AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
J	1		2

2. AMENDMENT/MODIFICATION NUMBER	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQUISITION NUMBER	5. PROJECT NUMBER *(If applicable)*
0002	23 JUL 2026		456277

6. ISSUED BY CODE W9126G

W076 ENDIST FT WORTH
KO CONTRACTING DIVISION, 819 TAYLOR ST BOX 17300
FORT WORTH, TX 76102-6124
UNITED STATES
CHRISTINE NORIEGA, EMAIL: CHRISTINE.NORIEGA@USACE.ARMY.MIL
TELEPHONE: (817) 886-1104

7. ADMINISTERED BY *(If other than Item 6)* CODE

SCD: PAS:

8. NAME AND ADDRESS OF CONTRACTOR *(Number, street, county, State and ZIP Code)*

CODE FACILITY CODE

(X)

☒ 9A. AMENDMENT OF SOLICITATION NUMBER
W9126G26RA028

9B. DATED *(SEE ITEM 11)*
22 JUN 2026

☐ 10A. MODIFICATION OF CONTRACT/ORDER NUMBER

10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☒ is extended. ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

SEE SECTION G - CONTRACT ADMINISTRATION DATA

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NUMBER AS DESCRIBED IN ITEM 14.

CHECK ONE	
☐	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NUMBER IN ITEM 10A.
☐	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation data, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
☐	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
☐	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ is not ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (*Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

Project: Basic Military Training (BMT), Dining and Classroom Facility (DCF) 4

See SF 30 Continuation Page

Proposal receipt date of August 4, 2026, at 2:00pm CT, is hereby changed to August 18, 2026, at 2:00pm CT.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*	16C. DATE SIGNED

SECTION SF 30 BLOCK 14 CONTINUATION PAGE
SUMMARY OF CHANGES
CHANGES TO SOLICITATION W9126G26RA028

CHANGES TO PROPOSAL RECEIPT DATE

1. Proposal Receipt Date: Change the proposal receipt date from "4 August 2026, 2:00 p.m. CT" to "18 August 2026, 2:00 p.m. CT ".

CHANGES TO THE SPECIFICATIONS

2. Added Sections: The following section has been added to the solicitation, bearing the notation W9126G26RA028-0002:

08 33 43	OVERHEAD COILING SMOKE CURTAINS FOR ELEVATOR DOORS
09 67 23.13	RESINOUS FLOORING

3. Replacement Sections: The following sections have been updated and replaced with the accompanying new sections of the same number and title bearing the notation W9126G26RA028-0002:

	PROJECT TABLE OF CONTENTS
	SUBMITTAL REGISTER
08 71 00	DOOR HARDWARE
22 00 00	PLUMBING, GENERAL PURPOSE
27 10 00	BUILDING TELECOMMUNICATIONS CABLING SYSTEM
31 00 00	EARTHWORK
33 71 02	UNDERGROUND ELECTRICAL DISTRIBUTION

4. Deleted Sections: The following section have been deleted from the solicitation:

09 67 23.14	CHEMICAL RESISTANT RESINOUS FLOORING

CHANGES TO THE DRAWINGS

5. Replacement Drawings: The drawings listed below are being replaced with the attached new drawings(s) of the same number, bearing the notation W9126G26RA028-0002:

D4-A-110 FIRST FLOOR INFO PLAN – AREA B
- Changed to semi-recessed fire extinguisher cabinet.

D4-A-112 SECOND FLOOR INFO PLAN – AREA B
- Changed to semi-recessed fire extinguisher cabinet.

D4-A-114 FIRST FLOOR REFLECTED CEILING PLAN – AREA A
- Added sheet note 11 regarding video wall in classrooms.

D4-A-115 FIRST FLOOR REFLECTED CEILING PLAN – AREA B
- Added sheet note 11 regarding video wall in classrooms.

D4-A-116 SECOND FLOOR REFLECTED CEILING PLAN – AREA A
- Added sheet note 11 regarding video wall in classrooms.

D4-A-117 SECOND FLOOR REFLECTED CEILING PLAN – AREA B
- Added sheet note 11 regarding video wall in classrooms.

D4-A-118 THIRD FLOOR REFLECTED CEILING PLAN
- Added sheet note 11 regarding video wall in classrooms. Added spot elevation.

D4-A-119 ROOF PLAN – AREA A
- Reversed gate swing at roof hatch access.

D4-A-307 CURVED PORCH WALL SECTIONS
- Added soffit panel information.

D4-A-404 STAIR A ENLARGED PLANS AND SECTIONS
- Removed perimeter drain. Adjusted callout arrows for clarity.

D4-A-406 STAIR C ENLARGED PLANS AND SECTIONS
- Removed perimeter drain.

D4-A-408 ELEVATOR PLANS AND SECTIONS
- Detail 2 - increase space in room 115 Elevator Equipment Room by moving the plan south wall further to the south. Added a fire extinguisher bracket. Detail 4 - Added additional callout descriptions to elevator pit.

D4-A-502 PARTITION TYPES AND DETAILS
- Added callouts to typical wall details.

D4-A-505 SECTION DETAILS
- Detail 2 removed 12" void space callout. Adjusted Detail 5 to better reflect void space in conjunction with structural drawings.

D4-A-506 SECTION DETAILS
- Added roof eave detail notes.

D4-A-510 CEILING DETAILS
- Provided additional information in Ceiling Details 6 and 8.

D4-A-601 DOOR SCHEDULE
- Multiple changes to door schedule.

D4-A-602 DOOR DETAILS
- Removed cased opening details.

D4-A-709 – EAST PANEL PARTIAL ELEVATION
- Added exhaust fan to Detail 1.

D4-C-100 CIVIL GENERAL NOTES, ABBREVIATIONS, AND LEGEND
- Added General Note 17 concerning coordination of temporary power with CPS Energy.

D4-CG401 SPOT ELEVATION PLAN
- Changed spot elevation at Point Number 40.

D4-CS401 SIDEWALK JOINT LAYOUT PLAN
- Removed the joint layout and revised the detail reference for a small portion of sidewalk.

D4-CS502 PAVING DETAILS II
- Revised low security wall section.

D4-CS505 CONSTRUCTION FENCE DETAILS

- Removed Fence Mounting on Concrete Barrier Details.

D4-CU220 SANITARY SEWER LINE A AND B PLAN AND PROFILE

- Identified sanitary sewer line responsibilities of privatized utility provider and removed associated profile information.

D4-CU221 SANITARY SEWER LINE C AND C1 PLAN AND PROFILE

- Identified sanitary sewer line responsibilities of privatized utility provider and removed associated profile information.

D4-CU222 SANITARY SEWER LINE D PLAN AND PROFILE

- Identified sanitary sewer line responsibilities of privatized utility provider and removed associated profile information.

D4-CU240 GAS LINE A PLAN AND PROFILE

- Identified gas line responsibilities of privatized utility provider and removed associated profile information.

D4-CU250 ELECTRICAL LINE A PLAN AND PROFILE

- Identified electrical line responsibilities of privatized utility provider and removed associated profile information.

D4-CU501 SANITARY SEWER DETAILS

- Removed details; responsibility of privatized utility provider.

D4-EG501 GROUNDING – LIGHTNING PROTECTION SYSTEM DETAILS

- Updated detail note concerning standing seam metal roof fasteners.

D4-EL101 FIRST FLOOR LIGHTING PLAN – AREA A

- Adjusted lighting in expanded Room 115 Elevator Equipment Room.

D4-EP100 CRAWL SPACE POWER PLAN

- Added receptacle for oil monitoring system.

D4-EP102 FIRST FLOOR POWER PLAN – AREA B

- Added power for VAV in Room 140. Added keynote regarding loading dock vehicle restraint system exterior indicator lights. Sanitary sewer line responsibilities of privatized utility provider and removed associated profile information.

D4-EP103 SECOND FLOOR POWER PLAN – AREA A

- Changed NEMA requirement in Keynote 8. Adjusted drawing for clarity.

D4-EP105 THIRD FLOOR POWER PLAN – AREA A

- Changed NEMA requirement in Keynote 8.

D4-EP401 ENLARGED ELECTRICAL POWER PLANS

- Adjusted equipment location to support expanded Room 115 Elevator Equipment Room. Updated mounting information in Keynotes 6 and 7. Added tray mounted locations.

D4-EP402 ENLARGED POWER PLANS

- Revised power plan in Room 149 (Can Wash) and added Keynote 12 with receptacle height note for hose reel.

D4-EP403 – ENLARGED POWER PLAN – KITCHEN AREA B1

- Revised power plan in Kitchen rooms 154, 155, and 156 to support mechanical equipment and hose reel.

D4-EP404 ENLARGED POWER PLAN – KITCHEN AREA B2

- Revised power plan to show VAVs. Deleted Keynote 3 and added Keynote 6.

D4-EP405 ENLARGED POWER PLAN – SERVING LINE 1 & 2 WAREWASH

- Revised power plan to show VAVs. Removed junction box. Deleted Keynote 2.

D4-EP406 ENLARGED POWER PLAN – SERVING LINE 3 & 4 WAREWASH

- Revised power plan to mechanical equipment. Removed junction box. Deleted Keynote 2.

D4-EP602 ELECTRICAL SCHEDULES

- Revised schedule for circulation pump and ERVs.

D4-EP602A ELECTRICAL SCHEDULES

- Added VAVs to schedule

D4-EP603 – ELECTRICAL SCHEDULES – KITCHEN & TRANSFORMER

- Updated schedule, primarily to support kitchen equipment, ventilation, and fire protection. Revised Note 13 and deleted Note 18.

D4-EP606 ELECTRICAL PANEL SCHEDULE – 1ST FLOOR

- Revised schedule for panel 1EKP21.

D4-EP608 ELECTRICAL PANEL SCHEDULES – 1ST FLOOR

- Revised schedules for panels 1KP27, 1KP28, and 1KP29.

D4-EP609 ELECTRICAL PANEL SCHEDULES – 1ST FLOOR

- Revised schedule for panel 1MP22.

D4-EP611 ELECTRICAL PANEL SCHEDULES – 2ND FLOOR

- Revised schedule for panel 2MP43.

D4-ES001 ELECTRICAL LEGEND AND ABBREVIATIONS

- Revised note regarding division of labor between contractor and CPS energy for medium voltage work.

D4-ES101 ELECTRICAL SITE PLAN

- Revised sheet to demonstrate contractor and CPS energy responsibilities.

D4-ES503 ELECTRICAL DETAILS

- Removed all details for work to be executed by CPS Energy.

D4-ES505 ELECTRICAL DETAILS

- Removed all details for work to be executed by CPS Energy.

D4-ES601 ELECTRICAL ONE-LINE DIAGRAM

- Removed one-line diagram for work to be executed by CPS Energy.

D4-FA001 FIRE ALARM – MASS NOTIFICATION LEGEND

- Updated carbon monoxide detector symbology.

D4-FA102 FIRST FLOOR FIRE ALARM – MASS NOTIFICATION PLAN - AREA B

- Updated carbon monoxide detector symbology.

DF-FA602 MASS NOTIFICATION MATRIX AND DETAILS

- Added mounting height note.

D4-G-103 WEST CAMPUS CONSTRUCTION AREA PLAN

- Added fence north of ATC5. Provided numerous updates to construction area, fencing, and mowing responsibilities.

D4-I-101 FIRST FLOOR FURNITURE PLAN

- Revised note to indicate reception desk is included in contract.

D4-I-102 SECOND FLOOR FURNITURE PLAN

- Revised detail note to clarify contractor responsibilities.

D4-I-103 THIRD FLOOR FURNITURE PLAN

- Corrected room numbers.

D4-I-104 FIRST FLOOR FINISH PLAN

- Improved plan hatching, added reference to specifications for elevator finishes.

D4-I-105 SECOND FLOOR FINISH PLAN

- Added reference to specifications for elevator finishes.

D4-I-107 FIRST FLOOR SIGNAGE PLAN

- Added multiple room signs at exterior doors.

D4-I-402 INTERIOR ELEVATIONS

- Added spacing dimension information.

D4-I-403 INTERIOR ELEVATIONS

- Added spacing dimension information.

D4-I-601 FINISH SELECTIONS

- Multiple changes to finishes.

D4-I-602 FINISH SCHEDULE

- Multiple changes to room finish schedule.

D4-I-603 FINISH SCHEDULE

- Multiple changes to room finish schedule.

D4-I-604 SIGNAGE TYPES

- Added Detail 2 for Sign Type H.

D4-M-100 OVERALL CRAWL SPACE – HVAC & HYDRONIC PLAN

- Added hydronic pipe location dimensions, utilidor section, Sheet note 3.

D4-M-101 FIRST FLOOR HVAC PLAN – AREA A

- Added duct sizes and tagging.

D4-M-102 FIRST FLOOR HVAC PLAN – AREA B

- Added duct sizes and tagging.

D4-M-104 SECOND FLOOR UNDER STAIRWELL HVAC PLAN

- Added duct and associated callouts that were missing from the Revit export. Return air radius elbow next to AHU-D4-1 changed to a square (miter) elbow to connect to the duct.

D4-M-401 ENLARGED MECHANICAL PLANS

- Added duct sizes and tagging and adjusted size of return duct above Office 139. Revised sheet note 4.

D4-M-501 MECHANICAL DETAILS

- Added vertically stacked coil detail with piping. Revised an existing detail to show stacked coils.

D4-M-601 MECHANICAL SCHEDULES

- Adjusted supply airflow and coil capacities on AHU schedule.

D4-M-602 MECHANICAL SCHEDULES

- Added wall caps.

D4-P-001 PLUMBING LEGEND, ABBREVIATIONS, AND GENERAL NOTES

- Updated General Note 24 regarding deconfliction of piping runs and structural elements.

D4-P-601 PLUMBING SCHEDULES

- Added Buy America Act (BAB) requirement to notes. Added pump schedule note concerning sump and sewage pump electrical requirements.

D4-P-908 PLUMBING ISOMETRICS

- Added callouts to isometric drawings.

D4-S-103 LOADING DOCK SCREEN WALL PLAN

- Added dimensions.

D4-S-110 SECOND FLOOR FRAMING PLAN – AREA A

- Added section markers.

D4-S-113 LOW ROOF FRAMING PLAN – AREA B

- Added marker for Section 14/D4-S-531.

D4-S-407 ENLARGED TOILET PARTITION SUPPORTS

- Added structural section and details.

D4-S-521 TYPICAL STEEL FRAMING DETAILS

- Revised Detail 16 to terminate beam at roofline.

D4-S-531 STEEL DETAILS

- Added section for Beam to Post Connection.

D4-TN401 ENLARGED TELECOMMUNICAITONS ROOM PLANS AND ELEVATIONS

- Removed CATV equipment note.

D4-TN601 FIRST FLOOR TELCOMMUNICATINOS RISER DIAGRAM

- Moved power from bottom to top of communications racks.

D4-TN602 SECOND FLOOR TELCOMMUNICATINOS RISER DIAGRAM

- Moved power from bottom to top of communications racks.

D4-TN603 THIRD FLOOR TELCOMMUNICATINOS RISER DIAGRAM

- Moved power from bottom to top of communications racks.

D4-TS501 COMMUNICATIONS MANHOLE DETAILS

- Changed bonding ribbon dimension on Detail 1, Section A-A.

End of Summary of Changes

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APPENDIX

APPENDIX A JUSTIFICATION & APPROVAL

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SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Lackland DCF4

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 30 00	SD-01 Preconstruction Submittals															
			View Location Map	1.4														
			Progress and Completion	1.5														
			Pictures															
			Field Office Overhead	1.8														
			Field Office Overhead	1.8.1														
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			Periodic Schedule Update	3.6.2	G													
		01 33 00	SD-01 Preconstruction Submittals															
			Submittal Register	1.8	G													
		01 33 29	SD-01 Preconstruction Submittals															
			Preliminary High Performance	1.5.3.2	G													
			and Sustainable Building Checklist															
			Sustainability Action Plan	1.4.1	G													
			Preliminary Sustainability	1.5.3.2	G													
			eNotebook															
			SD-11 Closeout Submittals															

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		01 33 29	Final High Performance and	1.5.3.2	G													
			Sustainable Building Checklist															
			Final Sustainability eNotebook	1.5.3.2	G													
			Amended Final Sustainability	1.5.3.2	G													
			eNotebook															
			Amended Final High	1.5.3.2	G													
			Performance and Sustainable															
			Building Checklist															
			Third Party Certification	3.2	G													
			Certificate, Assessment, or															
			Validation and Compliance Report															
		01 35 13.30 00	SD-01 Preconstruction Submittals															
			Digital Photos															
			SD-02 Shop Drawings															
			Surveys															
			ESRI File Geodatabase															
			Maps															
		01 35 26	SD-01 Preconstruction Submittals															
			Accident Prevention Plan (APP)	1.8	G													
			SD-06 Test Reports															
			Accident Reports	1.12.2	G													
			LHE Inspection Reports	1.12.3														
			Monthly Exposure Reports	1.5	G													
			SD-07 Certificates															
			Activity Hazard Analysis (AHA)	1.9	G													
			Certificate of Compliance	1.12.4														

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 35 26	Hot Work Permit	1.13														
			License Certificates	1.14														
			Portable Gauge Operations	1.14.1	G													
			Planning Worksheet															
			Radiography Operation Planning	1.14.1	G													
			Work Sheet															
			Standard Lift Plan	1.12.4	G													
		01 45 00	SD-01 Preconstruction Submittals															
			Contractor Quality Control (CQC)	1.5.2	G													
			Plan															
			SD-06 Test Reports															
			Verification Statement	1.12.3														
			SD-07 Certificates															
			Certificate Of Readiness	1.6.6.1	G													
		01 45 35	SD-01 Preconstruction Submittals															
			Written NDT Practices	3.1.2														
			SD-06 Test Reports															
			Daily Reports	3.1.2														
			Biweekly Reports	3.1.1														
			SD-07 Certificates															
			AISC Certified Steel Fabricator	2.1														
			Steel Joist Institute Membership	2.1														
			Certified Plant	2.1														
			Certificate of Compliance	2.1														
			Special Inspector	1.5	G													
			SD-11 Closeout Submittals															

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		01 45 35	Interim Report	3.1.2	G													
			Comprehensive Final Report	3.1.2	G													
		01 52 00.00 44	SD-03 Product Data															
			Government Field Office	2.1	G													
		01 56 00	SD-01 Preconstruction Submittals															
			Dust Control	3.1	G													
			Products and Procedures	2.1	G													
			SD-02 Shop Drawings															
			Recordkeeping	1.7														
		01 57 20	SD-01 Preconstruction Submittals															
			ENVIRONMENTAL	1.6	G													
			PROTECTION PLAN															
			Fish and Wildlife Protection		G													
			Measures															
			Environmental Permit		G													
			Asbestos Work Plans		G													
			Asbestos Certifications		G													
			Asbestos Transporter License		G													
			Asbestos Medical clearances		G													
			Asbestos Training Certificates		G													
			Asbestos TDSHS License		G													
			Unsigned copy of State		G													
			Renovation															
			Unsigned Demolition Notifications		G													
			Edwards Aquifer Protection Plan		G													
			Lead Work Plans		G													

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		01 57 20	Lead Occupant Protection Plan		G													
			Texas Department of State		G													
			Health Services Lead Licenses															
			Lead Notifications		G													
			Acknowledgement Of Api Std 650		G													
			Aboveground Piping Systems		G													
			Stormwater Pollution Prevention	1.5.4	G													
			Plan															
			Equipment Inventory List		G													
			Waste Disposal Plan		G													
			Construction Tpdes Notice Of		G													
			Intent And Site Notices															
			Construction Site Notice Or		G													
			Notice Of Intent															
			Hazardous Waste Management		G													
			Plan															
			Integrated Solid Waste		G													
			Management Plan															
			Hazardous Material List		G													
			Emergency Response Plan		G													
			And/Or Site Specific Spill															
			Prevention Response Plan															
			Summary Transmittal Letter	1.5.2	G													
			SD-03 Product Data															
			Safety Data Sheets (SDS) For All		G													
			Materials															

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		01 57 20	SD-06 Test Reports															
			Commercial Facility Lead		G													
			Contaminated Waste Shall Be															
			Characterized, Profiled, And															
			Manifested															
			Return Manifests And Weight		G													
			Tickets															
			Monthly Diversion And Landfill		G													
			Reports															
			Any Asbestos Inspection Reports		G													
			That Were Not Included In The															
			Original Assessment Or As A															
			Result To A Change In The Sow															
			Or Found As Unknown And															
			Unforseen Discoveries During Any															
			Phase Of He Project															
			Asbestos Inspection Reports That		G													
			Have Not Been Provided By The															
			Area Specific Env Office															
			Lead Based Paint Reports -Not		G													
			Included In Original Assessment															
			Or Results In Change Of Sow															
			Lead Inspection Reports- Not		G													
			Provided By JBSA Env Office or															
			by licensed Lead Inspector															
			OSHA Air Monitoring		G													

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		01 57 20	Lead OSHA Negative Exposure		G													
			Assessment															
			Asbestos Air Monitoring reports		G													
			Lead Air Monitoring reports		G													
			Analytical Results	3.6.1.6	G													
			SD-07 Certificates															
			Certificate Of Training Asbestos		G													
			Certificate Lead Training		G													
			EPA Lead Training Or Lead		G													
			Awareness Training (Min 8Hr)															
			Stormwater Notice Of Change		G													
			SD-11 Closeout Submittals															
			Notice Of Termination		G													
		01 57 23	SD-01 Preconstruction Submittals															
			Storm Water Pollution Prevention	1.3.2	G													
			Plan															
			Storm Water Notice of Intent	1.3.2	G													
			SD-06 Test Reports															
			Erosion and Sediment Controls	1.3														
			SD-07 Certificates															
			Mill Certificate or Affidavit	2.1.3														
		01 57 24.01 44	SD-01 Preconstruction Submittals															
			Storm Water Pollution Prevention	3.5.7	G													
			Plan															
			Notice of Termination	3.13	G													
		01 58 00	SD-02 Shop Drawings															

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		01 58 00	Preliminary One Line		G													
			Sign Legend Orders	1.3.1	G													
		01 74 19	SD-01 Preconstruction Submittals															
			Construction Waste Management	1.7	G													
			Plan															
			SD-06 Test Reports															
			Monthly Reporting															
			Quarterly Reports	1.9.2														
			Annual Report	1.9.3														
			SD-11 Closeout Submittals															
			Final Construction Waste	1.10	S													
			Diversion Report															
		01 78 00	SD-02 Shop Drawings															
			Preliminary Record Drawings	1.5.1														
			Final Record Drawings	1.5.1.1														
			Final Record Drawings	1.5.1.2														
			SD-03 Product Data															
			Warranty Management Plan	1.9.1														
			Warranty Tags	1.9.5														
			Spare Parts Data	1.7														
			warranty report	1.9.4														
			Inventory of Contractor Furnished															
			and Insttalled Equipment															
			Inventory of Government															
			Furnished Contractor Insttalled															
			Equipment (GF/CI)															

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		01 78 00	video	3.6.1.1														
			Red Zone Meeting	3.6.5														
			SD-08 Manufacturer's Instructions															
			Instructions	1.9.1														
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.6	G													
			Manuals															
			SD-11 Closeout Submittals															
			As-Built Drawings	3.1	G													
			Record Drawings	3.3	G													
			Record Model	2.2	G													
			As-Built Record of Equipment	3.5														
			and Materials															
			Warranted Equipment and	1.9.1														
			Materials															
			Final Approved Shop Drawings	3.4	G													
			Certification of EPA Designated		G													
			Items															
			Certification Of USDA Designated	2.3	G													
			Items															
			Interim DD FORM 1354	3.8.1	G													
			High Performance and	3.8.2	G													
			Sustainable Building (HPSB)															
			Checklist															

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		01 78 00	List Of Installed Building	3.8.2														
			Equipment Items For DD Form															
			1354															
			Checklist For Form Dd1354	3.8														
		01 78 23	SD-10 Operation and Maintenance															
			Data															
			Training Plan	3.1.1	G													
			Training Outline	3.1.3	G													
			Training Content	3.1.2	G													
			Operation And Maintenance	3.2.1	G													
			Manual, Progress Submittal															
			Operation And Maintenance	3.2.2	G													
			Manual, Prefinal Submittal															
			Operation And Maintenance	3.2.3	G													
			Manual, Final Submittal															
			SD-11 Closeout Submittals															
			Training Video Recording	3.1.4	G													
			Validation of Training Completion	3.1.6	G													
			Training Plan	3.1.1	G													
			Record Drawings And Utility	1.6.6.7	G													
			Systems															
		01 91 00.15 10	SD-01 Preconstruction Submittals															
			Commissioning Firm	1.8	G	DO												
			Lead Commissioning Specialist	1.8.1	G	DO												
			Technical Commissioning	1.8.2	G	DO												
			Specialists															

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		01 91 00.15 10	Commissioning Firm's Contract	1.8	G	DO												
			SD-06 Test Reports															
			Interim Construction Phase	3.1.2.1	G	DO												
			Commissioning Plan															
			Final Construction Phase	3.1.2.2	G	DO												
			Commissioning Plan															
			Template Building Envelope	3.1.2.1.2	G	DO												
			Inspection Checklists															
			Building Envelope Inspection	3.1.5.2	G	DO												
			Checklists															
			Pre-Functional Checklists	3.1.5.3	G	DO												
			Issues Log	1.10														
			Commissioning Report	3.2	G	DO												
			SD-07 Certificates															
			Certificate of Readiness	1.11	G	DO												
			SD-10 Operation and Maintenance															
			Data															
			Training Plan	3.1.6	G	RO												
			Training Attendance Rosters	3.1.6	G	RO												
			Systems Manual	3.1.7	G	DO												
			SD-11 Closeout Submittals															
			Final Commissioning Report	3.2	S	DO												
			Final Construction Phase	3.1.2.2	S													
			Commissioning Plan															
		03 30 00	SD-01 Preconstruction Submittals															
			Quality Control Plan	1.6.6	G													

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		03 30 00	Quality Control Personnel	1.6.7	G													
			Certifications															
			Laboratory Accreditation	1.6.9	G													
			Maturity Method Data	3.3.10														
			SD-02 Shop Drawings															
			Reinforcing Steel	1.6.2.1	G													
			SD-03 Product Data															
			Joint Sealants	2.4.5														
			Joint Filler	2.4.4														
			Formwork Materials	2.1														
			Cementitious Materials	2.3.1														
			Vapor Barrier	2.4.6														
			Concrete Curing Materials	2.4.1														
			Reinforcement	2.6														
			Liquid Chemical Floor Hardeners	2.4.3.1														
			and Sealers															
			Admixtures	2.3.4														
			Mechanical Reinforcing Bar	2.6.2														
			Connectors															
			Waterstops	2.2.2														
			Local/Regional Materials	1.8.1														
			Finishing Plan	1.6.3.2														
			Nonshrink Grout	2.4.2														
			SD-05 Design Data															
			Concrete Mix Design	1.6.1.1	G													
			SD-06 Test Reports															

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		03 30 00	Concrete Mix Design	1.6.1.1	G													
			Pozzolan	1.2														
			Pozzolan	1.7.1														
			Pozzolan	2.3.1.2														
			Pozzolan	2.3.1.2														
			Pozzolan	2.3.1.3														
			Pozzolan	2.3.1.3														
			Pozzolan	2.5.2.4														
			Pozzolan	2.5.2.4														
			Aggregates	1.6.4.1														
			Tolerance Report	3.10.2.1														
			Compressive Strength Tests	3.13.3.3	G													
			Air Content	3.13.3.4														
			Slump Tests	3.13.3.1														
			Water	2.3.2														
			SD-07 Certificates															
			Reinforcing Bars	2.6.1														
			Welder Qualifications	1.9														
			Safety Data Sheets	1.6.3.3														
			Field Testing Technician and	1.6.7.2														
			Testing Agency															
			SD-08 Manufacturer's Instructions															
			Liquid Chemical Floor Hardeners	2.4.3.1														
			and Sealers															
			Joint Sealants	2.4.5														
			Curing Compound	2.4.1														

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		03 41 33	SD-02 Shop Drawings															
			Fabrication Drawings	2.1	G													
			Installation Drawings	2.1	G													
			SD-05 Design Data															
			Normal-Weight Concrete	2.1.1.1	G													
			SD-06 Test Reports															
			Normal-Weight Concrete Air	1.3.4.2	G													
			Content															
			Air Entrainment for	1.3.4.2	G													
			Normal-Weight Concrete															
			Normal-Weight Concrete	2.1.1.1	G													
			Compressive Strength															
			Design Mix	1.3.4.2	G													
			Unit Weight	1.3.4.2	G													
			Anchorages	2.3.3.5														
			Nondestructive Testing	3.3.6.1	G													
			SD-07 Certificates															
			Qualifications for Welding Work	1.3.3	G													
			Installers	1.3.2														
			Manufacturer	1.3.1	G													
			Pretensioning	2.2.7	G													
			Detensioning	2.2.16	G													
			Welding Procedures	1.3.3	G													
			SD-08 Manufacturer's Instructions															
			Installation Instructions	1.3.3														

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		03 41 33	Welding Sequence and	1.3.3														
			Procedure															
			Epoxy-Resin Grout	2.3.5														
			Epoxy-Resin Adhesive	2.3.5														
		03 45 00	SD-01 Preconstruction Submittals															
			Pre-Installation Meeting	1.12.5														
			SD-02 Shop Drawings															
			Precast Drawings	1.12.1														
			SD-03 Product Data															
			Cast-In Embedded Items And	2.4	G													
			Connectors															
			Connection Devices	2.4.2	G													
			Admixtures	2.3.6														
			SD-04 Samples															
			Concrete Wall Panel Surface	1.12.3	G													
			Finish															
			Mock-up	1.12.4														
			Full Size Sample Wall Panel	1.12.3														
			SD-05 Design Data															
			Design Calculations	1.5.5														
			Concrete Mix Design	2.2.1	G													
			Repair of Surface Defects	2.5.9														
			Moisture and Thermal	1.5.6	G													
			Performance Calculations															
			SD-06 Test Reports															
			Strength Tests	1.11.2	G													

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		03 45 00	Slump	1.11.2														
			Air Content	1.11.1														
			Air Content	1.11.2														
			Test for Concrete Materials	1.11.1														
			Water	2.3.7														
			Testing Precast Units for Strength	3.6.4														
			SD-07 Certificates															
			Manufacturer's Qualifications	1.4	G													
			Fabricator Quality Certifications	1.8.1														
			Erector Certification	1.9														
			Erector's Post Audit Declaration	1.10														
			SD-08 Manufacturer’s Instructions															
			Installation	3.3	G													
			Cleaning	3.8	G													
			SD-11 Closeout Submittals															
			Recycled Content for Fly Ash and	2.3.1	S													
			Pozzolan															
		04 20 00	SD-02 Shop Drawings															
			Detail Drawings	3.4.1.1	G													
			SD-03 Product Data															
			Hot Weather Procedures	1.5.1	G													
			Cold Weather Procedures	1.5.2	G													
			SD-04 Samples															
			Mock-Up Panel	1.3.1.1	G													
			Clay or Shale Brick	2.2.2	G													

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		04 20 00	Glazed Structural Clay Facing	2.2.3.4	G													
			Tile															
			Concrete Masonry Units (CMU)	2.2.3.2	G													
			SD-05 Design Data															
			Masonry Compressive Strength	2.1.2	G													
			Fire-Rated Concrete Masonry	2.2.3.3														
			Units															
			Bracing Calculations	3.2.5	G													
			SD-06 Test Reports															
			Efflorescence Test	2.2.2.1.4														
			Fire-Rated Concrete Masonry	2.2.3.3														
			Units															
			Field Testing of Mortar	3.6.1.1	G													
			Field Testing of Grout	3.6.1.2	G													
			SD-10 Operation and Maintenance															
			Data															
			Take-Back Program	3.8														
		05 05 23.13 10	SD-01 Preconstruction Submittals															
			Personnel Qualification	1.4.1	G													
			Procedure description	2.1.1	G													
			SD-03 Product Data															
			Equipment and accessories	2.1.1														
			SD-06 Test Reports															
			Equipment Qualifications	1.4.5														
			Inspection Test Reports	3.4.1														
		05 05 23.16	SD-01 Preconstruction Submittals															

