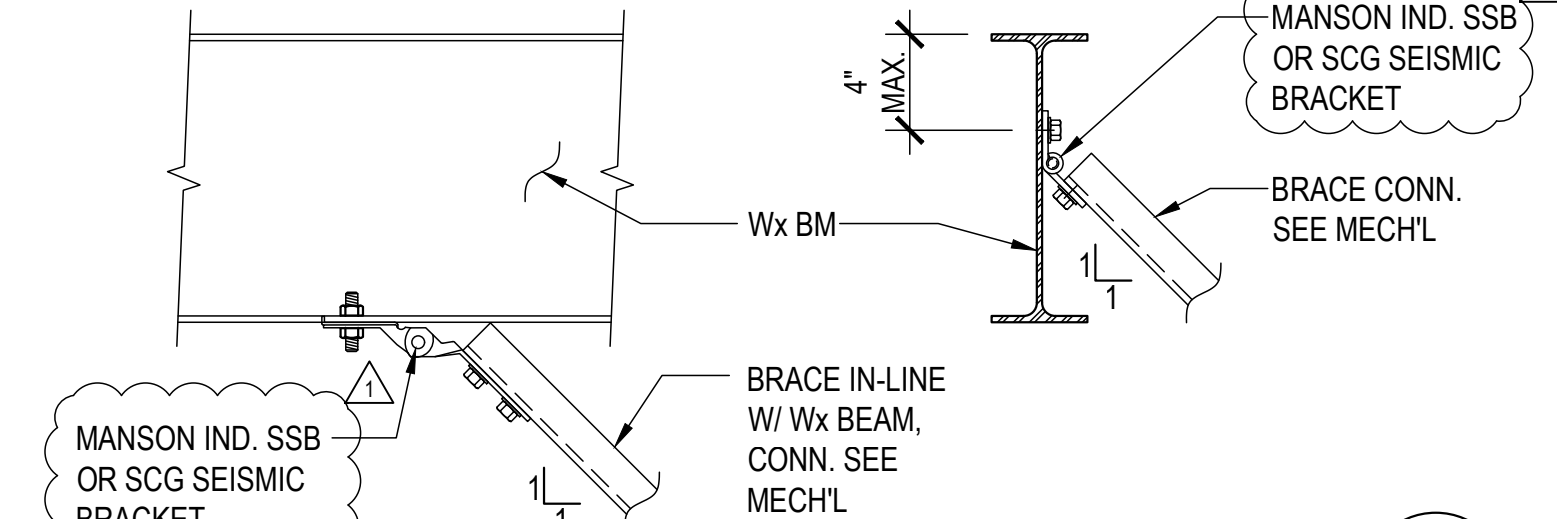
TYP. FRAMINGS AND DETAILS AT LARGE ROOF OPENING 14