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		05 05 23.16	Welding Quality Assurance Plan	3.2	G													
			SD-03 Product Data															
			Welding Procedure Qualifications	1.3	G													
			Welder, Welding Operator, and	1.3.4														
			Tacker Qualification															
			Previous Qualifications	1.3.2														
			Pre-Qualified Procedures	1.3.3	G													
			Welding Electrodes and Rods	2.2														
			SD-06 Test Reports															
			Nondestructive Testing	3.3														
			Weld Inspection Log	3.2														
			SD-07 Certificates															
			Certified Welding Inspector	1.3.5														
			Nondestructive Testing Personnel	1.3.5														
		05 12 00	SD-02 Shop Drawings															
			Fabrication Drawings	1.4.2	G													
			SD-03 Product Data															
			Shop Primer	2.6.2														
			Welding Electrodes and Rods	2.4.1														
			Direct Tension Indicator Washers	2.3.2.3														
			Non-Shrink Grout	2.4.2														
			Tension Control Bolts	2.3.3														
			SD-06 Test Reports															
			Class B Coating	2.6.2														
			Bolts, Nuts, and Washers	2.3														
			Weld Inspection Reports	3.7.1.2														

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		05 12 00	Direct Tension Indicator Washer	3.7.2.1														
			Inspection Reports															
			Bolt Testing Reports	3.7.3.1														
			SD-07 Certificates															
			Steel	2.2														
			Bolts, Nuts, and Washers	2.3														
			Galvanizing	2.5														
			AISC Structural Steel Fabricator	1.3														
			Quality Certification															
			Welding Procedures and	1.4.3.1														
			Qualifications															
			Welding Electrodes and Rods	2.4.1														
			Certified Welding Inspector	3.7.1.1														
			NDT Technician	3.7.1.2														
			Welding Procedure Specifications	3.4														
			(WPS)															
		05 21 00	SD-01 Preconstruction Submittals															
			Welder Qualification	1.3.2														
			SD-02 Shop Drawings															
			Steel Joist Framing	1.3.1	G													
			SD-03 Product Data															
			Recycled Content Of Steel	2.3	S													
			Products															
			SD-05 Design Data															
			Design Calculations	2.2	G													
			SD-06 Test Reports															

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		05 21 00	Erection Inspection	3.3														
			Welding Inspections	3.3														
			SD-07 Certificates															
			Certification of Compliance	1.3.2														
		05 30 00	SD-02 Shop Drawings															
			Fabrication Drawings	1.3.5	G													
			SD-03 Product Data															
			Accessories	2.2														
			Deck Units	2.1														
			Galvanizing Repair Paint	2.1.6														
			Mechanical Fasteners	2.2.17														
			Touch-Up Paint	2.1.6														
			Welding Rods and Accessories	1.3.3														
			SD-04 Samples															
			Metal Roof Deck Units	2.1.1														
			Flexible Closure Strips	2.2.4														
			SD-05 Design Data															
			Deck Units	2.1	G													
			SD-07 Certificates															
			Powder-Actuated Tool Operator	1.3.2														
			Fire Safety	1.3.4.1														
			Wind Storm Resistance	1.3.4.2														
			Manufacturer's Certificate	1.3.1														
		05 40 00	SD-02 Shop Drawings															
			Framing Components	1.5.1	G													
			SD-03 Product Data															

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		05 40 00	Studs, Joists	2.1														
			SD-07 Certificates															
			Welds	3.1.1														
		05 50 13	SD-02 Shop Drawings															
			Bollards/Pipe Guards	2.3	G													
			Roof Hatches	2.4	G													
			SD-03 Product Data															
			Roof Hatches	2.4	G													
		05 51 00	SD-02 Shop Drawings															
			Iron and Steel Hardware	2.1	G													
			Steel Shapes, Plates, Bars, and	2.1	G													
			Strips															
			Metal Stair System	2.2.1	G													
			SD-03 Product Data															
			Tread Plank	2.2.2.5	G													
			Landing Floor Plank	2.2.2.5	G													
			SD-07 Certificates															
			Welding Procedures	1.3.1	G													
			Welder Qualification	1.3.1	G													
			SD-08 Manufacturer’s Instructions															
			Tread	2.2.3	G													
			Landing Floor Plank	2.2.2.5	G													
		05 51 33	SD-02 Shop Drawings															
			Ladders	2.3														
			SD-03 Product Data															
			Ladders	2.3														

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		05 51 33	Ladder Safety Devices	2.3.2														
			SD-07 Certificates															
			Fabricator Certification for Ladder	1.3														
			Assembly															
			Fabricator Certification for Ships	1.3														
			Ladder Assembly															
		05 52 00	SD-02 Shop Drawings															
			Fabrication Drawings	1.2.1	G													
			Steel Shapes, Plates, Bars and	1.2.1	G													
			Strips															
			SD-03 Product Data															
			Anchorage and Fastening	1.2.1	G													
			Systems															
			SD-07 Certificates															
			Welding Procedures	1.4.1	G													
			Welder Qualification	1.4.2	G													
			SD-08 Manufacturer's Instructions															
			Installation Instructions	3.2	G													
		06 10 00	SD-02 Shop Drawings															
			Trussed Rafters	2.4.2	G													
			Trussed Joists	2.4.3	G													
			Fabricated Structural Members	1.9.1	G													
			Modifications of Structural	1.9.2	G													
			Members															
			Nailing Strips	2.2.1	G													
			SD-03 Product Data															

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		06 10 00	Fire-Retardant Treatment	1.8														
			Oriented Strand Board	2.3														
			Adhesives	2.4.6														
			SD-05 Design Data															
			Modifications of Structural	1.9.2	G													
			Members															
			SD-06 Test Reports															
			Preservative-treated	1.4.3														
			SD-07 Certificates															
			Certificates of Grade	1.11.1														
			Certified Sustainably Harvested	2.2.1	S													
			Framing Lumber															
			Preservative Treatment	1.7														
			Indoor Air Quality for Aerosol	2.4.6	S													
			Adhesives															
		06 41 16.00 10	SD-02 Shop Drawings															
			Shop Drawings	2.11														
			Installation	3.1														
			SD-03 Product Data															
			Wood Materials	2.1														
			Wood Finishes	2.9														
			Finish Schedule	2.11.8.3														
			Certification	1.5.2														
			SD-04 Samples															
			Plastic Laminates	2.3														
			Cabinet Hardware	2.6														

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		06 41 16.00 10	SD-07 Certificates															
			Quality Assurance	1.5														
			Laminate Clad Casework	2.9														
			Laminate Clad Casework	3.1														
			SD-11 Closeout Submittals															
			Guiding Principles	1.3														
			Documentation															
		06 61 16	SD-02 Shop Drawings															
			Installation	3.1	G													
			SD-03 Product Data															
			Solid Polymer	2.1.1	G													
			Indoor air quality for solid surface	2.2.2	S													
			seam and sealant products															
			SD-04 Samples															
			Material	2.1	G													
			Counter Tops	2.3.5	G													
			SD-06 Test Reports															
			Test Report Results	2.1.1														
			SD-07 Certificates															
			Qualifications	1.4.1														
			Indoor Air Quality for solid	2.1.1	S													
			surface fabrication products															
			SD-10 Operation and Maintenance															
			Data															
			Solid Polymer	2.1.1	G													
		07 05 23	SD-01 Preconstruction Submittals															

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		07 05 23	Work Plan	1.4	G													
			SD-03 Product Data															
			Thermal Imaging Camera	2.2	G													
			SD-05 Design Data															
			Envelope Surface Area	3.2	G													
			Calculations															
			SD-07 Certificates															
			Pressure Test Agency	1.6.2.1														
			Thermographer Qualifications	1.6.2.2														
			Test Instruments	1.6.3														
			Date Of Last Calibration	1.6.3														
			SD-06 Test Reports															
			Pressure Test Procedures	3.5	G													
			Air Leakage Test Report	1.6.4	G													
			Air Leakage Test Report	3.5.6	G													
			Diagnostic Test Report	1.6.4	G													
			Diagnostic Test Report	3.6.5	G													
		07 13 53	SD-03 Product Data															
			Manufacturer's Standard Details	1.3	G													
			Elastomeric Waterproofing Sheet	2.2	G													
			Material															
			Protection Board	2.5	G													
			Primers, Adhesives, and Mastics	1.4	G													
			Primers, Adhesives, and Mastics	2.2	G													
			SD-06 Test Reports															

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		07 13 53	Elastomeric Waterproofing Sheet	2.2	G													
			Material															
			Field Quality Control	3.6	G													
			Protective Covering	3.7	G													
			SD-07 Certificates															
			Elastomeric Waterproofing Sheet	2.2														
			Material															
			Primers, Adhesives, and Mastics	1.4	G													
			Primers, Adhesives, and Mastics	2.2	G													
			Protective Coverings	1.4	G													
			Special Warranties	1.8	G													
			Special Warranties	1.8	G													
			Certificates Of Compliance	2.1.1	G													
			Certificates Of Compliance	2.1.2	G													
			SD-08 Manufacturer's Instructions															
			Primers, Adhesives, and Mastics	1.4	G													
			Primers, Adhesives, and Mastics	2.2	G													
			SD-11 Closeout Submittals															
			Certificates Of Compliance	2.1.1	G													
			Certificates Of Compliance	2.1.2	G													
		07 14 10	SD-03 Product Data															
			Waterproof Flooring Surfacing	2.1														
			System															
			Solvent	3.6														
			Moisture meter	3.7.1														
			SD-04 Samples															

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		07 14 10	Color	3.3.1	G													
		07 17 00	SD-03 Product Data															
			Bentonite Materials	2.1	G													
			Bentonite Panels	2.1.3	G													
			Accessories	1.3	G													
			SD-08 Manufacturer’s Instructions															
			Application	3.2														
			Protection	3.3														
			Corrections	3.5	G													
		07 21 13	SD-03 Product Data															
			Manufacturer's Standard Details	1.3	G													
			Block or Board Insulation	2.1	G													
			Vapor Retarder	2.2	G													
			Vapor Retarder	2.2	G													
			Vapor Retarder	3.1	G													
			Vapor Retarder	3.6.1	G													
			Pressure Sensitive Tape	2.2	G													
			Protection Board or Coatings	1.4	G													
			Accessories	2.4	G													
			Recycled Content for Block or	2.1.4	S													
			Board Insulation															
			SD-07 Certificates															
			Block or Board Insulation	2.1	G													
			Vapor Retarder	2.2	G													
			Vapor Retarder	2.2	G													
			Vapor Retarder	3.1	G													

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		07 21 13	Vapor Retarder	3.6.1	G													
			Protection Board or Coating	2.3	G													
			Special Warranties	1.8	G													
			Special Warranties	1.8	G													
			Indoor Air Quality For Block Or	2.1.5	S													
			Board Insulation															
			SD-08 Manufacturer's Instructions															
			Block or Board Insulation	2.1														
			Adhesive	2.4.1														
		07 21 16	SD-03 Product Data															
			Blanket Insulation	2.1														
			Recycled Content for Insulation	2.1.2	S													
			Materials															
			Accessories	2.2														
			SD-07 Certificates															
			Indoor Air Quality for Adhesives	2.2.1	S													
			SD-08 Manufacturer's Instructions															
			Insulation	3.1.1														
		07 22 00	SD-02 Shop Drawings															
			Insulation Board Layout	1.3	G													
			Verification of Existing Conditions	1.3	G													
			SD-03 Product Data															
			Insulation	2.1	G													
			Cover Board	1.4	G													
			Fasteners	2.3	G													
			Recycled Content For Insulation	2.1.2	S													

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		07 22 00	SD-06 Test Reports															
			Flame Spread Rating	1.7.1	G													
			SD-07 Certificates															
			Installer Qualifications	1.6	G													
			Certificates Of Compliance For	1.6	G													
			Felt Materials															
			SD-08 Manufacturer's Instructions															
			Fasteners	2.3	G													
			Insulation	2.1	G													
		07 26 16	SD-03 Product Data															
			material	2.1	G													
			SD-06 Test Reports															
			material	2.1														
			SD-08 Manufacturer's Instructions															
			Installation	3.2														
		07 27 10.00 10	SD-02 Shop Drawings															
			Air Barrier System Shop	2.1	G													
			Drawings															
			SD-03 Product Data															
			Air Barrier System Product Data	2.1	G													
			SD-04 Samples															
			Mock-Up	3.1.2	G													
			Material Samples For Air Barrier	2.1	G													
			System															
			SD-05 Design Data															

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		07 27 10.00 10	Design Data And Calculations	1.8	G													
			For The Air Barrier System															
			SD-06 Test Reports															
			Design Review Report	1.8	G													
			Testing and Inspection	3.1.3	G													
			SD-07 Certificates															
			Air Barrier Inspector	1.7	G	RO												
		07 27 26	SD-01 Preconstruction Submittals															
			Qualifications of Manufacturer	1.8.1	G													
			Qualifications of Installer	1.8.2	G													
			SD-02 Shop Drawings															
			Fluid-Applied Membrane Air	1.4	G													
			Barrier															
			SD-03 Product Data															
			Fluid-Applied Membrane Air	1.4	G													
			Barrier															
			Transition Membrane	2.3	G													
			Primers, Adhesives, and Mastics	2.2	G													
			Reinforcement	2.6	G													
			Safety Data Sheets	1.4.2	G													
			SD-04 Samples															
			Mockup	1.4.3	G													
			SD-06 Test Reports															
			Capillary Moisture Test	1.4.4	G													
			Field Peel Adhesion Test	1.4.4	G													

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		07 27 26	Flame Propagation of Wall	1.4.4	G													
			Assemblies															
			Flame Spread and Smoke	1.4.4	G													
			Developed Index Ratings															
			Site Inspections	3.4.1	G													
			SD-07 Certificates															
			Fluid-Applied Membrane Air	1.4	G													
			Barrier															
			Transition Membrane	2.3	G													
			SD-08 Manufacturer's Instructions															
			Fluid-Applied Membrane Air	1.4	G													
			Barrier															
			Transition Membrane	2.3	G													
			Primers, Adhesives, and Mastics	2.2	G													
		07 27 36	SD-01 Preconstruction Submittals															
			Qualification of Manufacturer	1.10.1	G													
			Qualification of Installer	1.10.2	G													
			Quality Control Plan	1.11	G													
			Safety Plan	1.11	G													
			Fire Prevention Plan	1.9.1	G													
			Respirator Plan	1.9.2	G													
			SD-03 Product Data															
			Closed Cell	2.1.2	G													
			Transition Membrane	2.2	G													
			Primers, Adhesives, and Mastics	2.3	G													
			Sealants	2.5	G													

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		07 27 36	Safety Data Sheets	1.5.2	G													
			Thermal Barrier Materials	2.1.1	G													
			Ignition Barrier Coatings	1.12.3	G													
			Ignition Barrier Coatings	2.1.1	G													
			Accessories	2.1.6	G													
			Recycled Content for Closed Cell	2.1.2	S													
			Spray Foam Air Barrier															
			Blowing Agent	2.1.5														
			SD-04 Samples															
			Spray Foam Air Barrier	1.5	G													
			SD-06 Test Reports															
			Field Peel Adhesion Test	1.5.4	G													
			Thermographic Test	3.4.5.1	G													
			Air Barrier Test	1.8	G													
			Primers	1.5.3	G													
			Fire-Ratings Of Thermal and	1.5.4	G													
			Ignition Barrier Materials															
			Flame Spread And Smoke	1.5.4	G													
			Developed Index Ratings Of SPF															
			Products															
			Site Inspections	3.4.1	G													
			SD-07 Certificates															
			Indoor Air Quality for Spray Foam	2.1.5	S													
			Air Barrier															
			SD-08 Manufacturer's Instructions															

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		07 27 36	SPF Handling, Storage, and	1.6.1	G													
			Spray Procedures															
			Substrate Preparation	3.2.1	G													
			Thermal Barrier	1.5.1	G													
			Ignition Barrier	1.5.1	G													
			Transition Membrane	2.2	G													
			Primers, Adhesives, and Mastics	2.3	G													
			SD-09 Manufacturer's Field															
			Reports															
			Core Samples	1.11														
			Daily Work Record	3.3.3														
			Visual Inspection and Thermal	3.4.5														
			Scanning															
		07 41 13	SD-02 Shop Drawings															
			Roofing Panels	1.4.5	G													
			Flashing and Accessories	1.4.5	G													
			Gutter/Downspout Assembly	1.4.5	G													
			SD-03 Product Data															
			Roof Panels	2.1	G													
			Factory-Applied Color Finish	1.4.5	G													
			Accessories	2.4	G													
			Fasteners	1.4.5	G													
			Pressure Sensitive Tape	1.4.5	G													
			Underlayments	2.7	G													
			Gaskets and Sealing/Insulating	2.8	G													
			Compounds															

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		07 41 13	Coil Stock	1.4.5	G													
			Enamel Repair Paint	1.4.5	G													
			SD-04 Samples															
			Roof Panels	2.1	G													
			Factory-applied Color Finish	1.4.5	G													
			Accessories	2.4	G													
			Fasteners	1.4.5	G													
			Gaskets and Sealant/Insulating	1.4.5	G													
			Compounds															
			SD-05 Design Data															
			Engineering Calculations	1.4.6	G													
			Wind Uplift Resistance	1.2.1.2	G													
			SD-06 Test Reports															
			Leakage Test Report	1.2.1.1	G													
			Wind Uplift Test Report	1.2.1.2	G													
			Factory Finish and Color	2.2	G													
			Performance Requirements															
			SD-07 Certificates															
			Roof Panels	2.1	G													
			Coil Stock Compatibility	1.4.5	G													
			Self-Adhering Modified Bitumen	2.7.1	G													
			Polymer Film Underlayment															
			Qualification of Manufacturer	1.4.1	G													
			Qualification of Applicator	1.4.2	G													
			SD-08 Manufacturer's Instructions															
			Insulation	2.6	G													

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		07 41 13	Installation Manual	1.4.5	G													
			SD-09 Manufacturer’s Field															
			Reports															
			Manufacturer's Field Inspection	3.10.1	G													
			Reports															
			SD-11 Closeout Submittals															
			Warranties	1.8	G													
			Information Card	3.11	G													
		07 42 13	SD-01 Preconstruction Submittals															
			Qualification of Manufacturer	1.5.3	G													
			Qualification of Installation	1.5.4	G													
			Contractor															
			Warranty	1.8	G													
			SD-02 Shop Drawings															
			Installation Drawings	1.5.1.1	G													
			SD-03 Product Data															
			Wall Panels	1.2	G													
			Factory Color Finish	2.2.4														
			SD-04 Samples															
			Wall Panels	1.2	G													
			Metal Closure Strips	1.5.1	G													
			Metal Closure Strips	2.5.1	G													
			SD-05 Design Data															
			Wind load design analysis	1.5.1.2	G													
			SD-06 Test Reports															
			Leakage Tests	3.7.2	G													

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		07 42 13	Coating	2.2.4.2	G													
			Chalking	2.2.4.2	G													
			SD-08 Manufacturer’s Instructions															
			Installation	3.3	G													
			SD-09 Manufacturer’s Field															
			Reports															
			Manufacturer's Field Reports	3.8.1	G													
			SD-11 Closeout Submittals															
			Warranty	1.8	G													
			Maintenance Instructions	1.5.6	G													
			20 year 'No Dollar Limit' warranty	1.8.1														
			for labor and material															
		07 54 19	SD-02 Shop Drawings															
			Detail Drawings	1.6	G													
			Roof Plan	1.6	G													
			SD-03 Product Data															
			PVC Roofing Membrane	3.2.2	G													
			Energy Star Label for roof	2.1.2	S													
			membrane															
			Bonding Adhesive	2.1.5														
			Flashing	1.5.4														
			Flashing	3.2.2.2														
			Membrane Fasteners and Plates	2.1.8														
			Roof Insulation	2.1.11														
			Pre-Manufactured Accessories	2.1.9														
			Information Card	2.1.1														

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		07 54 19	SD-05 Design Data															
			Wind Uplift Resistance	1.3.2	G													
			SD-07 Certificates															
			Qualification of Manufacturer	1.5.1	G													
			Qualifications of Applicator	1.5.2	G													
			Qualification of Engineer of	1.5.3														
			Record															
			Wind Uplift Resistance	1.3.2	G													
			Fire Resistance	1.3.1	G													
			Minimum Polymer Thickness	2.1.1	G													
			Minimum Polymer Thickness	2.1.7	G													
			Sample	1.10	G													
			SD-08 Manufacturer’s Instructions															
			Application Method	3.2	G													
			Membrane Flashing	2.1.7	G													
			Membrane Flashing	3.3.2	G													
			Perimeter Attachment	3.2.4														
			Auxiliary Fasteners	2.1.8.2														
			Pre-Manufactured Accessories	2.1.9														
			Cold Weather	1.8	G													
			SD-11 Closeout Submittals															
			Warranty	1.10	G													
			Information Card	2.1.1														
			Instructions to Government	3.8	G													
			Personnel															
		07 60 00	SD-02 Shop Drawings															

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		07 60 00	Exposed Sheet Metal	2.2.1	G													
			Gutters	3.1.16	G													
			Downspouts	3.1.17	G													
			Expansion Joints	3.1.23	G													
			Gravel Stops and fascia	2.2.1	G													
			Splash Pans	3.1.19	G													
			Base Flashing	3.1.11	G													
			Counterflashing	3.1.12	G													
			Flashing at Roof Penetrations	3.1.24	G													
			and Equipment Supports															
			Reglets	2.2.10	G													
			Copings	3.1.27	G													
			Drip Edges	3.1.15	G													
			Conductor Heads	3.1.18	G													
			Open Valley Flashing	3.1.20	G													
			Eave Flashing	3.1.21	G													
			Recycled Content	2.1	S													
			SD-04 Samples															
			Finish Samples	1.4.2	G													
			SD-08 Manufacturer’s Instructions															
			Instructions for Installation	1.4.3	G													
			Quality Control Plan	3.5	G													
			SD-10 Operation and Maintenance															
			Data															
			Cleaning and Maintenance	1.4.3	G													
		07 81 00	SD-03 Product Data															

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		07 81 00	Fireproofing Material	3.3	G													
			SD-06 Test Reports															
			Fire Resistance Rating	1.2.2	G													
			SD-07 Certificates															
			Installer Qualifications	1.4.1	G													
		07 84 00	SD-02 Shop Drawings															
			Firestopping System	2.1	G													
			SD-03 Product Data															
			Firestopping Materials	2.2	G													
			SD-06 Test Reports															
			Inspection	3.3	G													
			SD-07 Certificates															
			Inspector Qualifications	1.5.2														
			Firestopping Materials	2.2														
			Installer Qualifications	1.5.1	G													
		07 92 00	SD-03 Product Data															
			Sealants	2.1	G													
			Primers	2.3	G													
			Bond Breakers	2.4	G													
			Backstops	2.5	G													
			Field Adhesion	3.1	G													
			SD-07 Certificates															
			Indoor Air Quality For Interior	2.1.1	S													
			Sealants															
			Indoor Air Quality For Interior	2.1.3	S													
			Floor Joint Sealants															

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		07 92 00	Indoor Air Quality For Interior	2.1.4	S													
			Acoustical Sealants															
		08 11 13	SD-02 Shop Drawings															
			Doors	2.1	G													
			Doors	2.1	G													
			Frames	2.5	G													
			Frames	2.5	G													
			Accessories	2.3														
			SD-03 Product Data															
			Doors	2.1	G													
			Recycled Content for Steel Door	2.1	S													
			Product															
			Frames	2.5	G													
			Accessories	2.3														
		08 11 16	SD-02 Shop Drawings															
			Door and Frame Assembly	1.5.1	G													
			SD-03 Product Data															
			Door and Frame Assembly	1.5.1	G													
			Recycled Content of Aluminum	2.2.3	S													
			Material															
			Air Infiltration	1.2.2	G													
			Water Penetration	1.2.3	G													
			NFRC Project Label Certificates	1.2.4	G													
			for Fenestration															
			SD-08 Manufacturer's Instructions															
			Door and Frame Assembly	1.5.1	G													

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		08 11 16	Adjustments, Cleaning, and	1.5.3	G													
			Maintenance															
			NFRC Project Label Certificates	1.2.4	G													
			for Fenestration															
		08 22 20	SD-02 Shop Drawings															
			Doors	2.1.1.5	G													
			Frames	2.1.1.5	G													
			Weather-stripping	1.2.1	G													
			Smoke Seals	1.2.1	G													
			SD-03 Product Data															
			Doors	2.1.1.5	G													
			Frames	2.1.1.5	G													
			Door Hardware Components and	1.2.1	G													
			Accessories															
			Weather-stripping	1.2.1	G													
			Smoke Seals	1.2.1	G													
			SD-07 Certificates															
			Sample Warranty	1.2.1	G													
			Warranty	3.4.1	G													
		08 31 00	SD-02 Shop Drawings															
			Access Doors And Panels	1.3	G													
			SD-03 Product Data															
			Access Doors And Panels	1.3	G													
			Hardware	1.3.2	G													
			Accessories	2.2.8	G													
			Recycled Content	2.1	S													

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		08 31 00	SD-04 Samples															
			Finishes	2.5	G													
			SD-06 Test Reports															
			Fire-rating(s) of Assemblies	1.3.1	G													
			Acoustical Ratings of Assemblies	1.3.1	G													
		08 33 23	SD-02 Shop Drawings															
			Overhead Coiling Doors	2.2.1	G													
			Counterbalancing Mechanism	2.2.3	G													
			Electric Door Operators	2.2.4	G													
			Guides	2.1.1.1	G													
			Hood	2.2.2.2	G													
			Installation Drawings	2.1.1.1	G													
			SD-03 Product Data															
			Overhead Coiling Doors	2.2.1	G													
			Hardware	2.2.2	G													
			Counterbalancing Mechanism	2.2.3	G													
			Electric Door Operators	2.2.4	G													
			Recycled content for steel curtain	2.2.1.1	S													
			slats															
			SD-05 Design Data															
			Overhead Coiling Doors	2.2.1	G													
			Hardware	2.2.2	G													
			Electric Door Operators	2.2.4	G													
			Fire-Rated Door	1.3	G													
			SD-10 Operation and Maintenance															
			Data															

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		08 33 23	Operation and Maintenance	1.3.2	G													
			Manuals															
			SD-11 Closeout Submittals															
			Warranty	1.3.1	G													
		08 33 43	SD-01 Preconstruction Submittals															
			Warranty Information	1.10														
			SD-02 Shop Drawings															
			shop drawings	3.1														
			SD-03 Product Data															
			Substrate	3.1														
			Substrate	3.1														
			Installation Means and Methods	3.3														
			Storage and Handling	1.8														
		08 41 13	SD-01 Preconstruction Submittals															
			Sample Warranty	1.2.1	G													
			List of Product Installations	1.2.1	G													
			SD-02 Shop Drawings															
			Installation Drawings	3.3	G													
			Fabrication Drawings	2.2														
			SD-03 Product Data															
			Manufacturer's Catalog Data	1.2.1	G													
			Finish	2.2.3	G													
			Recycled Content of Aluminum	2.1.1.2	S													
			Material															
			SD-04 Samples															
			Finish and Color Samples	1.2.1	G													

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		08 41 13	SD-06 Test Reports															
			Certified Test Reports	1.2.1	G													
			Deflection	3.4.3														
			Air Infiltration	3.4.1														
			Condensation Resistance and	3.4.4														
			Thermal Transmittance															
			Water Infiltration	3.4.5														
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Instructions	3.3														
			SD-11 Closeout Submittals															
			Manufacturer's Product Warranty	3.6														
		08 44 00	SD-02 Shop Drawings															
			Glazed Curtain Wall System	1.6	G													
			Fire Rated Curtain Wall	1.4.4.4	G													
			SD-03 Product Data															
			Glazed Curtain Wall System	1.6	G													
			SD-06 Test Reports															
			Field Water Spray Test Results	1.5.1	G													
			Air Infiltration Test Results	1.5.2	G													
			Water Penetration Test Results	1.5.2.1	G													
			SD-07 Certificates															
			Energy Performance Certificates	1.4.4.6	G													
			Qualifications for the Curtain-Wall	1.4.2	G													
			Installer															
			SD-08 Manufacturer’s Instructions															
			Glazed Curtain Wall System	1.6	G													

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		08 44 00	Insulating Glass	3.3.8	G													
			SD-11 Closeout Submittals															
			Warranty	1.8	G													
		08 51 13	SD-02 Shop Drawings															
			Windows	2.1	G													
			Fire Rated Windows	2.1.5	G													
			Fabrication Drawings	1.6														
			SD-03 Product Data															
			Windows	2.1	G													
			Fire Rated Windows	2.1.5	G													
			Recycled Content of Aluminum	2.1	S													
			Windows															
			Hardware	2.2.7.1	G													
			Window Performance	1.7	G													
			Thermal-Barrier Windows	2.3	G													
			Screens	2.2.10	G													
			Weatherstripping	2.1.8	G													
			Accessories	2.2.7	G													
			Adhesives	2.2.3														
			Thermal Performance	1.7.5	G													
			Energy Star Label For Residential	1.7.5	S													
			Aluminum Window Products															
			SD-04 Samples															
			Finish Sample	1.3.4.1														
			SD-05 Design Data															

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		08 51 13	Structural Calculations for	2.1	G													
			Deflection															
			Design Analysis	1.3.5	G													
			SD-06 Test Reports															
			Minimum Condensation	2.1														
			Resistance Factor															
			SD-07 Certificates															
			Engineer's Qualifications	1.3.3														
			SD-10 Operation and Maintenance															
			Data															
			Windows	2.1	G													
		08 71 00	SD-02 Shop Drawings															
			Manufacturer's Detail Drawings	1.3	G													
			Hardware Schedule	1.5	G													
			Keying System	2.3.7	G													
			SD-03 Product Data															
			Hardware Items	2.3	G													
			SD-08 Manufacturer’s Instructions															
			Installation	3.1														
			SD-10 Operation and Maintenance															
			Data															
			Hardware Schedule	1.5	G													
			SD-11 Closeout Submittals															
			Key Bitting	1.6.1														
		08 81 00	SD-03 Product Data															
			Insulating Glass	2.3														

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		08 81 00	Glazing Accessories	1.3														
			Fire Rated Glass	1.4														
			Fire Rated Glass Framing	2.2.7														
			SD-11 Closeout Submittals															
			Insulated Glass Units	1.7.1														
		08 91 00	SD-02 Shop Drawings															
			Wall Louvers	1.4														
			SD-03 Product Data															
			Metal Wall Louvers	2.2														
		09 22 00	SD-03 Product Data															
			Metal Support Systems	2.1														
			Recycled Content for Metal	2.1	S													
			Support Systems															
		09 29 00	SD-03 Product Data															
			Cementitious Backer Units	2.1.3														
			Glass Mat Covered or Reinforced	2.1.2														
			Gypsum Sheathing															
			Glass Mat Covered or Reinforced	2.1.2.1														
			Gypsum Sheathing Sealant															
			Gypsum Board	2.1.1														
			VOC Content of Joint Compound	2.1.4	S													
			SD-07 Certificates															
			Asbestos Free Materials	2.1	G													
			Indoor Air Quality for Gypsum	2.1.1	S													
			Board															

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		09 29 00	Indoor Air Quality for Non-aerosol	2.1.6	S													
			Adhesives															
			Indoor Air Quality for Aerosol	2.1.6	S													
			Adhesives															
			SD-10 Operation and Maintenance															
			Data															
			Manufacturer Maintenance	2.1														
			Instructions															
		09 51 00	SD-03 Product Data															
			Recycled Content for Type III	2.2.1.1	S													
			Ceiling Tiles															
			Recycled Content for Suspension	2.3	S													
			Systems															
			Acoustical Performance	2.1.1	G													
			SD-04 Samples															
			Acoustical Units	2.2	G													
			Acoustical Ceiling Tiles	2.2.1.1	G													
			SD-07 Certificates															
			Indoor Air Quality for Type III	2.2.1.1	S													
			Ceiling Tiles															
			Indoor Air Quality for Adhesives	2.5	S													
		09 65 00	SD-02 Shop Drawings															
			Resilient Flooring and	2.6	G													
			Accessories															
			SD-03 Product Data															

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		09 65 00	Resilient Flooring and	2.6	G													
			Accessories															
			Adhesives	2.4														
			Vinyl Composition Tile	2.1														
			Recycled content for Vinyl	2.1	S													
			Composition Tile															
			Luxury Vinyl Tile	3.6														
			Luxury Vinyl Tile	3.6														
			Wall Base	2.2														
			Stair Treads, Risers and	2.3														
			Stringers															
			SD-04 Samples															
			Resilient Flooring and	2.6	G													
			Accessories															
			SD-06 Test Reports															
			Moisture, Alkalinity and Bond	3.3	G													
			Tests															
			SD-07 Certificates															
			Indoor Air Quality for Vinyl	2.1	S													
			Composition Tile															
			Indoor Air Quality for Wall Base	2.2	S													
			Indoor Air Quality for Adhesives	2.4	S													
			SD-08 Manufacturer’s Instructions															
			Surface Preparation	3.2	G													
			Installation	3.1	G													

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		09 65 00	SD-10 Operation and Maintenance															
			Data															
			Resilient Flooring and	2.6	G													
			Accessories															
		09 67 23.13	SD-02 Shop Drawings															
			Installation Drawings	2.1	G													
			Fabrication Drawings															
			SD-03 Product Data															
			Manufacturer's Catalog Data	1.2.2	G													
			SD-04 Samples															
			Hardboard Mounted Epoxy	1.5.3	G													
			Flooring															
			Floor Topping	3.1.5	G													
			Mockups	1.5.1	G													
			SD-05 Design Data															
			Design Mix Data	1.2.3	G													
			SD-07 Certificates															
			Listing of Product Installations	1.5.2														
			Referenced Standards	1.5														
			Certificates															
			SD-11 Closeout Submittals															
			Warranty	1.6	G													
		09 68 00	SD-03 Product Data															
			Carpet	2.1	G													
			Carpet Cushion	2.3	G													
			Recycled Content for Carpeting	2.1.1	S													

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		09 68 00	Recycled Content for Rubber	2.3.2	S													
			Cushion															
			Indoor Air Quality for Aerosol	2.4	S													
			Adhesives															
			Indoor Air Quality for Non-Aerosol	2.4	S													
			Adhesives															
			Indoor Air Quality for Concrete	2.4	S													
			Primer															
			SD-04 Samples															
			Carpet	2.1	G													
			Carpet Cushion	2.3	G													
			SD-06 Test Reports															
			Moisture and Alkalinity Tests	3.2	G													
			SD-07 Certificates															
			Indoor Air Quality for Carpet	2.1.2	S													
			Indoor Air Quality for Fiber	2.3.1	S													
			Cushion															
			Indoor Air Quality for Rubber	2.3.2	S													
			Cushion															
			SD-08 Manufacturer’s Instructions															
			Surface Preparation	3.1														
			SD-10 Operation and Maintenance															
			Data															
			Cleaning and Protection	3.5														
			Maintenance Service	3.7.2														
			SD-11 Closeout Submittals															

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		09 68 00	Warranty	1.6														
		09 84 20	SD-02 Shop Drawings															
			Approved Detail Drawings	2.2	G													
			SD-03 Product Data															
			Installation	3.2														
			Acoustical Wall Panels	2.2	G													
			SD-04 Samples															
			Acoustical Wall Panels	2.2	G													
			SD-07 Certificates															
			Acoustical Wall Panels	2.2														
			SD-11 Closeout Submittals															
			Warranty	1.4														
		09 90 00	SD-02 Shop Drawings															
			Piping Identification	3.9														
			SD-03 Product Data															
			Coating	2.1	G													
			Product Data Sheets	2.1														
			Sealant	3.2.5														
			SD-04 Samples															
			Color	2.2	G													
			Textured Wall Coating System	1.6.7	G													
			Sample Textured Wall Coating	1.6.8	G													
			System Mock-Up															
			SD-07 Certificates															
			Qualification Testing	1.6.6.2	G													

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		09 90 00	Indoor Air Quality for Paints and	1.6.5														
			Primers															
			Indoor Air Quality for	1.6.5														
			Consolidated Latex Paints															
			SD-08 Manufacturer’s Instructions															
			Mixing	2.1														
			Manufacturer's Safety Data	1.8.1														
			Sheets															
			SD-10 Operation and Maintenance															
			Data															
			Coatings	2.1	G													
		09 96 59	SD-03 Product Data															
			High-Build Glaze Coatings	2.1.5														
			SD-04 Samples															
			High-Build Glaze Coatings	2.1.5	G													
			Coating System	2.1.5	G													
			SD-06 Test Reports															
			Filler Material	2.1.1														
			Primers	2.1.2														
			Top Coating	2.1.3														
			SD-07 Certificates															
			Qualifications of Installer	1.5														
			SD-08 Manufacturer’s Instructions															
			Wall Coating System	2.1														
		10 11 00	SD-02 Shop Drawings															
			Placement Schedule	3.1	G													

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		10 11 00	SD-03 Product Data															
			Visual Display Unit	1.2	G													
			Visual Display Unit	2.1	G													
			Projection Screen	2.4	G													
			SD-04 Samples															
			Fabric	2.1	G													
			Glass	2.1	G													
			Glass	2.2.1	G													
			SD-07 Certificates															
			Indoor air quality for	2.2.1	S													
			markerboards															
			Indoor air quality for tackboards	2.3	S													
			Indoor air quality for projection	2.4	S													
			screen															
			Certificate of Compliance	1.2														
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Cleaning	3.3														
			Instructions															
			Manufacturer's Printed	3.2	G													
			Installation Instructions															
		10 14 00.20	SD-02 Shop Drawings															
			Detail Drawings	1.4.2	G													
			SD-03 Product Data															
			Room Identification And	2.1	G													
			Directional Signage System															
			Stair Signage	2.2	G													

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		10 14 00.20	Exit Door Tactile Sign	2.3	G													
			Building Directories	2.4	G													
			Door Tags	2.5	G													
			SD-04 Samples															
			Interior Signage	1.4.1	G													
			Room Identification And	2.1	G													
			Directional Signage System															
			Stair Signage	2.2	G													
			Exit Door Tactile Sign	2.3	G													
			Building Directories	2.4	G													
			Door Tags	2.5	G													
			SD-10 Operation and Maintenance															
			Data															
			Approved Manufacturer's	3.1	G													
			Instructions															
			Protection and Cleaning	3.1.2	G													
		10 21 13	SD-02 Shop Drawings															
			Fabrication Drawings	2.1														
			Installation Drawings	3.2	G													
			SD-03 Product Data															
			Cleaning and Maintenance	2.1														
			Instructions															
			Colors And Finishes	2.9														
			Anchoring Devices and Fasteners	2.2.2														
			Hardware and Fittings	2.2.4														
			Brackets	2.2.3														

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		10 21 13	Door Hardware	2.2.5														
			Toilet Enclosures	2.3.1														
			Urinal Screens	2.1														
			Pilaster Shoes	2.7														
			Finishes	2.2.4.2	G													
			Finishes	2.9.2	G													
			SD-04 Samples															
			Colors and Finishes	2.9	G													
			Hardware and Fittings	2.2.4														
			Anchoring Devices and Fasteners	2.2.2														
			SD-07 Certificates															
			Warranty	1.6														
		10 26 00	SD-02 Shop Drawings															
			Corner Guards	2.2	G													
			Wall Guards	2.3	G													
			SD-03 Product Data															
			Corner Guards	2.2	G													
			Wall Guards	2.3	G													
			Recycled content for steel	2.2.1	S													
			component of corner guards															
			Recycled content for aluminum	2.3	S													
			component of wall guards,															
			Combination Handrail/Wall guard															
			and handrails															
			Recycled content for aluminum	2.3.1	S													
			component of crash rail locators															

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		10 26 00	SD-04 Samples															
			Corner Guards	2.2	G													
			Wall Guards	2.3	G													
			SD-06 Test Reports															
			Fire Resistance Rating	2.1.1.2														
			SD-10 Operation and Maintenance															
			Data															
			Corner Guards	2.2	G													
			Wall Guards	2.3	G													
		10 28 13	SD-02 Shop Drawings															
			Product Schedule	2.1	G													
			SD-03 Product Data															
			Recycled content for stainless	2.1	S													
			steel toilet accessories															
			Item A5080	2.1.3	G													
			Item A5084	2.1.4	G													
			Item A5109	2.1.5	G													
			Item A5110	2.1.6	G													
			Item A5135	2.1.7	G													
			Item A5200	2.1.8	G													
			SD-10 Operation and Maintenance															
			Data															
			Item A5080	2.1.3	G													
			Item A5084	2.1.4	G													
			Item A5109	2.1.5	G													
			Item A5110	2.1.6	G													

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		10 28 13	Item A5135	2.1.7	G													
			Item A5200	2.1.8	G													
		10 44 16	SD-02 Shop Drawings															
			Cabinets	Part 2	G													
			SD-03 Product Data															
			Fire Extinguishers	2.1.1	G													
			Accessories	Part 2	G													
			Cabinets	Part 2	G													
			Wall Brackets	2.2.2	G													
			SD-07 Certificates															
			Fire Extinguishers Certifications	2.1.1	G													
			Manufacturer's Warranty with	1.4	G													
			Inspection Tag															
		10 51 13	SD-02 Shop Drawings															
			Types	2.1	G													
			Location	1.4	G													
			Installation	3.1														
			Numbering system	3.2														
			SD-03 Product Data															
			Material	2.2														
			Locking Devices	2.3.1														
			Handles	2.3.4														
			Finish	2.2.3														
			components	2.3														
			Assembly	3.1														
			SD-04 Samples															

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		10 51 13	Color chips	1.5.1	G													
		10 52 00	SD-02 Shop Drawings															
			Location	1.3	G													
			Installation	3.1														
			SD-03 Product Data															
			Finish	2.1.2														
			Assembly	3.1														
			SD-04 Samples															
			Color chips	1.4.1	G													
		11 13 00	SD-02 Shop Drawings															
			Dock Bumpers	2.1.3	G													
			Restraining Device,	2.2.1														
			Detail Drawings	1.3.1	G													
			SD-03 Product Data															
			Dock Bumpers	2.1.3	G													
			Restraining Device	2.2.1	G													
			SD-10 Operation and Maintenance															
			Data															
			Operating and Maintenance	3.5	G													
			Instructions															
			Restraining Device	2.2.1	G													
		11 40 00	SD-02 Shop Drawings															
			Shop Drawings	2.2.27	G													
			Shop Drawings	2.2.27	G													
			Rough-in Drawings	2.2.20														
			SD-03 Product Data															

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		11 40 00	Equipment List	2.6.11	G													
		12 48 13	SD-02 Shop Drawings															
			Installation Drawings	3.2	G													
			Detail Drawings	3.2	G													
			SD-03 Product Data															
			Entrance Floor Mats and Frames	2.1.1	G													
			Adhesives and Concrete Primers	2.1.2	G													
			SD-04 Samples															
			Entrance Floor Mats and Frames	2.1.1	G													
			Custom Graphics	2.1.1	G													
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Instructions	3.2														
			SD-10 Operation and Maintenance															
			Data															
			Protection, Maintenance, and	3.2														
			Repair Information															
		12 50 00.13 10	SD-01 Preconstruction Submittals															
			Storage Location	1.7.3	G													
			SD-02 Shop Drawings															
			Installation Drawings	3.3.1	G													
			Wire Management Locations	3.3.1	G													
			SD-03 Product Data															
			Product Data	2.3	G													
			Product Style Options	2.3	G													
			SD-04 Samples															
			Fabric and Finishes	2.3.3	G													

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		12 50 00.13 10	SD-07 Certificates															
			Authorized Dealer	1.6	G													
			Certified Furniture Installers	1.6	G													
			Manufacturer's Certification	2.3	G													
			Warranty	1.8	G													
			SD-10 Operation and Maintenance															
			Data															
			Furniture, Data Package 1	3.5	G													
			SD-11 Closeout Submittals															
			Energy Efficient Equipment	2.1.1	S													
			Reduced VOC's for Furniture	2.1.2	S													
			Recycled Content of Furniture	2.1.3	S													
			Bio-Based Content of Furniture	2.1.4	S													
		12 65 00	SD-02 Shop Drawings															
			Detailed Drawings	3.1	G													
			SD-03 Product Data															
			Installation	3.1														
			Local/Regional Materials	2.1														
			SD-04 Samples															
			Seating and Table Systems	3.1	G													
			Training Table	2.3	G													
			SD-07 Certificates															
			Recyclable Materials	2.1														
			SD-10 Operation and Maintenance															
			Data															
			Assembly Manuals	2.5														

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		12 65 00	Maintenance Manuals	3.2														
			SD-11 Closeout Submittals															
			Adhesives	1.4														
			Fresh Paint	1.4														
		14 24 23	SD-02 Shop Drawings															
			Elevator	2.1	G													
			Elevator Components	1.2.1	G													
			Elevator Components	1.2.2	G													
			Elevator Machine	1.2.1	G													
			Elevator Controller	1.2.1	G													
			Wiring Diagrams	1.3.4	G													
			SD-03 Product Data															
			Elevator	2.1	G													
			Elevator Components	1.2.1	G													
			Elevator Components	1.2.2	G													
			Data Sheets	1.2.2	G													
			Elevator Microprocessor	2.5.2	G													
			Controller															
			SD-05 Design Data															
			Emergency Power Systems	1.2.3.3														
			Heat Loads	1.2.3.2														
			Reaction Loads	1.2.3.1														
			SD-07 Certificates															
			Price Lists	1.3.2	G													
			Warranty	1.4														
			Endorsement Letter	1.3.1.1														

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		14 24 23	Welders' Qualifications	1.2.4														
			Elevator Controller Certification	2.5.2.3	G													
			SD-10 Operation and Maintenance															
			Data															
			Elevator	2.1	G													
			Maintenance Control Program	1.2.5	G													
			(MCP)															
			Software and Documentation	2.5.2.2	G													
		21 12 00	SD-02 Shop Drawings															
			Standpipe System	1.4.5	G													
			SD-03 Product Data															
			Pipe and Fittings	2.1.1	G													
			Mechanical Couplings	2.1.1														
			Pipe Hangers and Supports	2.1.2	G													
			Valves	2.1.3	G													
			Valve Tamper Switch	2.1.9	G													
			SD-06 Test Reports															
			Preliminary Tests	3.6.1	G													
			Acceptance Tests	3.6.2	G													
			SD-07 Certificates															
			Qualifications of Installer	1.6.1	G													
			SD-11 Closeout Submittals															
			System As-Built Drawings	1.6.2	G													
		21 13 13	SD-01 Preconstruction Submittals															
			Qualified Fire Protection Engineer	1.2.3	G													
			(QFPE)															

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		21 13 13	Sprinkler System Designer	1.4.2.1	G													
			Sprinkler System Installer	1.4.2.2	G													
			SD-02 Shop Drawings															
			Shop Drawing	1.2.1.1	G													
			SD-03 Product Data															
			Pipe	2.2.1	G													
			Fittings	2.3.1.2	G													
			Valves	2.3.4	G													
			Relief Valves	2.8.4	G													
			Sprinklers	2.7	G													
			Pipe Hangers and Supports	2.3.3	G													
			Sprinkler Alarm Switch	2.4.1	G													
			Valve Supervisory (Tamper)	2.4.2	G													
			Switch															
			Backflow Prevention Assembly	2.5	G													
			Air Vent	2.8.5	G													
			Nameplates	2.1.2	G													
			SD-05 Design Data															
			Hydraulic Calculations	1.2.1.2	G													
			SD-06 Test Reports															
			Test Procedures	3.9.1	G													
			SD-07 Certificates															
			Verification of Compliant	3.9.2.1	G													
			Installation															
			Request for Government Final	3.9.2.2	G													
			Test															

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		21 13 13	SD-10 Operation and Maintenance															
			Data															
			Operating and Maintenance	3.11	G													
			(O&M) Instructions															
			Spare Parts	1.6	G													
			SD-11 Closeout Submittals															
			As-built drawings	3.11	G													
		22 00 00	SD-03 Product Data															
			Fixtures	2.5	G													
			Flush Valve Water Closets	2.5.3	G													
			Flush Valve Urinals	2.5.4	G													
			Lavatories	2.5.6	G													
			Mop Basin	2.5.13	G													
			Drinking-Water Coolers	2.5.8	G													
			Bottle Fill Stations	2.2	G													
			Pumps	2.9	G													
			Backflow Prevention Assemblies	3.8.1.1	G													
			Vibration-Absorbing Features	3.3	G													
			Plumbing System	3.8.1														
			SD-06 Test Reports															
			Tests, Flushing and Disinfection	3.8														
			Test of Backflow Prevention	3.8.1.1	G													
			Assemblies															
			SD-07 Certificates															
			Materials and Equipment	1.3														
			Bolts	2.2.1														

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		22 00 00	SD-10 Operation and Maintenance															
			Data															
			Plumbing System	3.8.1	G													
			SD-11 Closeout Submittals															
			Water-Efficient Products	2.1.1	S													
		23 05 48.00 40	SD-02 Shop Drawings															
			Installation Drawings	1.2	G													
			SD-03 Product Data															
			Equipment and Performance	1.2	G													
			Data															
			Isolators	2.2.7	G													
			SD-06 Test Reports															
			Type of Isolator	2.4	G													
			Type of Base	2.4	G													
			Allowable Deflection	2.4	G													
			Measured Deflection	2.4	G													
		23 05 93	SD-01 Preconstruction Submittals															
			Independent TAB Agency and	1.5.1	G													
			Personnel Qualifications															
			TAB Design Review Report	1.5.4.2	G													
			TAB Design Review Report	1.6.2.1	G													
			TAB Firm	1.5.9.1	G													
			TAB Team Engineer	1.2	G													
			TAB Specialist	1.5.9.2	G													
			TAB Team Field Leader	1.2	G													
			SD-02 Shop Drawings															

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		23 05 93	TAB Schematic Drawings and	1.3.3	G													
			Report Forms															
			SD-03 Product Data															
			Equipment and Performance	1.3	G													
			Data															
			TAB Related HVAC Submittals	1.5.1.3	G													
			TAB Related HVAC Submittals	1.5.9.4	G													
			TAB Procedures	1.5.7	G													
			Calibration	1.5.7	G													
			Systems Readiness Check	1.3.3	G													
			TAB Execution	1.5.10	G													
			TAB Verification	1.5.10.3	G													
			SD-06 Test Reports															
			Completed Pre-Final DALT	3.3.5	G													
			Report															
			Certified Final DALT Report	3.3.8	G													
			Prerequisite HVAC Work	1.5.4.3	G													
			Checkout List															
			Prerequisite HVAC Work	1.5.4.3	G													
			Checkout List															
			Prerequisite HVAC Work	1.5.4.3	G													
			Checkout List															
			Proportional Balancing	3.4.7.1	G													
			Proportional Balancing	3.7	G													
			Season 1	3.4.7.2	G													
			Season 1	3.7	G													

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		23 05 93	Season 2	3.4.7.2	G													
			Season 2	3.7	G													
			TAB Design Review Report	1.5.4.2	G													
			TAB Design Review Report	1.6.2.1	G													
			TAB Report for Season 1	1.5.11.2	G													
			TAB Report for Season 2	1.5.11.2	G													
			SD-07 Certificates															
			Independent TAB Agency and	1.5.1	G													
			Personnel Qualifications															
			DALT and TAB Submittal and	1.5.4.2	G													
			Work Schedule															
			DALT and TAB Submittal and	1.6.2	G													
			Work Schedule															
			TAB Pre-Field Engineering	1.5.4.3	G													
			Report															
			TAB Pre-Field Engineering	1.6.2.3	G													
			Report															
			Instrument Calibration	1.5.6	G													
			Certificates															
			DALT and TAB Procedures	3.7	G													
			Summary															
			Completed Pre-Final DALT Work	3.7	G													
			Checklist															
			Advance Notice of Pre-Final	3.3.2	G													
			DALT Field Work															
			Proportional Balancing	3.4.7.1	G													

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		23 05 93	Proportional Balancing	3.7	G													
			Season 1	3.4.7.2	G													
			Season 1	3.7	G													
			Season 2	3.4.7.2	G													
			Season 2	3.7	G													
			TAB Firm	1.5.9.1	G													
			Design Review Report	1.3.3	G													
			Pre-field DALT Preliminary	1.6.2.2	G													
			Notification															
			Advanced Notice for Season 1	1.6.2	G													
			TAB Field Work															
			Prerequisite HVAC Work Check	1.6.2	G													
			Out List For Season 1															
			Advanced Notice for Season 2	1.6.2	G													
			TAB Field Work															
			Prerequisite HVAC Work Check	1.6.2	G													
			Out List For Season 2															
		23 07 00	SD-02 Shop Drawings															
			MICA Plates	3.2.2.4	G													
			Pipe Insulation Systems	2.3														
			Pipe Insulation Systems	3.2														
			Duct Insulation Systems	3.3														
			Equipment Insulation Systems	3.4														
			SD-03 Product Data															
			Pipe Insulation Systems	2.3	G													
			Pipe Insulation Systems	3.2	G													

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		23 07 00	Duct Insulation Systems	3.3	G													
			Equipment Insulation Systems	3.4	G													
			SD-07 Certificates															
			Indoor air quality for adhesives	2.2.1	S													
			SD-08 Manufacturer’s Instructions															
			Pipe Insulation Systems	2.3	G													
			Pipe Insulation Systems	3.2	G													
			Duct Insulation Systems	3.3	G													
			Equipment Insulation Systems	3.4	G													
		23 08 00.00 20	SD-06 Test Reports															
			Pipe Flushing, Testing, And	1.6	G													
			Water Treatment Reports															
			Seasonal Test Report	3.7	G													
			Full-Load Test Report	3.8	G													
		23 09 00	SD-02 Shop Drawings															
			DDC Contractor Design Drawings	3.2	G													
			Draft As-Built Drawings	3.2	G													
			Final As-Built Drawings	3.2	G													
			SD-03 Product Data															
			Programming Software	1.8.1	G													
			Programming Software	1.8.5	G													
			Controller Application Programs	1.8.2	G													
			Controller Application Programs	1.8.6	G													
			Configuration Software	1.8.3	G													
			Controller Configuration Settings	1.8.4	G													
			Manufacturer's Product Data	2.2	G													

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		23 09 00	Final LNS Database	1.5	G													
			LNS Plug-ins	1.5	G													
			Niagara Framework Supervisory	1.8.7	G													
			Gateway Backups															
			Niagara Framework Engineering	1.8.8	G													
			Tool															
			Niagara Framework Wizards	1.5	G													
			SD-06 Test Reports															
			Existing Conditions Report	1.5														
			Pre-Construction Quality Control	1.9.1	G													
			(QC) Checklist															
			Post-Construction Quality Control	1.9.2	G													
			(QC) Checklist															
			Start-Up Testing Report	3.4.2	G													
			PVT Procedures	3.5.1	G													
			PVT Report	3.5.3	G													
			Control Contractor's Performance	3.6.5	G													
			Verification Testing Plan															
			Equipment Supplier's	3.6.3.1	G													
			Performance Verification Testing															
			Plan															
			Endurance Testing Results	3.6.8.3	G													
			Performance Verification Test	3.6.9	G													
			Report															
			SD-10 Operation and Maintenance															
			Data															

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		23 09 00	Operation and Maintenance	3.7	G													
			(O&M) Instructions															
			Training Documentation	3.9.1	G													
			SD-11 Closeout Submittals															
			Enclosure Keys	2.5	G													
			Password Summary Report	3.1.6.1	G													
			Closeout Quality Control (QC)	1.9.3	G													
			Checklist															
		23 09 13.34 40	SD-02 Shop Drawings															
			Fabrication Drawings	1.2	G													
			Installation Drawings	3.1	G													
			SD-03 Product Data															
			Self-Contained Temperature	2.1	G													
			Control Valves															
			Self-Contained	2.2	G													
			Temperature-Regulator Valves															
			Rate-of-Flow Controller	2.3	G													
			Nonmodulating Float Valve	2.4	G													
			Water Pressure Regulating Valve	2.5	G													
			Water Pressure Relief Valve	2.6	G													
			Relief Valves for Electric Water	2.7	G													
			Heaters															
			Sample Warranty	1.4	G													
			SD-07 Certificates															
			List of Product Installations	1.2	G													
			Certificates of Conformance	1.4	G													

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		23 09 13.34 40	Manufacturer's Warranty	3.3	G													
		23 30 00	SD-02 Shop Drawings															
			Detail Drawings	1.4.4	G													
			SD-03 Product Data															
			Metallic Flexible Duct	2.10.1.1														
			Insulated Nonmetallic Flexible	2.10.1.2														
			Duct Runouts															
			Duct Connectors	2.10.1.2														
			Duct Access Doors	2.10.2	G													
			Fire Dampers	2.10.3														
			Manual Balancing Dampers	2.10.4	G													
			Manual Balancing Dampers	2.10.5	G													
			Automatic Smoke-Fire Dampers	2.10.7														
			Automatic Smoke Dampers	2.10.8														
			Sound Attenuation Equipment	2.10.12														
			Acoustical Duct Liner	2.10.12.3														
			Diffusers	2.10.13.1														
			Registers and Grilles	2.10.13.5														
			Louvers	2.10.14														
			Air Vents, Penthouses, and	2.10.15														
			Goosenecks															
			Centrifugal Fans	2.11.1.1														
			In-Line Centrifugal Fans	2.11.1.2														
			Axial Flow Fans	2.11.1.3														
			Centrifugal Type Power Roof	2.11.1.5														
			Ventilators															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 30 00	Air-Curtain Fans	2.11.1.6														
			Ceiling Exhaust Fans	2.11.1.7														
			PL-109-58 label for ceiling	2.11.1.7	S													
			exhaust fan product															
			Air Handling Units	2.12	G													
			Room Fan-Coil Units	2.13.1	G													
			Variable Volume, Single Duct,	2.13.2.3	G													
			Fan-Powered Terminal Units															
			Unit Ventilators	2.13.3														
			Energy Recovery Devices	2.14	G													
			Test Procedures	1.4.5														
			Diagrams	1.2.1.2	G													
			Indoor Air Quality for Duct	2.10.1														
			Sealants															
			SD-06 Test Reports															
			Performance Tests	3.13	G													
			Damper Acceptance Test	3.11	G													
			SD-07 Certificates															
			Bolts	1.4.1														
			Ozone Depleting Substances	1.4.3														
			Technician Certification															
			SD-08 Manufacturer’s Instructions															
			Manufacturer's Installation	3.2														
			Instructions															
			Operation and Maintenance	3.15.2														
			Training															

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		23 30 00	SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.15.1	G													
			Manuals															
			Fire Dampers	2.10.3	G													
			Automatic Smoke-Fire Dampers	2.10.7	G													
			Centrifugal Fans	2.11.1.1	G													
			In-Line Centrifugal Fans	2.11.1.2	G													
			Axial Flow Fans	2.11.1.3	G													
			Panel Type Power Wall	2.11.1.4	G													
			Ventilators															
			Centrifugal Type Power Roof	2.11.1.5	G													
			Ventilators															
			Air-Curtain Fans	2.11.1.6	G													
			Ceiling Exhaust Fans	2.11.1.7	G													
			Air Handling Units	2.12	G													
			Room Fan-Coil Units	2.13.1	G													
			Variable Volume, Single Duct,	2.13.2.3	G													
			Fan-Powered Terminal Units															
			Energy Recovery Devices	2.14	G													
			SD-11 Closeout Submittals															
			Indoor Air Quality During	3.14														
			Construction															
		23 64 26	SD-03 Product Data															
			Calibrated Balancing Valves	2.5.8	G													
			Water Temperature Mixing Valve	2.5.9	G													

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 64 26	Water Temperature Regulating	2.5.10	G													
			Valves															
			Water Pressure Reducing Valve	2.5.11														
			Pressure Relief Valve	2.5.12														
			Combination Pressure and	2.5.13														
			Temperature Relief Valves															
			Expansion Joints	2.6.9	G													
			Pumps	2.7	G													
			Combination Strainer and Pump	2.6.3														
			Suction Diffuser															
			Expansion Tanks	2.8														
			Air Separator Tanks	2.9														
			Water Treatment Systems	2.10	G													
			SD-06 Test Reports															
			Piping Welds NDE Report	3.1.1.3														
			Pressure Tests Reports	3.5.2	G													
			Condenser Water Quality Test	3.5.3	G													
			Reports															
			Condenser Water Quality Test	3.5.3	G													
			Reports															
			One-Year Inspection Report For	3.7	G													
			Cooling Water															
			SD-07 Certificates															
			Employer's Record Documents	3.1.1.1														
			(For Welding)															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 64 26	Welding Procedures and	3.1.1.2														
			Qualifications															
			Fittings	2.2.2														
			Fittings	2.2.2														
			Fittings	2.3.2														
			Unions	3.1.4.6														
			Flanges	2.2.2.5														
			Flanges	3.1.4.6														
			Gaskets	2.2.2.2														
			SD-08 Manufacturer's Instructions															
			Lesson plan for the Instruction	3.6	G													
			Course															
			SD-10 Operation and Maintenance															
			Data															
			Water Treatment Systems	2.10	G													
			Calibrated Balancing Valves	2.5.8	G													
			Water Temperature Mixing Valve	2.5.9	G													
			Water Temperature Regulating	2.5.10	G													
			Valves															
			Water Pressure Reducing Valve	2.5.11	G													
			Pressure Relief Valve	2.5.12	G													
			Combination Pressure and	2.5.13	G													
			Temperature Relief Valves															
			Expansion Joints	2.6.9	G													
			Pumps	2.7	G													

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 64 26	Combination Strainer and Pump	2.6.3	G													
			Suction Diffuser															
			Expansion Tanks	2.8	G													
			Air Separator Tanks	2.9	G													
		23 82 00.00 20	SD-03 Product Data															
			Unit Heaters	2.1														
			SD-10 Operation and Maintenance															
			Data															
			Unit Heaters	2.1														
		25 05 11.01	SD-01 Preconstruction Submittals															
			Wireless and Wired Broadcast	3.2.2.3	G													
			Communication Request															
			Device Account Lock Exception	3.3.2	G													
			Request															
			Multiple Ethernet Connection	3.2.4.2	G													
			Device Request															
			Contractor Computer	1.10.1.6	G													
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.10.6	G													
			Cybersecurity Compliance															
			Statements															
			Cybersecurity Interconnection	1.8.2	G													
			Schedule															
			Protection of Information At Rest	3.7.4	G													
			Proposal															

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		25 05 11.01	Proposed STIG and SRG	1.8.1	G													
			Applicability Report															
			SD-02 Shop Drawings															
			Network Communication Report	1.8.3	G													
			Cybersecurity Riser Diagram	1.8.6	G													
			SD-03 Product Data															
			Control System Cybersecurity	1.8.8	G													
			Documentation															
			SD-06 Test Reports															
			Wireless Communication Test	3.2.2.4	G													
			Report															
			Control System Cybersecurity	3.14.1	G													
			Testing Procedures															
			Control System Cybersecurity	3.14.3	G													
			Testing Report															
			SD-07 Certificates															
			Software Licenses	1.9	G													
			SD-11 Closeout Submittals															
			Confidential Password Report	3.4.5.5	G													
			Password Change Summary	3.4.5.5	G													
			Report															
			Enclosure Keys	3.3.7	G													
			Software and Configuration	1.8.5	G													
			Backups															
			Auditing Front End Software	3.5.3	G													

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		25 05 11.01	Device Audit Record Upload	3.5.4.2	G													
			Software															
			System Maintenance Tool	3.9	G													
			Software															
			Control System Scanning Tools	3.11.2	G													
			STIG, SRG and Vendor Guide	1.8.7	G													
			Compliance Result Report															
			Control System Inventory Report	1.8.4	G													
			Integrity Verification Software	3.13.2	G													
		25 05 11.02	SD-01 Preconstruction Submittals															
			Wireless and Wired Broadcast	3.2.2.3	G													
			Communication Request															
			Device Account Lock Exception	3.3.2	G													
			Request															
			Multiple Ethernet Connection	3.2.4.2	G													
			Device Request															
			Contractor Computer	1.10.1.6	G													
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.10.6	G													
			Cybersecurity Compliance															
			Statements															
			Cybersecurity Interconnection	1.8.2	G													
			Schedule															
			Protection of Information At Rest	3.7.4	G													
			Proposal															

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		25 05 11.02	Proposed STIG and SRG	1.8.1	G													
			Applicability Report															
			SD-02 Shop Drawings															
			Network Communication Report	1.8.3	G													
			Cybersecurity Riser Diagram	1.8.6	G													
			SD-03 Product Data															
			Control System Cybersecurity	1.8.8	G													
			Documentation															
			SD-06 Test Reports															
			Wireless Communication Test	3.2.2.4	G													
			Report															
			Control System Cybersecurity	3.14.1	G													
			Testing Procedures															
			Control System Cybersecurity	3.14.3	G													
			Testing Report															
			SD-07 Certificates															
			Software Licenses	1.9	G													
			SD-11 Closeout Submittals															
			Confidential Password Report	3.4.5.5	G													
			Password Change Summary	3.4.5.5	G													
			Report															
			Enclosure Keys	3.3.7	G													
			Software and Configuration	1.8.5	G													
			Backups															
			Auditing Front End Software	3.5.3	G													

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		25 05 11.02	Device Audit Record Upload	3.5.4.2	G													
			Software															
			System Maintenance Tool	3.9	G													
			Software															
			Control System Scanning Tools	3.11.2	G													
			STIG, SRG and Vendor Guide	1.8.7	G													
			Compliance Result Report															
			Control System Inventory Report	1.8.4	G													
			Integrity Verification Software	3.13.2	G													
		25 05 11.03	SD-01 Preconstruction Submittals															
			Wireless and Wired Broadcast	3.2.3.3	G													
			Communication Request															
			Device Account Lock Exception	3.3.2	G													
			Request															
			Multiple Ethernet Connection	3.2.5.2	G													
			Device Request															
			Contractor Computer	1.10.1.6	G													
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.10.6	G													
			Cybersecurity Compliance															
			Statements															
			Cybersecurity Interconnection	1.8.2	G													
			Schedule															
			Protection of Information At Rest	3.7.4	G													
			Proposal															