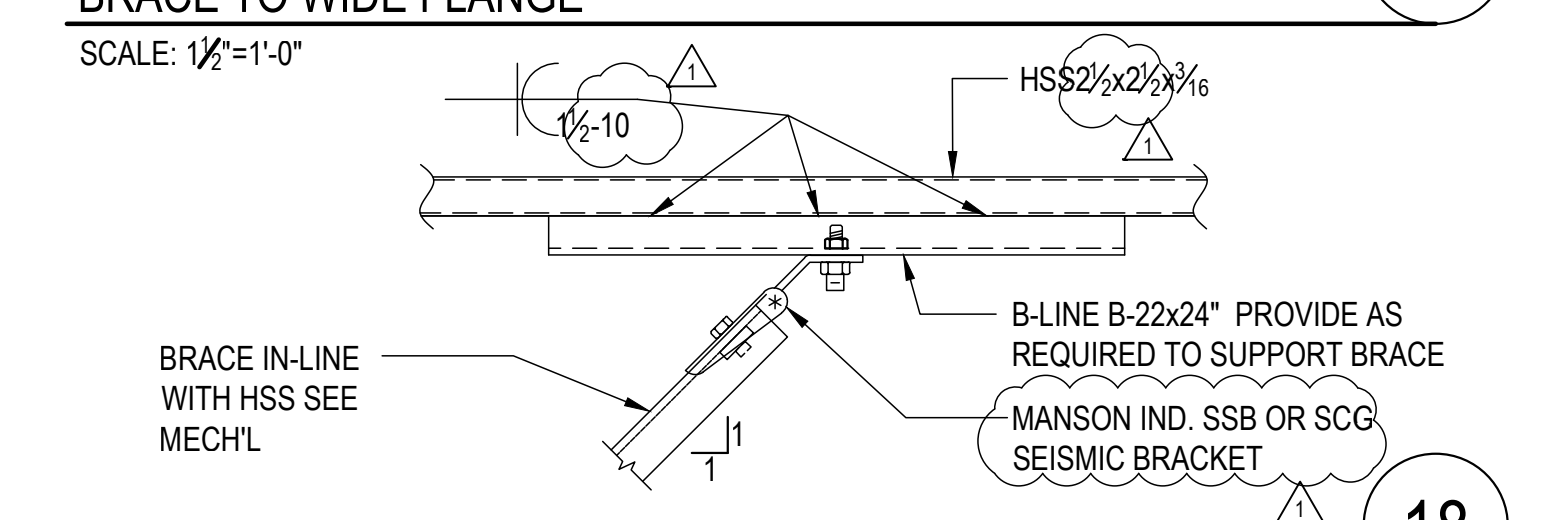
MECHANICAL UNIT SUPPORT 15



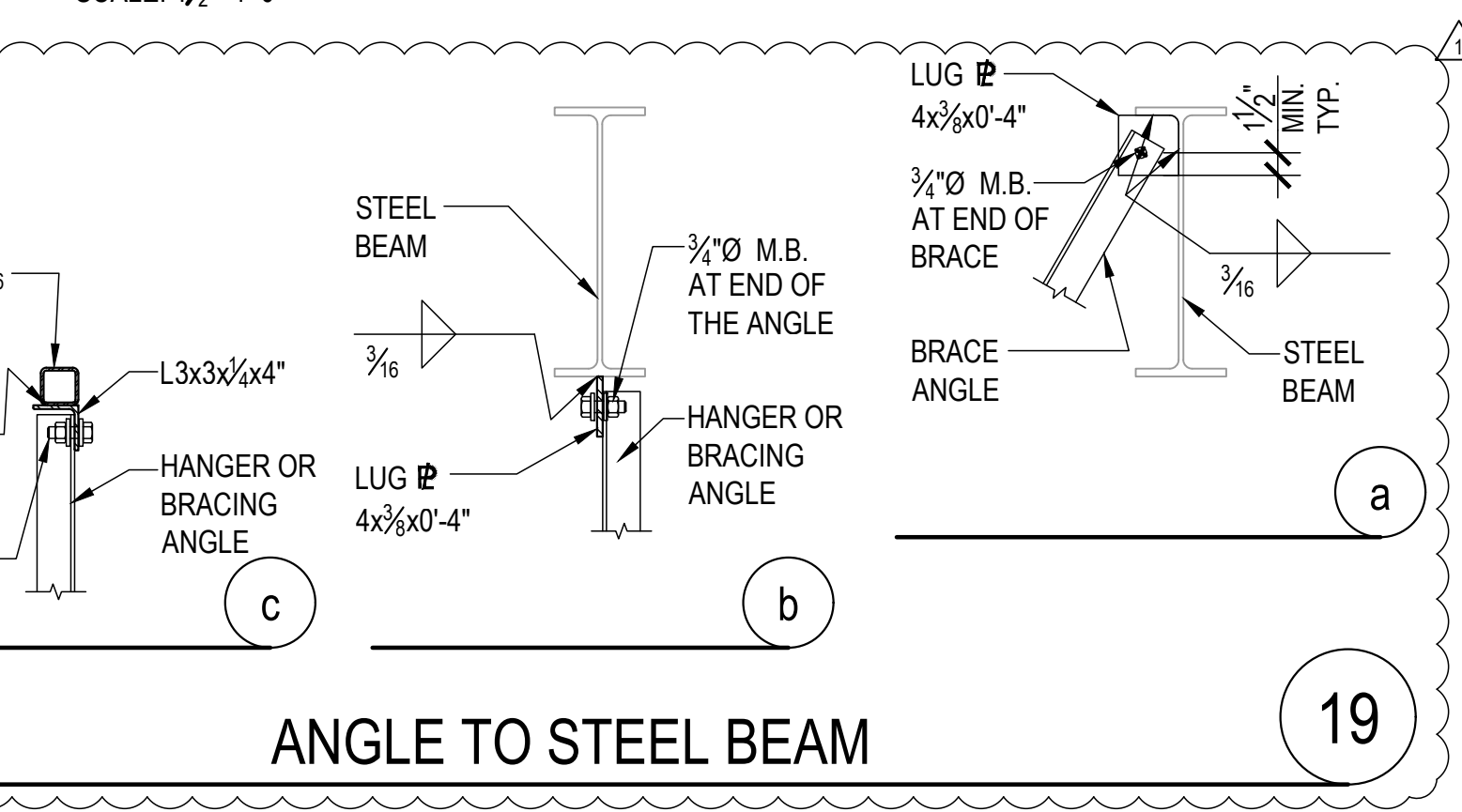
PIPE HANGER TO WIDE FLANGE 16



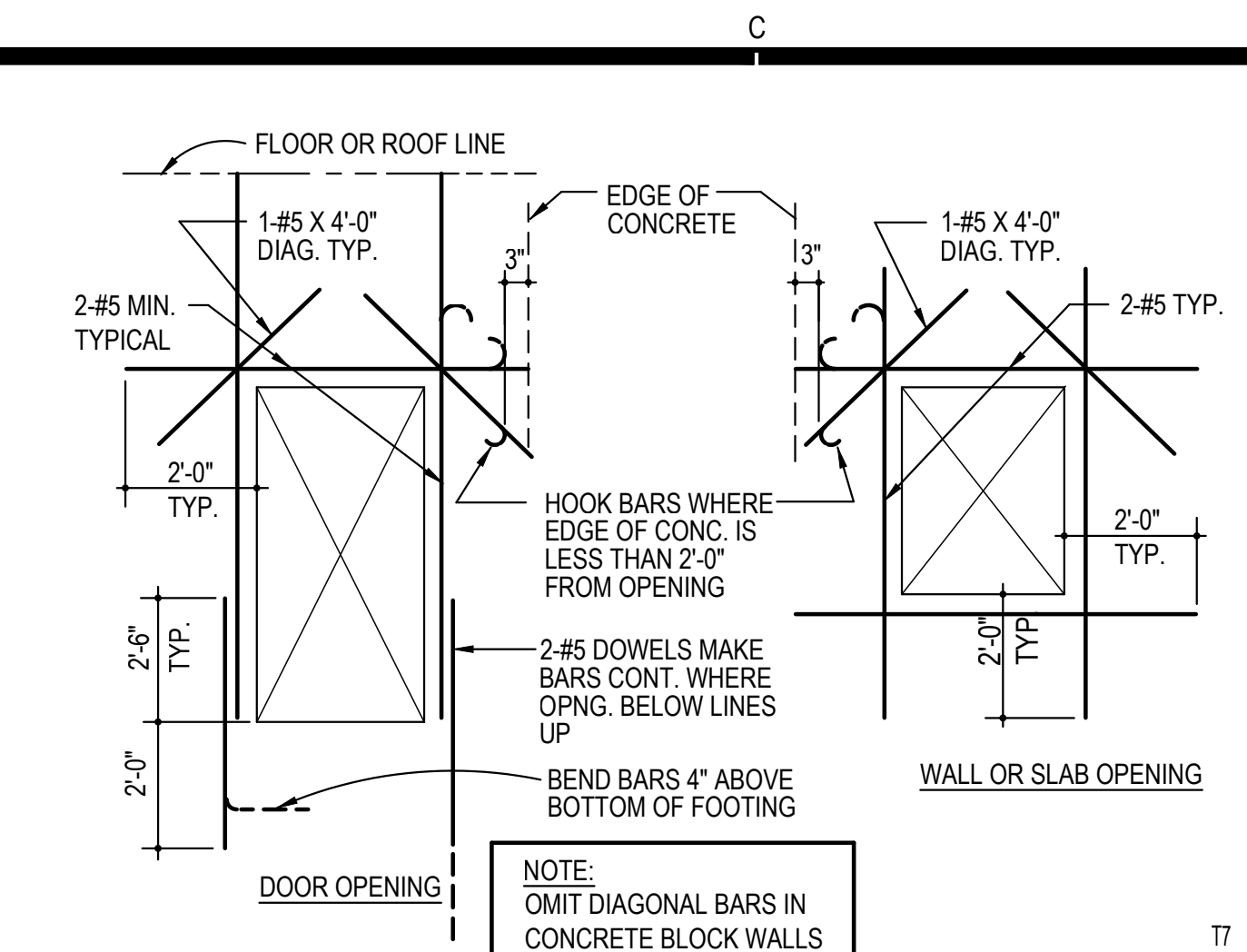
BRACE TO WIDE FLANGE 17



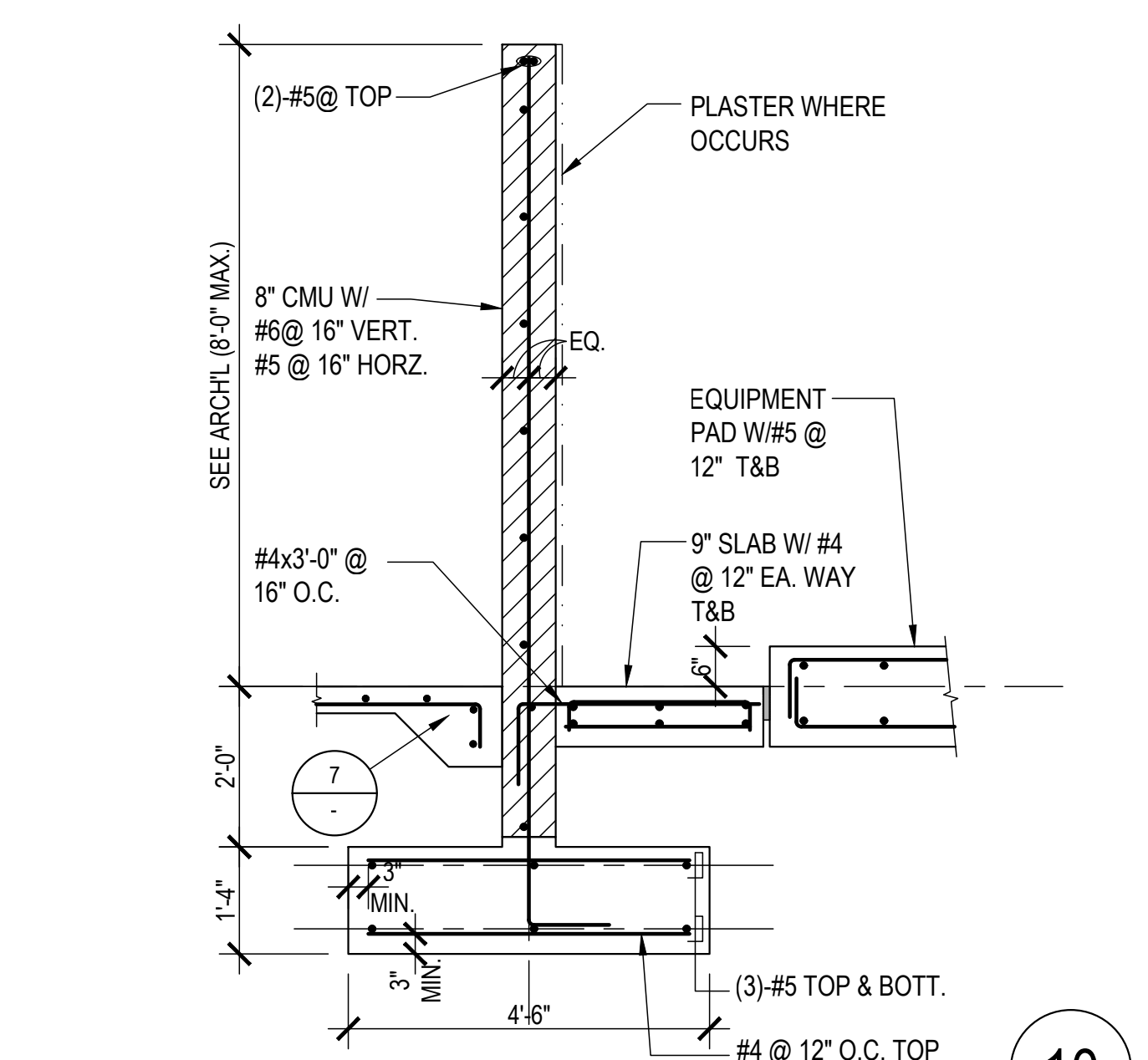
BRACE TO HSS STRUT CONNECTION 18



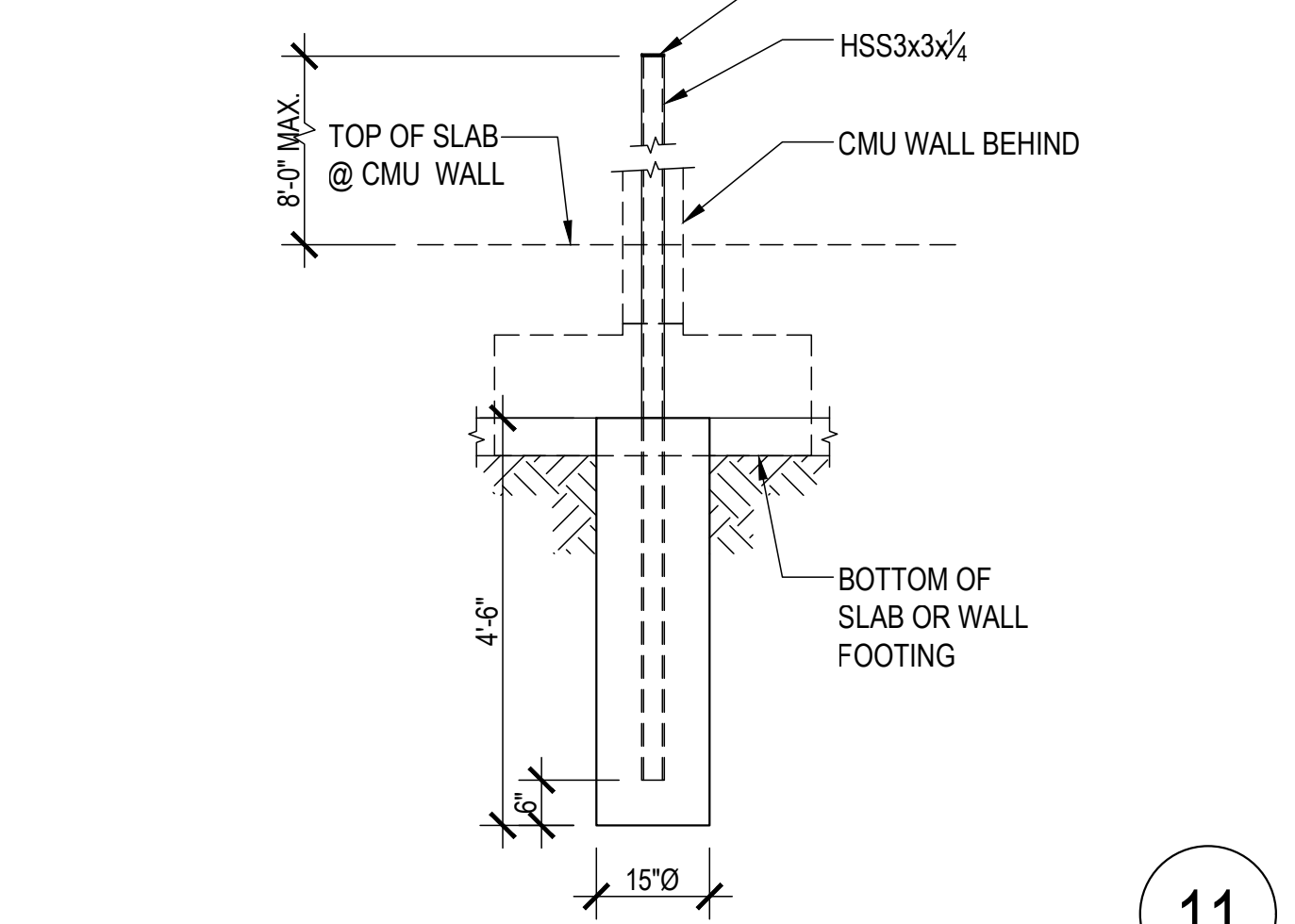
ANGLE TO STEEL BEAM 19



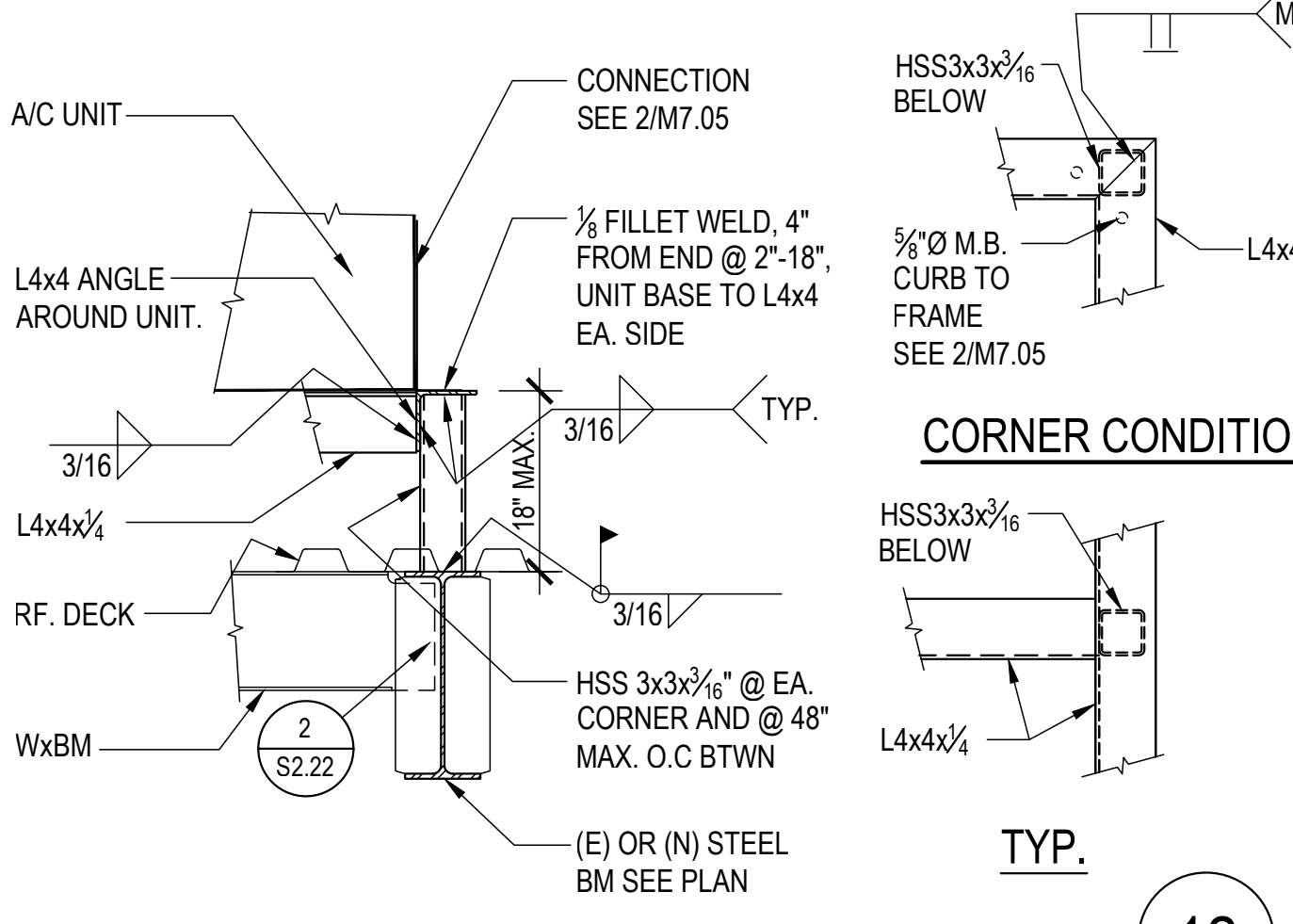
TYPICAL CONCRETE AND MASONRY OPENING REINFORCEMENT DETAIL 9