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		25 05 11.03	Proposed STIG and SRG	1.8.1	G													
			Applicability Report															
			SD-02 Shop Drawings															
			Network Communication Report	1.8.3	G													
			Cybersecurity Riser Diagram	1.8.6	G													
			SD-03 Product Data															
			Control System Cybersecurity	1.8.8	G													
			Documentation															
			SD-06 Test Reports															
			Wireless Communication Test	3.2.3.4	G													
			Report															
			Control System Cybersecurity	3.14.1	G													
			Testing Procedures															
			Control System Cybersecurity	3.14.3	G													
			Testing Report															
			SD-07 Certificates															
			Software Licenses	1.9	G													
			SD-11 Closeout Submittals															
			Confidential Password Report	3.4.5.5	G													
			Password Change Summary	3.4.5.5	G													
			Report															
			Enclosure Keys	3.3.7	G													
			Software and Configuration	1.8.5	G													
			Backups															
			Auditing Front End Software	3.5.3	G													

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		25 05 11.03	Device Audit Record Upload	3.5.4.2	G													
			Software															
			System Maintenance Tool	3.9	G													
			Software															
			Control System Scanning Tools	3.11.2	G													
			STIG, SRG and Vendor Guide	1.8.7	G													
			Compliance Result Report															
			Control System Inventory Report	1.8.4	G													
			Integrity Verification Software	3.13.2	G													
		25 05 11.04	SD-01 Preconstruction Submittals															
			Wireless and Wired Broadcast	1.5.2	G													
			Communication Request															
			Device Account Lock Exception	3.3.2	G													
			Request															
			Multiple Ethernet Connection	3.2.3.2	G													
			Device Request															
			Contractor Computer	1.10.1.6	G													
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.10.6	G													
			Cybersecurity Compliance															
			Statements															
			Cybersecurity Interconnection	1.8.2	G													
			Schedule															
			Proposed STIG and SRG	1.8.1	G													
			Applicability Report															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		25 05 11.04	SD-02 Shop Drawings															
			Network Communication Report	1.8.3	G													
			Cybersecurity Riser Diagram	1.8.6	G													
			SD-03 Product Data															
			Control System Cybersecurity	1.8.8	G													
			Documentation															
			SD-06 Test Reports															
			Wireless Communication Test	1.5.2	G													
			Report															
			Control System Cybersecurity	3.14.1	G													
			Testing Procedures															
			Control System Cybersecurity	3.14.3	G													
			Testing Report															
			SD-07 Certificates															
			Software Licenses	1.9	G													
			SD-11 Closeout Submittals															
			Confidential Password Report	3.4.5.5	G													
			Password Change Summary	3.4.5.5	G													
			Report															
			Enclosure Keys	3.3.6	G													
			Software and Configuration	1.8.5	G													
			Backups															
			Device Audit Record Upload	1.5.2	G													
			Software															
			System Maintenance Tool	3.9	G													
			Software															

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		25 05 11.04	Control System Scanning Tools	3.11.2	G													
			STIG, SRG and Vendor Guide	1.8.7	G													
			Compliance Result Report															
			Control System Inventory Report	1.8.4	G													
		25 05 11.06	SD-01 Preconstruction Submittals															
			Wireless and Wired Broadcast	3.2.1.3	G													
			Communication Request															
			Device Account Lock Exception	3.3.2	G													
			Request															
			Contractor Computer	1.10.1.6	G													
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.10.6	G													
			Cybersecurity Compliance															
			Statements															
			Cybersecurity Interconnection	1.5.2	G													
			Schedule															
			Proposed STIG and SRG	1.8.1	G													
			Applicability Report															
			SD-02 Shop Drawings															
			Network Communication Report	3.6	G													
			Cybersecurity Riser Diagram	1.8.4	G													
			SD-03 Product Data															
			Control System Cybersecurity	1.8.6	G													
			Documentation															
			SD-06 Test Reports															

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		25 05 11.06	Wireless Communication Test	1.5.2	G													
			Report															
			SD-07 Certificates															
			Software Licenses	1.9	G													
			SD-11 Closeout Submittals															
			Confidential Password Report	3.4.5.5	G													
			Password Change Summary	3.4.5.5	G													
			Report															
			Enclosure Keys	3.3.5	G													
			Software and Configuration	1.8.3	G													
			Backups															
			Device Audit Record Upload	1.5.2	G													
			Software															
			System Maintenance Tool	3.9	G													
			Software															
			Control System Scanning Tools	3.11.2	G													
			STIG, SRG and Vendor Guide	1.8.5	G													
			Compliance Result Report															
			Control System Inventory Report	1.8.2	G													
		25 08 10	SD-06 Test Reports															
			PVT Plan	3.1.1	G													
			PVT Phase I Report	3.1.2.1	G													
			PVT Phase II Report	3.1.2.2	G													
			SD-07 Certificates															
			Test Instrumentation Calibration	1.4	G													
			Certificates															

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		26 08 00	SD-06 Test Reports															
			Acceptance Tests and	3.1	G													
			Inspections															
			SD-07 Certificates															
			Qualifications	1.4.1	G													
			Acceptance Test and Inspections	1.4.3	G													
			Procedure															
		26 20 00	SD-02 Shop Drawings															
			Panelboards	2.13	G													
			Transformers	2.16	G													
			Cable Trays	2.4	G													
			Motor Control Centers	2.20	G													
			Wireways	2.29	G													
			Marking Strips	3.1.9.1	G													
			Cable Bus System	2.3	G													
			Cable Bus System	3.1.5	G													
			SD-03 Product Data															
			Receptacles	2.12	G													
			Circuit Breakers	2.13.3	G													
			Switches	2.10	G													
			Transformers	2.16	G													
			Enclosed Circuit Breakers	2.14	G													
			Motor Controllers	2.18	G													
			Combination Motor Controllers	2.20.1	G													
			Manual Motor Starters	2.19	G													
			Metering	2.30	G													

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		26 20 00	CATV Outlets	2.23.1	G													
			Secondary Bonding Busbar	2.24.3	G													
			Surge Protective Devices	2.31	G													
			Cable Trays	2.4	G													
			Cable Bus System	2.3	G													
			Cable Bus System	3.1.5	G													
			Cable Tray Design	2.4	G													
			SD-06 Test Reports															
			600-volt Wiring Test	3.5.2	G													
			Grounding System Test	3.5.6	G													
			Transformer Tests	3.5.3	G													
			Ground-fault Receptacle Test	3.5.4	G													
			Arc-fault Receptacle Test	3.5.5	G													
			SD-07 Certificates															
			Fuses	2.11	G													
			SD-09 Manufacturer’s Field															
			Reports															
			Transformer Factory Tests	2.33.1														
			SD-10 Operation and Maintenance															
			Data															
			Electrical Systems	1.5.1	G													
			Metering	2.30	G													
		26 24 13	SD-02 Shop Drawings															
			Switchboard Drawings	1.5.2	G													
			SD-03 Product Data															
			Switchboard	2.2	G													

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		26 24 13	SD-06 Test Reports															
			Switchboard Design Tests	2.5.2	G													
			Switchboard Production Tests	2.5.3	G													
			Acceptance Checks and Tests	3.5.1	G													
			SD-07 Certificates															
			Cybersecurity Installation	3.5.1.7	G													
			Certification															
			SD-10 Operation and Maintenance															
			Data															
			Switchboard Operation and	1.6.1	G													
			Maintenance															
			SD-11 Closeout Submittals															
			Assembled Operation and	1.6.2	G													
			Maintenance Manuals															
			Equipment Test Schedule	2.5.1	G													
			Request for Settings	3.5	G													
			Service Entrance Available Fault	2.8	G													
			Current Label															
		26 27 13.10 30	SD-03 Product Data															
			Power Meters	2.1	G													
			Current	2.1.3	G													
			Potential Transformer	2.1.2	G													
			Communications Module	2.2.2	G													
			Protocol Modules	1.6.1	G													
			Data Recorder	1.6.2	G													
			Modem	1.6.2	G													

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		26 27 13.10 30	SD-06 Test Reports															
			Acceptance Checks and Tests	3.3.1	G													
			SD-10 Operation and Maintenance															
			Data															
			Power Meters	2.1	G													
			Communications Module	2.2.2	G													
			Protocol Modules	1.6.1	G													
			Data Recorder	1.6.2	G													
			Modem	1.6.2	G													
			SD-11 Closeout Submittals															
			System Function Verification	3.3.2	G													
		26 28 01.00 10	SD-03 Product Data															
			Fault Current Analysis	2.1														
			Protective Device Coordination	2.1	G													
			Study															
			System Coordinator	1.4.1														
		26 29 23	SD-02 Shop Drawings															
			Schematic Diagrams	1.5.1	G													
			Interconnecting Diagrams	1.5.2	G													
			Installation Drawings	1.5.3	G													
			As-Built Drawings	1.5.3	G													
			SD-03 Product Data															
			Adjustable Speed Drives	2.1	G													
			Wires and Cables	2.3														
			Equipment Schedule	1.5.4														
			SD-06 Test Reports															

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		26 29 23	ASD Test	3.3.1														
			Performance Verification Tests	3.3.2														
			Endurance Test	3.3.3														
			SD-07 Certificates															
			Testing Agency's Field	3.3.1	G													
			Supervisor															
			SD-08 Manufacturer’s Instructions															
			Installation instructions	1.5.5														
			SD-09 Manufacturer’s Field															
			Reports															
			ASD Test Plan	2.5.1	G													
			Standard Products	1.5.6														
			SD-10 Operation and Maintenance															
			Data															
			Adjustable Speed Drives	2.1														
		26 36 23	SD-02 Shop Drawings															
			Automatic Transfer Switch	1.5.2	G													
			Drawings															
			SD-03 Product Data															
			Automatic Transfer Switches	2.1	G													
			By-Pass/Isolation Switch (BP/IS)	2.2	G													
			SD-06 Test Reports															
			Acceptance Checks and Tests	3.3.1	G													
			Functional Acceptance Tests	3.3.2	G													
			Factory Testing	2.4	G													
			Factory Test Reports	2.4.2	G													

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		26 36 23	SD-07 Certificates															
			Proof of Listing	1.5.1	G													
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	1.4	G													
			Manual															
		26 41 00	SD-02 Shop Drawings															
			Overall lightning protection	1.4.1.1	G													
			system															
			Each major component	1.4.1.2	G													
			SD-06 Test Reports															
			Lightning Protection and	1.4.3	G													
			Grounding System Test Plan															
			Lightning Protection and	3.5.1	G													
			Grounding System Test															
			SD-07 Certificates															
			Lightning Protection System	1.2.3	G													
			Installers Documentation															
			Component UL Listed and	1.4.2	G													
			Labeled															
			Lightning protection system	1.4.4	G													
			inspection certificate															
			Roof manufacturer's warranty	3.1.1	G													
		26 51 00	SD-02 Shop Drawings															
			Luminaire Drawings	1.5.1	G													

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		26 51 00	Occupancy/Vacancy Sensor	1.5.9	G													
			Coverage Layout															
			Lighting Control System One-Line	1.7.2	G													
			Diagram															
			Sequence of Operation for	2.5.1	G													
			Lighting Control System															
			SD-03 Product Data															
			Luminaires	2.2	G													
			Light Sources	2.3	G													
			LED Drivers	2.4	G													
			Luminaire Warranty	1.6.1	G													
			Lighting Controls Warranty	1.6.2	G													
			Local Area Controller	2.5.1.1.1	G													
			Lighting Control Panel	2.5.1.2.1	G													
			Gateway	2.5.1.2.2	G													
			Switches	2.5.2.1	G													
			Digital Switch Timers	2.5.2.2	G													
			Wall Box Dimmers	2.5.2.3	G													
			Scene Wallstations	2.5.2.4	G													
			Occupancy/Vacancy Sensors	2.5.2.5	G													
			Photosensors	2.5.2.6	G													
			Time Clocks	2.5.2.7	G													
			Power Packs	2.5.2.5.2	G													
			Power Hook Luminaire Hangers	2.7.4	G													
			Mini Inverters	2.6.4	G													
			Exit Signs	2.6.1	G													

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		26 51 00	Emergency Drivers	2.6.2	G													
			Linear LED Lamps	2.3.1.1	G													
			SD-05 Design Data															
			Luminaire Design Data	1.5.2	G													
			Photometric Plan	1.5.8	G													
			SD-06 Test Reports															
			ANSI/IES LM-79 Test Report	1.5.3	G													
			ANSI/IES LM-80 Test Report	1.5.4	G													
			ANSI/IES TM-21 Test Report	1.5.5	G													
			ANSI/IES TM-30 Test Report	1.5.6	G													
			Occupancy/Vacancy Sensor	3.2.1.1	G													
			Verification Test															
			Photosensor Verification Test	3.2.1.1	G													
			SD-07 Certificates															
			LED Driver and Dimming Switch	1.5.7	G													
			Compatibility Certificate															
			SD-10 Operation and Maintenance															
			Data															
			Lighting System	1.7.1	G													
			Lighting Control System	1.7.2	G													
			Maintenance Staff Training Plan	3.3.2.1	G													
			End-User Training Plan	3.3.2.2	G													
		26 56 00	SD-02 Shop Drawings															
			Luminaire Drawings	1.5.1.1	G													
			Control System One-Line	1.8.2	G													
			Diagram															

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		26 56 00	SD-03 Product Data															
			Luminaires	2.2	G													
			Light Sources	2.3	G													
			LED Drivers	2.4	G													
			Luminaire Warranty	1.7.1	G													
			Lighting Controls Warranty	1.7.2	G													
			Time Clock	3.3.1.2	G													
			SD-05 Design Data															
			Luminaire Design Data	1.5.2	G													
			Photometric Plan	1.5.6	G													
			SD-06 Test Reports															
			ANSI/IES LM-79 Test Report	1.5.3	G													
			ANSI/IES LM-80 Test Report	1.5.4	G													
			ANSI/IES TM-21 Test Report	1.5.5	G													
			SD-08 Manufacturer's Instructions															
			Poles	1.5.2														
			Poles	1.6														
			SD-10 Operation and Maintenance															
			Data															
			Lighting System	1.8.1	G													
			Exterior Lighting Control System	1.8.2	G													
			Maintenance Staff Training Plan	3.3.1.1	G													
			End-User Training Plan	3.3.1.2	G													
		27 10 00	SD-02 Shop Drawings															
			Telecommunications Drawings	1.6.1.1	G													

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		27 10 00	Telecommunications Space	1.6.1.2	G													
			Drawings															
			SD-03 Product Data															
			Telecommunications Cabling	2.3	G													
			Patch Panels	2.4.4	G													
			Telecommunications	2.5	G													
			Outlet/Connector Assemblies															
			Equipment Support Frame	2.4.2	G													
			Spare Parts	1.10.3	G													
			SD-06 Test Reports															
			Telecommunications Cabling	3.5.1	G													
			Testing															
			SD-07 Certificates															
			Telecommunications Contractor	1.6.2.1	G													
			Key Personnel	1.6.2.2	G													
			Manufacturer Qualifications	1.6.2.3	G													
			Test Plan	1.6.3	G													
			SD-09 Manufacturer's Field															
			Reports															
			Factory Reel Tests	2.10.1	G													
			SD-10 Operation and Maintenance															
			Data															
			Telecommunications Cabling and	1.10.1	G													
			Pathway System															
			SD-11 Closeout Submittals															
			Record Documentation	1.10.2	G													

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(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		28 08 10	SD-05 Design Data															
			Test Plan	3.1	G													
			SD-06 Test Reports															
			Draft Test Report	3.2.2														
			Final Test Report	3.4	G													
			SD-07 Certificates															
			Qualifications	1.4.1														
		28 10 05	SD-02 Shop Drawings															
			ACS Components	1.3.3.1	G													
			Overall System Schematic	1.3.3.2	G													
			SD-03 Product Data															
			Access Control Unit	2.3.4	G													
			Access Control Devices	2.3.5	G													
			Printers	2.4.4	G													
			Communications Interface	2.5	G													
			Devices															
			Network Switch	2.5.3	G													
			Video and ACS Transmission	2.5.4	G													
			Batteries	2.6.1	G													
			Component Enclosure	2.8	G													
			Equipment Rack	2.9	G													
			SD-05 Design Data															
			Backup Battery Capacity	1.5.1	G													
			Calculations															
			Throughput Rates	2.3.2	G													
			SD-07 Certificates															

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		28 10 05	Contractor Qualifications	1.3.4.1	G													
			Instructor Qualifications	1.3.4.2	G													
			SD-10 Operation and Maintenance															
			Data															
			Training Plan	3.6.1	G													
			Training Content	3.6	G													
			ACS Components	1.3.3.1	G													
			ACS Software	1.6	G													
			SD-11 Closeout Submittals															
			As-Built Drawings	1.8	G													
		28 31 76	SD-01 Preconstruction Submittals															
			Qualified Fire Protection Engineer	1.3.2	G													
			(QFPE)															
			Fire alarm system designer	1.8.2.1	G													
			Supervisor	1.8.2.2	G													
			Technician	1.8.2.3	G													
			Installer	1.8.2.4	G													
			Test Technician	1.8.2.5	G													
			Fire Alarm System Site-Specific	1.7	G													
			Software Acknowledgement															
			SD-02 Shop Drawings															
			Nameplates	1.8.1.3	G													
			Instructions	2.2.4	G													
			Wiring Diagrams	1.8.1.4	G													
			System Layout	1.8.1.5	G													
			Notification Appliances	1.8.1.6	G													

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		28 31 76	Initiating devices	1.8.1.7	G													
			Amplifiers	1.8.1.8	G													
			Battery Power	1.8.1.9	G													
			Voltage Drop Calculations	1.8.1.10	G													
			SD-03 Product Data															
			Fire Alarm and Mass Notification	2.3	G													
			Control Unit (FMCU)															
			Local Operating Console (LOC)	1.4.4	G													
			Amplifiers	1.8.1.8	G													
			Tone Generators	2.5	G													
			Digitalized voice generators	2.5	G													
			LCD Annunciator	2.6.1	G													
			Manual Stations	2.7	G													
			Smoke Detectors	2.8	G													
			Duct Smoke Detectors	2.8.2	G													
			Carbon monoxide detector	2.9	G													
			Addressable Interface Devices	2.10	G													
			Addressable Control Modules	2.11	G													
			Isolation Modules	2.12	G													
			Notification Appliances	1.8.1.6	G													
			Textual Display Sign Control	2.13.3	G													
			Panel															
			Textual Display Signs	2.13.3	G													
			Batteries	2.15.1	G													
			Battery Chargers	2.15.2	G													

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		28 31 76	Supplemental Notification	2.15.1.1	G													
			Appliance Circuit Panels															
			Auxiliary Power Supply Panels	2.15.1.1	G													
			Surge Protective Devices	2.16	G													
			Alarm Wiring	2.16	G													
			Back Boxes and Conduit	3.3.4	G													
			Ceiling Bridges	3.2.9	G													
			Terminal Cabinets	3.3.2	G													
			Automatic Fire Alarm	2.19	G													
			Transmitters															
			Radio Transmitter and Interface	2.19.1	G													
			Panels															
			Mass Notification Transceiver	2.18.1	G													
			Environmental Enclosures or	2.21	G													
			Guards															
			Document Storage Cabinet	3.10.3	G													
			SD-06 Test Reports															
			Test Procedures	3.6.1	G													
			SD-07 Certificates															
			Verification of Compliant	3.6.2.1	G													
			Installation															
			Request for Government Final	3.6.2.2	G													
			Test															
			SD-10 Operation and Maintenance															
			Data															

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		28 31 76	Operation and Maintenance	3.8	G													
			(O&M) Instructions															
			Instruction of Government	3.9	G													
			Employees															
			SD-11 Closeout Submittals															
			As-Built Drawings	1.8.1.13														
			Spare Parts	1.10.1														
		31 00 00	SD-01 Preconstruction Submittals															
			Shoring	3.5	G													
			Dewatering Work Plan	1.3.3	G													
			SD-03 Product Data															
			Utilization of Excavated Materials	3.9	G													
			SD-06 Test Reports															
			Testing	3.18														
			Borrow Site Testing	2.1														
			SD-07 Certificates															
			Testing	3.18														
		31 63 26	SD-02 Shop Drawings															
			Caissons	3.1	G													
			Survey of Caisson Locations	1.4.1	G													
			SD-07 Certificates															
			Caissons	3.1														
			Qualifications	1.4.2	G													
			SD-11 Closeout Submittals															
			Records	3.5														
		32 01 19.61	SD-03 Product Data															

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		32 01 19.61	Sealants	2.1														
			Manufacturer's	3.5.2														
			Recommendations															
			SD-04 Samples															
			Sealants	2.1														
			Blocking Media/Backup Materials	2.3.1														
			Backer Rod	3.3.4.1														
			Bond Breaking Tapes	2.3.2														
			SD-06 Test Reports															
			Sealants	2.1														
			SD-07 Certificates															
			Equipment List	3.1														
			SD-08 Manufacturer’s Instructions															
			Sealants	2.1														
		32 05 33	SD-01 Preconstruction Submittals															
			Integrated Pest Management	2.4	G													
			Plan															
			SD-03 Product Data															
			Fertilizer	2.1	G													
			Mulches Topdressing	2.3														
			Organic Mulch Materials	2.3.1														
			SD-07 Certificates															
			Maintenance Inspection Report	3.5.1														
			Plant Quantities	3.5.2	G													
			SD-10 Operation and Maintenance															
			Data															

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		32 05 33	Maintenance	1.6														
			SD-11 Closeout Submittals															
			Tree Staking and Guying	3.5.3														
			Removal															
		32 11 13.13	SD-03 Product Data															
			Plant, Equipment, Machines, and	2.1	G													
			Tools															
			Mix Design	2.2.4	G													
			Contractor's Plans	1.5.1	G													
			SD-04 Samples															
			Lime	2.2.1														
			SD-05 Design Data															
			Job-Mix Formula	1.7.1	G													
			SD-06 Test Reports															
			Sampling and Testing	3.4														
			Field Density	3.5.3														
			SD-07 Certificates															
			Bituminous Material	2.2.2														
			Lime	2.2.1														
			Laboratory	2.2.4														
		32 11 23	SD-03 Product Data															
			Plant, Equipment, and Tools	2.4	G													
			SD-06 Test Reports															
			Initial Tests	2.3.1	G													
			In-Place Tests	3.12.1	G													
		32 12 13	SD-03 Product Data															

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		32 12 13	Local/Regional Materials	2.2.3														
			SD-06 Test Reports															
			Sampling and Testing	3.7														
		32 12 16.16	SD-02 Shop Drawings															
			Placement Plan	2.1	G													
			SD-03 Product Data															
			Diamond Grinding Plan	2.1.5	G													
			Mix Design	2.4	G													
			Contractor Quality Control	3.1	G													
			SD-04 Samples															
			Aggregates	2.2														
			Asphalt Cement Binder	2.3														
			SD-06 Test Reports															
			Aggregates	2.2	G													
			QC Monitoring	3.1.3.9														
			SD-07 Certificates															
			Asphalt Cement Binder	2.3	G													
			Laboratory Accreditation and	1.3.11														
			Validation															
		32 13 14.13	SD-01 Preconstruction Submittals															
			Proposed Techniques	3.1.2	G													
			Preliminary Proposed	2.13.2	G	DO												
			Proportioning															
			Pavement Quality Control Plan	1.3.3.3	G													
			SD-03 Product Data															
			Diamond Grinding Plan	2.1.7	G													

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		32 13 14.13	Dowels	2.9.1	G													
			Dowel Bar Assemblies	2.9.2	G													
			Equipment	2.11	G													
			Concrete Patching Mixture	2.1.5	G													
			SD-05 Design Data															
			Proportioning Studies	2.13.2	G	DO												
			SD-06 Test Reports															
			Batch Plant Manufacturer's	1.3.1	G													
			Inspection Report															
			Slipform Paver Manufacturer's	1.3.1	G													
			Inspection Report															
			Sampling and Testing	2.1.4.1	G													
			Diamond Grinding of PCC	2.1.7	G													
			Surfaces															
			Mixer Performance (Uniformity)	2.11.2.1	G													
			Testing															
			Repair Recommendations Plan	3.9.1	G													
			Paving Lot Report	3.12.5	G													
			SD-07 Certificates															
			Contractor Quality Control (CQC)	1.3.1	G													
			Staff															
			Laboratory Accreditation and	1.3.3	G													
			Validation															
			Commercial Laboratory	1.3.3	G													
			NRMCA Certificate of	2.11														
			Conformance															

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		32 13 14.13	Petrographer Resume	1.3.2	G													
			Licensed Surveyor	1.3.2	G													
			Concrete Batch Plant Operator	1.3.2	G													
		32 16 19	SD-03 Product Data															
			Concrete	2.1														
			Biodegradable Form Release	3.2														
			Agent															
			SD-06 Test Reports															
			Field Quality Control	3.8														
		32 84 24	SD-02 Shop Drawings															
			Irrigation sprinkler system	1.3														
			SD-03 Product Data															
			Piping materials	2.1														
			Valves	2.3														
			heads	2.2														
			Automatic controller	2.5														
			Solvent cement	2.1.4														
			Control wiring	2.6.1														
			Rain shut-off device	2.4.1.1														
			Freeze shut-off device	2.4.1.2														
			Valve boxes and lids	3.1.6.1														
			SD-05 Design Data															
			System pressure calculations	1.3														
			Irrigation requirements	1.3														
			SD-06 Test Reports															
			tests	1.7.1														

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		32 84 24	Pressure test	3.2.1														
			Operation test	3.2.2														
			SD-08 Manufacturer's Instructions															
			Automatic controller	2.5														
			heads	2.2														
			Piping materials	2.1														
			Valves	2.3														
			Solvent cement	2.1.4														
			Control wiring	2.6.1														
			Rain shut-off device	2.4.1.1														
			Freeze shut-off device	2.4.1.2														
			SD-10 Operation and Maintenance															
			Data															
			Piping materials	2.1	G													
			heads	2.2	G													
			Valves	2.3	G													
			Automatic controller	2.5	G													
			Rain shut-off device	2.4.1.1	G													
			Freeze shut-off device	2.4.1.2	G													
			SD-11 Closeout Submittals															
			Controller Charts	3.2.3														
		32 92 23	SD-03 Product Data															
			Fertilizer	2.4														
			SD-06 Test Reports															
			Topsoil composition tests	2.2.3														
			SD-07 Certificates															

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		32 92 23	sods	2.1														
		32 93 00	SD-01 Preconstruction Submittals															
			State Landscape Contractor's	1.4.3														
			License															
			Time Restrictions and Planting	1.6														
			Conditions															
			SD-03 Product Data															
			Composted Derivatives	2.3.4														
			Rotted Manure	2.3.5														
			Organic Mulch Materials	2.6.1														
			Mulch	2.6	G													
			Ground Stakes	2.7.1.1														
			Ground Stakes	2.7.1.1														
			Hose	2.9.1														
			Fertilizer	2.5														
			Staking Material	2.7.1														
			Antidesiccants	2.8														
			Photographs	1.4.4	G													
			SD-04 Samples															
			Mulch	2.6	G													
			SD-06 Test Reports															
			Topsoil composition tests	1.4.1														
			Topsoil composition tests	2.2.4														
			Percolation Test	1.4.5														
			SD-07 Certificates															
			Nursery certifications	1.4.2														

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		32 93 00	Nursery certifications	2.1.1														
		33 11 00	SD-01 Preconstruction Submittals															
			Connections	3.1.1	G													
			SD-03 Product Data															
			Pipe, Fittings, Joints and	2.1.1	G													
			Couplings															
			Valves	2.1.2	G													
			Valve Boxes	2.1.2.4	G													
			Fire Hydrants	2.1.4.1	G													
			Pipe Restraint	2.2.1	G													
			Tapping Sleeves	2.2.3	G													
			Backflow Preventer	1.4.2.1.1	G													
			Precast Concrete Thrust Blocks	2.2.1.2	G													
			Disinfection Procedures	3.2.4	G													
			SD-06 Test Reports															
			Backflow Preventer Tests	3.3.1.5	G													
			Hydrostatic Sewer Test	3.2.1.1.6														
			SD-07 Certificates															
			Pipe, Fittings, Joints and	2.1.1														
			Couplings															
			Lining	2.1.1.1.1														
			Lining for Fittings	2.1.1.2.1.2														
			Valves	2.1.2														
			Fire Hydrants	2.1.4.1														
			Backflow Prevention Training	1.4.2.1.1.2														
			Certificate															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Lackland DCF4

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		33 11 00	Backflow Tester	1.4.2.1.1.1														
			Backflow Certificate	2.1.6														
			Compound Type Meters	2.1.5.1														
			SD-08 Manufacturer's Instructions															
			Ductile-Iron Piping	2.1.1.1														
			PVC Piping	2.1.1.2.1.1														
			PVC Piping For Service Lines	2.1.1.2.2														
			Copper Pipe For Service Lines	2.1.1.3														
		33 30 00	SD-01 Preconstruction Submittals															
			Contractor's License	1.3.1	G													
			SD-02 Shop Drawings															
			Installation Drawings	3.1.1	G													
			SD-03 Product Data															
			Frames, Covers, and Gratings	2.2.8														
			Gravity Pipe	2.2.1														
			Pressure Pipe	2.2.2														
			SD-06 Test Reports															
			Negative Air Pressure Test	3.3.1.2.1	G													
			Tests For Pressure Lines	3.3.1.3	G													
			Deflection Testing	3.3.1.4														
			Leakage Testing	3.3.1.1														
			SD-07 Certificates															
			Portland Cement	2.2.4														
			Pre-Installation Inspection	3.3.3.1	G													
			Request															
			Post-Installation Inspection	3.3.3.2	G													

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Lackland DCF4

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		33 40 00	SD-07 Certificates															
			Hydrostatic Test on Watertight	2.5.1	G													
			Joints															
			Frame and Cover or Gratings	2.4.5	G													
			SD-08 Manufacturer's Instructions															
			Placing Pipe and Box Culvert	3.3	G													
			SD-11 Closeout Submittals															
			Post-Installation Inspection	3.8.2.1.3	G													
			Report															
		33 71 02	SD-02 Shop Drawings															
			Precast Underground Structures	1.6.1	G													
			SD-03 Product Data															
			Precast Concrete Structures	2.13.2.1	G													
			Sealing Material	2.13.2.4														
			Pulling-In Irons	3.5.3														
			Manhole Frames and Covers	2.13.3	G													
			Handhole Frames and Covers	2.13.4	G													
			Ductile Iron Frames and Covers	2.13.5														
			for Fire Lanes and Roadways															
			Composite/Fiberglass Handholes	2.13.7	G													
			Cable Supports	2.14	G													
			SD-06 Test Reports															
			Field Acceptance Checks and	3.17.1	G													
			Tests															
			Cable Installation Plan and	3.3	G													
			Procedure															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Lackland DCF4

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		33 71 02	SD-07 Certificates															
			Cable Installer Qualifications	1.6.2	G													
			Certificate of Conformance	1.6.3	G													
		33 82 00	SD-02 Shop Drawings															
			Telecommunications Outside	1.6.1.1	G													
			Plant															
			Telecommunications Entrance	1.6.1.2	G													
			Facility Drawings															
			Telecommunications Outside	1.6.1.1	G													
			Plant Butterfly Drawings Depicting															
			Manhole Duct Usage															
			SD-03 Product Data															
			Wire and Cable	2.8	G													
			Cable Splices, and Connectors	2.5	G													
			Closures	2.4	G													
			Building Protector Assemblies	2.2.1	G													
			Protector Modules	2.2.2	G													
			Spare Parts	1.8.2	G													
			SD-06 Test Reports															
			Pre-installation Tests	3.5.1	G													
			Acceptance Tests	3.5.2	G													
			Outside Plant Test Plan	1.6.3	G													
			SD-07 Certificates															
			Telecommunications Contractor	1.6.2.1	G													
			Key Personnel	1.6.2.2	G													
			Manufacturer's Qualifications	1.6.2.3	G													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Lackland DCF4

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		33 82 00	SD-08 Manufacturer's Instructions															
			Building Protector Assembly	2.2.1	G													
			Installation															
			Cable Tensions	3.1.6.1	G													
			Fiber Optic Splices	3.1.7.2	G													
			SD-09 Manufacturer's Field															
			Reports															
			Factory Reel Test Data	2.14.1	G													
			SD-10 Operation and Maintenance															
			Data															
			Telecommunications Outside	1.6.1.1	G													
			Plant (OSP)															
			SD-11 Closeout Submittals															
			Record Documentation	1.8.1	G													

SECTION 08 33 43

OVERHEAD COILING SMOKE CURTAINS FOR ELEVATOR DOORS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023) National Electrical Code
NFPA 105	(2022) Standard for Smoke Door Assemblies and Other Opening Protectives

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A17.1/CSA B44	(2019) Safety Code for Elevators and Escalators

ASTM INTERNATIONAL (ASTM)

ASTM A240/A240M	(2022b) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials

INTERNATIONAL CODE COUNCIL (ICC)

ICC-ES AC77	(2021) Smoke-Containment Systems Used with Fire-Resistance-Rated Elevator Hoistway Doors and Frames and at the Intersection of Elevator Lobby and Corridor

UNDERWRITERS LABORATORIES (UL)

UL 1784	(2012) Standard for Air Leakage Tests

1.2 SUBMITTALS

Submit under provisions of Section 01 33 00 SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Warranty Information

Submit confirmation and details of manufacturer's warranty, extended warranty, and replacement policies.

SD-02 Shop Drawings

Submit Manufacturer's approved shop drawings detailing the section and elevation views of each product to be installed.

Coordinate with locations listed on Contract Drawings.

SD-03 Product Data

Manufacturer's product information and data sheets for each product specified in this section, including:

Substrate Preparation Instructions and Recommendations

Installation Means and Methods

Recommendations and Requirements for Proper Storage and Handling

1.3 SECTION INCLUDES

Overhead coiling smoke curtains for elevator doors.

1.4 RELATED SECTIONS

a. Section 14 24 23.02 HYDRAULIC PASSENGER ELEVATORS

b. Section 28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE

1.5 COORDINATION

a. Coordinate smoke curtain assemblies with power, signal, fire-alarm, and smoke-detection systems specified in Division 26 and Division 28.

b. Coordinate elevator smoke-protective curtain assemblies with elevator hoistway door frames specified in Division 14.

c. Coordinate smoke-protective curtain assemblies with ceilings for operational clearances and maintenance access requirements.

d. Coordinate smoke-protective curtain assemblies with walls for support requirements, rating continuity above ceilings, and recessed wall switches.

e. Coordinate requirements for metal supports required for smoke-protective curtain assemblies.

1.6 CLOSEOUT SUBMITTALS

a. Operation and Maintenance Data: For smoke-protective curtain assemblies to include in emergency, operation, and maintenance manuals.

b. Field quality-control reports for required testing.

1.7 QUALITY ASSURANCE

Qualifications:

a. Manufacturer: Minimum of seven (7) years experience in manufacturing

draft-control curtain assemblies at a facility in the United States that have been successfully installed in compliance with requirements of authorities having jurisdiction.

b. Installers: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.8 DELIVERY, STORAGE AND HANDLING

a. Deliver, store and handle materials and products in accordance with the manufacturer's instructions and recommendations and industry standards.

b. Store all materials in the manufacturer's original packaging until ready for installation. Protect all products from damage or exposure to adverse weather conditions.

1.9 PROJECT CONDITIONS

Prior to fabrication, verify that dimensions are consistent with those found in the construction drawings. Where discrepancies exist, confirm the proper dimensions with the Architect before proceeding with work.

1.10 WARRANTY INFORMATION

Manufacturer Warranty: Provide manufacturer's warranty covering parts and labor costs to repair or replace part that fail to perform.

Warranty Period: Parts and labor warranty for 12 months from date of Substantial Completion or date of purchase, whichever comes first.

PART 2 PRODUCTS

2.1 SMOKE-PROTECTIVE CURTAIN ASSEMBLIES FOR ELEVATOR ENTRANCES

a. Alarm-activated transparent-film smoke curtain assembly complying with ICC-ES AC77 and NFPA 105.

b. Smoke-Protective Curtain Assemblies: Provide smoke-protective curtains listed and labeled with the letter "S" by a qualified testing agency for smoke- and draft-control based on testing in accordance with UL 1784 without an artificial bottom seal; with maximum air-leakage rate of 3.0 cfm/sq. ft. (0.01524 cu. m/s x sq. m) of opening at 0.10 inch wg (24.9 Pa) for both ambient and elevated temperature tests in accordance with ICC-ES AC77.

c. Curtain Materials: Provide manufacturer's standard curtain complying with each of the following:

(1) Flame-Spread and Smoke-Developed Indexes: No greater than 25 and 50, respectively, when tested in accordance with ASTM E84.

(2) Transparent-Film Curtain: Provide curtain of transparent film in compliance with vision panel requirements of ASME A17.1/CSA B44.

(3) Screen Reinforcement: Provide film with reinforcement to limit deflection or tearing.

d. Curtain Egress: Provide curtain that is operable from the egress side

without use of keys, tools, special knowledge, or effort in excess of the opening force requirements of authorities having jurisdiction.

(1) Egress Switch: Include switch to rewind screen into housing to comply with egress requirements of ASME A17.1/CSA B44.

i. Switch Size and Color: Provide switch no less than 4 by 4 inches and in contrasting color with curtain.

ii. Switch Operation: Provide switch operable with a closed fist or a loose grip, not requiring finger movements in compliance with the requirements of authorities having jurisdiction.

iii. Switch Location: Mount 42 inches above finished floor level in compliance with forward reach requirements of authorities having jurisdiction.

(2) Manual Egress: Provide curtain allowing fail-safe manual egress with less than 15 pounds release pressure in the direction of travel.

i. Opening Size: Provide curtain with manual egress opening of at least 32 inches in compliance with the requirements of authorities having jurisdiction.

e. Curtain Attachment: Provide curtain that forms a pressure-resisting seal by magnetic adhesion with flexible multi-pole magnetic strips attached to longitudinal edges of film with low modulus silicone adhesive.

(1) Curtain Installation: Provide curtain attachment systems that do not require modification of the elevator jamb including direct or mechanical attachment.

(2) Elevator Door Frames: Type 430 ferritic stainless steel elevator door frames to create seal with curtain by magnetic adhesion.

i. Auxiliary Rails: Provide 16-gauge ASTM A240/A240M, Type 430, ferritic stainless steel vertical rails above elevator door head to create seal with curtain by magnetic adhesion no less than 2 inches (51 mm) wide and 1 inch (25 mm) deep.

(3) Auxiliary Rails: Provide vertical rails to create seal with curtain by magnetic adhesion.

i. Material: 16-gauge ASTM A240/A240M, Type 430, ferritic stainless steel.

ii. Size: At least 2 inches (51 mm) wide, 1 inch (25 mm) deep.

f. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

g. Curtain Housing: Provide sheet metal housings containing support rollers and associated electronics.

(1) Coordinate operator wiring requirements and electrical characteristics with building electrical system.

(2) Housing includes electrical junction box that does require the removal of any part of the building in accordance with NFPA 70.

(3) Provide electrical junction box access through housing in the open condition.

(4) Curtain housing to contain all components required for operation.

(5) Housing Finish: Prime finish for painting to match ceiling.

h. Curtain Operation: Controlled descent automatically by fail-safe, gravity-closing deployment and motorized rewind.

(1) Curtain deploys on activation of one of the following:

i. Local Smoke Detector.

iii. Testing Key Switch

(2) Release Mechanism: Labelled as defined by UL864.

2.2 ACCESSORIES

a. End of Line Diode: Provide manufacturer's standard diode device installed at smoke detector to monitor the circuit.

(1) Power Requirements: 3.9 Volts, 2 Watts.

PART 3 EXECUTION

3.1 EXAMINATION

a. Examine substrates upon which work will be installed.

(1) Verify related work performed under other sections is complete and in accordance with Shop Drawings.

(2) Verify wall surfaces and elevator door frames are acceptable for installation of smoke containment system components.

b. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

c. Proceed with installation only after unsatisfactory conditions have been corrected.

d. Verify that locations of concealed reinforcements have been clearly marked for the installer.

e. Locate reinforcement points and clearly mark their locations if not already done.

3.2 PREPARATION

a. Clean surfaces prior to installation.

b. Prepare surfaces as recommended by the manufacturer for achieving optimal results.

3.3 INSTALLATION MEANS AND METHODS

a. Install in accordance with manufacturer's current installation instructions and industry recognized best practices.

b. Install in accordance with all code bodies having jurisdiction.

3.4 CLEANING AND PROTECTION

a. Clean and remove all stains, grime, or other soils using soap and water. Only use detergents approved by the manufacturer for use on the finishes specified. Do not use acid solutions, steel wool, and other harsh abrasives.

b. Damaged products must be repaired or replaced prior to substantial completion.

c. Protect installed products until completion of work specified in this section.

3.5 FIELD QUALITY CONTROL

a. Field Test: Follow manufacturer's cycle test procedures.

(1) Notify Owner's Representative, local Fire Marshal, alarm sub-contractor and elevator sub-contractor or service company minimum one week in advance of scheduled testing.

(2) Complete maintenance service record.

3.6 DEMONSTRATION

Demonstrate required testing and maintenance procedures to Owner's Representative.

3.7 MAINTENANCE AND TESTING

a. Perform minimum semi-annual maintenance and testing on each smoke containment system as required by the manufacturer's warranty, code agency evaluation reports, and as required by local authority having jurisdiction.

(1) Retain permanent record of tests.

b. Fire Event: Owner shall engage a qualified inspector to assess unit(s) after exposure to a fire event.

-- End of Section --

SECTION 08 71 00

DOOR HARDWARE

AMENDMENT 0002

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E283	(2019) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.1	(2021) Butts and Hinges
ANSI/BHMA A156.3	(2020) Exit Devices
ANSI/BHMA A156.4	(2013) Door Controls - Closers
ANSI/BHMA A156.5	(2020) Cylinder and Input Devices for Locks
ANSI/BHMA A156.6	(2021) Architectural Door Trim
ANSI/BHMA A156.7	(2016) Template Hinge Dimensions
ANSI/BHMA A156.8	(2021) Door Controls - Overhead Stops and Holders
ANSI/BHMA A156.10	(2017) Power Operated Pedestrian Doors
ANSI/BHMA A156.13	(2017) Mortise Locks & Latches Series 1000
ANSI/BHMA A156.16	(2018) Auxiliary Hardware
ANSI/BHMA A156.18	(2020) Materials and Finishes
ANSI/BHMA A156.21	(2019) Thresholds
ANSI/BHMA A156.22	(2021) Gasketing
ANSI/BHMA A156.26	(2012) Continuous Hinges
ANSI/BHMA A156.31	(2013) Electric Strikes and Frame Mounted Actuators
ANSI/BHMA A156.36	(2010) Auxiliary Locks

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023) National Electrical Code
NFPA 72	(2022; ERTA 22-1) National Fire Alarm and Signaling Code
NFPA 80	(2022) Standard for Fire Doors and Other Opening Protectives
NFPA 101	(2021; TIA 21-1) Life Safety Code
NFPA 252	(2022) Standard Methods of Fire Tests of Door Assemblies

STEEL DOOR INSTITUTE (SDI/DOOR)

SDI/DOOR A250.8	(2017) Specifications for Standard Steel Doors and Frames

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

UNDERWRITERS LABORATORIES (UL)

UL Bld Mat Dir	(updated continuously online) Building Materials Directory

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Manufacturer's Detail Drawings; G

Hardware Schedule; G

Keying System; G

SD-03 Product Data

Hardware Items; G

SD-08 Manufacturer's Instructions

Installation

SD-10 Operation and Maintenance Data

Hardware Schedule Items, Data Package 1; G

SD-11 Closeout Submittals

Key Bitting

1.3 SHOP DRAWINGS

Submit manufacturer's detail drawings indicating all hardware assembly components and interface with adjacent construction. Indicate power components and wiring coordination for electrified hardware. Base shop drawings on verified field measurements.

1.4 PRODUCT DATA

Indicate fire-ratings at applicable components. Provide documentation of ABA/ADA accessibility compliance of applicable components, as required by 36 CFR 1191 Appendix D - Technical.

1.5 HARDWARE SCHEDULE

Provide Hardware Item List and Hardware Schedule containing the following information, and additional information as needed to identify the complete make up of each hardware set and its application to each opening:

1.5.1 Hardware Item List:

a. Hardware Type

b. Item Number

c. Quantity

d. Size(s)

e. Reference Publication / Type Number

f. Manufacturer's Name / Catalog Number

g. Key Control Symbols

h. UL Mark (If fire rated and listed)

i. BHMA Finish(es)

j. Remarks

1.5.2 Hardware Schedule

a. Hardware Set Number

b. Opening Number(s)

c. Opening Description (single/double leaf, hand, size, door/frame material)

d. Fire Rating

e. Sound Rating

f. Hardware Items

g. Quantity

h. Size

i. BHMA Finish

j. Remarks

In addition, submit hardware schedule data package 1 in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.6 KEY BITTING CHART REQUIREMENTS

1.6.1 Requirements

Submit key bitting charts to the Contracting Officer prior to completion of the work. Include:

a. Complete listing of all keys (e.g. AA1 and AA2).

b. Complete listing of all key cuts (AA1-123456, AA2-123458).

c. Tabulation showing which key fits which door.

d. Copy of floor plan showing doors and door numbers.

e. Listing of 20 percent more key cuts than are presently required in each master system.

1.7 QUALITY ASSURANCE

1.7.1 Hardware Manufacturers and Modifications

Provide, as far as feasible, locks, hinges, and closers of one lock, hinge, or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified.

1.7.2 Key Shop Drawings Coordination Meeting

Prior to the submission of the key shop drawing, the Contracting Officer, Contractor, Door Hardware Subcontractor, using Activity and Base Locksmith must meet to discuss and coordinate key requirements for the facility.

1.8 DELIVERY, STORAGE, AND HANDLING

Deliver hardware in original individual containers, complete with necessary appurtenances including fasteners and instructions. Mark each individual container with item number as shown on hardware schedule. Deliver permanent keys and removable cores to the Contracting Officer, either directly or by certified mail. Deliver construction master keys with the locks.

PART 2 PRODUCTS

2.1 TEMPLATE HARDWARE

Hardware applied to metal or to prefinished doors must be manufactured using a template. Provide templates to door and frame manufacturers in accordance with ANSI/BHMA A156.7 for template hinges. Coordinate hardware items to prevent interference with other hardware.

2.2 HARDWARE FOR FIRE DOORS AND EXIT DOORS

Provide all hardware necessary to meet the requirements of NFPA 72 for door alarms, NFPA 80 for fire doors, NFPA 101 for exit doors, NFPA 252 for fire tests of door assemblies, ABA/ADA accessibility requirements, and all other requirements indicated, even if such hardware is not specifically mentioned in paragraph HARDWARE SCHEDULE. Provide Underwriters Laboratories, Inc. labels for such hardware in accordance with UL Bld Mat Dir or equivalent labels in accordance with another testing laboratory approved in writing by the Contracting Officer.

2.3 HARDWARE ITEMS

Clearly and permanently mark with the manufacturer's name or trademark, hinges, pivots, locks, latches, exit devices, bolts and closers where the identifying mark is visible after the item is installed. For closers with covers, the name or trademark may be beneath the cover. Coordinate electrified door hardware components with corresponding components specified in Division 28 ELECTRONIC SECURITY SYSTEMS (ESS).

2.3.1 Hinges

Provide in accordance with ANSI/BHMA A156.1. Provide hinges that are 4-1/2 by 4-1/2 inch unless otherwise indicated. Construct loose pin hinges for interior doors and reverse-bevel exterior doors so that pins are non-removable when door is closed.

2.3.2 Continuous Hinges

Where continuous hinges are required, provide in accordance with ANSI/BHMA A156.26.

2.3.3 Locks and Latches

a. At exterior locations provide locksets of full stainless steel type 302 or 304 construction including fronts, strike, escutcheons, knobs, bolts and all interior working parts. Marine Grade I, fully non-ferrous.

b. In non-air-conditioned interior environments or humid interior environments, provide interior locksets on the same Marine Grade I, fully non-ferrous as exterior locksets.

2.3.3.1 Mortise Locks and Latches

Provide in accordance with ANSI/BHMA A156.13, Series 1000, Operational Grade 1, Security Grade 2. Provide mortise locks with escutcheons not less than 7 by 2-1/4 inch with a bushing at least 1/4 inch long. Cut escutcheons to fit cylinders and provide trim items with straight, beveled, or smoothly rounded sides, corners, and edges. Provide knobs and roses of mortise locks with screwless shanks and no exposed screws.

2.3.3.2 Auxiliary Locks

Provide in accordance with ANSI/BHMA A156.36, Grade 1.

2.3.4 Exit Devices

Provide in accordance with ANSI/BHMA A156.3, Grade 1. Provide adjustable strikes for rim type and vertical rod devices. Provide open back strikes for pairs of doors with mortise and vertical rod devices. Provide touch bars in lieu of conventional crossbars and arms. Provide escutcheons not less than 7 by 2-1/4 inch.

Use stainless steel or bronze base metal with plated finishes. Also include stainless steel fasteners and screws.

2.3.5 Cylinders and Cores

Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Provide cylinders and cores with seven pin tumblers. Provide cylinders from the products of one manufacturer, and provide cores from the products of one manufacturer.

Submit a core code sheet with the cores. The cores shall be master keyed to the existing system (Structure #538121) for this project. Provide construction interchangeable cores and permanent cores for all locks and cylinders. The hardware supplier shall meet with the Lackland Air Force Base Civil Engineer Locksmith and a field representative of the lock manufacturer to determine all permanent keying requirements at the project site, prior to ordering permanent cores. All permanent cores and keys shall be shipped directly to the CE Locksmith via Certified Mail or restricted delivery. To the greatest extent possible, the same manufacturer shall manufacture all locks, latch sets, privacy sets, cylinders and permanent cores.

2.3.5.1 Keying System

Provide an extension of the existing great grand master key system and a construction master key system with construction interchangeable cores. All permanent cores shall have 7 pin tumblers and shall be keyed as per the base Locksmith to the existing Great Grand Master Small Format Interchangeable Core Key system. Provide two (2) complete full size copies of the floor plan sheets which list the door number and permanent key symbol at each opening. The hardware supplier shall meet with the Lackland Air Force Base Civil Engineer Locksmith and a field representative of the lock manufacturer to determine all permanent keying requirements at the project site, prior to ordering permanent cores. All permanent cores and keys shall be shipped directly to the CE Locksmith via Certified Mail or restricted delivery.

2.3.6 Electrified Hardware

Comply with the requirements of NFPA 70 for wiring of electrified hardware.

2.3.6.1 Electric Strikes and Frame Mounted Actuators

Provide in accordance with ANSI/BHMA A156.31, Grade 1. Provide electric strikes and actuators as required to meet operational requirements. Provide electric strikes that remain secure during power failure. Provide

a separate power supply for electric strikes, other locking devices and ancillary parts. Provide strikes and actuators with a minimum opening force of 2300 pounds.

Provide facility interface devices that use direct current (dc) power to energize the solenoids. Provide electric strikes and actuators that incorporate end-of-line resistors to facilitate line supervision by the system. If not incorporated into the electric strike or local controller, provide metal oxide resistors (MOVs) to protect the controller from reverse current surges.

2.3.6.1.1 Solenoid

Provide actuating solenoid for strikes and actuators that are rated for continuous duty, cannot dissipate more than 12 Watts and must operate on 12 or 24 Volts dc. Inrush current cannot exceed 1 ampere and the holding current cannot be greater than 500 milliamperes. Actuating solenoid must move from fully secure to fully open positions in less than 500 milliseconds.

2.3.6.1.2 Signal Switches

Provide strikes and actuators with signal switches to indicate to the system when the bolt is not engaged or the strike mechanism is unlocked. Signal switches must report a forced entry to the system.

2.3.6.1.3 Tamper Resistance

Provide strike guards that prevent tampering with the latch bolt of the locking hardware or the latch bolt keeper of the electric strike. Strike guards to bolt through the door using tamper resistant screws. Provide strike guards made of 1/8 inch thick brass and that are 11-1/14 inch high by 1-5/8 inch wide, with a minimum 5/32 inch wide offset.

2.3.6.1.4 Coordination

Provide electric strikes and actuators of a size, weight and profile compatible with each specified door frame. Field verify installation clearances prior to procurement.

2.3.6.1.5 Mounting Method

Provide electric strikes and actuators suitable for use with single and double doors, with mortise or rim type hardware specified, and for right or left hand mounting as specified. In double door installations, locate the lock in the active leaf and monitor the fixed leaf.

2.3.6.2 Door Position Switches

Provide under provisions of Section 28 10 05 ACCESS CONTROL SYSTEMS (ACS).

2.3.6.3 Power Operated Pedestrian Door Hardware

Provide in accordance with ANSI/BHMA A156.10, Grade 1.

2.3.7 Keying System

Provide a construction master keying system and construction interchangeable cores.

The Government will provide permanent cylinders with cores and keys for mortise locksets, auxiliary locks, and exit devices. Provide cylinders of Grade 1 products from one manufacturer. Notify the Contracting Officer 90 days prior to the required delivery of the cylinders. Provide temporary cores and keys for the Contractor's use during construction, and for testing of locksets.

2.3.8 Lock Trim

Provide cast, forged, or heavy wrought construction and commercial plain design for lock trim.

2.3.8.1 Lever Handles

Provide lever handles where indicated in the Hardware Schedule. Provide in accordance with ANSI/BHMA A156.3 for mortise locks of lever handles for exit devices. Provide lever handle locks with a breakaway feature (such as a weakened spindle or a shear key) to prevent irreparable damage to the lock when force in excess of that specified in ANSI/BHMA A156.13 is applied to the lever handle. Provide lever handles return to within 1/2 inch of the door face.

2.3.9 Keys

Furnish one file key, one duplicate key, and one working key for each key change and for each master and grand master keying system. Furnish one additional working key for each lock of each keyed-alike group. Furnish a quantity of key blanks equal to 20 percent of the total number of file keys. Stamp each key with appropriate key control symbol and "U.S. property - do not duplicate." Do not place room number on keys.

2.3.10 Door Bolts

Provide in accordance with ANSI/BHMA A156.16. Provide dustproof strikes for bottom bolts, except at doors having metal thresholds. Provide automatic latching flush bolts in accordance with ANSI/BHMA A156.3, Type 25.

2.3.11 Closers

Provide in accordance with ANSI/BHMA A156.4, Series C02000, Grade 1, with PT 4C. Provide with brackets, arms, mounting devices, fasteners, full size covers, except at storefront mounting, and other features necessary for the particular application. Size closers in accordance with manufacturer's printed recommendations, or provide multi-size closers, Sizes 1 through 6, and list sizes in the Hardware Schedule. Provide manufacturer's 10 year warranty.

Use stainless steel inside bracketed or door mounted closers on exterior doors. Non-ferrous closers, such as aluminum or cast bronze, are permissible where door utilization is minimal. On interior doors use closers of 302 or 304 stainless steel or non-ferrous materials. On surface-mounted closers use or apply rust inhibiting finish on all ferrous parts. Also apply this finish on concealed closers.

2.3.11.1 Identification Marking

Engrave each closer with manufacturer's name or trademark, date of manufacture, and manufacturer's size designation in locations that will be

visible after installation.

2.3.12 Overhead Holders

Provide in accordance with ANSI/BHMA A156.8.

2.3.13 Door Protection Plates

Provide in accordance with ANSI/BHMA A156.6.

2.3.13.1 Sizes of Kick Plates

2 inch less than door width for single doors; 1 inch less than door width for pairs of doors. Provide 10 inch kick plates for flush doors.

2.3.14 Door Stops and Silencers

Provide in accordance with ANSI/BHMA A156.16. Silencers Type L03011. Provide three silencers for each single door, two for each pair.

2.3.15 Thresholds

Provide in accordance with ANSI/BHMA A156.21. Use J35100, with vinyl or silicone rubber insert in face of stop, for exterior doors opening out, unless specified otherwise.

2.3.16 Weatherstripping Gasketing

Provide in accordance with ANSI/BHMA A156.22. Provide the type and function designation where specified in paragraph HARDWARE SCHEDULE. Provide a set to include head and jamb seals and, for pairs of doors, astragals. Air leakage of weatherstripped doors not to exceed 0.5 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E283. Provide weatherstripping with one of the following:

2.3.16.1 Extruded Aluminum Retainers

Extruded aluminum retainers not less than 0.050 inch wall thickness with vinyl, neoprene, silicone rubber, or polyurethane inserts. Provide bronze anodized aluminum.

2.3.17 Rain Drips

Provide in accordance with ANSI/BHMA A156.22. Provide extruded aluminum rain drips, not less than 0.08 inch thick, bronze anodized finish. Provide rain drips with a 4 inch overlap on each side of each exterior door. Set drips in sealant and fasten with stainless steel screws.

2.3.17.1 Door Rain Drips

Approximately 1-1/2 inch high by 5/8 inch projection. Align bottom with bottom edge of door.

2.3.17.2 Overhead Rain Drips

Approximately 1-1/2 inch high by 2-1/2 inch projection. Align bottom with door frame rabbet.

2.3.18 Auxiliary Hardware (Other than locks)

Provide in accordance with ANSI/BHMA A156.16, Grade 1.

2.3.19 Special Tools

Provide special tools, such as spanner and socket wrenches and dogging keys, as required to service and adjust hardware items.

2.4 FASTENERS

Provide fasteners of type, quality, size, and quantity appropriate to the specific application. Fastener finish to match hardware. Provide stainless steel or nonferrous metal fasteners in locations exposed to weather. Verify metals in contact with one another are compatible and will avoid galvanic corrosion when exposed to weather.

2.5 FINISHES

Provide in accordance with ANSI/BHMA A156.18. Provide hardware in BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except aluminum paint finish for surface door closers, and except BHMA 652 finish (satin chromium plated) for steel hinges. Provide hinges for exterior doors in stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Furnish exit devices in BHMA 626 finish in lieu of BHMA 630 finish except where BHMA 630 is specified under paragraph HARDWARE SETS. Match exposed parts of concealed closers to lock and door trim. Match hardware finish for aluminum doors to the doors.

2.6 KEY CABINET AND CONTROL SYSTEM

Provide in accordance with ANSI/BHMA A156.5. Type required to yield a capacity (number of hooks) 50 percent greater than the number of key changes used for door locks.

PART 3 EXECUTION

3.1 INSTALLATION

Provide hardware in accordance with manufacturers' printed installation instructions. Fasten hardware to wood surfaces with full-threaded wood screws or sheet metal screws. Provide machine screws set in expansion shields for fastening hardware to solid concrete and masonry surfaces. Provide toggle bolts where required for fastening to hollow core construction. Provide through bolts where necessary for satisfactory installation.

3.1.1 Weatherstripping Installation

Provide full contact, weathertight seals that allow operation of doors without binding the weatherstripping.

3.1.1.1 Stop Applied Weatherstripping

Fasten in place with color matched sheet metal screws not more than 9 inch on center after doors and frames have been finish painted.

3.1.2 Threshold Installation

Extend thresholds the full width of the opening and notch end for jamb stops. Set thresholds in a full bed of sealant and anchor to floor with cadmium-plated, countersunk, steel screws in expansion sleeves. For aluminum thresholds placed on top of concrete surfaces, coat the underside surfaces that are in contact with the concrete with fluid applied waterproofing as a separation measure prior to placement.

3.2 FIRE DOORS AND EXIT DOORS

Provide hardware in accordance with NFPA 72 for door alarms, NFPA 80 for fire doors, NFPA 101 for exit doors, and NFPA 252 for fire tests of door assemblies.

3.3 HARDWARE LOCATIONS

Provide in accordance with SDI/DOOR A250.8, unless indicated or specified otherwise.

a. Kick Plates: Push side of single-acting doors. Both sides of double-acting doors.

3.4 KEY CABINET AND CONTROL SYSTEM

Locate where directed. Tag one set of file keys and one set of duplicate keys. Place other keys in appropriately marked envelopes, or tag each key. Provide complete instructions for setup and use of key control system. On tags and envelopes, indicate door and room numbers or master or grand master key.

3.5 FIELD QUALITY CONTROL

After installation, protect hardware from paint, stains, blemishes, and other damage until acceptance of work. Submit notice of testing 15 days before scheduled, so that testing can be witnessed by the Contracting Officer. Adjust hinges, locks, latches, bolts, holders, closers, and other items to operate properly. Demonstrate that permanent keys operate respective locks, and give keys to the Contracting Officer. Correct, repair, and finish, errors in cutting and fitting and damage to adjoining work.

3.6 HARDWARE SETS

Provide hardware for aluminum doors under this section. Deliver Hardware templates and hardware, except field applied hardware, to the aluminum door and frame manufacturer for use in fabricating doors and frames.

Set: 1.0

Doors: 101A, 101B, 101C, 101D, 119, 121, 122A, 124A, 125, 126, 171A
Description: Pair - ASF Exterior - Rim Latch Retraction x DT - HD Par Spring Stop Closer

2 Continuous Hinge (A51031B) CFM(height)SLF-HD1 PT PE
1 Removable Mullion (Type 22) KRM200 - DOOR HEIGHT 600 YA
1 Rim Exit (Type 1, 02, E01, E04) 7105 B MELR EO Temp Core 630 YA
1 Exit Device (Type 1, 03, E01, E04) 7105 B MELR 121NL Temp Core 630 YA
3 Interchangeable Core (E09241) SFIC 26 MC
1 Mortise Mullion Cylinder Housing (E09251) As required SFIC 626 YA
2 Door Pull (J402) BF158 US32D RO
2 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
1 Threshold (J36100) 2009APK PE
2 Sweep (R3D534) 345AV PE
2 Frame Harness QC-C1500P MK
2 Door Harness QC-C___ MK
2 Position Switch (E08) DPS-M-BK SU
1 Power Supply* AQDxx - TAA (TO SUIT) SU
2 Electric Power Transfer* EL-CEPT 630 SU

Notes: Confirm hardware compatibility with door manufacturer. Wide stile required.
*Waiver may be required to comply with Trade Agreement Act.
o Perimeter/meeting stile seals by frame/door supplier.
Confirm hardware compatibility with aluminum door manufacturer. Wide stile required.

Doors allow free entry during business hours by electric dogging. After hours latches release and entry is by manual key only at active leaf. No card reader. Upon loss of power, doors will remain secure. Free egress at all times. Coordinate operation with security.

Set: 2.0

Doors: 100A, 100B
Description: Pair - FRP Exterior - Rim Latch Retraction x DT - HD Par Spring Stop Closer

2 Continuous Hinge (A31031G) CFM (height) HD1 PT PE
1 Removable Mullion (Type 22) KRM200 - DOOR HEIGHT 600 YA
1 Rim Exit (Type 1, 02, E01, E04) 7105 B MELR EO Temp Core 630 YA
1 Exit Device (Type 1, 03, E01, E04) 7105 B MELR 121NL Temp Core 630 YA
3 Interchangeable Core (E09241) SFIC 26 MC
1 Mortise Mullion Cylinder Housing (E09251) As required SFIC 626 YA
2 Door Pull (J402) BF158 US32D RO
2 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
1 Threshold (J36100) 2009APK PE
1 Gasketing (R3E164) 303AS (HEAD/JAMBS) PE
2 Sweep (R3D534) 345AV PE
2 Frame Harness QC-C1500P MK

2 Door Harness QC-C___ MK
2 Position Switch (E08) DPS-M-BK SU
1 Power Supply* AQDxx - TAA (TO SUIT) SU
2 Electric Power Transfer* EL-CEPT 630 SU

Notes: Confirm hardware compatibility with door manufacturer. Wide stile required.
*Waiver may be required to comply with Trade Agreement Act.
o Perimeter/meeting stile seals by frame/door supplier.
Confirm hardware compatibility with aluminum door manufacturer. Wide stile required.

Doors allow free entry during business hours by latch retraction. After hours latches release and entry is by manual key only at active leaf. No card reader. Upon loss of power, doors will remain secure. Free egress at all times. Coordinate operation with security.

Set: 3.0

Doors: 134, 171B, 171C
Description: Sgle - Exterior - ASF - NL - Latch Retraction - Closer/Stop

1 Continuous Hinge (A31031G) CFM (height) HD1 PT PE
1 Exit Device (Type 1, 03, E01, E04) 7105 B MELR 121NL Temp Core 630 YA
2 Interchangeable Core (E09241) SFIC 26 MC
1 Door Pull (J402) BF158 US32D RO
1 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
1 Threshold (J36100) 2009APK PE
1 Rain Guard (R0Y976) 346C PE
1 Sweep (R3D534) 345AV PE
1 Frame Harness QC-C1500P MK
1 Door Harness QC-C___ MK
1 Position Switch (E08) DPS-M-BK SU
1 Power Supply* AQDxx - TAA (TO SUIT) SU
1 Electric Power Transfer* EL-CEPT 630 SU

Notes: Confirm hardware compatibility with door manufacturer. Wide stile required.
*Waiver may be required to comply with Trade Agreement Act.
o Perimeter/meeting stile seals by frame/door supplier.
Confirm hardware compatibility with aluminum door manufacturer. Wide stile required.