WALL SECTION 10



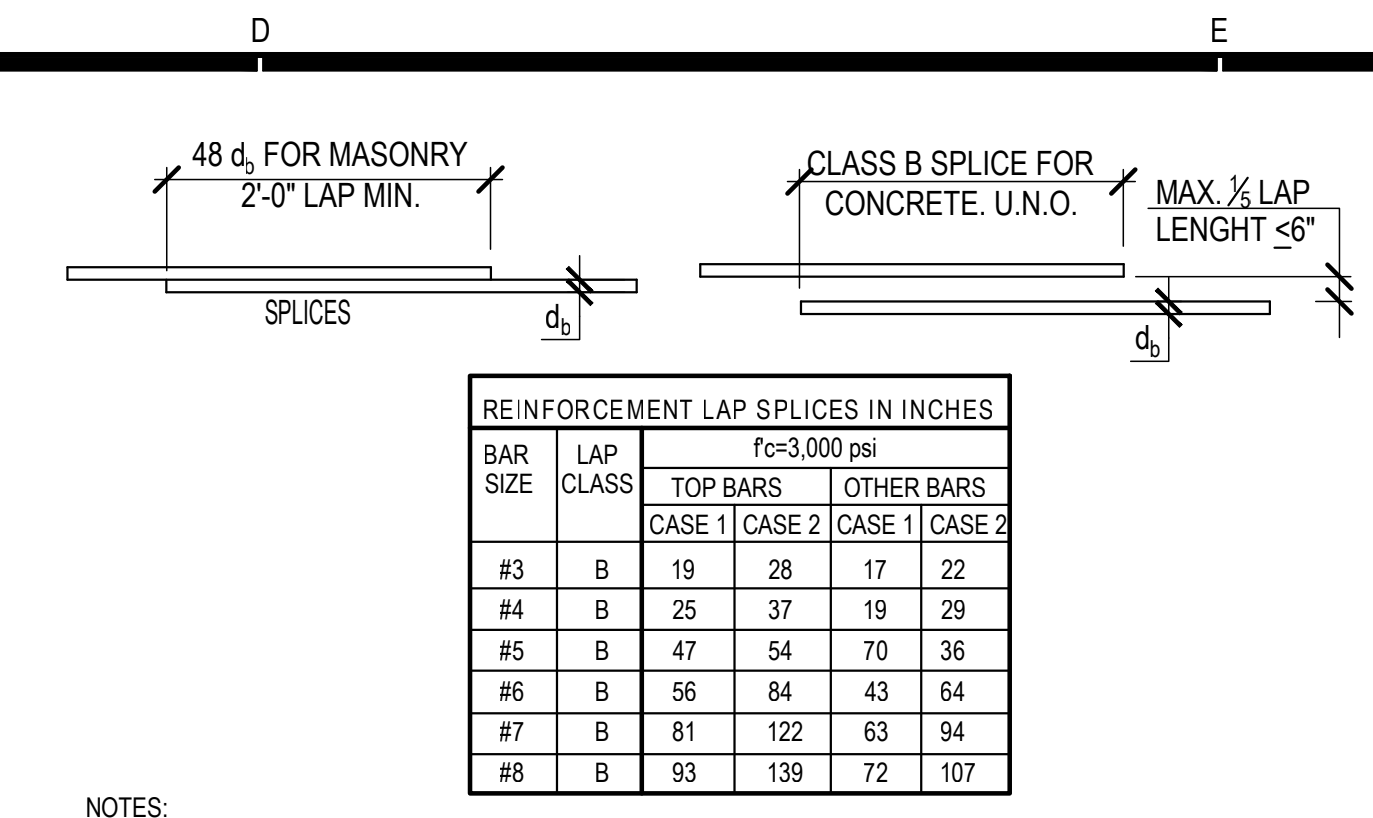
FENCE POST 11



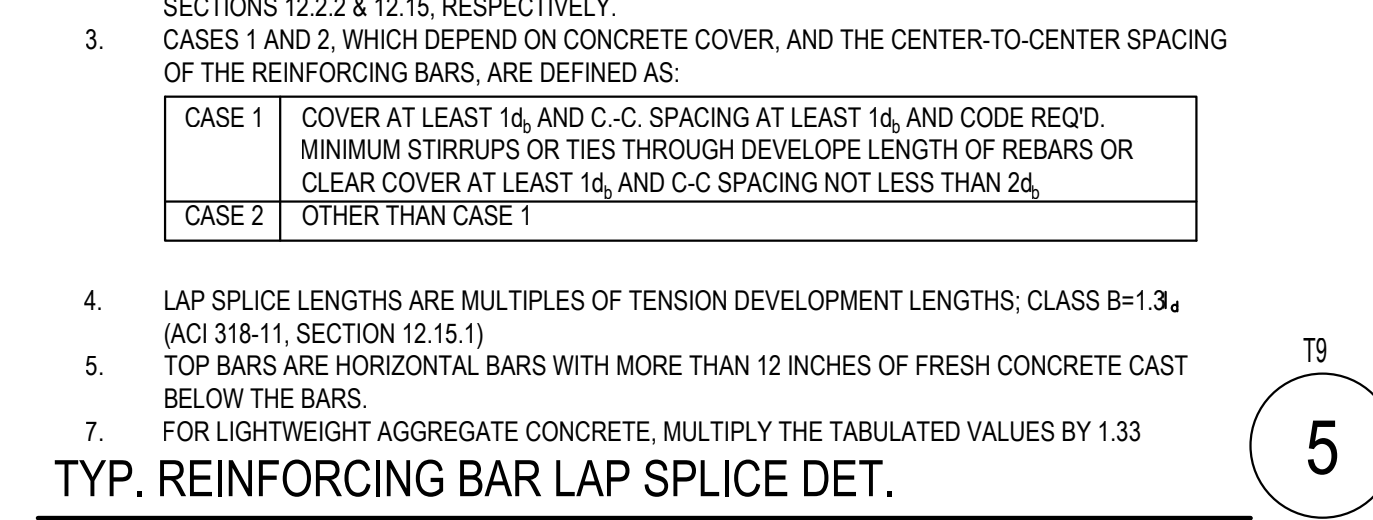
CORNER CONDITION 12



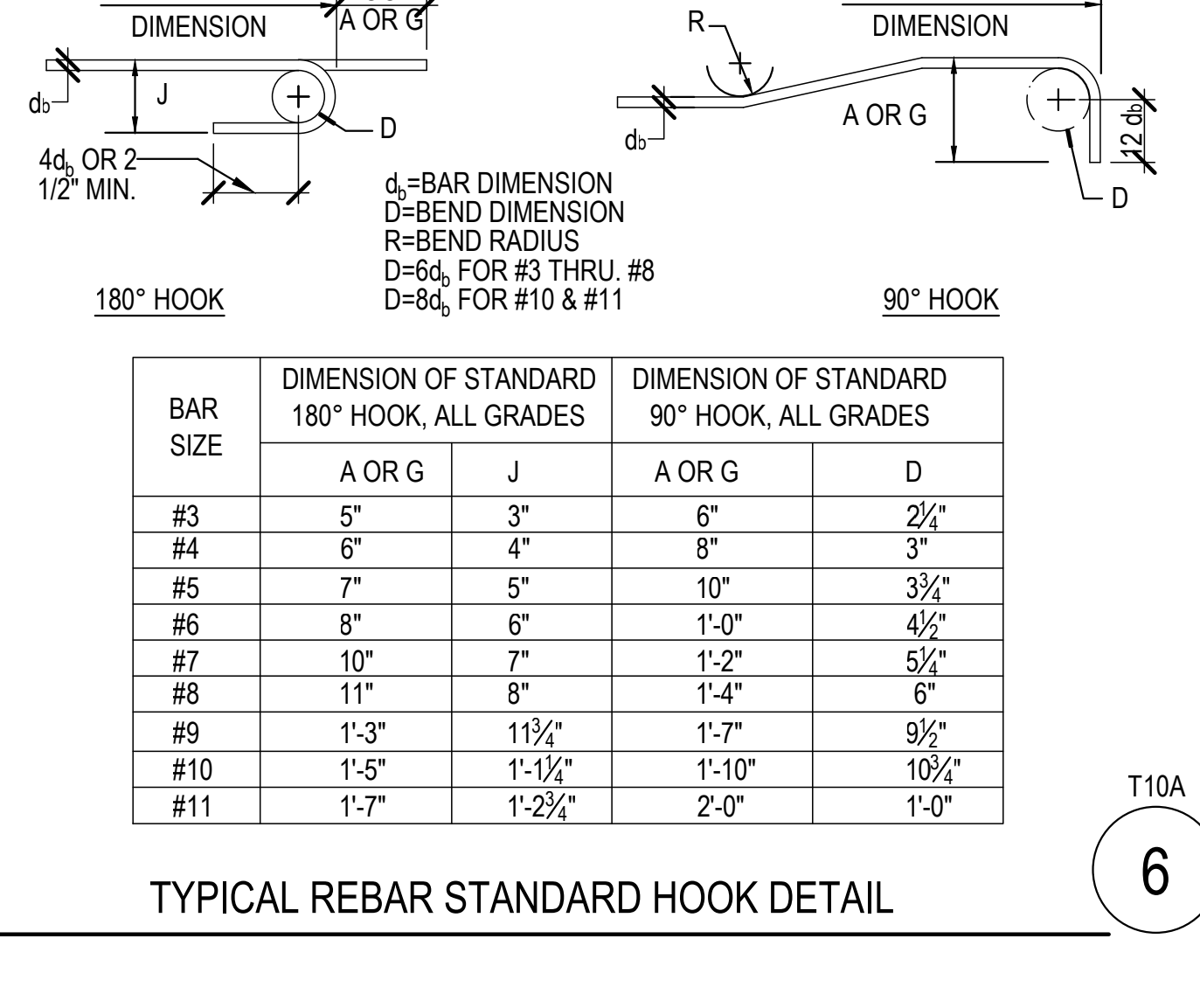
MECHANICAL UNIT SUPPORT 12



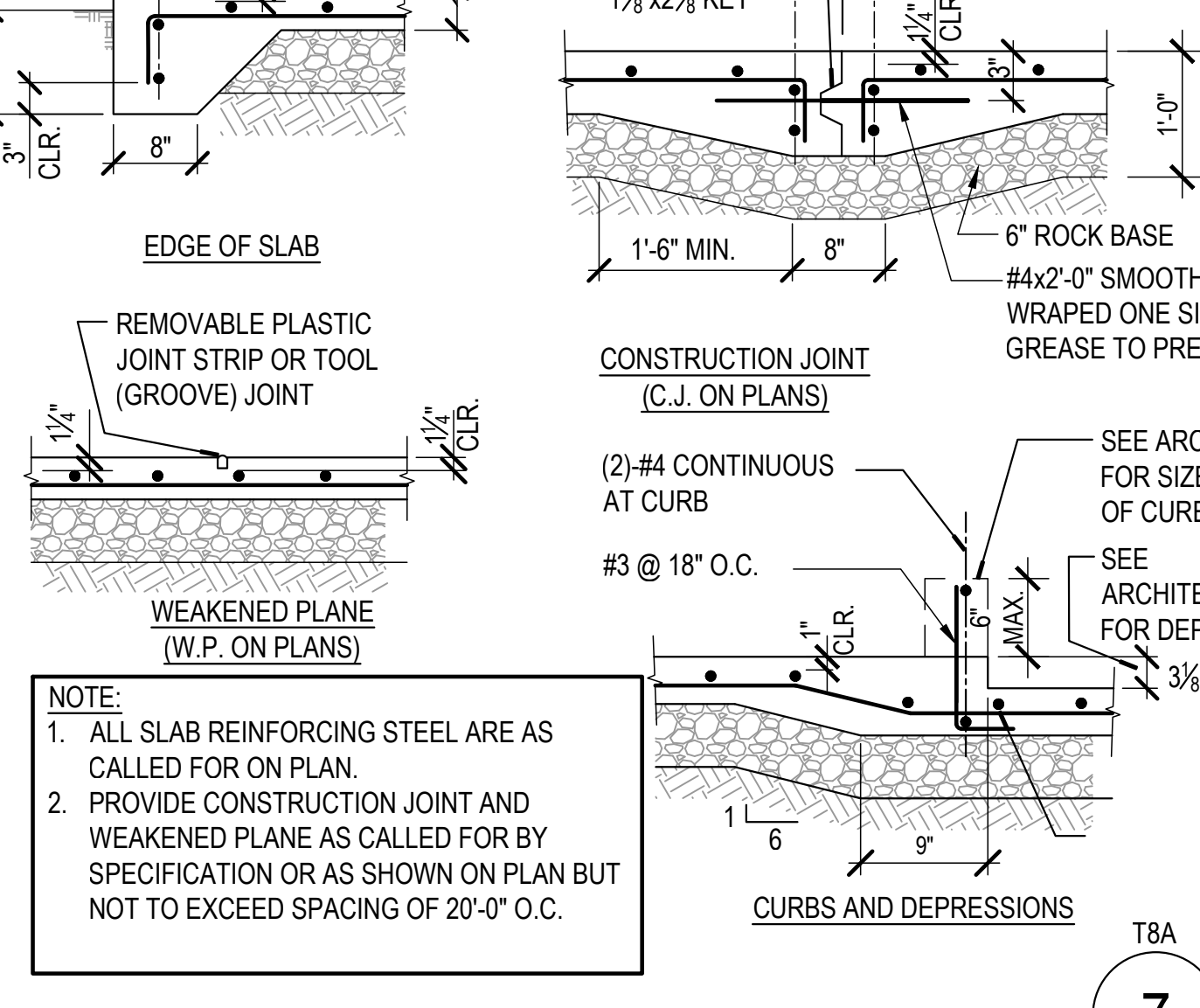
TYP. REINFORCING BAR LAP SPLICE DET. 5



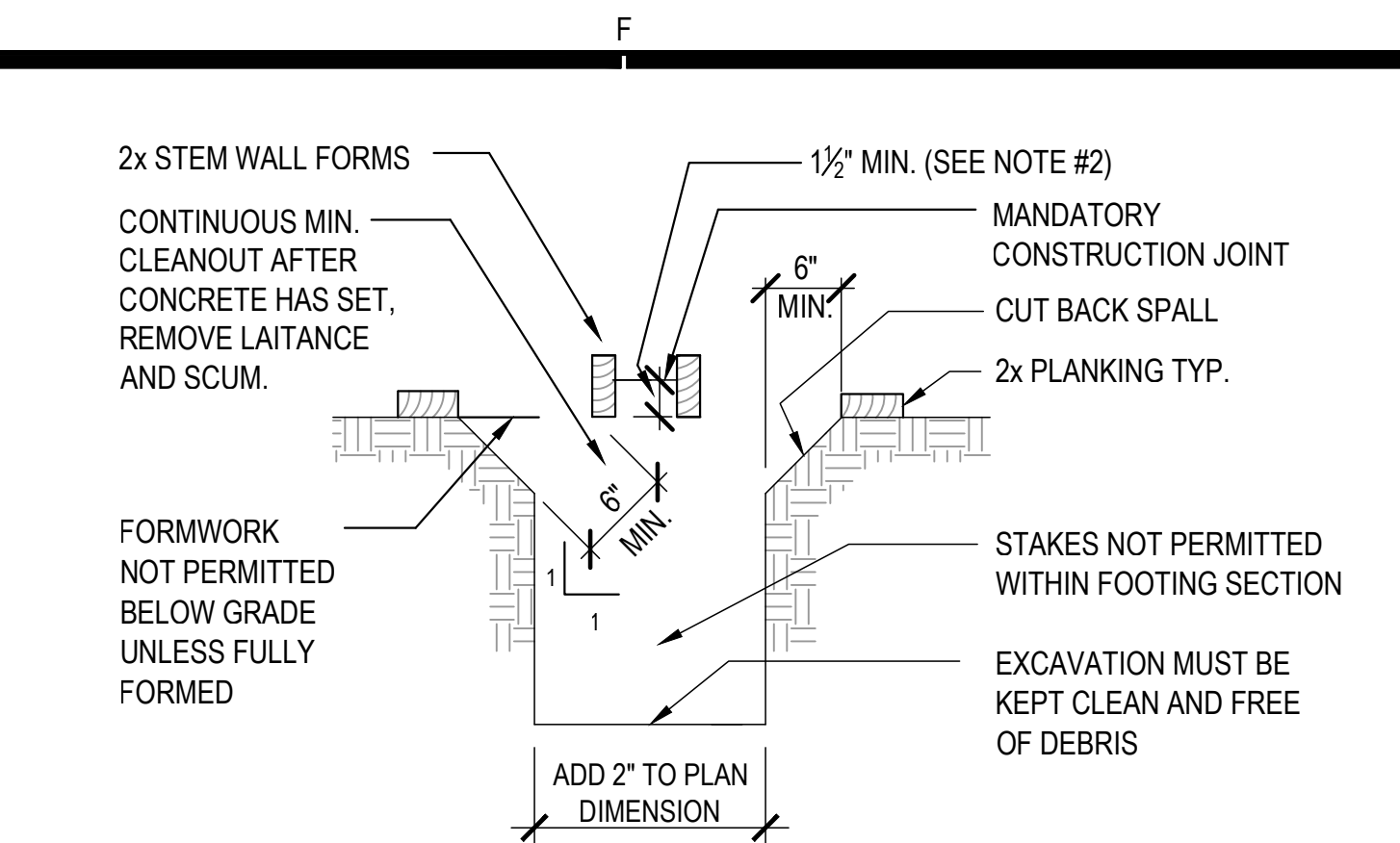
TYPICAL REBAR STANDARD HOOK DETAIL 6



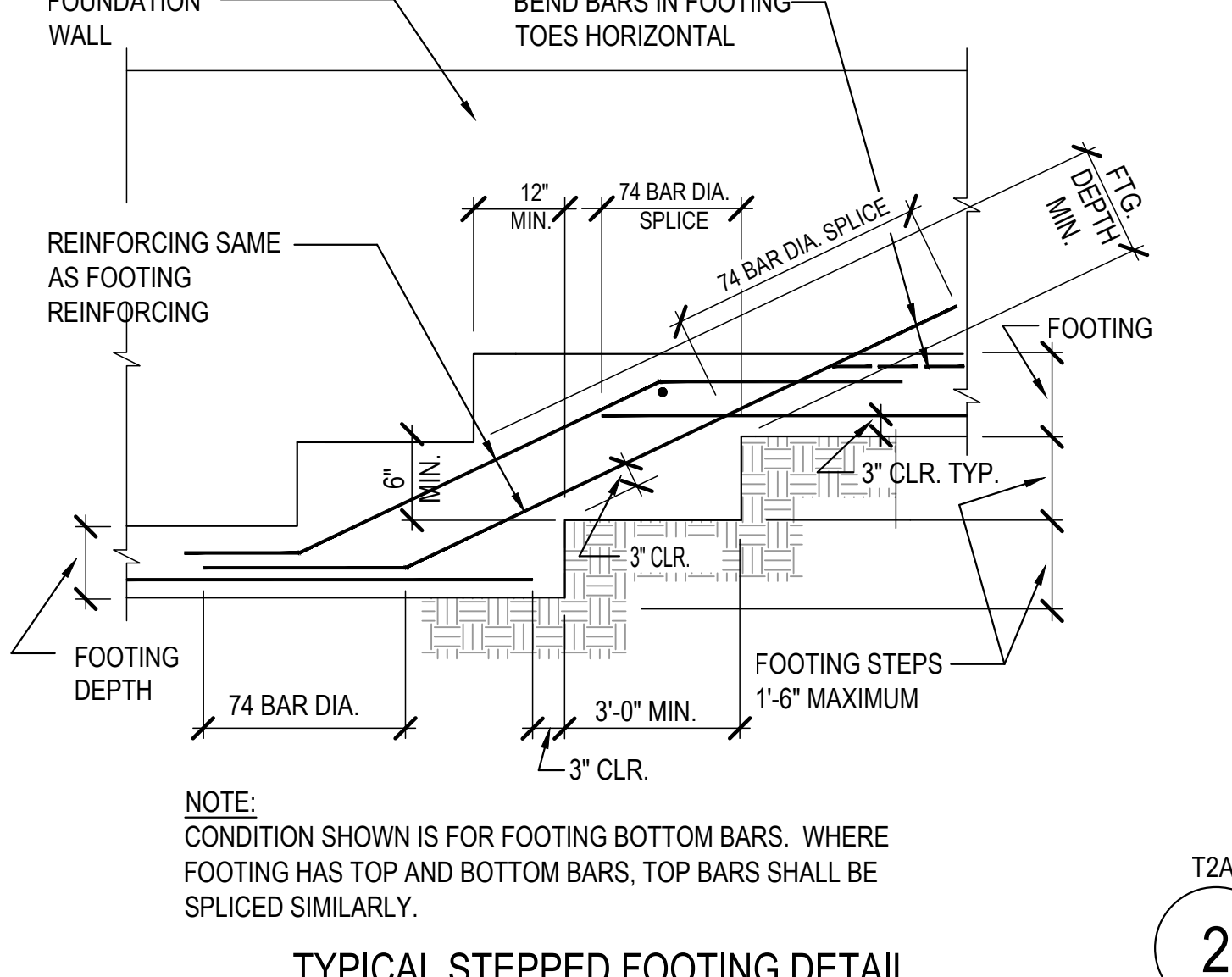
TYP. SLAB-ON-GRADE DETAIL (REINFORCED) 7