Doors allow free entry during business hours by latch retraction. After hours latches release and entry is by manual key only at active leaf. No card reader. Upon loss of power, doors will remain secure. Free egress at all times. Coordinate operation with security.

Set: 4.0

Doors: 151A
Description: Pair- Exterior - Rim Storeroom - HD Par Spring Stop Closer

2 Continuous Hinge (A31031G) CFM (height) HD1 PE
1 Removable Mullion (Type 22) KRM200 - DOOR HEIGHT 600 YA
1 Exit Device (Type 1, 03) 7105 121NL Temp Core 630 YA
1 Exit Device (Type 1, 02) 7105 EO Temp Core 630 YA
3 Interchangeable Core (E09241) SFIC 26 MC

1 Mortise Mullion Cylinder Housing (E09251) As required SFIC 626 YA
2 Door Pull (J402) BF158 US32D RO
2 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
2 Kick Plate (J102) K1050 10" CSK US32D RO
1 Threshold (J36100) 2009APK PE
1 Rain Guard (R0Y976) 346C PE
1 Gasketing (R3E164) 303AS (HEAD/JAMBS) PE
2 Sweep (R3D534) 345AV PE
2 Astragal (R3E734) 29310CS PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 5.0

Doors: 148, 172A
Description: Pair- Exterior - Rim Storeroom - HD Par Spring Stop Closer - High Abuse

2 Continuous Hinge (A31031G) CFM (height) HD1 PE
1 Removable Mullion (Type 22) KRM200 - DOOR HEIGHT 600 YA
<AM#0002>~~1~~2**</AM#0002>** Exit Device **<AM#0002>**~~(Type 1, 03) 7105 121NL Temp Core~~E028 MLR Exit Device**</AM#0002>** 630 YA
<AM#0002>~~1 Exit Device (Type 1, 02) 7105 EO Temp Core 630 YA~~
</AM#0002>3 Interchangeable Core (E09241) SFIC 26 MC
1 Mortise Mullion Cylinder Housing (E09251) As required SFIC 626 YA
2 Door Pull (J402) BF158 US32D RO
2 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
2 Armor Plate (J101) K1050 36" CSK US32D RO
1 Threshold (J36100) 2009APK PE
1 Rain Guard (R0Y976) 346C PE
1 Gasketing (R3E164) 303AS (HEAD/JAMBS) PE
2 Sweep (R3D534) 345AV PE
2 Astragal (R3E734) 29310CS PE**<AM#0002>**
2 Position Switch (E08) DPS-M-BK SU
2 Power Supply* AQDxx - TAA (TO SUIT) SU
2 Electric Power Transfer* EL-CEPT 630 SU**</AM#0002>**

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 6.0

Doors: 151B
Description: Sgle - Exterior - Rim Storeroom - HD Par Spring Stop Closer

1 Continuous Hinge (A31031G) CFM (height) HD1 PE
1 Exit Device (Type 1, 03) 7105 121NL Temp Core 630 YA
2 Interchangeable Core (E09241) SFIC 26 MC
1 Door Pull (J402) BF158 US32D RO
1 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Threshold (J36100) 2009APK PE
1 Rain Guard (R0Y976) 346C PE
1 Gasketing (R3E164) 303AS (HEAD/JAMBS) PE
1 Sweep (R3D534) 345AV PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 7.0

Doors: 150A, 150B
Description: Pair - Exterior - Storeroom - HD Par Spring Stop Closer

2 Continuous Hinge (A31031G) CFM (height) HD1 PE
2 Flush Bolt (L04251/L04261) 555/557 (TO SUIT) US26D RO
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surf Overhead Stop (CO2541) 9-X36 630 RF
1 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
2 Kick Plate (J102) K1050 10" CSK US32D RO
1 Threshold (J36100) 2009APK PE
1 Gasketing (R0Y264) 379CS PE
1 Rain Guard (R0Y976) 346C PE
2 Sweep (R3D534) 345AV PE
1 Astragal (R0Y634) 357SP PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 7.1
Doors: 236, 238, 239
Description: Pair - Exterior - Storeroom - HD Par Spring Stop Closer

2 Continuous Hinge (A31031G) CFM (height) HD1 PE
2 Flush Bolt (L04251/L04261) 555/557 (TO SUIT) US26D RO
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surf Overhead Stop (CO2541) 9-X36 630 RF
1 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
2 Kick Plate (J102) K1050 10" CSK US32D RO
1 Threshold (J36100) 2009APK PE
1 Gasketing (R0Y264) 379CS PE
1 Astragal (R0Y634) 357SP PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 8.0

Doors: 219B, 227B
Description: Sgle - Exterior - Passage - HD Par Spring Stop Closer

3 Continuous Hinge (A31031G) CFM (height) HD1 PE
1 Passage Latch (F01) AUR 8801FL 630 YA
1 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Threshold (J36100) 2009APK PE
1 Gasketing (R3E164) 303AS (HEAD/JAMBS) PE
1 Sweep (R3D534) 345AV PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 9.0

Doors: 122B, 124B, 200A, 200B, 200CA, 200CB, 200DA, 200DB, 300A, 300B, 300CA, 300CB, 300DA, 300DB
Description: Sgle - Rated - Passage Exit - Stair

3 Hinge (A8111) T4A3786 US26D MK
1 Exit Device (Type 1, 14) 7100F AU628F 630 YA
1 Surface Closer (C02011 / C02021) R/PR3501 (TO SUIT) 689 YA

1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
1 Adhesive Gasketing (R0Y154) S88BL PE

Notes: Closer inside Stairwell
*Waiver may be required to comply with Trade Agreement Act.

Set: 10.0

Doors: 201D, 201E, 202C, 202D, 203C, 203D, 204D, 204E, 205C, 205D, 206D, 206E, 207D, 207E, 208C, 208D, 301D, 301E, 302C, 302D, 303C, 303D, 304D, 304E, 305C, 305D, 306D, 306E, 307D, 307E, 308C, 308D
Description: Sgle - Rim, Classroom Security - HD Closer - W/F Stop

3 Hinge (A8111) T4A3786 US26D MK
1 Rim Exit (Type 1, 10) 7100-2 AU626F Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surface Closer (C02011 / C02021) R/PR3501 (TO SUIT) 689 YA
1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 11.0

Doors: 201B, 202B, 203B, 204B, 205B, 206B, 207C, 208B, 219A, 227A, 301B, 302B, 303B, 304B, 305B, 306B, 307B, 308B, 319, 333
Description: Sgle - Storage

3 Hinge (A8112) TA2714 US26D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 12.0

Doors: 145, 147, 149, 170
Description: Sgle - Kitchen Storage

3 Hinge, Full Mortise (A5112) TA2314 US32D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 13.0

Doors: 161, 169
Description: Sgle - Kitchen Storeroom Lock - Surf OH Hold Open

3 Hinge, Full Mortise (A5112) TA2314 US32D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC

1 Surf Overhead Hold Open (CO2511) 9-X26 630 RF
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 14.0
Doors: 201A, 203A, 204A, 205A, 206A, 207A, 301A, 303A, 304A, 305A, 306A, 307A, 308A
Description: Sgle - Storeroom Lock - Surf OH Stop

3 Hinge (A8112) TA2714 US26D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surf Overhead Stop (CO2541) 9-X36 630 RF
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 15.0

Doors: 114
Description: Sgle - Storeroom Lock - Closer

3 Hinge (A8112) TA2714 US26D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surface Closer (C02011 / C02021) R/PR3501 (TO SUIT) 689 YA
1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 16.0

Doors: 000E, 001F, 100C, 100D, 112, 113, 131, 132, 133, 201C, 204C, 206C, 207B, 212, 213, 220, 228, 231, 232, 233, 301C, 304C, 306C, 307C, 312, 313, 320, 327, 328, 329, 332
Description: Sgle - Storeroom - Closer - Gasket

3 Hinge (A8111) T4A3786 US26D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surface Closer (C02011 / C02021) R/PR3501 (TO SUIT) 689 YA
1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
1 Adhesive Gasketing (R0Y154) S88BL PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 17.0

Doors: 144, 146
Description: Sgle - Kitchen Storeroom - Closer - Gasket

3 Hinge, Full Mortise (A5112) TA2314 US32D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surface Closer (C02011 / C02021) R/PR3501 (TO SUIT) 689 YA

1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
1 Adhesive Gasketing (R0Y154) S88BL PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 18.0

Doors: 115
Description: Sgle - Storeroom - Closer/stop - Gasket

3 Hinge (A8111) T4A3786 US26D MK
1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surface Closer (C02021-PT4G) 3531 (Drop plate as req.) 689 YA
1 Gasketing (R3E164) 303AS (HEAD/JAMBS) PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 19.0

Doors: 139, 140
Description: Sgle - Kitchen - Office/Lounge

3 Hinge, Full Mortise (A5112) TA2314 US32D MK
1 Office Lock (F04) AUR 8807FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 20.0

Doors: 135, 136, 137
Description: Sgle - Passage Lock - W/F Stop

3 Hinge (A8112) TA2714 US26D MK
1 Passage Latch (F01) AUR 8801FL 630 YA
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
3 Silencer (L03011) 608 RO

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 21.0

Doors: 000C, 000D
Description: Sgle - Crawl Space (Storeroom) - Closer - Gasket

1 Storeroom Lock (F07) AUR 8805FL Temp Core 630 YA
1 Interchangeable Core (E09241) SFIC 26 MC
1 Surface Closer (C02011 / C02021) R/PR3501 (TO SUIT) 689 YA
1 Kick Plate (J102) K1050 10" CSK US32D RO
1 Door Stop (L02251 / L02121) 403/470 (TO SUIT) US26D RO
1 Threshold (J32130) 271A PE
1 Gasketing (R3E164) 303AS (HEAD/JAMBS) PE
1 Sweep (R3D534) 345AV PE

Notes: *Waiver may be required to comply with Trade Agreement Act.

Set: 22.0

Doors: 117, 118, 129, 130, 141, 141A, 142, 142A, 217, 218, 229, 230, 317, 318, 330, 331
Description: Sgle - Restroom / Locker Room

3	Hinge (A8111)	T4A3786	US26D	MK
1	Push Plate (J301)	70C-RKW	US32D	RO
1	Door Pull w/ Plate (J405)	BF 110x70C	US32D	RO
1	Surface Closer (C02011 / C02021)	R/PR3501 (TO SUIT)	689	YA
1	Kick Plate (J102)	K1050 10" CSK	US32D	RO
1	Mop Plate (J103)	K1050 6" CSK	US32D	RO
1	Door Stop (L02251 / L02121)	403/470 (TO SUIT)	US26D	RO
1	Adhesive Gasketing (R0Y154)	S88BL	PE	

Notes: *Waiver may be required to comply with Trade Agreement Act.
o Mop plate at inswinging doors only.

Set: 23.0

Doors: 120, 123A, 123B, 123C, 123D, 123E, 123F, 127
Description: Eliason

1	All hardware	By the door manufacturer	OT

-- End of Section --

SECTION 09 67 23.13

RESINOUS FLOORING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C307	(2023) Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings
ASTM C413	(2018; R 2023) Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes
ASTM C531	(2018; R 2023) Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings, and Polymer Concretes
ASTM C579	(2023) Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM C580	(2018; R 2023) Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
ASTM D2240	(2015; R 2021) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D2369	(2020) Standard Test Method for Volatile Content of Coatings
ASTM D2794	(1993; R 2024) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D4060	(2019) Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM E648	(2025) Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

ASTM F1869	(2023) Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
ASTM F2170	(2019a) Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

1.2 ADMINISTRATIVE REQUIREMENTS

1.2.1 Pre-Installation Meetings

Pre-installation Conference: Conduct conference at Project site.

1.2.2 Product Data

Within 30 days of contract award, submit manufacturer's catalog data for the following items:

a. Epoxy-Resin Binder/Matrix

b. Cured Epoxy Binder

c. Surface Sealing Coat

1.2.3 Design Mix Data

Within 30 days of contract award, submit design mix data for the following items, including a complete list of ingredients and admixtures:

a. Epoxy-Resin Binder/Matrix

b. Cured Epoxy Binder

c. Surface Sealing Coat

Ensure applicable test reports verify the mix has been successfully tested and meets design requirements.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation Drawings; G

Fabrication Drawings;

SD-03 Product Data

Manufacturer's Catalog Data; G

SD-04 Samples

Hardboard Mounted Epoxy Flooring; G

Floor Topping; G

Mockups; G

SD-05 Design Data

Design Mix Data; G

SD-07 Certificates

Listing of Product Installations

Referenced Standards Certificates

SD-11 Closeout Submittals

Warranty; G

1.4 DELIVERY, STORAGE, AND HANDLING

Protect materials from weather, soil, and damage during delivery, storage, and construction. Deliver materials in original packages, containers, or bundles bearing brand name and name of material.

Maintain materials used in the installation of floor topping at a temperature between 65 and 85 degrees F.

1.5 QUALITY CONTROL

Prior to commencement of work, submit referenced standards certificates for the following, showing conformance with the referenced standards contained in this section:

a. Epoxy-Resin Binder/Matrix

b. Cured Epoxy Binder

c. Aggregate

d. Surface Sealing Coat

1.5.1 Mockups

Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Apply full-thickness mockups on 96 inch square floor area selected by Contracting Officer, include length of integral cove base. Simulate finished lighting conditions for the review of mockups. Approved mockup may become part of completed work if undistributed at time of Substantial Completion.

1.5.2 Qualifications

Submit a listing of product installations for heavy duty epoxy flooring including identification of at least 5 units, similar to those proposed for

use, that have been in successful service for a minimum period of 5 years. Identify purchaser, address of installation, service organization, and date of installation.

Ensure floor system applicators are experienced in the application of troweled aggregate thin-set floor topping.

1.5.3 Sampling

Submit hardboard mounted epoxy flooring samples not less than 12 inch square for each required color.

Provide panels showing nominal thickness of finished toppings, color, and texture of finished surfaces. Finished floor toppings and the approved samples are to match in color and texture.

1.6 WARRANTY

Submit a 2 year written warranty for all materials and installation work.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Submit installation drawings for heavy duty epoxy flooring systems clearly designating the areas of application and the installation plan. Include in the installation plan, methods to control sand and dust if sand blasting is required.

2.2 MATERIALS

2.2.1 Polyurethane Resinous Flooring (POLY-1, POLY-2)

2.2.1.1 Product

Subject to compliance with requirements of troweled ¼ inch urethane mortar system with added four-component, fast-setting, trowelable grout for slab infill at 1-1/2 inches (roughly). Multiple layers of liquids, Slurries and broadcasts will be rejected.

2.2.1.2 System Characteristics

a. Color and Pattern: As indicated on drawings

b. Wearing Surface: TXT 8

c. Integral Cove Base: 6 inches

d. Overall System Thickness: Two inches. Add trowelable grout for infill of depression 1-1/2 to 1-3/4 inches then self-priming, textured, four-component, notch-troweled applied, polyurethane mortar system at 1/4 inch.

2.2.1.3 System Components

Provide manufacturer's standard components that are compatible with each other and as follows:

a. Mortar: Liquid-rich, self-priming, textured, four-component,

notch-trowel-applied, polyurethane mortar system.

(1) Resin: Urethane.

(2) Formulation Description: High solids.

(3) Application Method: Screed, Trowel.

(a) Thickness of Coats: 1/4".

(b) Number of Coats: One.

b. Physical Characteristics:

(1) Compressive strength: 7,700 psi after 7 days (ASTM C579)

(2) Tensile Strength: 1,000 psi (ASTM C307)

(3) Flexural Strength: 2,400 psi)

(4) Flexural Modulus of Elasticity: 2.6 x 106 psi (ASTM C580)

(5) Hardness: 80 to 84 (ASTM D2240, Shore D)

(6) Impact Resistance: >160 in./lbs. (ASTM D2794)

(7) Abrasion Resistance: 0.03 gm * (ASTM D4060, CS-17)

(8) Flammability: Class 1 (ASTM E648)

(9) Thermal Coefficient of Linear Expansion: 1.1 x 10-5 in./in.°F (ASTM C531)

(10) Water Absorption: < 1% (ASTM C413)

(11) VOC Content: Mortar - 7 g/l (ASTM D2369, Method E), Topcoat - 53 g/l

(12) Cure Rate: 6 hours for foot traffic (@ 77°F/25°C); 24 hours for normal operations

(13) Aggregates: Pigmented Blended aggregate.

c. Topcoat:

(1) Material design basis: Two-component, solvent-free, abrasion-resistant, pigmented urethane sealer.

(a) Abrasion Resistance: 0.03 gm max weight loss per ASTM D4060, CS-17

(b) VOC Content 12 g/f per ASTM D2369, Method E

(2) Resin: Urethane

(3) Formulation Description: 100% solids.

(4) Type: Pigmented

(5) Finish: Standard

(6) Number of Coats: One.

2.2.1.4 Accessory Materials

a. Primer: Type recommended by manufacturer for substrate and body coats indicated. Formulation Description: Self-priming urethane mortar.

b. Infill 1 1/2-1 3/4 inches: Use a four component fast setting non Cementitious Urethane Grout, no exceptions. Moisture resistant polyurethane based grout designed for permanent repairs under flooring system.

c. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for joint fill material, and concrete crack treatment.

2.3 EPOXY RESINOUS FLOORING (EXP-1)

2.3.1 Product

Subject to compliance with requirements of the following: a penetrating two-component epoxy primer, four-component 3/16th inch mortar consisting of epoxy resin, curing agent and finely graded quartz silica aggregate, three-component, epoxy undercoat, brightly colored, quartz silica aggregate broadcast and a high performance, two-component, clear epoxy sealer. Liquid rich systems and or builds of slurries and non troweled mortar systems will be rejected.

2.3.2 System Characteristics

a. Color and Pattern: As indicated on drawings.

b. Wearing Surface: Medium texture as selected from manufacturer.

c. Integral Cove Base: Where indicated.

d. Overall System Thickness: 3/16 inch (5 mm).

2.3.3 System Components

Manufacturer's standard components that are compatible with each other and as follows:

a. Standard Primer

(1) Material Basis: Bisphenol A Epoxy Primer.

b. Body Coat(s):

(1) Material Basis: Four component troweled epoxy mortar consisting of epoxy resin, curing agent and finely graded aggregate.

(2) Resin: Epoxy.

c. Undercoat and broadcast quartz:

(1) Resin: Three component free flowing epoxy that includes resin, curing agent, and manufacturer aggregate.

(2) Formulation Description: 100% solids.

(3) Number of Coats: 1.

d. Topcoat:

(1) Material Basis: Two-component, clear, solvent-free chemically modified epoxy resin cured with an aliphatic amine

(2) Resin: High performance UV resistant, clear epoxy sealer

(3) Two component.

(4) Number of Coats: (1) thick coat to get desired medium texture.

e. Physical Characteristics

(1) Compressive Strength: 10,000 psi after 7 days(ASTM C579)

(2) Tensile Strength: 2,000 psi (ASTM C307)

(3) Flexural Strength: 4,300 psi (ASTM C580)

(4)Flexural Modulus of Elasticity: 2.0 x 106 psi (ASTM C580)

(5) Hardness: 85 to 90 (ASTM D2240, Shore D)

(6) Impact Resistance: >160 in./lbs. (ASTM D2794)

(7) Abrasion Resistance: 0.06 gm max. weight loss (ASTM D4060, CS-17)

(8) Flammability: Class 1 (ASTM E648)

(9) Thermal Coefficient of Linear Expansion: 1.3 x 10-5 in./in.°F (ASTM C531)

(10) Water Absorption: 0.1% (ASTM C413)

(11) VOC Content: Base - 4 g/l (ASTM D2369), Undercoat - 34 g/l, Topcoat: 34 g/l

(12) Cure Rate; 12 hours for foot traffic (@ 77°F/25°C); 24 hours for normal operations

PART 3 EXECUTION

3.1 PREPARATION

Prior to applying resinous flooring material, inspect substrate and immediately report any unsatisfactory conditions that exist and repair.

Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

a. Mechanically prepare substrates as follows:

(1) Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

(2) Comply with ASTM C811 requirements, unless manufacturer's written instructions are more stringent.

b. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.

c. Verify that concrete substrates are dry.

(1) Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.

(2) Perform anhydrous calcium chloride test, ASTM F1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 7 lb of water/1000 sq. ft. of slab in 24 hours.

(3) Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.

d. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

3.1.1 Resinous Materials

Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for joint fill material, and concrete crack treatment.

3.1.2 Safety Precautions

Prior to application in confined spaces of toppings and coatings containing flammable or toxic properties, institute safety precautions recommended by the manufacturer of the product.

Erect "NO SMOKING" signs, and prohibit smoking or use of spark- or flame-producing devices within 50 feet of any mixing or placing operation involving flammable materials.

Provide the personnel required to handle, mix, or apply toppings containing toxic or flammable properties with such items of personal protective equipment and apparel for eye, skin, and respiratory protection as are recommended by the manufacturer of the product. Ensure all personnel are trained in the appropriate use and wearing of personal protection equipment.

3.1.3 Protection of Adjacent Surfaces

In addition to the protection of adjacent surfaces during installation, provide areas used to store and mix materials with a protective covering under the materials. After application of the sealer coats, protect finished flooring during the remainder of the construction period. In areas of expected minimum or moderate traffic, cover floors with a 30-30-30 waterproof kraft paper, with strips taped together and edges secured to prevent roll-up. Place vegetable fiberboard, plywood, or other suitable material that does not mar the flooring over the paper to protect areas used as passages by workmen and areas subject to floor damage because of subsequent building operations. Upon completion of construction, remove the protection, clean flooring and, where necessary, repair, reseal, or both, at no additional cost to the Government.

3.1.4 Concrete Subfloor

3.1.4.1 New Concrete Floors

Do not commence installation of the floor topping until the concrete has cured a minimum of 28 calendar days. Verify that the concrete floor is straight, properly sloped, and has wooden float type finish. Ensure that the concrete is moist cured with burlap or polyethylene. Before applying the prime coat, clean the concrete surface by an approved method.

3.1.5 Mixing Of Materials

Select the job mix proportions on the trial batch proportions used to prepare the floor topping samples as submitted and approved.

Use mechanical equipment for mixing of materials in accordance with the manufacturer's instructions.

Use rotating paddle-type masonry mortar mixers for preblending the three sizes and color pigment, if any, of the walnut shell aggregate and addition of the mixed epoxy resin binder. Ensure mixing times are as recommended by the materials supplier(s), provided mixing times result in homogeneous mixtures. Limit quantity of material mixed at one time to that which can be applied and finished within the working life of the mixtures. Verify that the temperature of materials at the time of mixing are between 65 and 85 degrees F.

3.2 APPLICATION

3.2.1 Areas of Application

Anchor plates set with the top surface at or above the finished epoxy floor level do not require coverage with this flooring material. Extend flooring under equipment, except when the equipment base is indicated to be flush against the structural floor. Cover and/or mask surfaces not to receive the epoxy floor topping, such as equipment or cabinets installed prior to surface-preparation efforts and adjacent to the flooring installation.

3.2.2 Application of Prime Coat and Troweling

General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

a. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.

b. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.

c. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.

(1) Apply joint sealant to comply with manufacturer's written recommendations.

d. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

e. Integral Cove Base and Curb Coating: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and top coating of cove base. Round internal and external corners. Requires Primer.

(1) Integral Cove Base: 6 inches (POLY-1, POLY-2), 4 inches (EXP-1)

f. Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate at manufacturer’s recommended height using specially designed trowel and or Screed box. Broadcast desired light texture directly into mortar base. Field verify texture needed.

g. Apply topcoat in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.2.3 Terminations

a. Chase edges to “lock” the coating system into the concrete substrate along lines of termination.

b. Penetration Treatment: Lap and seal coating onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement. Install thermal isolation construction detail where applicable and indicated in detail drawings.

c. Trenches: Continue coating system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.

d. Treat floor drains by chasing the coating to lock in place at point of termination. Install thermal isolation construction detail where applicable and indicated in detail drawings.

3.2.4 Joints and Cracks

a. Treat control joints to bridge potential cracks and to maintain monolithic protection.

b. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.

c. Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.3 FIELD QUALITY CONTROL

3.3.1 Material Sampling

Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.

a. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.

b. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.

c. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.3.2 Repairing

Remove and replace damaged or unacceptable portions of completed work with new work to match adjacent surfaces at no additional cost to the Government.

3.4 CLEANING, PROTECTING, AND CURING

Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.

Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

-- End of Section --

SECTION 22 00 00

PLUMBING, GENERAL PURPOSE

AMENDMENT 0002

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

AHRI 1010	(2002) Self-Contained, Mechanically Refrigerated Drinking-Water Coolers

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z21.22/CSA 4.4	(2015; R 2020) Relief Valves for Hot Water Supply Systems

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1	(2014) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
ASHRAE 90.1 - IP	(2019; Errata 1 2019; Errata 2-5 2020; Addenda BY-CP 2020; Addenda AF-DB 2020; Addenda A-G 2020; Addenda F-Y 2021; Errata 6-8 2021; Interpretation 1-4 2020; Interpretation 5-8 2021 Addenda AS-AQ 2022) Energy Standard for Buildings Except Low-Rise Residential Buildings

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1001	(2008) Performance Requirements for Atmospheric Type Vacuum Breakers (ANSI approved 2009)
ASSE 1003	(2020) Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems - (ANSI approved 2010)
ASSE 1010	(2004) Performance Requirements for Water Hammer Arresters (ANSI approved 2004)
ASSE 1011	(2004; Errata 2004) Performance Requirements for Hose Connection Vacuum Breakers (ANSI approved 2004)
ASSE 1012	(2009) Performance Requirements for

	Backflow Preventer with an Intermediate Atmospheric Vent - (ANSI approved 2009)
ASSE 1013	(2011) Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers - (ANSI approved 2010)
ASSE 1018	(2001) Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied (ANSI Approved 2002
ASSE 1019	(2011) Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type (ANSI Approved 2004)
ASSE 1020	(2004; Errata 2004; Errata 2004) Performance Requirements for Pressure Vacuum Breaker Assembly (ANSI Approved 2004)
ASSE 1037	(2015) Performance Requirements for Pressurized Flushing Devices (Flushometers) for Plumbing Fixtures

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA 10084	(2017) Standard Methods for the Examination of Water and Wastewater
AWWA B300	(2018) Hypochlorites
AWWA B301	(2018) Liquid Chlorine
AWWA C105/A21.5	(2018) Polyethylene Encasement for Ductile-Iron Pipe Systems
AWWA C116/A21.16	(2015) Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray Iron Fittings
AWWA C153/A21.53	(2019) Ductile-Iron Compact Fittings for Water Service
AWWA C203	(2008) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C213	(2022) Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings
AWWA C606	(2015) Grooved and Shouldered Joints
AWWA C651	(2014) Standard for Disinfecting Water Mains
AWWA C652	(2011) Disinfection of Water-Storage

	Facilities
AWWA C700	(2015) Standard for Cold Water Meters - Displacement Type, Bronze Main Case
AWWA C701	(2015) Cold-Water Meters - Turbine Type for Customer Service

AMERICAN WELDING SOCIETY (AWS)

AWS A5.8/A5.8M	(2019) Specification for Filler Metals for Brazing and Braze Welding
AWS B2.2/B2.2M	(2016) Specification for Brazing Procedure and Performance Qualification

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A112.1.2	(2012) Standard for Air Gaps in Plumbing Systems (For Plumbing Fixtures and Water-Connected Receptors)
ASME A112.14.1	(2003; R 2012) Backwater Valves
ASME A112.19.2/CSA B45.1	(2018; ERTA 2018) Standard for Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals
ASME A112.19.3/CSA B45.4	(2008; R 2013) Stainless Steel Plumbing Fixtures
ASME A112.19.5	(2011; R 2016) Trim for Water-Closet Bowls, Tanks and Urinals
ASME A112.36.2M	(1991; R 2012) Cleanouts
ASME A112.6.1M	(1997; R 2012) Floor Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use
ASME A112.6.3	(2016) Standard for Floor and Trench Drains
ASME B1.20.1	(2013; R 2018) Pipe Threads, General Purpose (Inch)
ASME B16.12	(2009; R 2014) Cast Iron Threaded Drainage Fittings
ASME B16.15	(2018) Cast Copper Alloy Threaded Fittings Classes 125 and 250
ASME B16.18	(2021) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.21	(2021) Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.22	(2021) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings

ASME B16.23	(2011) Cast Copper Alloy Solder Joint Drainage Fittings - DWV
ASME B16.24	(2022) Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves Classes 150, 300, 600, 900, 1500, and 2500
ASME B16.29	(2012) Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV
ASME B16.34	(2021) Valves - Flanged, Threaded and Welding End
ASME B16.39	(2020) Standard for Malleable Iron Threaded Pipe Unions; Classes 150, 250, and 300
ASME B16.4	(2021) Gray Iron Threaded Fittings; Classes 125 and 250
ASME B16.5	(2020) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME B16.50	(2013) Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings
ASME B31.1	(2022) Power Piping
ASME B31.5	(2020) Refrigeration Piping and Heat Transfer Components
ASME B40.100	(2013) Pressure Gauges and Gauge Attachments
ASME BPVC SEC IV	(2017) BPVC Section IV-Rules for Construction of Heating Boilers
ASME BPVC SEC IX	(2017; Errata 2018) BPVC Section IX-Welding, Brazing and Fusing Qualifications
ASME CSD-1	(2021) Control and Safety Devices for Automatically Fired Boilers

ASTM INTERNATIONAL (ASTM)

ASTM A105/A105M	(2021) Standard Specification for Carbon Steel Forgings for Piping Applications
ASTM A193/A193M	(2020) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and Other Special Purpose Applications
ASTM A515/A515M	(2017; R2022) Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service

ASTM A516/A516M	(2017) Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
ASTM A53/A53M	(2022) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A536	(1984; R 2019; E 2019) Standard Specification for Ductile Iron Castings
ASTM A733	(2016; R 2022) Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
ASTM A74	(2021) Standard Specification for Cast Iron Soil Pipe and Fittings
ASTM A888	(2021a) Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
ASTM B117	(2019) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B306	(2020) Standard Specification for Copper Drainage Tube (DWV)
ASTM B32	(2020) Standard Specification for Solder Metal
ASTM B370	(2022) Standard Specification for Copper Sheet and Strip for Building Construction
ASTM B42	(2020) Standard Specification for Seamless Copper Pipe, Standard Sizes
ASTM B43	(2020) Standard Specification for Seamless Red Brass Pipe, Standard Sizes
ASTM B584	(2014; R 2022) Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM B813	(2016) Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
ASTM B828	(2016) Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
ASTM B88	(2022) Standard Specification for Seamless Copper Water Tube
ASTM B88M	(2020) Standard Specification for Seamless Copper Water Tube (Metric)

ASTM C564	(2020a) Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
ASTM C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM D3139	(2019) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D3212	(2020) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3311	(2017) Standard Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns
ASTM D3409/D3409M	Standard test method for adhesion of Asphalt-Roof Cement to Damp, Wet, or Underwater Surfaces
ASTM E1	(2014) Standard Specification for ASTM Liquid-in-Glass Thermometers
ASTM F1760	(2016; R 2020) Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content
ASTM F2389	(2021) Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems
ASTM F477	(2014; R 2021) Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

CAST IRON SOIL PIPE INSTITUTE (CISPI)

CISPI 301	(2018) Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
CISPI 310	(2012) Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

COPPER DEVELOPMENT ASSOCIATION (CDA)

CDA A4015	(2016; 14/17) Copper Tube Handbook

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO)

IAPMO PS 117	(2005b) Press Type Or Plain End Rub Gasketed W/ Nail CU & CU Alloy Fittings 4

Install On CU Tubing

INTERNATIONAL CODE COUNCIL (ICC)

ICC A117.1 COMM	(2009) Standard And Commentary and Usable Buildings and Facilities
ICC IPC	(2021) International Plumbing Code

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-110	(2010) Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
MSS SP-25	(2018) Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-44	(2019) Steel Pipeline Flanges
MSS SP-58	(2018) Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation
MSS SP-67	(2022) Butterfly Valves
MSS SP-69	(2003; Notice 2012) Pipe Hangers and Supports - Selection and Application (ANSI Approved American National Standard)
MSS SP-70	(2011) Gray Iron Gate Valves, Flanged and Threaded Ends
MSS SP-71	(2018) Gray Iron Swing Check Valves, Flanged and Threaded Ends
MSS SP-72	(2010a) Ball Valves with Flanged or Butt-Welding Ends for General Service
MSS SP-78	(2011) Cast Iron Plug Valves, Flanged and Threaded Ends
MSS SP-80	(2019) Bronze Gate, Globe, Angle and Check Valves
MSS SP-83	(2014) Class 3000 Steel Pipe Unions Socket Welding and Threaded
MSS SP-85	(2011) Gray Iron Globe & Angle Valves Flanged and Threaded Ends

NACE INTERNATIONAL (NACE)

NACE SP0169	(2015) Control of External Corrosion on Underground or Submerged Metallic Piping Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2020) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA MG 1	(2021) Motors and Generators
NEMA MG 11	(1977; R 2012) Energy Management Guide for Selection and Use of Single Phase Motors

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 90A	(2021) Standard for the Installation of Air Conditioning and Ventilating Systems

NSF INTERNATIONAL (NSF)

NSF/ANSI 372	(2016) Drinking Water System Components - Lead Content
NSF/ANSI 14	(2021) Plastics Piping System Components and Related Materials
NSF/ANSI 61	(2022) Drinking Water System Components - Health Effects

PLASTIC PIPE AND FITTINGS ASSOCIATION (PPFA)

PPFA Fire Man	(2010) Firestopping: Plastic Pipe in Fire Resistive Construction

PLUMBING AND DRAINAGE INSTITUTE (PDI)

PDI WH 201	(2010) Water Hammer Arresters Standard

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE J1508	(2009) Hose Clamp Specifications

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SM 9223	(2004) Enzyme Substrate Coliform Test
PL 93-523	(1974; A 1999) Safe Drinking Water Act

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 141.80	National Primary Drinking Water Regulations; Control of Lead and Copper; General Requirements
PL 109-58	Energy Policy Act of 2005 (EPAct05)

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 4170.11	(2018) Installation Energy Management
UFC 3-420-01	Plumbing Systems, Including Change 10, October 2015

UNDERWRITERS LABORATORIES (UL)

UL 1951	(2011; Reprint Oct 2016) UL Standard for Safety Electric Plumbing Accessories
UL 399	Standard for Drinking-Water Coolers

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fixtures; G

List of installed fixtures with manufacturer, model, and flow rate.