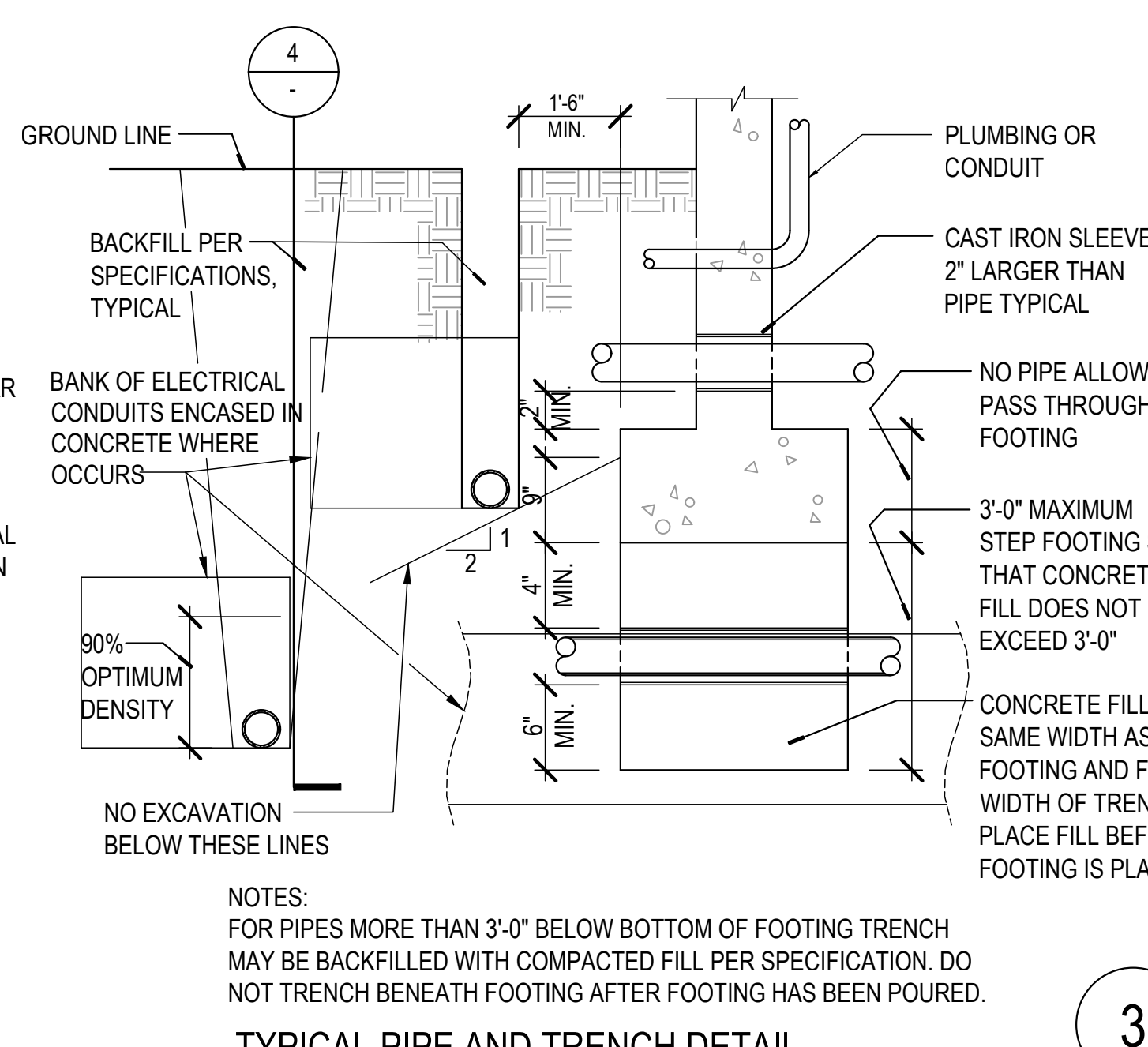
TYPICAL STEM WALL REINFORCING DETAIL 8



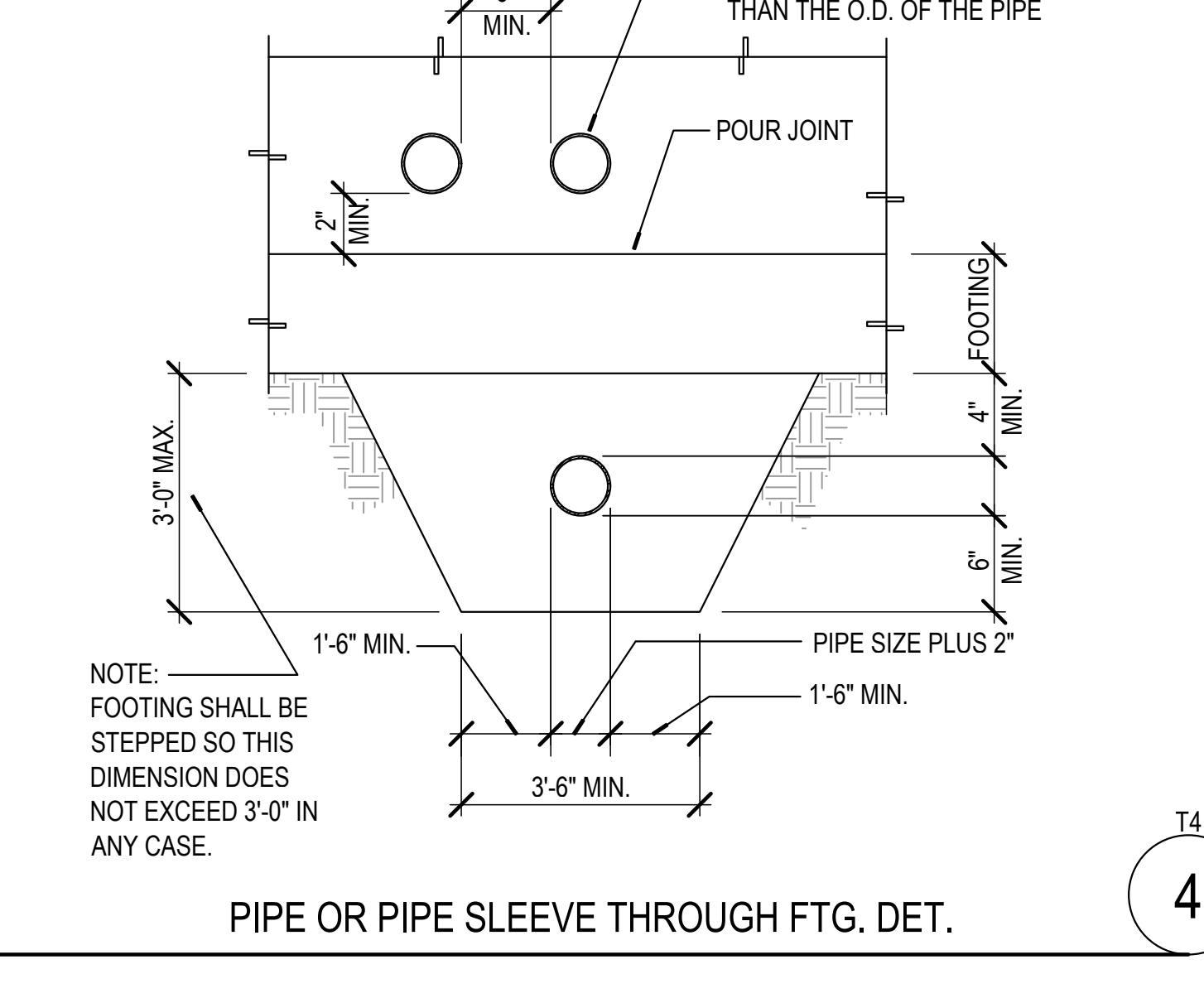
TYPICAL FOUNDATION FORMING DETAIL 1



TYPICAL STEPPED FOOTING DETAIL 2

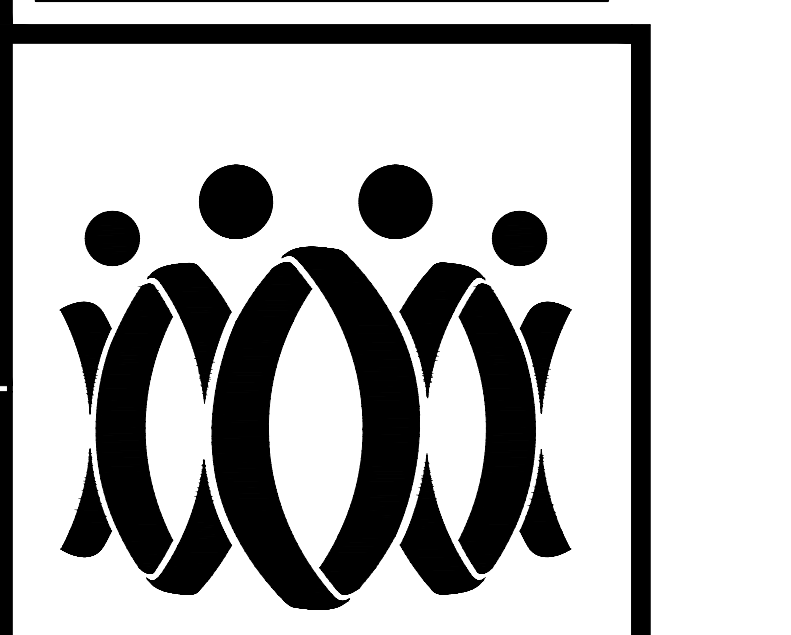


TYPICAL PIPE AND TRENCH DETAIL 3



PIPE OR PIPE SLEEVE THROUGH FTG. DET. 4

PTN_72546-80 APPL_03-120038

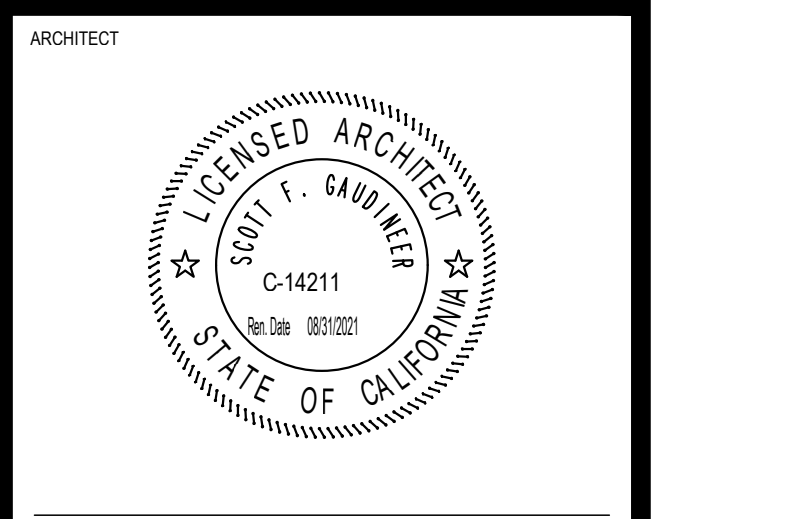


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BID SET (06-12-20)

OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM

4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

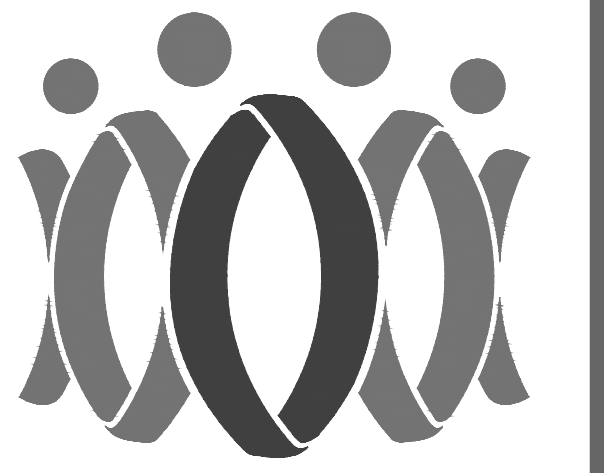
TYPICAL DETAILS

Job No. 2841.100

Date 04-03-2020

S1.02

PTN_ 72546-80 APPL_ 03-120038



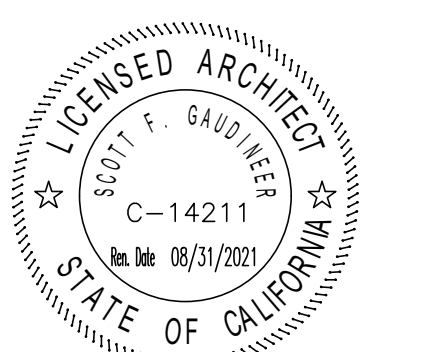
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ARCHITECT



CONSULTANT

ba **BUDLONG & ASSOCIATES, INC.**
MEP CONSULTING ENGINEERS
Job No. 18-440



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Drawn by: **PF**
Checked by: **SP**

Revisions:
No. Date Description
1 BID ADDENDUM

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RANCHO CAMPANA HIGH SCHOOL

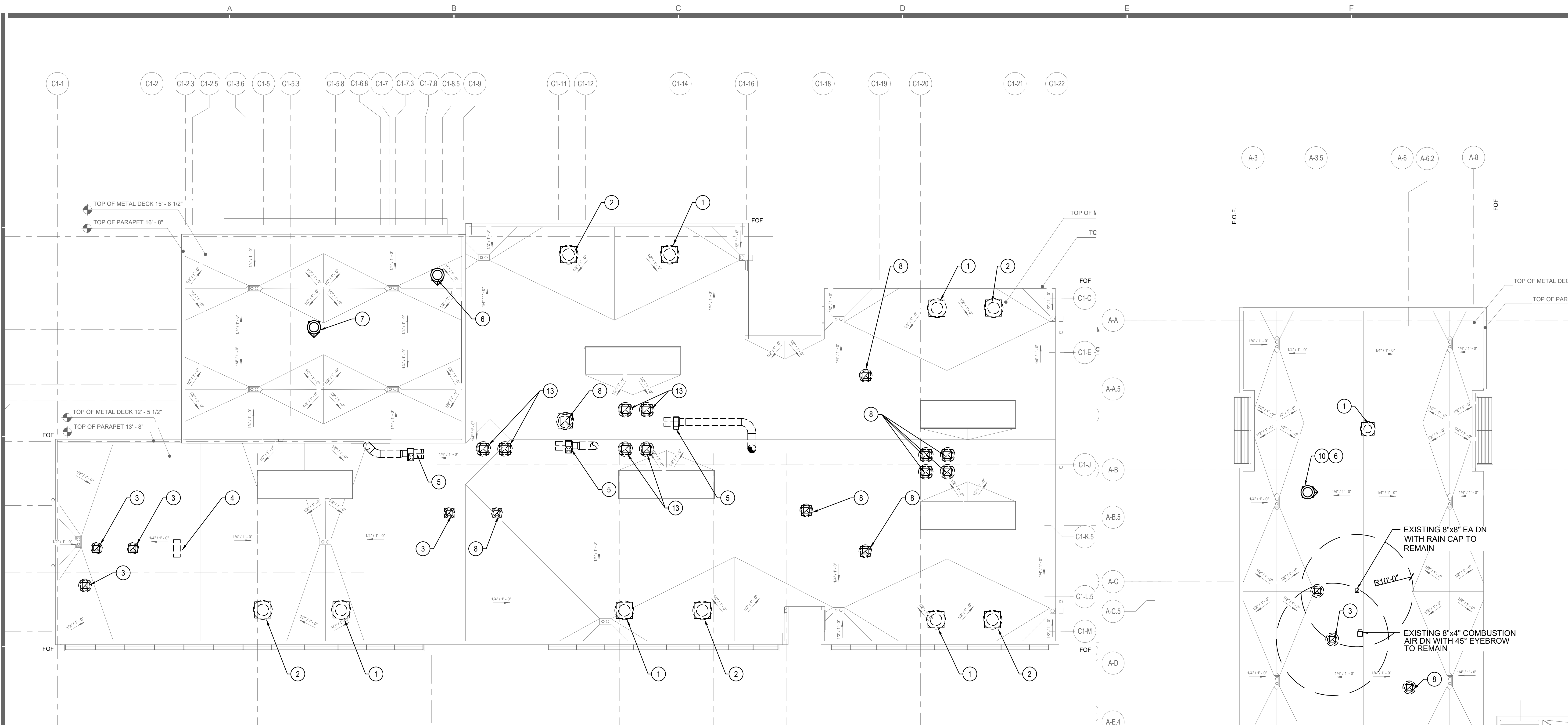
NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDINGS A & C1
MECHANICAL ROOF PLAN

Job No:
2841.100

M3.02

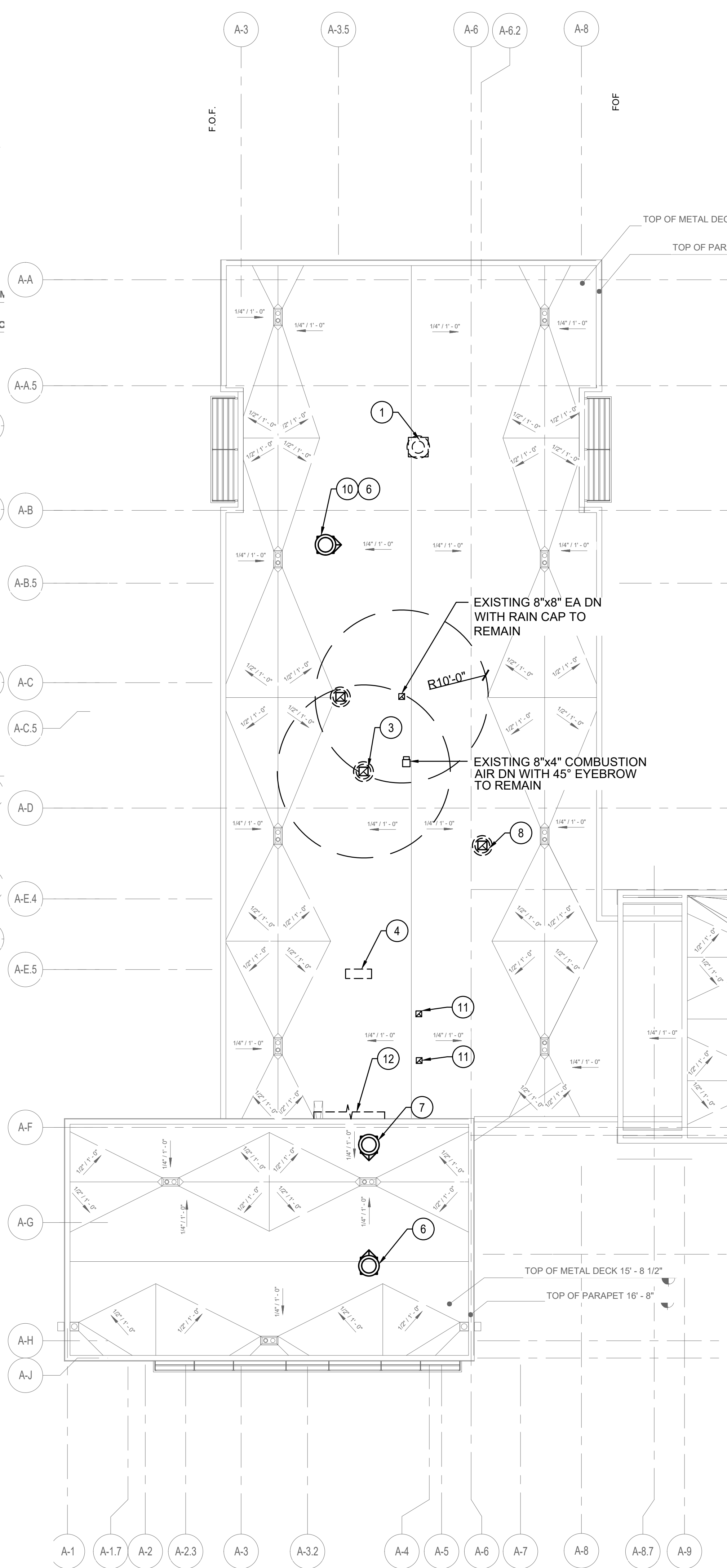
Date:
03-16-2020



BUILDING C1- MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"
2 M3.02

NOTE:
SEE SHEET M2.02 FOR
EXISTING HVAC EQUIPMENT
DESIGNATION

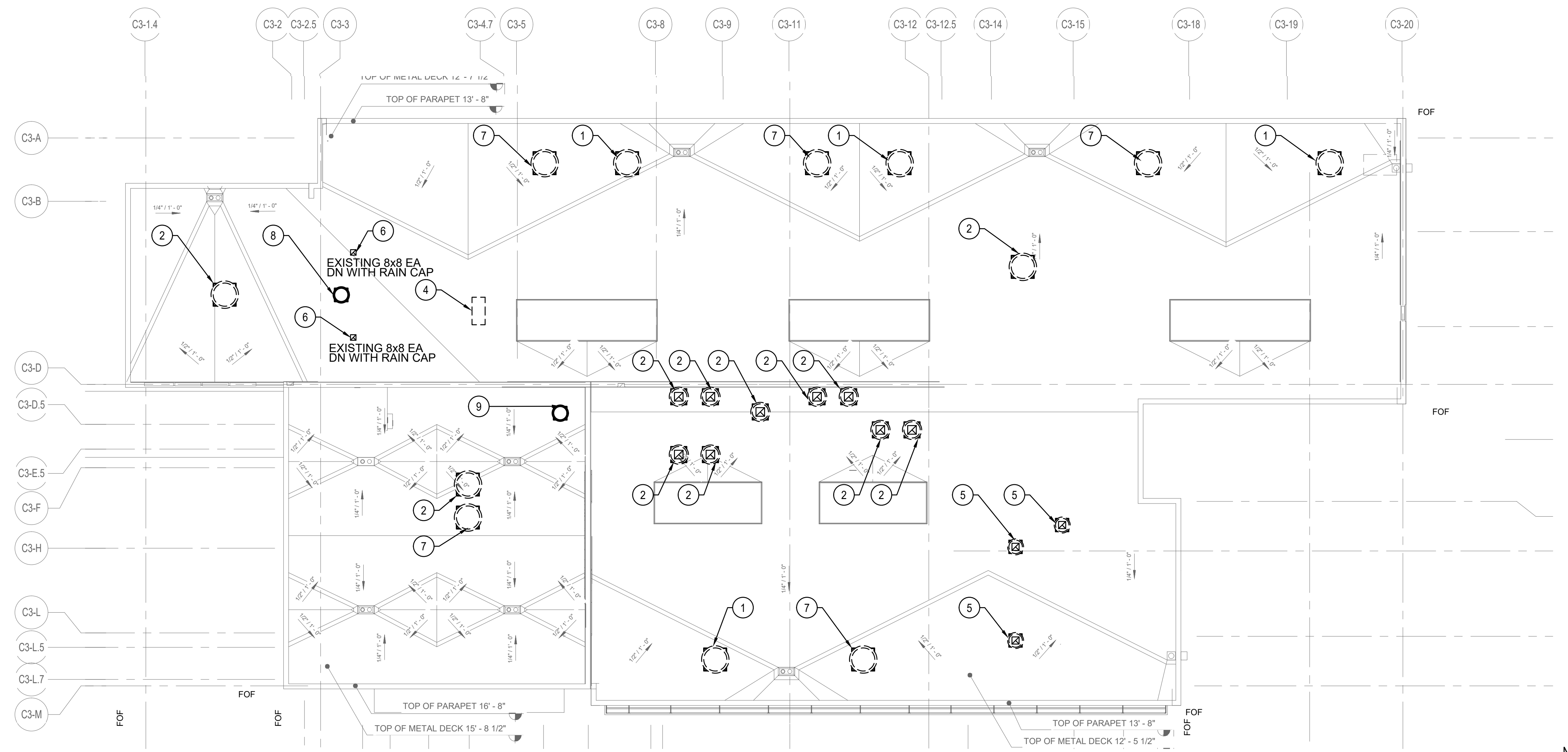
- KEY NOTES**
- EXISTING GRAVITY VENTILATOR TO BE REUSED FOR OUTSIDE AIR INTAKE.
 - EXISTING GRAVITY VENTILATOR TO BE REUSED FOR RELIEF AIR OUTLET.
 - EXISTING EXHAUST FAN TO BE REUSED. CLEAN, ADJUST, AND REPAIR AS REQUIRED.
 - EXISTING CONDENSING UNIT TO REMAIN.
 - EXISTING FUME HOOD FAN TO REMAIN. CLEAN, ADJUST, AND REPAIR AS REQUIRED TO REUSE.
 - PROVIDE NEW GRAVITY VENTILATOR FOR OUTSIDE AIR INTAKE. SEE DETAIL 3 ON SHEET M7.05 FOR ROOF MOUNTING.
 - PROVIDE NEW GRAVITY VENTILATOR FOR RELIEF AIR OUTLET. SEE DETAIL 3 ON SHEET M7.05 FOR ROOF MOUNTING.
 - EXISTING ROOF GRAVITY VENTILATION/ GRAVITY VENT/EXHAUST FAN TO BE ABANDONED IN PLACE AND TO BE CAPPED AT THE BOTTOM OF THE ROOF.
 - CAP EXISTING DUCTWORK AT ROOF LEVEL WHERE EXISTING DUCT ENTERS BUILDING.
 - RUN OUTSIDE AIR DUCT THROUGH EXISTING ROOF PENETRATION. PATCH REMAINING ROOF OPENING TO MATCH EXISTING CONDITION TO MAINTAIN MANUFACTURERS WARRANTY.
 - EXISTING ROOF JACK TO REMAIN
 - REFER TO ARCHITECTURAL SHEET A2.17 FOR WALL PATCHING.
 - CONTRACTOR TO REPLACE SPEED MOTOR ON EXHAUST FANS AND PROVIDE VFD. TIE TO BUILDING MANAGEMENT SYSTEM.