Flush Valve Water Closets; G

Flush Valve Urinals; G

Lavatories; G

Mop Basin; G

Drinking-Water Coolers; G

Bottle Fill Stations; G

Pumps; G

Backflow Prevention Assemblies; G

Vibration-Absorbing Features; G

A copy of qualified procedures and a list of names and identification symbols of qualified welders and welding operators.

Details of vibration-absorbing features, including arrangement, foundation plan, dimensions and specifications.

Plumbing System

Diagrams, instructions, and other sheets proposed for posting. Manufacturer's recommendations for the installation of bell and spigot and hubless joints for cast iron soil pipe.

SD-06 Test Reports

Tests, Flushing and Disinfection

Test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove

compliance with the specified performance criteria, completion and testing of the installed system. Each test report shall indicate the final position of controls.

Test of Backflow Prevention Assemblies; G

Certification of proper operation shall be as accomplished in accordance with state regulations by an individual certified by the state to perform such tests. If no state requirement exists, the Contractor shall have the manufacturer's representative test the device, to ensure the unit is properly installed and performing as intended. The Contractor shall provide written documentation of the tests performed and signed by the individual performing the tests.

SD-07 Certificates

Materials and Equipment

Where equipment is specified to conform to requirements of the ASME Boiler and Pressure Vessel Code, the design, fabrication, and installation shall conform to the code.

Bolts

Written certification by the bolt manufacturer that the bolts furnished comply with the specified requirements.

SD-10 Operation and Maintenance Data

Plumbing System; G

SD-11 Closeout Submittals

Water-Efficient Products; S

1.3 STANDARD PRODUCTS

Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products. Specified equipment shall essentially duplicate equipment that has performed satisfactorily at least two years prior to bid opening. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

1.3.1 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

1.3.2 Service Support

The equipment items shall be supported by service organizations. Submit a

certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.3.3 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.3.4 Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Contracting Officer.

1.3.4.1 Definitions

For the International Code Council (ICC) Codes referenced in the contract documents, advisory provisions shall be considered mandatory, the word "should" shall be interpreted as "shall." Reference to the "code official" shall be interpreted to mean the "Contracting Officer."

1.3.4.2 Administrative Interpretations

For ICC Codes referenced in the contract documents, the provisions of Chapter 1, "Administrator," do not apply. These administrative requirements are covered by the applicable Federal Acquisition Regulations (FAR) included in this contract and by the authority granted to the Officer in Charge of Construction to administer the construction of this project. References in the ICC Codes to sections of Chapter 1, shall be applied appropriately by the Contracting Officer as authorized by his administrative cognizance and the FAR.

1.4 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

1.5 PERFORMANCE REQUIREMENTS

1.5.1 Welding

Piping shall be welded in accordance with qualified procedures using performance-qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME BPVC SEC IX. Welding procedures qualified by others, and welders and welding operators qualified by another employer, may be accepted as permitted by ASME B31.1. The Contracting Officer shall be notified 24 hours in advance of tests, and the tests shall be performed at the work site if practicable. Welders or welding operators shall apply their assigned symbols near each weld they make as a permanent record. Structural members shall be welded in

accordance with Section 05 05 23.16 STRUCTURAL WELDING. Structural members shall be welded in accordance with Section 05 05 23.16 STRUCTURAL WELDING.

1.6 REGULATORY REQUIREMENTS

Unless otherwise required herein, plumbing work shall be in accordance with ICC IPC. Energy consuming products and systems shall be in accordance with PL 109-58 and ASHRAE 90.1 - IP.

1.7 PROJECT/SITE CONDITIONS

The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.8 INSTRUCTION TO GOVERNMENT PERSONNEL

When specified in other sections, furnish the services of competent instructors to give full instruction to the designated Government personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.

Instruction shall be scheduled with Base maintenance personnel to be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. The number of man-days (8 hours per day) of instruction furnished shall be as specified in the individual section. When more than 4 man-days of instruction are specified, use approximately half of the time for classroom instruction. Use other time for instruction with the equipment or system.

When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instruction to acquaint the operating personnel with the changes or modifications.

1.9 ACCESSIBILITY OF EQUIPMENT

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install concealed valves, expansion joints, controls, dampers, and equipment requiring access, in locations freely accessible through access doors.

PART 2 PRODUCTS

2.1 PRODUCT SUSTAINABILITY CRITERIA

For products in this section, where applicable and to extent allowed by performance criteria, provide and document the following:

2.1.1 Water-Efficient Products

Provide documentation in conformance with Section 01 33 29 SUSTAINABILITY REPORTING that the following products meet water efficiency requirements as outlined in this section and when applicable, that they are EPA WaterSense labeled products:

a. Fixtures

b. Flush valve water closets

c. Flush valve urinals

d. Lavatories

e. Kitchen sinks

f. Mop sinks

g. Drinking-water coolers

h. Bottle fill stations

i. Pumps

2.2 Materials

Materials for various services shall be in accordance with TABLES I and II. PVC pipe shall contain a minimum of 25 percent recycled content in accordance with ASTM F1760. Steel pipe shall contain a minimum of 25 percent recycled content, with a minimum of 10 percent post-consumer recycled content. Pipe schedules shall be selected based on service requirements. Pipe fittings shall be the same material as, and by the same manufacturer as the applicable pipe materials. Iron Pipe size and shall comply with NSF/ANSI 14, NSF/ANSI 61 and ASTM F2389. Grooved pipe, couplings, and fittings shall not be used. Material or equipment containing a weighted average of greater than 0.25 percent lead shall not be used in any potable water system intended for human consumption, and shall be certified in accordance with NSF/ANSI 61, Annex G or NSF/ANSI 372. In line devices such as water meters, building valves, check valves, meter stops, valves, fittings and back flow preventers shall comply with PL 93-523 and NSF/ANSI 61, Section 8. End point devices such as drinking water fountains, bottle fill stations, lavatory faucets, kitchen and bar faucets, residential ice makers, supply stops and end point control valves used to dispense water for drinking must meet the requirements of NSF/ANSI 61, Section 9. Hubless cast-iron soil pipe shall not be installed underground, under concrete floor slabs, or in crawl spaces below kitchen floors. Cast-iron pipe shall contain a minimum of 25 percent recycled content. Plastic pipe shall not be installed in air plenums.

FRP, PVC and CPVC elements may be used as a part of a manufacturer’s factory assembled equipment provided this pipe martial is only used up to, but not beyond flange connection to water supply. Contractor shall coordinate with equipment manufacturer to provide approved alternate piping material for equipment if available.

2.2.1 Pipe Joint Materials

Hubless cast-iron soil pipe shall not be used underground. Solder containing lead shall not be used with copper pipe. Cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Institute. Joints and gasket materials shall conform to the following:

a. Coupling for Cast-Iron Pipe: for hub and spigot type ASTM A74, AWWA C606. For hubless type: CISPI 310.

b. Coupling for Steel Pipe: AWWA C606.

c. Flange Gaskets: Gaskets shall be made of non-asbestos material in accordance with ASME B16.21. Gaskets shall be flat, 1/16 inch thick, and contain Aramid fibers bonded with Styrene Butadiene Rubber (SBR) or Nitro Butadiene Rubber (NBR). Gaskets shall be the full face or self centering flat ring type. Gaskets used for hydrocarbon service shall be bonded with NBR.

d. Brazing Material: Brazing material shall conform to AWS A5.8/A5.8M, BCuP-5.

e. Brazing Flux: Flux shall be in paste or liquid form appropriate for use with brazing material. Flux shall be as follows: lead-free; have a 100 percent flushable residue; contain slightly acidic reagents; contain potassium borides; and contain fluorides.

f. Solder Material: Solder metal shall conform to ASTM B32.

g. Solder Flux: Flux shall be liquid form, non-corrosive, and conform to ASTM B813, Standard Test 1.

h. PTFE Tape: PTFE Tape, for use with Threaded Metal or Plastic Pipe.

i. Rubber Gaskets for Cast-Iron Soil-Pipe and Fittings (hub and spigot type and hubless type): ASTM C564.

j. Flexible Elastomeric Seals: ASTM D3139, ASTM D3212 or ASTM F477.

k. Flanged fittings including, but not limited to, flanges, bolts, nuts and bolt patterns shall be in accordance with ASME B16.5 class 150 and shall have the manufacturer's trademark affixed in accordance with MSS SP-25. Flange material shall conform to ASTM A105/A105M. Blind flange material shall conform to ASTM A516/A516M cold service and ASTM A515/A515M for hot service. Bolts shall be high strength or intermediate strength with material conforming to ASTM A193/A193M.

l. Press fittings for Copper Pipe and Tube: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for copper press fittings shall be EPDM, FKM or HNBR. Sealing elements shall be factory installed or an alternative supplied fitting manufacturer. Sealing element shall be selected based on manufacturer's approved application guidelines.

m. Copper tubing shall conform to ASTM B88, Type K, L or M.

n. Heat-fusion joints for polypropylene piping: ASTM F2389.

2.2.2 Miscellaneous Materials

Miscellaneous materials shall conform to the following:

a. Water Hammer Arrester: PDI WH 201. Water hammer arrester shall be piston type.

b. Copper, Sheet and Strip for Building Construction: ASTM B370.

c. Asphalt Roof Cement: ASTM D3409/D3409M.

d. Hose Clamps: SAE J1508.

e. Supports for Off-The-Floor Plumbing Fixtures: ASME A112.6.1M.

f. Metallic Cleanouts: ASME A112.36.2M.<AM#0002> All cleanouts will comply with the Buy America Act.</AM#0002>

g. Plumbing Fixture Setting Compound: A preformed flexible ring seal molded from hydrocarbon wax material. The seal material shall be nonvolatile nonasphaltic and contain germicide and provide watertight, gastight, odorproof and verminproof properties.

h. Coal-Tar Protective Coatings and Linings for Steel Water Pipelines: AWWA C203.

i. Hypochlorites: AWWA B300.

j. Liquid Chlorine: AWWA B301.

k. Gauges - Pressure and Vacuum Indicating Dial Type - Elastic Element: ASME B40.100.

l. Thermometers: ASTM E1. Mercury shall not be used in thermometers.

2.2.3 Pipe Insulation Material

Insulation shall be as specified in Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

2.3 PIPE HANGERS, INSERTS, AND SUPPORTS

Pipe hangers, inserts, and supports shall conform to MSS SP-58 and MSS SP-69.

2.4 VALVES

Valves shall be provided on supplies to equipment and fixtures. Valves 2-1/2 inches and smaller shall be bronze with threaded bodies for pipe and solder-type connections for tubing. Valves 3 inches and larger shall have flanged iron bodies and bronze trim. Pressure ratings shall be based upon the application. Grooved end valves shall not be used. Valves shall conform to the following standards:

Description	Standard
Butterfly Valves	MSS SP-67
Cast-Iron Gate Valves, Flanged and Threaded Ends	MSS SP-70
Cast-Iron Swing Check Valves, Flanged and Threaded Ends	MSS SP-71
Ball Valves with Flanged Butt-Welding Ends for General Service	MSS SP-72
Ball Valves Threaded, Socket-Welding, Solder Joint, and Flared Ends	MSS SP-110

Cast-Iron Plug Valves, Flanged and Threaded Ends	MSS SP-78
Bronze Gate, Globe, Angle, and Check Valves	MSS SP-80
Steel Valves, Socket Welding and Threaded Ends	ASME B16.34
Cast-Iron Globe and Angle Valves, Flanged and Threaded Ends	MSS SP-85
Backwater Valves	ASME A112.14.1
Vacuum Relief Valves	ANSI Z21.22/CSA 4.4
Water Pressure Reducing Valves	ASSE 1003
Water Heater Drain Valves	ASME BPVC SEC IV, Part HLW-810: Requirements for Potable-Water Heaters Bottom Drain Valve
Trap Seal Primer Valves	ASSE 1018
Temperature and Pressure Relief Valves for Hot Water Supply Systems	ANSI Z21.22/CSA 4.4
Temperature and Pressure Relief Valves for Automatically Fired Hot Water Boilers	ASME CSD-1 Safety Code No., Part CW, Article 5

2.4.1 Backwater Valves

Backwater valves shall be either separate from the floor drain or a combination floor drain, P-trap, and backwater valve, as shown. Valves shall have cast-iron bodies with cleanouts large enough to permit removal of interior parts. Valves shall be of the flap type, hinged or pivoted, with revolving disks. Hinge pivots, disks, and seats shall be nonferrous metal. Disks shall be slightly open in a no-flow no-backwater condition. Cleanouts shall extend to finished floor and be fitted with threaded countersunk plugs.

2.4.2 Wall Faucets

Wall faucets with integral vacuum-breaker backflow preventer shall be brass with 3/4 inch male inlet threads, hexagon shoulder, and 3/4 inch hose connection. Faucet handle shall be securely attached to stem.

2.4.3 Wall Hydrants (Frostproof)

ASSE 1019 with vacuum-breaker backflow preventer shall have a nickel-brass or nickel-bronze wall plate or flange with integral vacuum breaker, nozzle and detachable key handle. A brass or bronze operating rod shall be provided within a galvanized iron casing of sufficient length to extend through the wall so that the valve is inside the building, and the portion of the hydrant between the outlet and valve is self-draining. A brass or bronze valve with coupling and union elbow having metal-to-metal seat shall be provided. Valve rod and seat washer shall be removable through the face of the hydrant. The hydrant shall have 3/4 inch exposed hose thread on spout and 3/4 inch male pipe thread on inlet.

2.4.4 Relief Valves

Water heaters and hot water storage tanks shall have a combination pressure and temperature (P&T) relief valve. The pressure relief element of a P&T relief valve shall have adequate capacity to prevent excessive pressure buildup in the system when the system is operating at the maximum rate of heat input. The temperature element of a P&T relief valve shall have a relieving capacity which is at least equal to the total input of the heaters when operating at their maximum capacity. Relief valves shall be rated according to ANSI Z21.22/CSA 4.4. Relief valves for systems where the maximum rate of heat input is less than 200,000 Btuh shall have 3/4 inch minimum inlets, and 3/4 inch outlets. Relief valves for systems where the maximum rate of heat input is greater than 200,000 Btuh shall have 1 inch minimum inlets, and 1 inch outlets. The discharge pipe from the relief valve shall be the size of the valve outlet.

2.4.5 Thermostatic Mixing Valves

Provide thermostatic mixing valve for lavatory faucets. Mixing valves, thermostatic type, pressure-balanced or combination thermostatic and pressure-balanced shall be line size and shall be constructed with rough or finish bodies either with or without plating. Each valve shall be constructed to control the mixing of hot and cold water and to deliver water at a desired temperature regardless of pressure or input temperature changes. The control element shall be of an approved type. The body shall be of heavy cast bronze, and interior parts shall be brass, bronze, corrosion-resisting steel or copper. The valve shall be equipped with necessary stops, check valves, unions, and sediment strainers on the inlets. Mixing valves shall maintain water temperature within 5 degrees F of any setting.

2.5 FIXTURES

Fixtures shall be water conservation type fixtures for use by the physically handicapped shall be in accordance with ICC A117.1 COMM. ASME A112.19.3/CSA B45.4 302 stainless steel, Vitreous China, nonabsorbent, hard-burned, and vitrified throughout the body shall be provided. All fixtures must meet the EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products. Porcelain enameled ware shall have specially selected, clear white, acid-resisting enamel coating evenly applied on surfaces. No fixture will be accepted that shows cracks, crazes, blisters, thin spots, or other flaws. Fixtures shall be equipped with appurtenances such as traps, faucets, stop valves, and drain fittings. Each fixture and piece of equipment requiring connections to the drainage system, except grease interceptors, shall be equipped with a

trap. Brass expansion or toggle bolts capped with acorn nuts shall be provided for supports, and polished chromium-plated pipe, valves, and fittings shall be provided where exposed to view. Fixtures with the supply discharge below the rim shall be equipped with backflow preventers. Internal parts of flush valves and flushometer valves, shower mixing valves, shower head face plates, pop-up stoppers of lavatory waste drains, and pop-up stoppers and overflow tees and shoes of bathtub waste drains shall be copper alloy with all visible surfaces chrome plated. Plastic in contact with hot water shall be suitable for 180 degrees F water temperature.

2.5.1 Lavatories

Vitreous china lavatories shall be provided with two integral molded lugs on the back-underside of the fixture and drilled for bolting to the wall in a manner similar to the hanger plate. Lavatory faucets and lavatory faucet accessories must meet the EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products.

2.5.2 Automatic Controls

Provide automatic, sensor operated faucets to comply with ASSE 1037 and UL 1951 for lavatory faucets. Faucet systems shall consist of solenoid-activated valves with light beam sensors. Flush valve for water closet shall be manual flush valves. Flushing devices shall be provided as described in paragraph FIXTURES AND FIXTURE TRIMMINGS.

2.5.3 Flush Valve Water Closets

ASME A112.19.2/CSA B45.1, white vitreous china, siphon jet, elongated bowl, wall mounted, wall outlet. Provide wax bowl ring including plastic sleeve. Provide white solid plastic elongated open-front seat.

Water flushing volume of the water closet and flush valve combination shall not exceed 1.28 gallons per flush. Water closets must meet the EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products.

Provide large diameter flush valve including angle control-stop valve, vacuum breaker, tail pieces, slip nuts, and wall plates all provided by valve manufacturer; exposed to view components shall be chromium-plated or polished stainless steel. Flush valves shall be nonhold-open type. Mount flush valves not less than 11 inches above the fixture. Mounted height of flush valve shall not interfere with the hand rail in ADA stalls. Provide diaphragm type manual flush valve.

2.5.4 Flush Valve Urinals

ASME A112.19.2/CSA B45.1, white vitreous china, wall-mounted, wall outlet, siphon jet, integral trap, and extended side shields. Provide urinal with the rim 17 inches above the floor. Water flushing volume of the urinal and flush valve combination shall not exceed 0.125 gallons per flush. Urinals must meet the specifications of http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products. Provide ASME A112.6.1M concealed chair carriers with vertical steel pipe supports. Provide large diameter flush valve including angle control-stop valve, vacuum breaker, tail pieces, slip

nuts, and wall plates all provided by valve manufacturer; exposed to view components shall be chromium-plated or polished stainless steel. Flush valves shall be nonhold-open type. Mount flush valves not less than 11 inches above the fixture. Provide diaphragm type manual flush valve.

2.5.5 Wheelchair Flush Valve Type Urinals

ASME A112.19.2/CSA B45.1, white vitreous china, wall-mounted, wall outlet, blowout action, integral trap, elongated projecting bowl, 20 inches long from wall to front of flare, and ASME A112.19.5 trim. Provide large diaphragm (not less than 2.625 inches upper chamber inside diameter at the point where the diaphragm is sealed between the upper and lower chambers), nonhold-open flush valve of chrome plated cast brass conforming to ASTM B584, including vacuum breaker and angle (control-stop) valve with back check. The water flushing volume of the flush valve and urinal combination shall not exceed 0.125 gallon per flush. Urinals must meet the specifications of http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products. Furnish urinal manufacturer's certification of conformance. Provide ASME A112.6.1M concealed chair carriers. Provide diaphragm type manual flush valve.

2.5.6 Lavatories

ASME A112.19.2/CSA B45.1, white vitreous china, straight back type, minimum dimensions of 19 inches, wide by 17 inches front to rear, with supply openings for use with top mounted centerset faucets, and openings for concealed arm carrier installation. Provide aerator with faucet. Water flow rate shall not exceed 0.5 gpm when measured at a flowing water pressure of 60 psi. Lavatory faucets and lavatory faucet accessories must meet the EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products. Provide ASME A112.6.1M concealed chair carriers with vertical steel pipe supports and concealed arms for the lavatory.

2.5.7 Countertop Lavatories

ASME A112.19.2/CSA B45.1, white vitreous china, self-rimming, minimum dimensions of 19 inches wide by 17 inches front to rear, with supply openings for use with top mounted centerset faucets. Furnish template and mounting kit by lavatory manufacturer. Provide aerator with faucet. Water flow rate shall not exceed 0.5 gpm when measured at a flowing water pressure of 60 psi. Provide top-mounted solenoid-activated lavatory faucets including electrical-operated light-beam-sensor to energize the solenoid. Lavatory faucets and lavatory faucet accessories must meet the EPA WaterSense product definition specified in http://www.epa.gov/watersense/partners/product_program_specs.html and must be EPA WaterSense labeled products.

2.5.8 Drinking-Water Coolers, Single Unit, ADA Compliant

AHRI 1010 with more than a single thickness of metal between the potable water and the refrigerant in the heat exchanger, wall-hung, bubbler style, air-cooled condensing unit, 8.0 gph minimum capacity, stainless steel splash receptor and basin, and galvanized steel cabinet. Bubblers shall be controlled by push levers or push bars, front mounted or side mounted near the front edge of the cabinet. Spouts shall direct water flow at least 4 inches above unit basin and trajectory parallel or nearly parallel to the front of unit.

Drinking fountain shall not be supplied with water filter and filter replacement indicators (lights, signals) shall be disengaged and/or disable by the manufacture to maintain equipment warrantee.

2.5.9 Drinking Water Cooler, Dual Height, ADA Compliant

AHRI 1010, wall-mounted bubbler style with ASME A112.6.1M dual height unit with concealed chair carrier, air-cooled condensing unit, 8.0 gph minimum capacity, stainless steel splash receptor, and all galvanized cabinet, with 27 inch minimum knee clearance from front bottom of unit to floor and 36 inch maximum spout height above floor and bottle filler. Bubblers shall also be controlled by push levers, by push bars, or touch pads one on each side or one on front and both sides of the cabinet.

Drinking fountan and/ or bottle filler shall not be supplied with water filter and filter replacement indicators (lights, signals) shall be disengaged and/or disable by the manufacture to maintain equipment warrantee.

2.5.10 Bottle Filler (Canteen), Interior

In-wall recessed bottle filling station, non-chilled drinking water at 1.1 gpm maximum capacity, stainless steel construction with ABS alcove, sensor activated with 20 second shut-off timer. Bottle filler shall not be supplied with water filter and filter replacement indicators (lights, signals) shall be disengaged and/or disable by the manufacture to maintain equipment warrantee. Unit shall be lead free and NSF/ANSI 61 and NSF/ANSI 372, and UL 399 certified.

2.5.11 Bottle Filler (Canteen), Exterior

Pedestal mounted water bottle (canteen) filler for exterior use, freeze resistant, heavy duty vandal-resistant steel construction, non-chilled with laminar flow spout, floor mounted and free standing. Unit shall be lead free and NSF/ANSI 61, and NSF/ANSI 372 certified.

2.5.12 Drinking Fountain, Exterior, Standard and ADA

Wall mounted, weather-resistant water fountain, stone aggregate finish with contour formed, stainless steel basin, with rounded corners and edges. Freeze-resistant with vandal-resistant bubbler, self-closing push button operation. Unit shall be lead free and NSF/ANSI 61 certified.

2.5.13 Precast Terrazzo Mop Basin

Terrazzo shall be made of marble chips cast in white portland cement to produce 3000 psi minimum compressive strength 7 days after casting. Provide floor or wall outlet copper alloy body drain cast integral with terrazzo, with polished stainless steel strainers.

2.6 BACKFLOW PREVENTERS

Backflow prevention devices must be approved by the State or local regulatory agencies. If there is no State or local regulatory agency requirements, the backflow prevention devices must be listed by the Foundation for Cross-Connection Control & Hydraulic Research, or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention devices and

assemblies.

Reduced pressure principle assemblies, double check valve assemblies, atmospheric (nonpressure) type vacuum breakers, and pressure type vacuum breakers shall be meet the above requirements.

Backflow preventers with intermediate atmospheric vent shall conform to ASSE 1012. Reduced pressure principle backflow preventers shall conform to ASSE 1013. Hose connection vacuum breakers shall conform to ASSE 1011. Pipe applied atmospheric type vacuum breakers shall conform to ASSE 1001. Pressure vacuum breaker assembly shall conform to ASSE 1020. Air gaps in plumbing systems shall conform to ASME A112.1.2.

2.7 DRAINS

2.7.1 Floor Drains

Floor drains shall consist of a galvanized, integral seepage pan, and adjustable strainer per schedule, consisting of grate and threaded collar. Drains shall be of double drainage pattern for embedding in the floor construction. The seepage pan shall have weep holes or channels for drainage to the drainpipe. The strainer shall be adjustable to floor thickness. If applicable, a clamping device for attaching flashing or waterproofing membrane to the seepage pan without damaging the flashing or waterproofing membrane shall be provided when required. Drains shall be provided with threaded connection. Between the drain outlet and waste pipe, a neoprene rubber gasket conforming to ASTM C564 may be installed, provided that the drain is specifically designed for the rubber gasket compression type joint. Floor and shower drains shall conform to ASME A112.6.3.**<AM#0002>** All Floor drains will comply with the Buy America Act.**</AM#0002>**

2.7.1.1 Drains and Backwater Valves

Drains and backwater valves installed in connection with waterproofed floors or shower pans shall be equipped with bolted-type device to securely clamp flashing.

2.7.2 Area Drains

Area drains shall be plain pattern with stainless steel perforated or slotted grate and bottom outlet. The drain shall be per plumbing fixture schedule. Drains shall be cast iron with manufacturer's standard coating. Grate shall be easily lifted out for cleaning. Outlet shall be suitable for inside caulked connection to drain pipe. Drains shall conform to ASME A112.6.3.

2.7.3 Floor Sinks

Floor sinks shall be per plumbing fixture schedule. Floor sink shall have a stainless steel body, anti-splash dome strainer, and stainless steel 1/2 top grate. The outlet pipe size shall be as indicated or of the same size as the connecting pipe.

2.8 TRAPS

Unless otherwise specified, traps shall be copper-alloy adjustable tube type with slip joint inlet and swivel. Traps shall be without a cleanout. Tubes shall be copper alloy with walls not less than 0.032 inch thick

within commercial tolerances, except on the outside of bends where the thickness may be reduced slightly in manufacture by usual commercial methods. Inlets shall have rubber washer and copper alloy nuts for slip joints above the discharge level. Swivel joints shall be below the discharge level and shall be of metal-to-metal or metal-to-plastic type as required for the application. Nuts shall have flats for wrench grip. Outlets shall have internal pipe thread, except that when required for the application, the outlets shall have sockets for solder-joint connections. The depth of the water seal shall be not less than 2 inches. The interior diameter shall be not more than 1/8 inch over or under the nominal size, and interior surfaces shall be reasonably smooth throughout. A copper alloy "P" trap assembly consisting of an adjustable "P" trap and threaded trap wall nipple with cast brass wall flange shall be provided for lavatories. The assembly shall be a standard manufactured unit and may have a rubber-gasketed swivel joint.

2.8.1 Deep Seal Traps for Floor Drains and Floor Sinks

All floor drains, and floor sinks in janitor's rooms and mechanical rooms shall be provided with a 4 inch deep trap seal per UFC 3-420-01 Section 1002.4 to prevent the trap seal from evaporating.

2.9 PUMPS

2.9.1 Sump Pumps

Sump pumps shall be of capacities scheduled. The pumps shall be of the automatic, electric motor-driven, submerged type, complete with necessary control equipment and with a or solid cast-iron or steel cover plate. The pumps shall have packed bearings sealed against dirt and moisture. Motors shall be totally enclosed, of sizes as indicated and shall be equipped with an across-the-line magnetic controller in a NEMA 250, Type 1 enclosure. Integral size motors shall be the premium efficiency type in accordance with NEMA MG 1. The suction side of each pump shall have a strainer of ample capacity. A float switch assembly, with the switch completely enclosed in a NEMA 250, Type 1 enclosure, shall start and stop each motor at predetermined water levels. Duplex pumps shall be equipped with an automatic alternator to change the lead operation from one pump to the other, and for starting the second pump if the flow exceeds the capacity of the first pump. The discharge line from each pump shall be provided with a union or flange, a nonclog swing check valve, and a stop valve in an accessible location near the pump.

2.9.2 Circulating Pumps

Domestic hot water circulating pumps shall be electrically driven, single-stage, centrifugal, with mechanical seals, suitable for the intended service. Pump and motor shall be integrally mounted on a cast-iron or steel subbase, supported by the piping on which it is installed. The shaft shall be one-piece, heat-treated, corrosion-resisting steel with impeller and smooth-surfaced housing of bronze.

Motor shall be totally enclosed, fan-cooled if required, and shall have sufficient horsepower for the service required. Each pump motor shall be equipped with an across-the-line magnetic controller in a NEMA 250, Type 1 enclosure with "START-STOP" switch in cover.

Integral size motors shall be premium efficiency type in accordance with NEMA MG 1. Pump motors smaller than 1 hp Fractional horsepower pump motors

shall have integral thermal overload protection in accordance with Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Guards shall shield exposed moving parts.

2.9.3 Flexible Connectors

Flexible connectors shall be provided at the suction and discharge of each pump. Connectors shall be constructed of neoprene, rubber, or braided bronze, with Class 150 standard flanges. Flexible connectors shall be line size and suitable for the pressure, or vacuum pressure, and temperature of the intended service. Flexible connectors on pumps located on the crawl space floor shall withstand lateral and/or axial movement of up to 9 inches in any direction while maintaining full function and capacity of the pump.

2.10 DOMESTIC WATER SERVICE METER

Cold water meters 2 inches and smaller shall be positive displacement type conforming to AWWA C700. Cold water meters 2-1/2 inches and larger shall be turbine type conforming to AWWA C701. Meter register may be round or straight reading type, as provided by the local utility. Meter shall be provided with a pulse generator, remote readout register and all necessary wiring and accessories.

Provide water meters to monitor use in building consuming indoor and outdoor water as required by DODI 4170.11 (Installation Energy Management). Implement sub-metering when authorized in writing by the installation. Refer to ASHRAE 189.1 Section 7.3.3 (Energy Consumption Management) for subsystem implementation.

Meters must be connected to the base wide energy and utility monitoring and control system using the installation's advanced metering protocols.

2.11 ELECTRICAL WORK

Provide electrical motor driven equipment specified complete with motors, motor starters, and controls as specified herein and in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Provide internal wiring for components of packaged equipment as an integral part of the equipment. Provide high efficiency type, three-phase, horsepower alternating-current motors, including motors that are part of a system, corresponding to the applications in accordance with NEMA MG 11. In addition to the requirements of Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM, provide polyphase, squirrel-cage medium induction motors with continuous ratings, including motors that are part of a system, that meet the efficiency ratings for premium efficiency motors in accordance with NEMA MG 1. Provide motors in accordance with NEMA MG 1 and of sufficient size to drive the load at the specified capacity without exceeding the nameplate rating of the motor.

Motors shall be rated for continuous duty with the enclosure specified. Motor duty requirements shall allow for maximum frequency start-stop operation and minimum encountered interval between start and stop. Motor torque shall be capable of accelerating the connected load within 20 seconds with 80 percent of the rated voltage maintained at motor terminals during one starting period. Motor bearings shall be fitted with grease supply fittings and grease relief to outside of the enclosure.

Controllers and contactors shall have auxiliary contacts for use with the controls provided. Manual or automatic control and protective or signal

devices required for the operation specified and any control wiring required for controls and devices specified, but not shown, shall be provided. For packaged equipment, the manufacturer shall provide controllers, including the required monitors and timed restart.