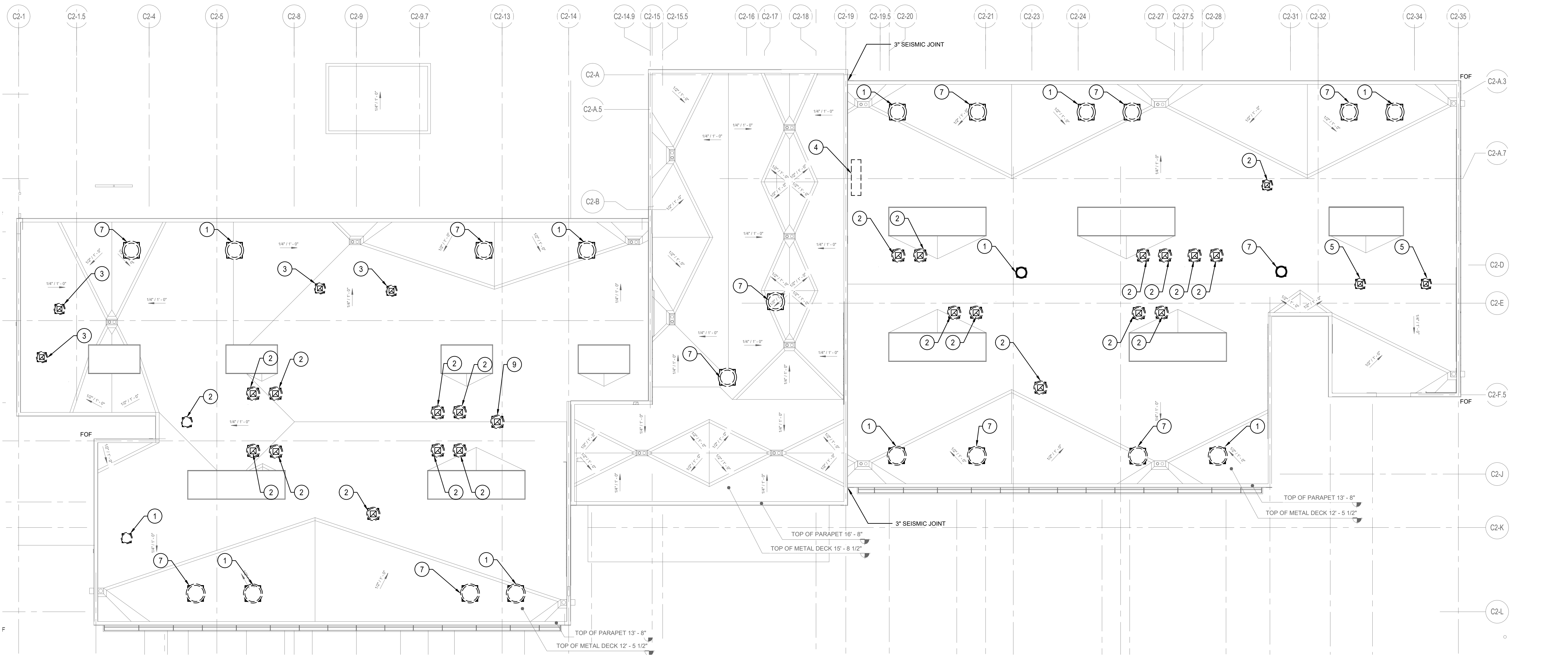
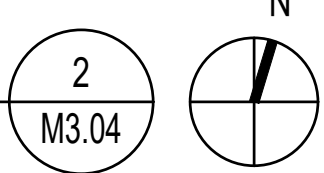
BUILDING A- MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"
1 M3.02

- KEY NOTES**
- 1 EXISTING GRAVITY VENTILATOR FOR OUTSIDE AIR INLET TO REMAIN. CLEAN, ADJUST, REPAIR AS REQUIRED TO BE REUSED. PROVIDE NEW DUCT PLENUM FOR OUTSIDE AIR DUCT CONNECTIONS.
 - 2 EXISTING ROOF GRAVITY VENTILATION/ GRAVITY VENT/EXHAUST FAN TO BE ABANDONED IN PLACE AND CAPPED BELOW ROOF.
 - 3 EXISTING GRAVITY VENTILATOR FOR RELIEF AIR TO REMAIN.
 - 4 EXISTING CONDENSING UNIT TO REMAIN.
 - 5 EXISTING EXHAUST FAN TO REMAIN.
 - 6 EXHAUST AIR DUCT WITH RAIN CAP DOWN.
 - 7 EXISTING GRAVITY VENTILATOR TO REMAIN. CLEAN, ADJUST, REPAIR AS REQUIRED TO BE REUSED FOR RELIEF AIR OUTLET.
 - 8 PROVIDE ROOF MOUNTED GRAVITY VENTILATOR. SEE DETAIL 3 ON SHEET M7.09 FOR ROOF MOUNTING.
 - 9 PROVIDE ROOF MOUNTED GRAVITY VENTILATOR FOR OSA INTAKE. SEE DETAIL 3 ON SHEET M7.09 FOR ROOF MOUNTING.

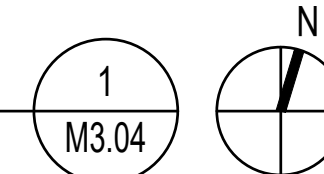
NOTE:
SEE SHEET M2.04 FOR
EXISTING HVAC EQUIPMENT
DESIGNATION



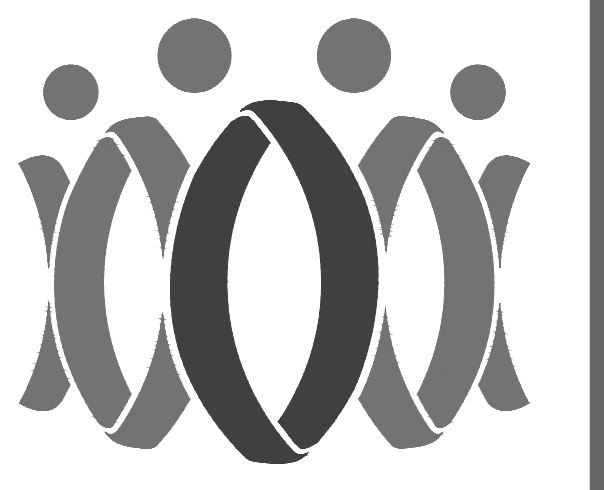
BUILDING C3- MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"



BUILDING C2- MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"



72546-80 03-120038



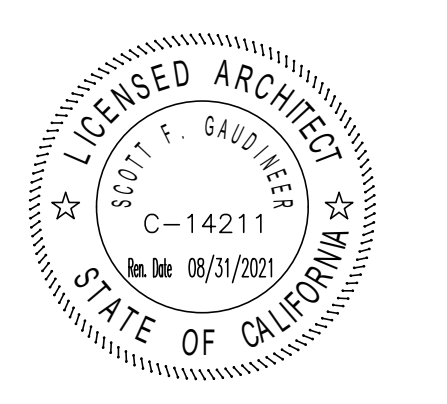
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300 W. VENETA BLVD. STE. 200
CAMARILLO, CA 93010
TEL: 805.467-4001



BID SET
(06-12-20)

Drawn by **PF**
Checked by **SP**

No.	Date	Description
1		BID ADDENDUM

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RANCHO CAMPANA HIGH SCHOOL

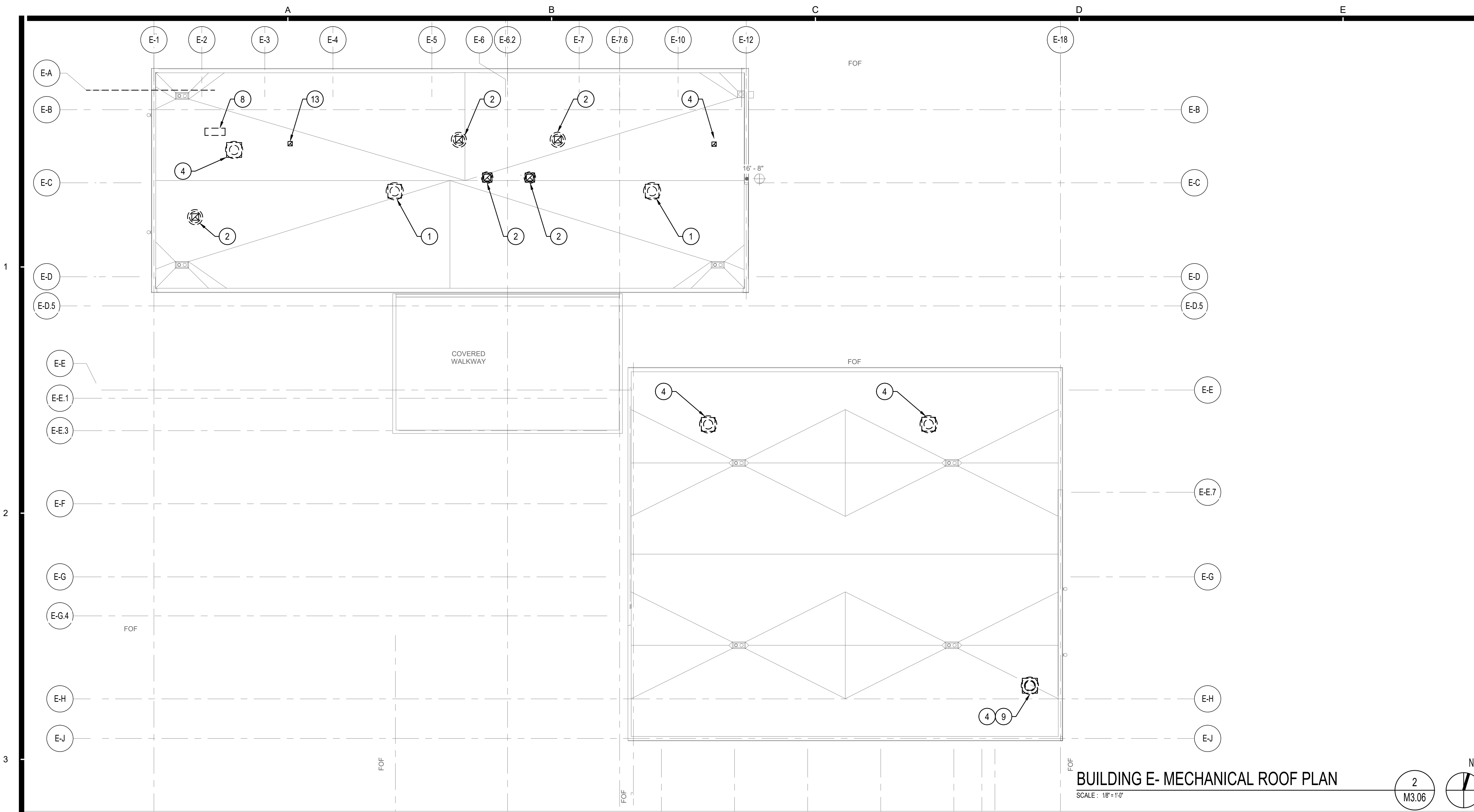
NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDINGS C2 & C3
MECHANICAL ROOF PLAN

Job No.
2841.100

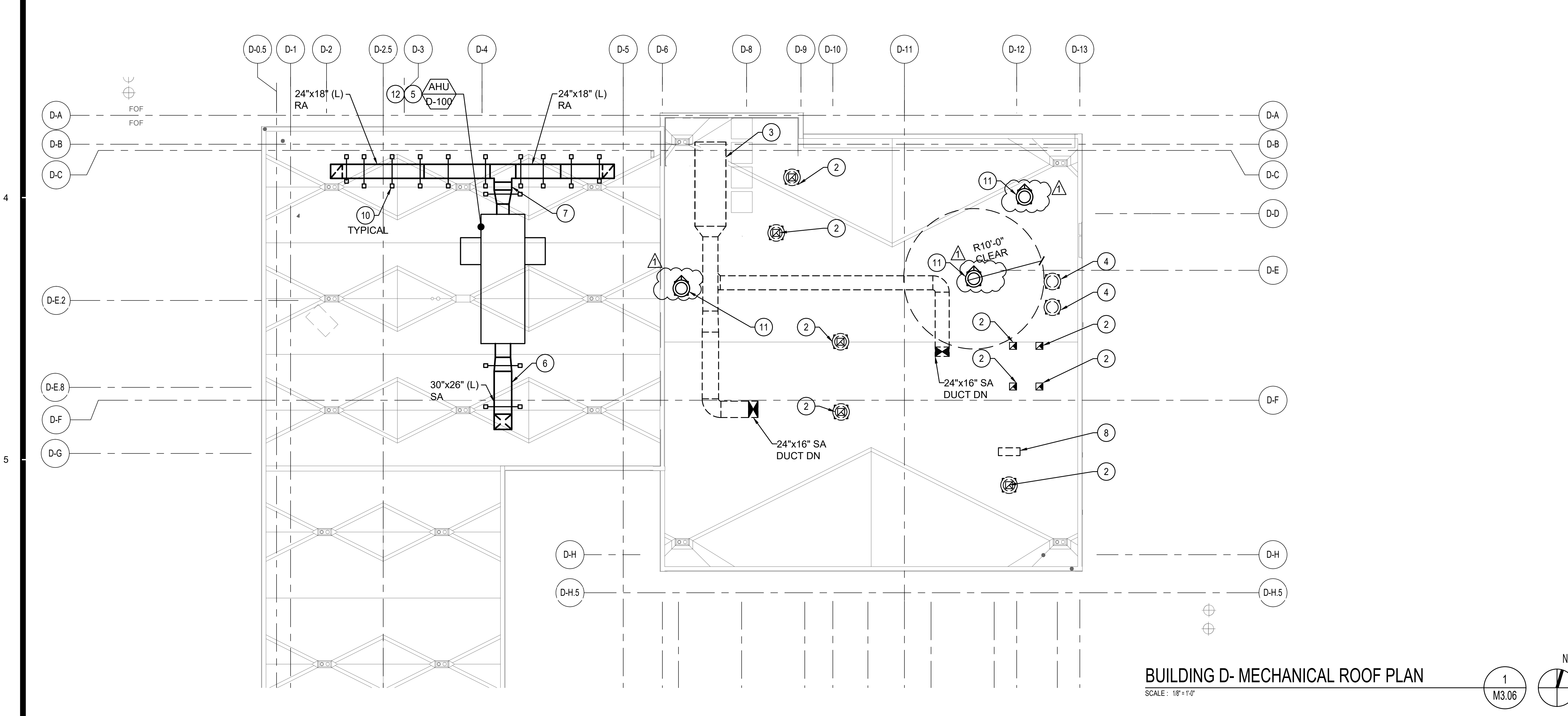
M3.04

Date
03-16-2020

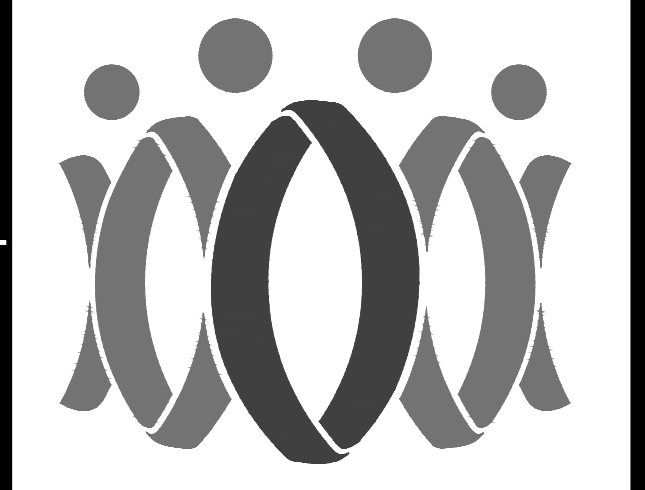


- ### KEY NOTES
- 1 EXISTING OPENING FOR OSA TO REMAIN. BLANK OFF DUCT OPENING BELOW ROOF. CLEAN AND REPAIR. RUN OSA DUCTS INTO RELIEF AIR OPENING.
 - 2 EXISTING EXHAUST FAN TO REMAIN.
 - 3 EXISTING MAKEUP AIR UNIT.
 - 4 EXISTING GRAVITY VENT FOR RELIEF AIR TO REMAIN. CLEAN AND REPAIR.
 - 5 INSTALL NEW AIR HANDLING UNIT WITH ALL RELATED ACCESSORIES.
 - 6 PROVIDE NEW 30"x26" SA DUCT.
 - 7 PROVIDE NEW 30"x26" SA DUCT.
 - 8 EXISTING CU TO REMAIN.
 - 9 EXISTING OPENING FOR OSA TO REMAIN.
 - 10 ROOF DUCT SUPPORTS PER DIAGRAMS 3 & 4 ON SHEET M7.09.
 - 11 PROVIDE NEW GRAVITY VENTILATOR FOR OUTSIDE AIR INTAKE. SEE DETAIL 3 ON SHEET M7.05 FOR ROOF MOUNTING.
 - 12 ROOFTOP DUCTWORK AND DUCT SUPPORTS SHALL BE PAINTED. PROVIDE 22 GAUGE ROOFTOP DUCTWORK.
 - 13 EXISTING EXHAUST AIR DOWN THROUGH ROOF.

NOTE:
SEE SHEET M2.06 FOR
EXISTING HVAC EQUIPMENT
DESIGNATION



AGENCY
PTN_ 72546-80 APPL_ 03-120038



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RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

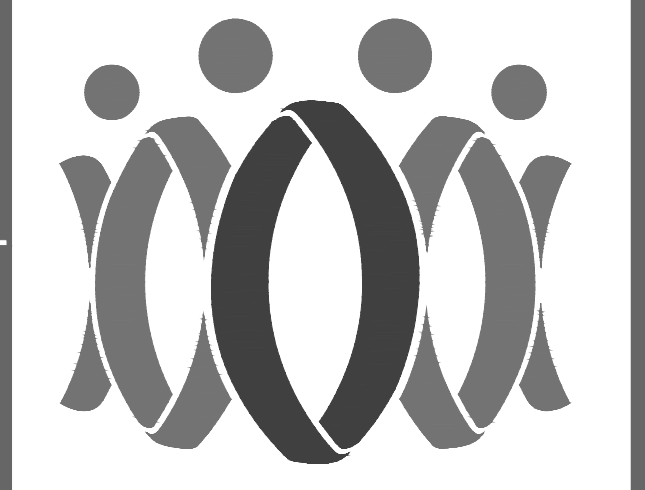
BUILDINGS D & E
MECHANICAL ROOF PLAN

Job No:
2841.100
Date:
03-16-2020

M3.06

AGENCY

PTN: 72546-80 APPL: 03-120038

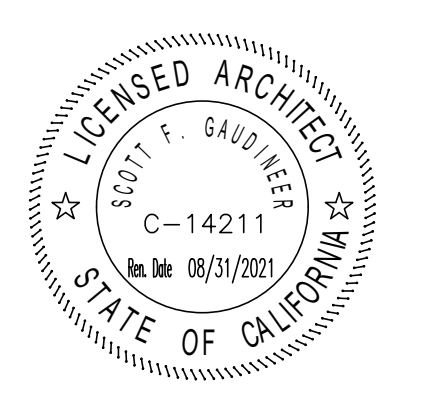


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Checked by: _____

Revisions:
No. Date Description
1 BID ADDENDUM

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OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

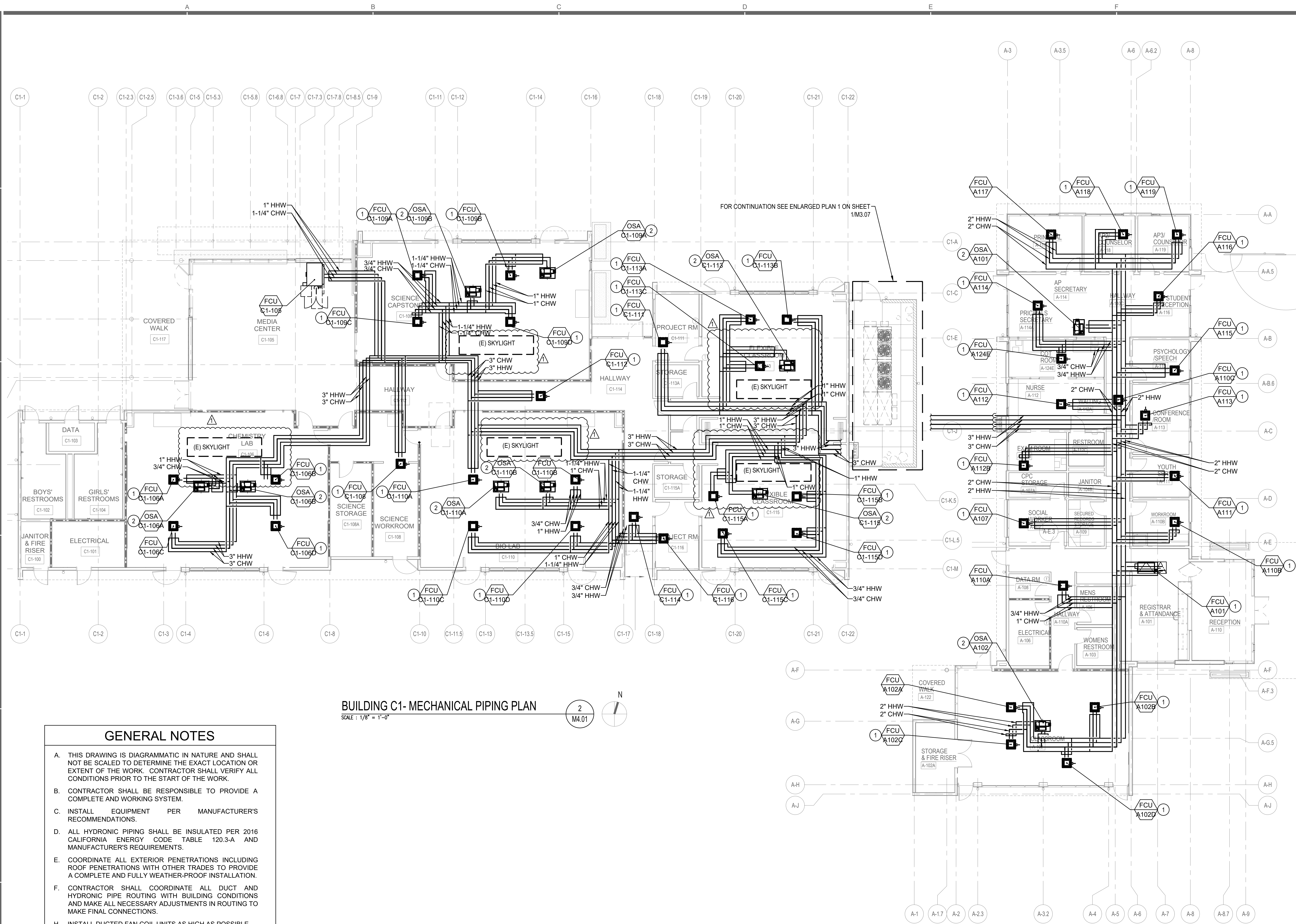
NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDING A & C1 MECHANICAL PIPING PLAN

Job No:
2841.100

M4.01

Date:
03-16-2020



BUILDING C1- MECHANICAL PIPING PLAN
SCALE: 1/8" = 1'-0"
2
M4.01

GENERAL NOTES

- A. THIS DRAWING IS DIAGRAMMATIC IN NATURE AND SHALL NOT BE SCALED TO DETERMINE THE EXACT LOCATION OR EXTENT OF THE WORK. CONTRACTOR SHALL VERIFY ALL CONDITIONS PRIOR TO THE START OF THE WORK.
- B. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A COMPLETE AND WORKING SYSTEM.
- C. INSTALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.
- D. ALL HYDRONIC PIPING SHALL BE INSULATED PER 2016 CALIFORNIA ENERGY CODE TABLE 120.3-A AND MANUFACTURER'S REQUIREMENTS.
- E. COORDINATE ALL EXTERIOR PENETRATIONS INCLUDING ROOF PENETRATIONS WITH OTHER TRADES TO PROVIDE A COMPLETE AND FULLY WEATHER-PROOF INSTALLATION.
- F. CONTRACTOR SHALL COORDINATE ALL DUCT AND HYDRONIC PIPE ROUTING WITH BUILDING CONDITIONS AND MAKE ALL NECESSARY ADJUSTMENTS IN ROUTING TO MAKE FINAL CONNECTIONS.
- H. INSTALL DUCTED FAN COIL UNITS AS HIGH AS POSSIBLE.
- I. SKYLIGHTS ARE EXISTING IN THE BUILDING AND PIPING SHOULD BE INSTALLED TO AVOID THEM.

KEY NOTES

- 1 INSTALL 3/4" HHWS/R AND 3/4" CHWS/R PIPING. INSTALL PIPING TO FAN COIL UNIT WITH SIX WAY VALVE ASSEMBLY PER MANUFACTURER RECOMMENDATIONS.
- 2 INSTALL 1" HHWS/R AND 3/4" CHWS/R PIPING. INSTALL PIPING TO OUTSIDE AIR UNIT WITH SIX WAY VALVE ASSEMBLY PER MANUFACTURER RECOMMENDATIONS.

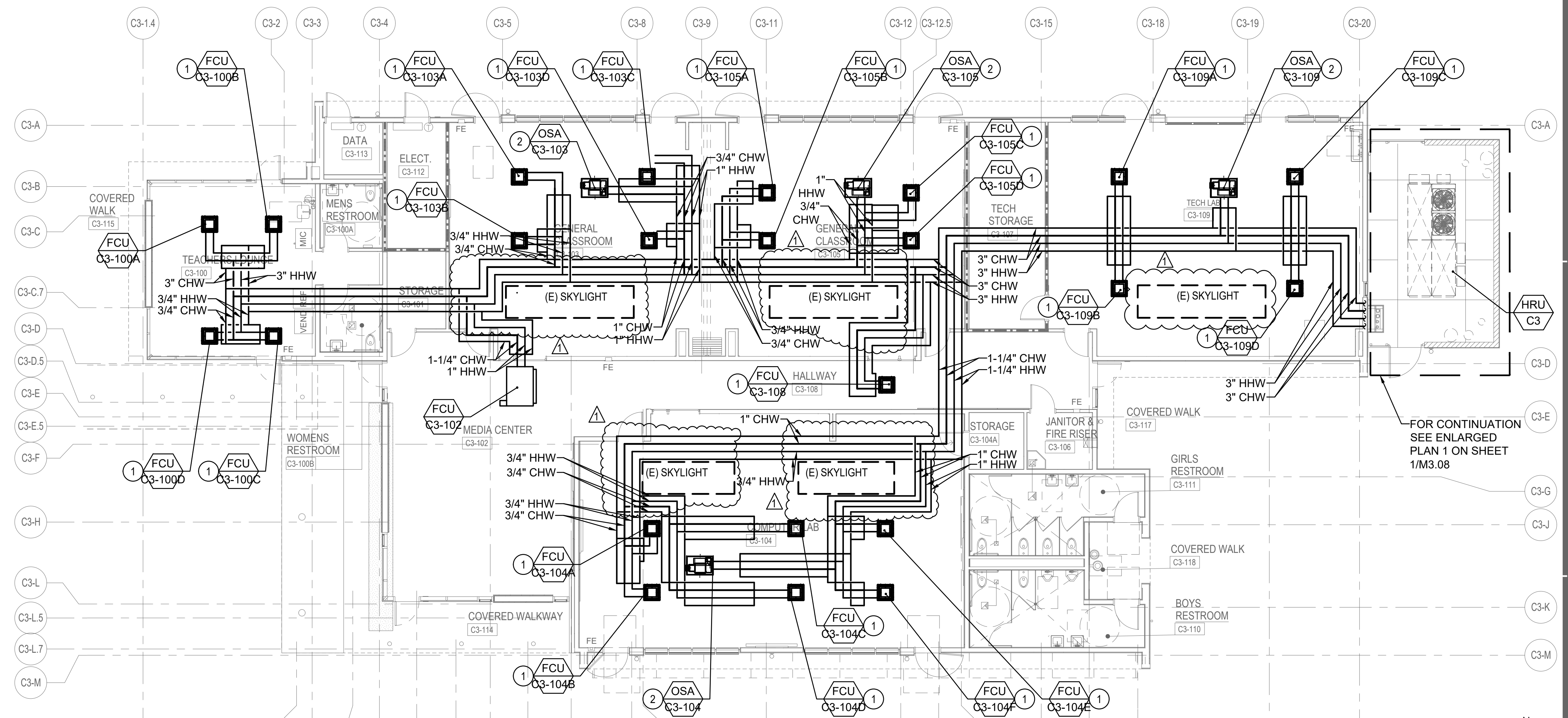
BUILDING A- MECHANICAL PIPING PLAN
SCALE: 1/8" = 1'-0"
1
M4.01

GENERAL NOTES

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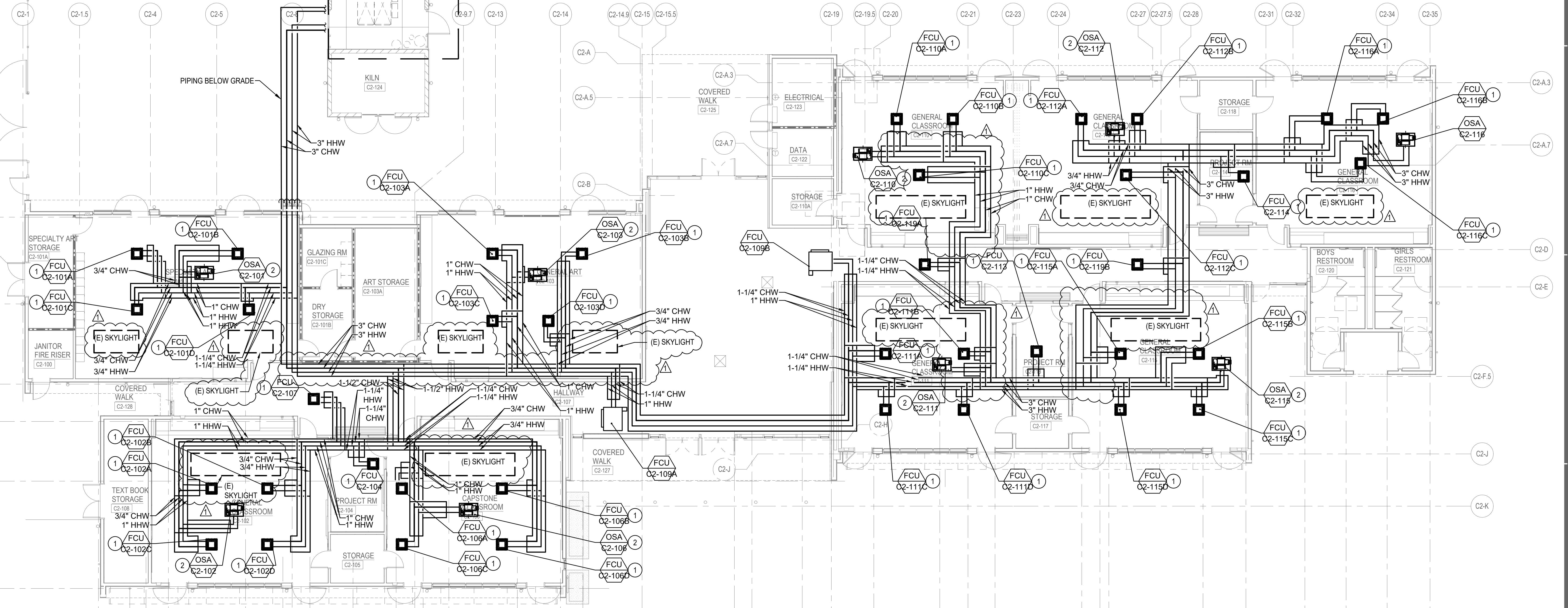


BUILDING C3- MECHANICAL PIPING PLAN

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

2
M4.02

FOR CONTINUATION SEE ENLARGED PLAN 2 ON SHEET 2/M3.07

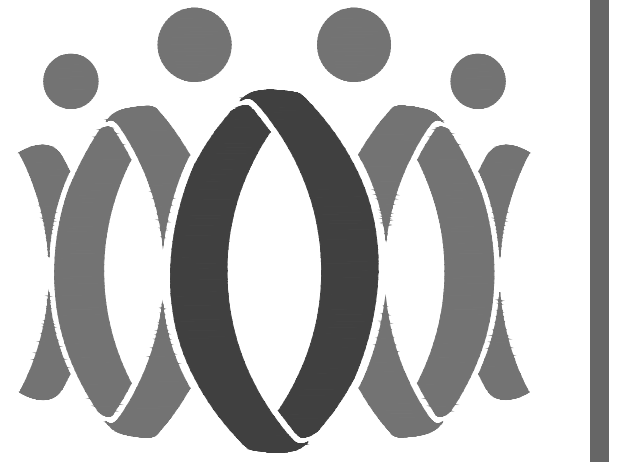


BUILDING C2- MECHANICAL PIPING PLAN

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

1
M4.02

PTN_ 72546-80 APPL_ 03-120038



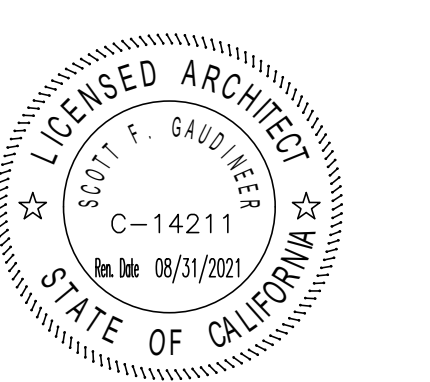
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BID SET
(06-12-20)

Drawn by: M/J

Checked by: M/S

No.	Date	Description
1		BID ADDENDUM

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OXNARD UNION HIGH SCHOOL DISTRICT
RANCHO CAMPANA HIGH SCHOOL

NEW HVAC SYSTEM
4235 MAR VISTA DRIVE
CAMARILLO, CA 93010

BUILDINGS C2 & C3
MECHANICAL PIPING PLANS

Job No. 2841.100

M4.02

Date: 03-16-2020

Attachment J

SECTION 07 54 16

POLYVINYL-CHLORIDE (PVC) ROOF SYSTEM PATCH / REPAIR

BID ADDENDUM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The work includes but is not limited to the installation of:
 - 1. Cutting and Removal of Existing Roofing for new work.
 - 2. Substrate Preparation for pipes, stanchion supports, curbs, etc.
 - 3. Adhesive for Flashings.
 - 4. Flashings.
 - 5. Walkways.
 - 6. Sealants.

1.2 RELATED SECTIONS

- A. Section 07 62 00 – Sheet Metal Flashing and Trim.
- B. Divisions 21-23 – Mechanical.
- C. Divisions 25-28 – Electrical.

1.3 REFERENCES

- A. Existing Conditions: Metal decking over steel framing. Roof System: 1.5" minimum tapered isocyanurate insulation installed directly over the metal deck and 5/8" thick DensDeck cover board mechanically fastened to the metal roof deck concurrently. Over the DensDeck, a layer of Sarnafil S327 60 mil membrane is mechanically fastened to the metal deck and all side and end laps are hot-air welded as required. (Original Installation completed 2016. Contact Sika Sarnafil Technical Services Department for Warranty Type & Term).
- B. Sika Sarnafil Inc., 15616 Euclid Avenue, Chino, California 91710. Technical Services Department: (714) 898-9355 / Ext. 7126. Material specifications are incorporated by reference.
- C. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 0 for definitions, acronyms, and abbreviations.
- D. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.
- E. Referenced Standards and Manuals:
 - 1. ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulation Board.
 - 2. ASTM C1177/C1177M – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

3. ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
4. ASTM C1371 – Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
5. ASTM C1549 – Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
6. ASTM D570 – Standard Test Method for Water Absorption of Plastics.
7. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
8. ASTM D1004 – Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
9. ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
10. ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.
11. ASTM D2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
12. ASTM D2136 – Standard Test Method for Coated Fabrics-Low-Temperature Bend Test.
13. ASTM D3045 – Standard Practice for Heat Aging of Plastics Without Load.
14. ASTM D4434 – Standard Specification for Poly (Vinyl Chloride) Sheet Roofing.
15. ASTM D5602 – Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens.
16. ASTM D5635 – Standard Test Method for Dynamic Puncture Resistance of Roofing Membrane Specimens.
17. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
18. ASTM E408 – Standard Test Method for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
19. ASTM E1980 – Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
20. ASTM G154 – Standard Practice for Operating Fluorescent Light Apparatus for Exposure of Nonmetallic Materials.
21. Factory Mutual Global (FMG) Approval Guide.
22. NRCA – National Roofing Contractors Association.

1.4 SUBMITTALS

- A. Submit under provisions of Division 0.
- B. Copies of Specification.
- C. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.

- D. Written approval by the insulation manufacturer for use and performance of the product in the proposed system.
- E. Sample copy of roofing manufacturer's warranty.
- F. Sample copy of applicator's warranty.
- G. Dimensioned shop drawings which shall include:
 - 1. Outline of roof with roof size and elevations shown.
 - 2. Details of flashing methods for penetrations.
 - 3. Technical acceptance from roofing manufacturer.
- H. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and other industry standards or practices.
- I. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by this Section.

1.5 QUALITY ASSURANCE

- A. Roof system modifications and/or repairs shall be applied only by an Applicator authorized by the Roof System Manufacturer prior to bid. If the roof system is less than two (2) years old, the original Applicator shall perform all roof replacement work by section as identified and/or all noted repair work.
- B. Upon completion of all required work and the delivery to the Roof System Manufacturer by the Applicator a certification that all work has been done in strict accordance with the contract specifications and Roof System Manufacturer's requirements, a Roof System Manufacturer's Technical Service Representative will review all applicable work to the existing roof system when a System warranty has been specified.
- C. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written acceptance by the Districts Representative (Architect) and Roof System Manufacturer.
- D. All work pertaining to the installation of roof membrane and flashings shall only be completed by Applicator personnel trained and authorized by the Roof System Manufacturer in those procedures.
- E. Upon successful completion of all the work in accordance with the Roof System Manufacturer's standard detail and installation requirements, the original Warranty will remain in full force.

1.6 CODE REQUIREMENTS

- A. The Applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" article of this Section.
 - 1. System shall be designed to meet a minimum wind design requirements of the most recent version of ASCE 7.
 - 2. Factory Mutual Research Corporation (FM) - Norwood, MA: Class 1-90 (for high wind exposure).

3. Underwriters Laboratories, Inc. - Northbrook, IL: Class A assembly.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.
- D. As a general rule, all adhesives shall be stored at temperatures between 40 degrees F and 80 degrees F. Read instructions contained on adhesive canister for specific storage instructions.
- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- F. All materials which are determined to be damaged by shall be removed from the job site and replaced at no cost to the College.

1.8 JOB CONDITIONS

- A. Roofing materials may be installed under certain adverse weather conditions but only after consultation with roofing manufacturer, as installation time and system integrity may be affected.
- B. Maintain roof as weathertight each day, including all flashing and detail work, shall be installed. All seams shall be heat welded before leaving the job site that day.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.
- D. All surfaces to receive new insulation, cover board, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Arrange work sequence to avoid use of newly repaired or replaced roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to these areas. A substantial protection layer consisting of 1/2" plywood over non-woven polyester or polypropylene mat cushion layer or 1/2" plywood over insulation board shall be provided for newly repaired, replaced or existing roof areas that receive rooftop traffic during construction.
- G. Prior to and during application, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air, or similar methods.

- H. The applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.
- I. All applicable roofing, insulation, cover board, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State, and Federal requirements.
- J. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.
- K. The Applicator shall take precautions that storage and application of materials and equipment does not overload the roof deck or building structure.
- L. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.
- M. All rooftop contamination that is anticipated or that is occurring shall be reported to Roof System Manufacturer to determine the corrective steps to be taken.
- N. The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing (letter copy to roofing manufacturer) to the Architect for corrective action prior to the installation of the roof system.
- O. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Architect of such condition in writing for correction (letter copy to roof system manufacturer).
- P. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Districts Representative's (Architect's) satisfaction.
- Q. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.
- R. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.
- S. Roof membranes are slippery when wet or covered with ice or frost. Working on surfaces under these conditions may be hazardous. Appropriate safety measures must be implemented prior to working on such surfaces. Always follow OSHA and other relevant fall protection standards when working on roofs.

1.9 WARRANTIES

- A. Manufacturer's System Warranty: Upon successful completion of all the work in accordance with the Roof System Manufacturer's standard detail and installation requirements, the original Warranty will remain in full force.
- B. Applicator/Roofing Contractor Warranty: Applicator shall supply Oxnard Union High School District (OUHSD) with a separate workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within Applicator warranty term, defective or otherwise

not in accordance with Contract Documents, the applicator shall repair that defect at no cost to the District. Applicator's warranty obligation shall be directly to OUHSD and a copy shall be sent to the Roof System Manufacturer.

- C. Applicator's/Roofing Contractor's Warranty shall be in effect for a two (2) year duration.

PART 2 PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS – MEMBRANE MATERIAL

- A. Original Product: Sarnafil S327-15, 60 mil thermoplastic membrane with polyester reinforcement by Sika Sarnafil, Chino, CA; (714) 898-9355, www.sikacorp.com. Provide the named product.
- B. Substitutions: Not allowed due to existing, in-force Warranty stipulations.

2.2 GENERAL

- A. Components to be used that are other than those supplied or manufactured by the original Roof System Manufacturer may be submitted for review and acceptance by the Manufacturer. The Manufacturer's acceptance of any other product is only for a determination of compatibility with PVC membrane products and not for inclusion in the original Warranty. The specifications, installation instructions, limitations, and restrictions of the respective manufacturers shall be reviewed by the OUHSD Representative and Architect for acceptability for the intended use with the existing roof system products.

2.3 MEMBRANE

- A. Membrane shall conform to ASTM D4434. Classification: Type III.
1. Sarnafil S327-15, 60 mil thermoplastic membrane with polyester reinforcement and lacquer coating.
- B. Certified Polymer Thickness:
1. Membrane manufacturer is to certify that the polymer thickness is of the polymer thickness specified. Certification is to be signed by the membrane manufacturer's quality control manager. ASTM +/- tolerance for membrane thickness is not acceptable.
- C. Color of Membrane:
1. EnergySmart White, initial solar reflectance of 0.84, emittance of 0.86, and solar reflective index (SRI) of 105 (ENERGY STAR listed).

2.4 FLASHING MATERIALS

- A. Miscellaneous Flashing:
1. Flashing Membrane: Sarnafil 60 mil G410 membrane flashing.
 2. Sarnacol 2163 Board Adhesive.
 3. Sikaflex-1a Sealant: One-part urethane sealant used at flashing terminations.
 4. Stabond Adhesive: Solvent-based, low VOC, reactivating adhesive used to attach G459 Membrane to vertical flashing substrates.
 5. Sarnafelt NWP: Non-woven polypropylene mat cushion layer that is necessary behind G410 Membrane when vertical flashing substrate is rough or incompatible with the G410 Membrane.

2.5 INSULATION/OVERLAYMENT/RECOVER BOARD

- A. Existing board and insulation If existing insulation and cover board are in reusable condition, with original size (length, width, thickness) being maintained, it is acceptable to reinstall at opening.
- B. Sarnatherm ISO CG: Rigid isocyanurate foam insulation composed of a closed cell polyisocyanurate foam core laminated to coated glass mat facers at both sides of board.
- C. DensDeck - Georgia Pacific: Fire-tested, 5/8 inch thick gypsum hardboard with glass-mat facers. Install 1/2" DensDeck Prime on vertical surfaces where required to replace existing DensDeck Prime.

2.6 WALKWAY PROTECTION

- A. Sarnatred: Polyester reinforced, 0.096 inch, weldable membrane with surface embossment. Used as a protection layer from rooftop traffic. Sarnatred is supplied in rolls of 39.3 inches wide and 50 feet long.

2.7 MISCELLANEOUS ACCESSORIES

- A. Multi-Purpose Sealing Tape: Compressible foam tape with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and windblown moisture entry.
- B. Sarnasolv: Solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Sarnasolv is also used daily to clean seam areas prior to hot-air welding in dirty conditions or if the membrane is not welded the same day it is unrolled.

2.8 SEALANTS

- A. Sarnafil Sikaflex-1a Sealant (for termination details).

PART 3 EXECUTION

3.1 PRE-CONSTRUCTION CONFERENCE

- A. The Oxnard Union High School District Representative, Architect, Applicator and Roof System Manufacturer shall attend a pre-construction conference.
- B. The meeting shall discuss all aspects of the project including but not limited to:
 - 1. Safety
 - 2. Set up
 - 3. Construction schedule
 - 4. Contract conditions
 - 5. Coordination of the work

3.2 SUBSTRATE CONDITION

- A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new materials as required to perform all repair and/or roof system modifications.

- B. Applicator shall verify that the work done under related sections meets the following conditions:
 - 1. New roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
 - 2. All surfaces are smooth and free of dirt, debris and incompatible materials.

3.3 SUBSTRATE PREPARATION

- A. The roof deck and existing roof construction must be structurally sound to provide support for the new equipment curbs, platforms, etc. The Applicator shall load all replacement materials on the rooftop in such a manner as to eliminate risk of deck overload due to concentrated weight.
- B. After removal of existing roof system at identified locations, properly prepare existing metal deck substrate as needed. The substrate shall be clean and dry. The surface shall have a smooth and level finish and shall be free of dust, excess moisture, oil-based curing agents and loose debris. Sharp ridges or other projections above the surface shall be removed before roofing.

3.4 SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive new adhered membrane at all identified replacement locations.
- B. The Applicator shall inspect applicable substrate at replacement areas for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.
- C. The applicable substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.
- D. All replacement membrane shall be applied over compatible and accepted substrates only.

3.5 REPLACEMENT INSULATION / COVER BOARD INSTALLATION

- A. Replacement insulation and cover board shall be installed according to insulation manufacturer's instructions.
- B. Insulation and cover board shall be neatly cut to fit around new penetrations and projections.

3.6 INSTALLATION OF PIPE FLASHING MEMBRANE

- A. At each location where new pipe is scheduled to be installed, carefully cut and remove all layers of existing roof system down to the metal deck substrate. Clean/remove all loose debris after removal.
- B. Install new insulation and cover board to match existing and fasten with Sarnafastener #12 and Sarnaplate to substrate. Insulation and cover board shall be installed to fit tightly against new pipe, avoiding any gaps or openings greater than 1/4". Note: If existing insulation and cover board are in reusable condition, with original size (length, width, thickness) being maintained, it is acceptable to reinstall at opening.
- C. Over the properly prepared insulation and cover board, install new S327 membrane to match existing membrane thickness and fasten to prepared metal deck substrate with Sarnafastener #15 XP and SarnaDisc XPN. Hot-air weld all edges of S327 as required.

- D. Install 60-mil G410 membrane flashing detail at new pipe in accordance with the applicable detail drawing(s). Note: Bottom edge of PVC membrane collar must extend a minimum of 2" below the primary stainless-steel clamp and caulking (at PVC membrane flashing termination).

3.7 INSTALLATION OF CURB FLASHING MEMBRANE

- A. At each location where new HVAC curb is scheduled to be installed, install Sarnafelt NWP in accordance with Manufacturers requirements.
- B. Install new 60-mil G410 membrane flashing over the prepared new curb. Hot-air weld all edges of G410 as required.

3.8 HOT-AIR WELDING OF SEAM OVERLAPS

A. General:

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches wide when automatic machine-welding and 4 inches wide when hand-welding, except for certain details.
2. Welding equipment shall be provided by or approved by Roof System Manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by Roofing Manufacturer's Technical Service Representative prior to welding.
3. All membrane to be welded shall be clean and dry.

B. Hand-Welding:

1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
3. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow", the hand roller is positioned perpendicular to the nozzle and rolled lightly. For straight seams, the 1-1/2 inch wide nozzle is recommended for use. For corners and compound connections, the 3/4 inch wide nozzle shall be used.

C. Machine Welding

1. Machine welded seams are achieved by the use of Roof System Manufacturer's automatic welding equipment. When using this equipment, Manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated simultaneously off the generator.
2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

D. Quality Control of Welded Seams

1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark gray material from the underside of the top membrane. Onsite evaluation of welded seams shall be made daily by the Applicator at locations as directed by the Districts Representative, Architect

or Roof System Manufacturer's Representative. One inch wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the District.

3.9 METAL BASE FLASHINGS/EDGE METAL

A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval from the Districts Representative, Architect and Roof System Manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.

B. WALKWAY INSTALLATION (As Required)

1. Sarnatred Walkway:

a. Roofing membrane to receive Walkway Tread shall be clean and dry. Place chalk lines on deck sheet to indicate location of walkway. Apply a continuous coat of Stabond Adhesive to the G410 field membrane and the back of walkway in accordance with the Manufacturer's technical requirements and press walkway into place with a minimum 20-Lb weighted roller. Clean the field and/or replacement membrane in areas to be welded. Hot-air weld the entire perimeter of the walkway to the field membrane. Check all welds with a rounded screwdriver. Re-weld any inconsistencies. Check all existing deck membrane seams that are to be covered by walkway with rounded screwdriver and re-weld any inconsistencies before walkway installation.

3.10 TEMPORARY CUT-OFF

A. All new replacement membrane and flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100 percent watertight seal. The stagger of new insulation / cover board joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. Waterstop shall be sealed to the deck or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant.

B. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of offsite. None of these materials shall be used in the new work.

C. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.

D. If any water is allowed to enter under the newly-completed roof system repairs and/or upgrades, the affected area shall be removed and replaced at the Applicator's expense.

3.11 COMPLETION

A. Prior to demobilization from the site, the work shall be reviewed by the Districts Representative, Architect, Roof System Manufacturer and the Applicator. All defects noted and non-compliances with the original and this Specification shall be itemized in a punch list. These items shall be corrected immediately by the Applicator to the satisfaction of the Districts Representative, Architect and Roof System Manufacturer prior to demobilization.

3.12 CLEANING

- A. Clean as recommended by the Roof System Manufacturer. Do not use materials or methods which may damage surface or surrounding construction.
- B. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

Attachment K

SECTION 23 20 16**UNDERGROUND HVAC PIPING****PART 1 – GENERAL****1.1 SUMMARY**

- A. Section Includes: Underground piping systems for heating, ventilating and air conditioning systems. Systems include, but are not limited to, the following:
1. Chilled Water Piping System.
 2. Hot Water Heating Piping System.
 3. Condenser Water Piping.
- B. Related Requirements:
1. Division 01: General Requirements.
 2. Section 23 05 00: Common Work Results for HVAC.
 3. Section 23 05 13: Basic HVAC Materials and Methods.
 4. Section 23 05 53: HVAC Identification.
 5. Section 23 20 13: HVAC Piping.
 6. Section 31 23 23: Excavation and Fill for Utilities.

1.2 REFERENCES

- A. ASTM International:
1. ASTM A47 – Standard Specification for Ferritic Malleable Iron Castings.
 2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 3. ASTM A105 - Standard Specification for Carbon Steel Forgings for Piping Applications.
 4. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 5. ASTM A181 - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
 6. ASTM A234 - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

7. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
 8. ASTM B32 - Standard Specification for Solder Metal.
 9. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 10. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
 11. ASTM F2389-17A: Pressure-Rated Polypropylene (PP) Piping Systems
 12. ASTM D2657-07: Heat Fusion for Polypropylene Pipe & Fittings
 13. ASTM D2774-12: Underground Installation of thermoplastic Pressure Piping
 14. ASTM F1668-16: Construction Procedures for Buried Plastic Pipe
- B. American National Standard Institute (ANSI) and The American Society for Mechanical Engineers (ASME):
1. ANSI/ASME B1.20.1 - Pipe Threads, General Purpose, Inch.
 2. ANSI/ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
 3. ANSI/ASME B16.9 - Factory Made Wrought Butt-welding Fittings.
 4. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

1.3 SUBMITTALS

- A. Provide submittals in accordance with Division 01, Sections 23 05 00, and 23 05 13.
- B. Provide Shop Drawings with dimensioned piping layout and details of expansion loops, elbows, anchor points, building or manhole entry points and other pertinent information required to verify layout, intent and type of materials are in accordance with this Section. Prefabricated pipe units shall be dimensioned and numbered to fit actual Work with field verified conditions prior to start of factory fabrication.
- C. The CONTRACTOR shall indicate location and depth of all installed fittings, in addition to the as-built drawing content required in accordance with Section 01 77 00.

1.4 QUALITY ASSURANCE

- A. Refer to Sections 23 05 00 and 23 05 13.
- B. The Contractor shall be present to inspect delivered pipe and fittings, shall ensure that piping and associated jacketing is not damaged and shall verify that pipe and fittings are properly stored. The CONTRACTOR shall repair and/or replace damaged materials.
- C. The Pipe and fittings manufacturer's representative shall provide the installing Contractor with on-site training and installer certification in the fusion welding methods, and the

operation of fusion machines, as well as the proper handling of pipe and fittings on site for quality control.

- D. The Contractor shall routinely monitor that welding and installation practices are being performed in accordance with manufacturer's installation instructions and recommendations.
- E. Welding of Pipe and Qualifications of Welder shall be in accordance with Section 23 05 13: Basic HVAC Materials and Methods.
- F. Welding performed as part of this Division may be subject to radiographic inspections at random in accordance with requirements specified in Section 23 05 13: Basic HVAC Materials and Methods.

1.5 PRODUCT HANDLING

- A. Comply with the requirements of Section 23 05 13.
- B. Verify that materials delivered to the site are undamaged.

Deliver piping with factory applied packaging or end caps. Packaging or end caps shall remain in place until piping is installed to prevent entrance of dirt, debris and moisture.

- C. Handle and store materials on site in accordance to manufacturer recommendations.
- D. Protect stored piping from moisture and dirt by elevating above grade.

1.6 COORDINATION

- A. Coordinate installation and related procedures with provisions of Section 23 05 00.

1.7 WARRANTY

- A. Manufacturer shall warrant materials for a period of five years starting at Substantial Completion.
- B. Polypropylene PP-RCT piping and preinsulated PP-RCT piping shall be warranted by the manufacturer for minimum of 30 years.
- C. CONTRACTOR shall remedy defects due to faulty material or workmanship and pay for any damage to other work resulting therefrom within a period of three years from Substantial Completion.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Chilled Water, Condenser Water and Heating Hot Water, 1-1/4" inch and Larger Pipe and Fittings: Underground chilled water, condenser water and hot water supply and return piping that are pre-insulated, pre-fabricated type, composed of integral sealed units of outer jacket, polyurethane foam insulation, and fiberglass reinforced PP-RCT polypropylene carrier pipe.
 - 1. Carrier Pipe and Fittings: Seamless fiberglass reinforced Polypropylene PP-RCT pipe and fittings. ANSI/NSF 14, ANSI/NSF 61, ASTM F2389, ASTM F2023, CSA

B137.11, in SDR (wall thickness) sizes SDR 7.3, SDR 11, or SDR17, selected to meet the service temperature and pressure for each application.

2. Outer Jacket: Seamless Polypropylene PP-R having a minimum wall thickness meeting schedule 40 pipe dimensions..
3. Insulation: CFC free, rigid closed cell Polyurethane foam completely filling annular space between carrier pipe and outer jacket, having a "K" factor of 0.14 BTU/ (hour) (square foot) (degrees F/in) at 122 degrees F. Exposed insulation at unit ends shall be sealed with a factory-supplied fittings.
4. Fittings: Insulated fittings shall be factory preassembled or assembled from factory kits in the field, made up of PP-RCT fittings with PP-R polypropylene jacketing.
5. Field Joining Pipe and Fittings: Joining methods for preinsulated pipe and fittings may include butt-fusion, socket-fusion, and electrofusion methods in compliance with ASTM F1290-19 and ASTM D2657-07.
6. Preparation and installation of all field joints shall comply with the preinsulated piping manufacturer's approved installation instructions.
7. Thrust Blocks: Shall be sized and installed as recommended by the preinsulated pipe manufacturer.
8. Expansion Joints: Where indicated on Drawings, expansion joints and seismic connectors shall consist of annular corrugated [T316 stainless steel], or [Bronze] with a [T304 stainless steel], or [Bronze] braided cover, have a flanged connection to PP-RCT to the piping system.

B. Chilled Water, Condenser Water and Heating Hot Water, 2-inch and Smaller Pipe and Fittings: Underground chilled water, condenser water and hot water supply and return piping shall be pre-insulated, pre-fabricated type, composed of integral sealed units of HDPE (2" Size) and PVC (1-1/2" or smaller) outer jacket, polyurethane foam insulation, and seamless copper carrier pipe Type K manufactured by: Perma-Pipe Rovanco Copper Pipe System, Thermal Pipe Systems, Thermacore Copper-Therm, or equal.

9. Carrier Pipe: ASTM B88, Type "K" seamless Copper tubing.
10. Outer Jacket (1-1/2" and Smaller Pipe): Seamless PVC plastic outer jacket extruded from Type I, Grade I, polyvinyl chloride, per ASTM D1784. See Table 1 for minimum wall thickness.
11. Outer Jacket (2" Pipe): Seamless High Density Polyethylene (HDPE) per ASTM D1248 and D3350. Type III, Category 5, Class C. No overwrap or sprayed jacketing will be allowed. See Table 1 for minimum jacket thickness.
12. Insulation: Polyurethane foam completely filling annular space between carrier pipe and outer jacket. In-place density shall be 1.9 to 2.1 pcf, with a "K" factor of 0.1 BTU/ (hour) (square foot) (degrees F/in) at 73 degrees F, and a closed cell content of 90 percent. Exposed insulation at unit ends shall be sealed with a factory-applied end seal. Minimum 1-inch thick insulation (nominal).
13. End Seals: Factory installed water tight end seals by the fitting and pipe manufacturer. Suitable for service ad pressure of the system. Surfaces shall be smooth and free of voids. "Painted on" end seals are not allowed.

14. Fittings: ANSI B16.22 wrought copper fittings. Soldered joints shall be provided with silver solder or brazing alloys with melting points at or above 1,100 °F. Tin-lead solders, with melting points less than 1,100 °F, are not permitted.
 15. Field Joints: Carrier pipe ends shall be brazed, and insulated with pre-fabricated rigid insulating half shells covered by insulating jacket or injected insulation after installation of jacket. O-Ring fittings are not allowed.
 16. Preparation and installation of all field joints shall be observed and approved by pre-insulated pipe manufacturer's authorized representative and Project Inspector.
 17. Thrust Blocks: Suitably sized concrete thrust blocks shall be installed at changes in direction, both vertical and horizontal, changes in pipe size, dead ends, and valves.
 18. Anchors: Where indicated on Drawings, install anchor plates attached to the carrier pipe and sealed to pipe jacketing per pipe manufacturer's recommendations.
- A. Chilled Water, Condenser Water and Hot Water, 2-½-inch and Larger Pipe and Fittings: Underground chilled water, condenser water and hot water supply and return piping that are pre-insulated, prefabricated-pipe type, composed of integral sealed units of HDPE outer jacket, polyurethane foam insulation and schedule 40 seamless black steel carrier pipe manufactured by: Perma Pipe, Rovanco, Thermal Pipe Systems "Heat-Tite", Thermacor "Ferro-Therm", or equal.
1. Carrier Pipe: ASTM A53, Grade B, Schedule 40, seamless black steel pipe.
 2. Outer Jacket: Seamless High Density Polyethylene (HDPE) per ASTM D1248 and D3350. Type III, Category 5, Class C. No overwrap or sprayed jacketing will be allowed. Tape shall not be allowed to serve as a jacket. The HDPE jacket shall be pressure tested for watertight integrity. See Table 1 for minimum jacket thickness.
 3. Insulation: Polyurethane foam completely filling annular space between carrier pipe and outer jacket to a minimum thickness of 1 inch. In-place density shall be 1.9 to 2.1 0.14 BTU/ (hour) (square foot) degrees F/in) at 73 degrees F, and a closed cell content of 90 to 95 percent. Exposed insulation at unit ends shall be sealed with factory-applied end seal.
 4. End Seals: Furnish factory installed watertight end seals by the jacket and carrier pipe manufacturer suitable for services and pressure of the system. Surfaces shall be smooth and free of voids. "Painted on" end seals are not be allowed.
 5. Fittings: Factory fabricated and pre-insulated with polyurethane foam insulation. Insulation shall be protected with a HDPE jacket of same thickness and quality as that of straight units of pre-insulated pipe. Mitters on HDPE jacket at fittings shall be as strong as pipe outer jacket.
 6. Joints: Standard weight, seamless steel; welding fittings ASTM A234 and ANSI/ASME B16.9.
 7. Expansion Elbows and Loops: Prefabricated elbows, expansion loops and tees shall be furnished where expansion compensation is indicated on the Drawings. Pre-insulated fittings that must provide compensation for pipe expansion or contraction shall be installed in a suitably sized jacket and insulated with flexible polyurethane foam insulation. Straight units adjoining expansion fittings shall also be insulated with flexible polyurethane foam insulation to compensate for lateral

pipe movement. Expansion loops and elbows shall be properly designed in accordance with stress limits indicated by ANSI B31.1 Code for Pressure Piping.

8. Thrust Blocks: Suitably sized concrete thrust blocks shall be installed, when indicated on Drawings.
 9. Anchors: Prefabricated plate anchors shall be furnished where indicated on Drawings and shall consist of a steel plate welded to carrier pipe and sealed to outer jacket.
 10. Field Joints: Field joints between prefabricated units shall be installed in the following manner:
 - a. Split or full round HDPE sleeve shall be slid over end of unit before connection of carrier pipe. Connect carrier pipe and hydrostatically test as specified.
 - b. Center HDPE sleeves over joint area and hold in position with fiberglass tape, mix polyurethane foam components and pour into cavity according to instructions provided by manufacturer.
 - c. Trim cured polyurethane foam flush with jacket sleeve. Center heat-actuated shrink blanket over jacket sleeve and jacket of adjoining units to provide double layer protection. Using a soft orange flame from a propane torch, work flame from center toward one end, moving rapidly back and forth and around shrink blanket. Air pockets shall be removed and worked out from under shrink blanket. At field joints with expansion provisions, wrap pipe with flexible polyurethane foam insulation and hold in place with tape and complete joint in same manner per prior instructions.
 - d. Preparation and installation of field joints shall be observed and approved by the pre-insulated pipe manufacturer's authorized representative and the Project Inspector.
 11. Valves: Refer to Section 23 05 13: Basic HVAC Materials and Methods. Provide valve stem extension and valve boxes.
- B. Condensate Pipe and Fittings: Underground condensate return piping shall be pre-insulated, pre-fabricated pipe composed of integral sealed units of steel outer jacket, cellular glass or mineral wool insulation, and schedule 40 seamless black steel carrier pipe with welded joints as specified: Perma-Pipe MULTI-THERM 500, Rovanco Rhinocoat High Temp Conduit, Thermacor DUO-THERM "505", or equal.1. Outer Conduit: Welded steel casing. See Table 2 for minimum required wall thickness.
1. Outer Conduit Protection / Insulation:
 - a. 20 Mil Fusion bonded epoxy per ASTM D1763.
 - b. Interior surface of the outer conduit shall be corrosion resistant. Epoxy coating or other similar coating shall be installed.
 - c. One-inch Polyurethane Foam Insulation with 20 mil Fiberglass (FRP) Filament wound directly onto the foam insulation. The urethane foam shall meet ASTM C591, K = 0.14, density of 2 PCF and closed cell content of 90 to 95 percent.

- d. Cellular glass, mineral wool, or calcium silicate banded on carrier pipe with stainless steel band, K factor = 0.31 at 200 degrees F. Exposed insulation at unit ends shall be sealed with a factory-applied vapor barrier. Minimum 1 inch thick insulation (nominal).
- 2. Carrier Pipe:
 - a. ASTM A53, Grade B, schedule 40, seamless black steel pipe with beveled ends for welding.
- 3. End Seals: Shall consist of a steel bulkhead plated, welded to the outer jacket where there is no anchor within 5 feet of a thermal end, provide gland seals with packed stuffing box and gland follower mounted on a steel plate, welded to the end of the exposed jacket.
- 4. Fittings: Shall be factory fabricated and pre-insulated. Insulation shall be protected with a jacket of same thickness and quality as that of straight units of pre-insulated pipe.
- 5. Expansion Elbows and Loops: Prefabricated elbows, expansion loops and tees shall be furnished where expansion is required on the Drawings. Pre-insulated fittings that must provide compensation for pipe expansion or contraction shall be installed in a suitably sized jacket and insulated with flexible insulation to compensate for lateral pipe movement.
- 6. Thrust Blocks: Expansion loops and elbows shall be properly designed in accordance with stress limits indicated by ANSI B31.1 Code for Pressure Piping.
- 7. Anchors: Prefabricated plate anchors shall be furnished and shall consist of a steel plate welded to carrier pipe and to outer jacket.
- 8. Field Joints: Field joints shall be furnished only at straight sections. Preparation and installation of field joints shall be observed and approved by the pre-insulated pipe manufacturer's authorized representative and the Project Inspector.
 - a. Weld carrier pipe and hydrostatically test as specified.
 - b. Weld in place the outer jacket closure sleeve. Install the outer jacket protection/insulation. Seal the entire joint with a heat shrinkable sleeve.
 - c. Trim insulation flush with jacket sleeve.

2.2 MINIMUM THICKNESS OF HDPE JACKETS

TABLE 1	
Pipe Size (Inches)	Jacket Thickness (Inches)
2	0.070
2-1/2	0.070
3	0.080

4	0.080
5	0.100
6	0.100
8	0.120
10	0.120
12	0.170
14	0.200

2.3 MINIMUM WALL THICKNESS OF STEEL OUTER JACKET

TABLE 2	
Jacket Size (Inches)	Jacket Thickness (Gage)
6-26	10
28-36	6
38-42	4

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Refer to Section 23 05 13: Basic HVAC Materials and Methods.
- B. Refer to Section 23 20 13: HVAC Piping.
- C. Installation shall be in accordance with manufacturer's instructions.
- D. Manufacturer's technical representative shall provide the installing Contractor with on-site training and installer certification in the fusion welding methods, and the operation of fusion machines, as well as the proper handling of pipe and fittings.
- E. Individuals installing and welding or fusing pipe and fittings shall have been trained by the manufacturer, and shall certification documentation of that training.
- F. Inspections and Tests:
 - 1. Welding Inspection: In accordance with Section 23 05 13.
 - 2. Pressure Testing: In accordance with Section 23 05 13 and following:
 - a. Test at 200 psi. Maintain test pressure for at least 4 hours, observed by the Project Inspector, to prove tightness without leaks.

- b. Testing of fiberglass reinforced Polypropylene PP-RCT piping systems shall in accordance with the manufacturer's instruction.
 - 3. Field Joint Inspection:
 - a. Verify installation of insulation at all field joints. Installation of field applied insulation and jackets shall be observed by the Project Inspector.
 - 4. Video Recording of Underground Installation:
 - a. Prior to backfill, the CONTRACTOR shall video record the entire extent of the underground piping installation. The video recording shall also note depths, and locations of fittings.
 - b. The video recording shall be developed on a 12 cm, DVD disk, or Flash Drive. Provide three copies of the recording to the Project Inspector for approval by the ARCHITECT, prior to backfill.
 - c. Provide one copy of the recording within the underground piping "as-built" drawing submittal package.
- G. Backfill: For excavation, fill, import and export of materials refer to Section 31 23 23, Excavation and Fill for Utilities.
 - 1. Immediately after piping is installed in trench, a partial backfill shall be provided in middle of each unit leaving joints exposed for inspection before hydrostatic tests. After all thrust blocks are installed, a hydrostatic test shall be performed.
 - 2. After hydrostatic testing, final backfill of selected earth shall be hand-packed and hand-tamped to 12-inch minimum over top of jacket. Remainder of backfill shall be free of large boulders, rocks over 6-inch in diameter, frozen earth, or foreign matter. Do not furnish wheeled or tracked vehicles for tamping of backfill.
- H. Detectable Warning Tape: Provide and install detectable marking tape along buried piping per Section 23 05 53, HVAC Identification.

3.2 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose off of Project site.

3.3 PROTECTION

- A. Protect the Work of this Section until Substantial Completion.

3.4 DEMONSTRATION AND TRAINING

- A. The CONTRACTOR shall provide a minimum of two (2) hours of demonstration and training to District Maintenance and Operations Personnel covering the following items:
 - 1. Field joint preparation and installation.
 - 2. Installation of field applied insulation.

3. Installation and repair of Polypropylene PP-RCT pipe and fittings, and HDPE & PVC jackets.
4. Testing of installed field joints to ensure water tight installation.

END OF SECTION 23 20 16