Power wiring and conduit for field installed equipment shall be provided under and conform to the requirements of Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

2.12 MISCELLANEOUS PIPING ITEMS

2.12.1 Escutcheon Plates

Provide one piece or split hinge metal plates for piping entering floors, walls, and ceilings in exposed spaces. Provide chromium-plated on copper alloy plates or polished stainless steel finish in finished spaces. Provide paint finish on plates in unfinished spaces.

2.12.2 Pipe Sleeves

Provide where piping passes entirely through walls, ceilings, roofs, and floors. Sleeves are not required where drain, waste, and vent (DWV) piping passes through concrete floor slabs located on grade, except where penetrating a membrane waterproof floor.

2.12.2.1 Sleeves in Masonry and Concrete

Provide steel pipe sleeves or schedule 40 PVC plastic pipe sleeves. Sleeves are required where drain, waste, and vent (DWV) piping passes through concrete floor slabs located on grade. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.

2.12.2.2 Sleeves Not in Masonry and Concrete

Provide 26 gage galvanized steel sheet or PVC plastic pipe sleeves.

2.12.3 Pipe Hangers (Supports)

Provide MSS SP-58 and MSS SP-69 Type 1 with adjustable type steel support rods, except as specified or indicated otherwise. Attach to steel joists with Type 19 or 23 clamps and retaining straps. Attach to Steel W or S beams with Type 21, 28, 29, or 30 clamps. Attach to steel angles and vertical web steel channels with Type 20 clamp with beam clamp channel adapter. Attach to horizontal web steel channel and wood with drilled hole on centerline and double nut and washer. Attach to concrete with Type 18 insert or drilled expansion anchor. Provide Type 40 insulation protection shield for insulated piping.

Spacing of hangars shall be per section 3.1.8 and per the pipe manufacturer's requirements.

2.12.4 Expansion Joints

2.12.4.1 Vertical (Linear)Type Expansion Joint

Expansion joints shall be installed in the locations indicated on the drawings and shall be manufactured of ductile iron conforming to the material properties of ANSI/AWWA C153/A21.53. All expansion joints shall

be capable of expanding or contracting indicated in the Soils Report, but in no case shall there be less than 4 inch total axial movement. Separation beyond the maximum extension of the expansion joint shall be prevented without the use of external tie rods. Each expansion joint shall be pressure tested against its own restraint to a minimum of 350 psi (250 psi 24 inch and greater). A joint restraint shall be provided with each mechanical joint connection. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C153/A21.53. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16A. Sealing gaskets shall be constructed of EPDM. The coating shall meet NSF/ANSI 61.

2.12.4.2 Ball Joint Type Expansion Joint

Flexible expansion joints shall be installed in the locations indicated on the drawings and shall be manufactured of ductile iron conforming to the material requirements of ASTM A536 and ANSI/AWWA C153/A21.53. Foundry certification of material shall be readily available upon request. Each flexible expansion joint shall be pressure tested prior to shipment against its own restraint to a minimum of 350 psi (250 psi for flexible expansion joints 2 inch and 30 inches diameter and larger). A minimum 2:1 safety factor, determined from the published pressure rating, shall apply. Factory Mutual Approval for the 3 inch through 12 inch sizes is required. Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of: 20°, 2 inch - 12 inch; 15°, 14 inch - 36 inch; 12°, 42 inch - 48 inch and 4 inches minimum expansion. Additional expansion sleeves shall be available and easily added or removed at the factory or in the field. Both standardized mechanical joint and flange end connections shall be available. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Sealing gaskets shall be constructed of EPDM. The coating shall meet NSF/ANSI 61. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16. Appropriately sized polyethylene sleeves, meeting ANSI/AWWA C105/A21.5, shall be included for direct buried applications. Manufacturer's certification of compliance to the above standards and requirements shall be readily available upon request. The purchaser (or Owner) shall reserve the right to inspect the manufacturer's facility for compliance.

2.12.5 Nameplates

Provide 0.125 inch thick melamine laminated plastic nameplates, black matte finish with white center core, for equipment, gages, thermometers, and valves; valves in supplies to faucets will not require nameplates. Accurately align lettering and engrave minimum of 0.25 inch high normal block lettering into the white core. Minimum size of nameplates shall be 1.0 by 2.5 inches. Key nameplates to a chart and schedule for each system. Frame charts and schedules under glass and place where directed near each system. Furnish two copies of each chart and schedule.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Piping located in air plenums shall conform to NFPA 90A requirements. Piping located in shafts that constitute air ducts or that enclose air

ducts shall be noncombustible in accordance with NFPA 90A. Installation of plastic pipe where in compliance with NFPA may be installed in accordance with PPFA Fire Man. The plumbing system shall be installed complete with necessary fixtures, fittings, traps, valves, and accessories. Water and drainage piping shall be extended 5 feet outside the building, unless otherwise indicated. A full port ball valve and drain shall be installed on the water service line inside the building approximately 6 inches above the floor from point of entry. Piping shall be connected to the exterior service lines or capped or plugged if the exterior service is not in place. Sewer and water pipes shall be laid in separate trenches, except when otherwise shown. Exterior underground utilities shall be at least 36 inches below the finish grade or as indicated on the drawings. If trenches are closed or the pipes are otherwise covered before being connected to the service lines, the location of the end of each plumbing utility shall be marked with a stake or other acceptable means. Valves shall be installed with control no lower than the valve body.

3.1.1 Water Pipe, Fittings, and Connections

3.1.1.1 Utilities

The piping shall be extended to fixtures, outlets, and equipment. The hot-water and cold-water piping system shall be arranged and installed to permit draining. The supply line to each item of equipment or fixture, except faucets, flush valves, or other control valves which are supplied with integral stops, shall be equipped with a shutoff valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. Supply piping to fixtures, faucets, hydrants, shower heads, and flushing devices shall be anchored to prevent movement.

3.1.1.2 Cutting and Repairing

The work shall be carefully laid out in advance, and unnecessary cutting of construction shall be avoided. Damage to building, piping, wiring, or equipment as a result of cutting shall be repaired by mechanics skilled in the trade involved.

3.1.1.3 Protection of Fixtures, Materials, and Equipment

Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemicals, and mechanical injury. Upon completion of the work, the fixtures, materials, and equipment shall be thoroughly cleaned, adjusted, and operated. Safety guards shall be provided for exposed rotating equipment.

3.1.1.4 Mains, Branches, and Runouts

Piping shall be installed as indicated. Pipe shall be accurately cut and worked into place without springing or forcing. Structural portions of the building shall not be weakened. Aboveground piping shall run parallel with the lines of the building, unless otherwise indicated. Branch pipes from service lines may be taken from top, bottom, or side of main, using crossover fittings required by structural or installation conditions. Supply pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering on the different services. Bare and insulated water lines shall not bear directly against building structural elements so as to

transmit sound to the structure or to prevent flexible movement of the lines. Water pipe shall not be buried in or under floors unless specifically indicated or approved. Changes in pipe sizes shall be made with reducing fittings. Use of bushings will not be permitted except for use in situations in which standard factory fabricated components are furnished to accommodate specific accepted installation practice. Change in direction shall be made with fittings, except that bending of pipe 4 inches and smaller will be permitted, provided a pipe bender is used and wide sweep bends are formed. The center-line radius of bends shall be not less than six diameters of the pipe. Bent pipe showing kinks, wrinkles, flattening, or other malformations will not be acceptable.

3.1.1.5 Pipe Drains

Pipe drains indicated shall consist of 3/4 inch hose bibb with renewable seat and full port ball valve ahead of hose bibb. At other low points, 3/4 inch brass plugs or caps shall be provided. Disconnection of the supply piping at the fixture is an acceptable drain.

3.1.1.6 Expansion and Contraction of Piping

Allowance shall be made throughout for expansion and contraction of water pipe. Each hot-water and hot-water circulation riser shall have expansion loops or other provisions such as offsets and changes in direction where required. Risers shall be securely anchored as required or where indicated to force expansion to loops. Branch connections from risers shall be made with ample swing or offset to avoid undue strain on fittings or short pipe lengths. Horizontal runs of pipe over 50 feet in length shall be anchored to the wall or the supporting construction about midway on the run to force expansion, evenly divided, toward the ends. Sufficient flexibility shall be provided on branch runouts from mains and risers to provide for expansion and contraction of piping. Flexibility shall be provided by installing one or more turns in the line so that piping will spring enough to allow for expansion without straining. Mechanical grooved pipe coupling systems shall not be used.

3.1.1.7 Thrust Restraint

Plugs, caps, tees, valves and bends deflecting 11.25 degrees or more, either vertically or horizontally, in waterlines 4 inches in diameter or larger shall be provided with thrust blocks, where indicated, to prevent movement. Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2000 psi after 28 days. Blocking shall be placed between solid ground and the fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of the thrust block shall be poured against undisturbed earth. The side of the thrust block not subject to thrust shall be poured against forms. The area of bearing will be as shown. Blocking shall be placed so that the joints of the fitting are accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

3.1.1.8 Commercial-Type Water Hammer Arresters

Commercial-type water hammer arresters shall be provided on hot- and cold-water supplies and shall be located as generally indicated, with precise location and sizing to be in accordance with PDI WH 201. Water hammer arresters, where concealed, shall be accessible by means of access

doors or removable panels. Commercial-type water hammer arresters shall conform to ASSE 1010. Vertical capped pipe columns will not be permitted.

3.1.2 Joints

Installation of pipe and fittings shall be made in accordance with the manufacturer's recommendations. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints shall be made up with fittings of compatible material and made for the specific purpose intended.

3.1.2.1 Threaded

Threaded joints shall have American Standard taper pipe threads conforming to ASME B1.20.1. Only male pipe threads shall be coated with graphite or with an approved graphite compound, or with an inert filler and oil, or shall have a polytetrafluoroethylene tape applied.

3.1.2.2 Mechanical Couplings

Mechanical couplings may be used for aboveground, ferrous or non-ferrous, domestic hot and cold water systems, in lieu of unions, brazed, soldered, welded, flanged, or threaded joints.

Mechanical couplings are permitted in accessible locations including behind access plates. Grooved joints will not be permitted.

3.1.2.3 Unions and Flanges

Unions, flanges and mechanical couplings shall not be concealed in walls, ceilings, or partitions. Unions shall be used on pipe sizes 2-1/2 inches and smaller; flanges shall be used on pipe sizes 3 inches and larger.

3.1.2.4 Cast Iron Soil, Waste and Vent Pipe

Bell and spigot compression and hubless gasketed clamp joints for soil, waste and vent piping shall be installed per the manufacturer's recommendations.

3.1.2.5 Copper Tube and Pipe

a. Brazed. Brazed joints shall be made in conformance with AWS B2.2/B2.2M, ASME B16.50, and CDA A4015 with flux and are acceptable for all pipe sizes. Copper to copper joints shall include the use of copper-phosphorus or copper-phosphorus-silver brazing metal without flux. Brazing of dissimilar metals (copper to bronze or brass) shall include the use of flux with either a copper-phosphorus, copper-phosphorus-silver or a silver brazing filler metal.

b. Soldered. Soldered joints shall be made with flux and are only acceptable for piping 2 inches and smaller. Soldered joints shall conform to ASME B31.5 and CDA A4015. Soldered joints shall not be used in compressed air piping between the air compressor and the receiver.

c. Copper Tube Extracted Joint. Mechanically extracted joints shall be made in accordance with ICC IPC.

d. Press connection. Copper press connections shall be made in strict accordance with the manufacturer's installation instructions for

manufactured rated size. The joints shall be pressed using the tool(s) approved by the manufacturer of that joint. Minimum distance between fittings shall be in accordance with the manufacturer's requirements.

3.1.2.6 Other Joint Methods

3.1.3 Dissimilar Pipe Materials

Connections between ferrous and non-ferrous copper water pipe shall be made with dielectric unions or flange waterways. Dielectric waterways shall have temperature and pressure rating equal to or greater than that specified for the connecting piping. Waterways shall have metal connections on both ends suited to match connecting piping. Dielectric waterways shall be internally lined with an insulator specifically designed to prevent current flow between dissimilar metals. Dielectric flanges shall meet the performance requirements described herein for dielectric waterways. Connecting joints between plastic and metallic pipe shall be made with transition fitting for the specific purpose.

3.1.4 Corrosion Protection for Buried Pipe and Fittings

Ductile iron, cast iron, and steel pipe, fittings, and joints shall have a protective coating. Coatings shall be selected, applied, and inspected in accordance with NACE SP0169 and as otherwise specified. The pipe shall be cleaned and the coating system applied prior to pipe tightness testing. Joints and fittings shall be cleaned and the coating system applied after pipe tightness testing. For tape coating systems, the tape shall conform to AWWA C203 and shall be applied with a 50 percent overlap. Primer utilized with tape type coating systems shall be as recommended by the tape manufacturer.

3.1.5 Pipe Sleeves and Flashing

Pipe sleeves shall be furnished and set in their proper and permanent location.

3.1.5.1 Sleeve Requirements

Unless indicated otherwise, provide pipe sleeves meeting the following requirements:

Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, ceilings, roofs, and floors.

A modular mechanical type sealing assembly may be installed in lieu of a waterproofing clamping flange and caulking and sealing of annular space between pipe and sleeve. The seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve using galvanized steel bolts, nuts, and pressure plates. The links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and each nut. After the seal assembly is properly positioned in the sleeve, tightening of the bolt shall cause the rubber sealing elements to expand and provide a watertight seal between the pipe and the sleeve. Each seal assembly shall be sized as recommended by the manufacturer to fit the pipe and sleeve involved.

Sleeves shall not be installed in structural members, except where

indicated or approved. Rectangular and square openings shall be as detailed. Each sleeve shall extend through its respective floor, or roof, and shall be cut flush with each surface, except for special circumstances. Pipe sleeves passing through floors in wet areas such as mechanical equipment rooms, lavatories, kitchens, and other plumbing fixture areas shall extend a minimum of 4 inches above the finished floor.

Unless otherwise indicated, sleeves shall be of a size to provide a minimum clearance between bare pipe or insulation and inside of sleeve or between insulation and inside of sleeve. Sleeves in bearing walls and concrete slab on grade floors shall be steel pipe or cast-iron pipe. Sleeves in nonbearing walls or ceilings may be steel pipe, cast-iron pipe, galvanized sheet metal with lock-type longitudinal seam, or plastic.

Except as otherwise specified, the annular space between pipe and sleeve, or between jacket over insulation and sleeve, shall be sealed as indicated with sealants conforming to ASTM C920 and with a primer, backstop material and surface preparation as specified. The annular space between pipe and sleeve, between bare insulation and sleeve or between jacket over insulation and sleeve shall not be sealed for interior walls which are not designated as fire rated.

Sleeves through below-grade walls in contact with earth shall be recessed 1/2 inch from wall surfaces on both sides. Annular space between pipe and sleeve shall be filled with backing material and sealants in the joint between the pipe and concrete or masonry wall as specified above. Sealant selected for the earth side of the wall shall be compatible with dampproofing/waterproofing materials that are to be applied over the joint sealant. Pipe sleeves in fire-rated walls shall conform to the requirements in Section 07 84 00 FIRESTOPPING.

Piping with insulation in ceilings, crawl space, or other unfinished areas that penetrate through a wall; the insulation shall continue through wall penetration and sleeve shall conform to the information provided in this section.

Piping with insulation in walls that turn to penetrate through wall into finished space; the insulation shall stop down stream of last elbow inside the wall and be cut flush with interior side of wall construction. The sleeve shall conform to bare pipe instructions provided in this section.

3.1.5.2 Flashing Requirements

Pipes passing through roof shall be installed through a 16 ounce copper flashing, each within an integral skirt or flange. Flashing shall be suitably formed, and the skirt or flange shall extend not less than 8 inches from the pipe and shall be set over the roof or floor membrane in a solid coating of bituminous cement. The flashing shall extend up the pipe a minimum of 10 inches. For cleanouts, the flashing shall be turned down into the hub and caulked after placing the ferrule. Pipes passing through pitched roofs shall be flashed, using lead or copper flashing, with an adjustable integral flange of adequate size to extend not less than 8 inches from the pipe in all directions and lapped into the roofing to provide a watertight seal. The annular space between the flashing and the bare pipe or between the flashing and the metal-jacket-covered insulation shall be sealed as indicated. Flashing for dry vents shall be turned down into the pipe to form a waterproof joint. Pipes, up to and including 10 inches in diameter, passing through roof or floor waterproofing membrane may be installed through a cast-iron sleeve with caulking recess, anchor lugs,

flashing-clamp device, and pressure ring with brass bolts. Flashing shield shall be fitted into the sleeve clamping device. Pipes passing through wall waterproofing membrane shall be sleeved as described above. A waterproofing clamping flange shall be installed.

3.1.5.3 Waterproofing

Waterproofing at floor-mounted water closets shall be accomplished by forming a flashing guard from soft-tempered sheet copper. The center of the sheet shall be perforated and turned down approximately 1-1/2 inches to fit between the outside diameter of the drainpipe and the inside diameter of the cast-iron or steel pipe sleeve. The turned-down portion of the flashing guard shall be embedded in sealant to a depth of approximately 1-1/2 inches; then the sealant shall be finished off flush to floor level between the flashing guard and drainpipe. The flashing guard of sheet copper shall extend not less than 8 inches from the drainpipe and shall be lapped between the floor membrane in a solid coating of bituminous cement. If cast-iron water closet floor flanges are used, the space between the pipe sleeve and drainpipe shall be sealed with sealant and the flashing guard shall be upturned approximately 1-1/2 inches to fit the outside diameter of the drainpipe and the inside diameter of the water closet floor flange. The upturned portion of the sheet fitted into the floor flange shall be sealed.

3.1.5.4 Optional Counterflashing

Instead of turning the flashing down into a dry vent pipe, or caulking and sealing the annular space between the pipe and flashing or metal-jacket-covered insulation and flashing, counterflashing may be accomplished by utilizing the following:

a. A standard roof coupling for threaded pipe up to 6 inches in diameter.

b. A tack-welded or banded-metal rain shield around the pipe.

3.1.5.5 Pipe Penetrations of Slab on Grade Floors

Where pipes, fixture drains, floor drains, cleanouts or similar items penetrate slab on grade floors, except at penetrations of floors with waterproofing membrane as specified in paragraphs FLASHING REQUIREMENTS and WATERPROOFING, a groove 1/4 to 1/2 inch wide by 1/4 to 3/8 inch deep shall be formed around the pipe, fitting or drain. The groove shall be filled with a sealant as specified in Section 07 92 00 JOINT SEALANTS.

3.1.5.6 Pipe Penetrations

Provide sealants for all pipe penetrations. All pipe penetrations shall be sealed to prevent infiltration of air, insects, and vermin.

3.1.6 Fire Seal

Where pipes pass through fire walls, fire-partitions, fire-rated pipe chase walls or floors above grade, a fire seal shall be provided as specified in Section 07 84 00 FIRESTOPPING.

3.1.7 Supports

3.1.7.1 General

Hangers used to support piping 2 inches and larger shall be fabricated to permit adequate adjustment after erection while still supporting the load. Pipe guides and anchors shall be installed to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying, and undue strain. Piping subjected to vertical movement when operating temperatures exceed ambient temperatures shall be supported by variable spring hangers and supports or by constant support hangers. In the support of multiple pipe runs on a common base member, a clip or clamp shall be used where each pipe crosses the base support member. Spacing of the base support members shall not exceed the hanger and support spacing required for an individual pipe in the multiple pipe run. Threaded sections of rods shall not be formed or bent.

3.1.7.2 Pipe Hangers, Inserts, and Supports

Installation of pipe hangers, inserts and supports shall conform to MSS SP-58 and MSS SP-69 except as modified herein. Coordinate this section with the requirements of International Plumbing Code and the pipe manufacturer's requirements for supporting piping. The more stringent shall apply.

a. Types 5, 12, and 26 shall not be used.

b. Type 3 shall not be used on insulated pipe.

c. Type 18 inserts shall be secured to concrete forms before concrete is placed. Continuous inserts which allow more adjustment may be used if they otherwise meet the requirements for type 18 inserts.

d. Type 19 and 23 C-clamps shall be torqued per MSS SP-58 and shall have both locknuts and retaining devices furnished by the manufacturer. Field-fabricated C-clamp bodies or retaining devices are not acceptable.

e. Type 20 attachments used on angles and channels shall be furnished with an added malleable-iron heel plate or adapter.

f. Type 24 may be used only on trapeze hanger systems or on fabricated frames.

g. Type 39 saddles shall be used on insulated pipe 4 inches and larger when the temperature of the medium is 60 degrees F or higher. Type 39 saddles shall be welded to the pipe.

h. Type 40 shields shall:

(1) Be used on insulated pipe less than 4 inches.
(2) Be used on insulated pipe 4 inches and larger when the temperature of the medium is 60 degrees F or less.
(3) Have a high density insert for all pipe sizes. High density inserts shall have a density of 8 pcf or greater.

i. Horizontal pipe supports shall be spaced as specified in MSS SP-58 and a support shall be installed not over 1 foot from the pipe fitting joint at each change in direction of the piping. Pipe supports shall be spaced not over 5 feet apart at valves. Horizontal pipe runs shall

include allowances for expansion and contraction.

j. Vertical pipe shall be supported at each floor, except at slab-on-grade, at intervals of not more than 15 feet nor more than 8 feet from end of risers, and at vent terminations. Vertical pipe risers shall include allowances for expansion and contraction.

k. Type 35 guides using steel, reinforced polytetrafluoroethylene (PTFE) or graphite slides shall be provided to allow longitudinal pipe movement. Slide materials shall be suitable for the system operating temperatures, atmospheric conditions, and bearing loads encountered. Lateral restraints shall be provided as needed. Where steel slides do not require provisions for lateral restraint the following may be used:

(1) On pipe 4 inches and larger when the temperature of the medium is 60 degrees F or higher, a Type 39 saddle, welded to the pipe, may freely rest on a steel plate.
(2) On pipe less than 4 inches a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.
(3) On pipe 4 inches and larger carrying medium less that 60 degrees F a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.

l. Pipe hangers on horizontal insulated pipe shall be the size of the outside diameter of the insulation. The insulation shall be continuous through the hanger on all pipe sizes and applications.

m. Where there are high system temperatures and welding to piping is not desirable, the type 35 guide shall include a pipe cradle, welded to the guide structure and strapped securely to the pipe. The pipe shall be separated from the slide material by at least 4 inches or by an amount adequate for the insulation, whichever is greater.

n. Hangers and supports for plastic pipe shall not compress, distort, cut or abrade the piping, and shall allow free movement of pipe except where otherwise required in the control of expansion/contraction.

3.1.7.3 Structural Attachments

Attachment to building structure concrete and masonry shall be by cast-in concrete inserts, built-in anchors, or masonry anchor devices. Inserts and anchors shall be applied with a safety factor not less than 5. Supports shall not be attached to metal decking. Supports shall not be attached to the underside of concrete filled floor or concrete roof decks unless approved by the Contracting Officer. Masonry anchors for overhead applications shall be constructed of ferrous materials only.

3.1.8 Welded Installation

Plumbing pipe weldments shall be as indicated. Changes in direction of piping shall be made with welding fittings only; mitering or notching pipe to form elbows and tees or other similar type construction will not be permitted. Branch connection may be made with either welding tees or forged branch outlet fittings. Branch outlet fittings shall be forged, flared for improvement of flow where attached to the run, and reinforced against external strains. Beveling, alignment, heat treatment, and inspection of weld shall conform to ASME B31.1. Weld defects shall be removed and repairs made to the weld, or the weld joints shall be entirely removed and rewelded. After filler metal has been removed from its

original package, it shall be protected or stored so that its characteristics or welding properties are not affected. Electrodes that have been wetted or that have lost any of their coating shall not be used.

3.1.9 Pipe Cleanouts

Pipe cleanouts shall be the same size as the pipe except that cleanout plugs larger than 4 inches will not be required. A cleanout installed in connection with cast-iron soil pipe shall consist of a long-sweep 1/4 bend or one or two 1/8 bends extended to the place shown. An extra-heavy cast-brass or cast-iron ferrule with countersunk cast-brass head screw plug shall be caulked into the hub of the fitting and shall be flush with the floor. Cleanouts in connection with other pipe, where indicated, shall be T-pattern, 90-degree branch drainage fittings with cast-brass screw plugs, except plastic plugs shall be installed in plastic pipe. Plugs shall be the same size as the pipe up to and including 4 inches. Cleanout tee branches with screw plug shall be installed at the foot of soil and waste stacks, at the foot of interior downspouts, on each connection to building storm drain where interior downspouts are indicated, and on each building drain outside the building. Cleanout tee branches may be omitted on stacks in single story buildings with slab-on-grade construction or where less than 18 inches of crawl space is provided under the floor. Cleanouts on pipe concealed in partitions shall be provided with chromium plated bronze, nickel bronze, nickel brass or stainless steel flush type access cover plates. Round access covers shall be provided and secured to plugs with securing screw. Square access covers may be provided with matching frames, anchoring lugs and cover screws. Cleanouts in finished walls shall have access covers and frames installed flush with the finished wall. Cleanouts installed in finished floors subject to foot traffic shall be provided with a chrome-plated cast brass, nickel brass, or nickel bronze cover secured to the plug or cover frame and set flush with the finished floor. Heads of fastening screws shall not project above the cover surface. Where cleanouts are provided with adjustable heads, the heads shall be cast iron or plastic.

3.2 FIXTURES AND FIXTURE TRIMMINGS

Polished chromium-plated pipe, valves, and fittings shall be provided where exposed to view. Angle stops, straight stops, stops integral with the faucets, or concealed type of lock-shield, and loose-key pattern stops for supplies with threaded, sweat or solvent weld inlets shall be furnished and installed with fixtures. Where connections between copper tubing and faucets are made by rubber compression fittings, a beading tool shall be used to mechanically deform the tubing above the compression fitting. Exposed traps and supply pipes for fixtures and equipment shall be connected to the rough piping systems at the wall, unless otherwise specified under the item. Floor and wall escutcheons shall be as specified. Drain lines and hot water lines of fixtures for handicapped personnel shall be insulated and do not require polished chrome finish. Plumbing fixtures and accessories shall be installed within the space shown.

Tail pieces for flush valve fixtures shall be by, or suppled by, same manufacture as the fixture.

3.2.1 Fixture Connections

Where space limitations prohibit standard fittings in conjunction with the cast-iron floor flange, special short-radius fittings shall be provided. Connections between earthenware fixtures and flanges on soil pipe shall be

made gastight and watertight with a closet-setting compound or neoprene gasket and seal. Use of natural rubber gaskets or putty will not be permitted. Fixtures with outlet flanges shall be set the proper distance from floor or wall to make a first-class joint with the closet-setting compound or gasket and fixture used.

3.2.2 Flushometer Valves

Flushometer valves shall be secured to prevent movement by anchoring the long finished top spud connecting tube to wall adjacent to valve with approved metal bracket. Flushometer valves for water closets shall be installed 39 inches above the floor, except at water closets intended for use by the physically handicapped where flushometer valves shall be mounted at approximately 30 inches above the floor and arranged to avoid interference with grab bars. In addition, for water closets intended for handicap use, the flush valve handle shall be installed on the wide side of the enclosure.

3.2.3 Height of Fixture Rims Above Floor

Installation of fixtures for use by the physically handicapped shall be in accordance with ICC A117.1 COMM.

3.2.4 Fixture Supports

Fixture supports for off-the-floor lavatories, urinals, water closets, and other fixtures of similar size, design, and use, shall be of the chair-carrier type. The carrier shall provide the necessary means of mounting the fixture, with a foot or feet to anchor the assembly to the floor slab. Adjustability shall be provided to locate the fixture at the desired height and in proper relation to the wall. Support plates, in lieu of chair carrier, shall be fastened to the wall structure only where it is not possible to anchor a floor-mounted chair carrier to the floor slab.

3.2.4.1 Support for Solid Masonry Construction

Chair carrier shall be anchored to the floor slab. Where a floor-anchored chair carrier cannot be used, a suitable wall plate shall be imbedded in the masonry wall.

3.2.4.2 Support for Concrete-Masonry Wall Construction

Chair carrier shall be anchored to floor slab. Where a floor-anchored chair carrier cannot be used, a suitable wall plate shall be fastened to the concrete wall using through bolts and a back-up plate.

3.2.4.3 Support for Steel Stud Frame Partitions

Chair carrier shall be used. The anchor feet and tubular uprights shall be of the heavy duty design; and feet (bases) shall be steel and welded to a square or rectangular steel tube upright. Wall plates, in lieu of floor-anchored chair carriers, shall be used only if adjoining steel partition studs are suitably reinforced to support a wall plate bolted to these studs.

3.2.4.4 Support for Wood Stud Construction

Where floor is a concrete slab, a floor-anchored chair carrier shall be used. Where entire construction is wood, wood crosspieces shall be

installed. Fixture hanger plates, supports, brackets, or mounting lugs shall be fastened with not less than No. 10 wood screws, 1/4 inch thick minimum steel hanger, or toggle bolts with nut. The wood crosspieces shall extend the full width of the fixture and shall be securely supported.

3.2.4.5 Wall-Mounted Water Closet Gaskets

Where wall-mounted water closets are provided, reinforced wax, treated felt, or neoprene gaskets shall be provided. The type of gasket furnished shall be as recommended by the chair-carrier manufacturer.

3.2.5 Backflow Prevention Devices

Plumbing fixtures, equipment, and pipe connections shall not cross connect or interconnect between a potable water supply and any source of nonpotable water. Backflow preventers shall be installed where indicated and in accordance with ICC IPC at all other locations necessary to preclude a cross-connect or interconnect between a potable water supply and any nonpotable substance. In addition backflow preventers shall be installed at all locations where the potable water outlet is below the flood level of the equipment, or where the potable water outlet will be located below the level of the nonpotable substance. Backflow preventers shall be located so that no part of the device will be submerged. Backflow preventers shall be of sufficient size to allow unrestricted flow of water to the equipment, and preclude the backflow of any nonpotable substance into the potable water system. Bypass piping shall not be provided around backflow preventers. Access shall be provided for maintenance and testing. Each device shall be a standard commercial unit.

3.2.6 Access Panels

Access panels shall be provided for concealed valves and controls, or any item requiring inspection or maintenance. Access panels shall be of sufficient size and located so that the concealed items may be serviced, maintained, or replaced. Access panels shall be as specified in Section 05 50 13 MISCELLANEOUS METAL FABRICATIONS.

3.2.7 Sight Drains

Sight drains shall be installed so that the indirect waste will terminate 2 inches above the flood rim of the funnel to provide an acceptable air gap.

3.2.8 Traps

Each trap shall be placed as near the fixture as possible, and no fixture shall be double-trapped. Traps installed on cast-iron soil pipe shall be cast iron. Traps installed on steel pipe or copper tubing shall be recess-drainage pattern, or brass-tube type. Traps installed on plastic pipe may be plastic conforming to ASTM D3311. Traps for acid-resisting waste shall be of the same material as the pipe.

3.3 VIBRATION-ABSORBING FEATURES

Mechanical equipment, including compressors and pumps, shall be isolated from the building structure by approved vibration-absorbing features, unless otherwise shown. Each foundation shall include an adequate number of standard isolation units. Each unit shall consist of machine and floor or foundation fastening, together with intermediate isolation material, and shall be a standard product with printed load rating. Piping connected to

mechanical equipment shall be provided with flexible connectors. Isolation unit installation shall limit vibration to 10 percent of the lowest equipment rpm.

3.4 WATER METER REMOTE READOUT REGISTER

The remote readout register shall be mounted at the location indicated or as directed by the Contracting Officer.

3.5 IDENTIFICATION SYSTEMS

3.5.1 Identification Tags

Identification tags made of brass, engraved laminated plastic, or engraved anodized aluminum, indicating service and valve number shall be installed on valves, except those valves installed on supplies at plumbing fixtures. Tags shall be 1-3/8 inch minimum diameter, and marking shall be stamped or engraved. Indentations shall be black, for reading clarity. Tags shall be attached to valves with No. 12 AWG, copper wire, chrome-plated beaded chain, or plastic straps designed for that purpose.

3.5.2 Pipe Color Code Marking

Color code marking of piping shall be as specified in Section 09 90 00 PAINTS AND COATINGS.

3.5.3 Color Coding Scheme for Locating Hidden Utility Components

Scheme shall be provided in buildings having suspended grid ceilings. The color coding scheme shall identify points of access for maintenance and operation of operable components which are not visible from the finished space and installed in the space directly above the suspended grid ceiling. The operable components shall include valves, dampers, switches, linkages and thermostats. The color coding scheme shall consist of a color code board and colored metal disks. Each colored metal disk shall be approximately 3/8 inch in diameter and secured to removable ceiling panels with fasteners. The fasteners shall be inserted into the ceiling panels so that the fasteners will be concealed from view. The fasteners shall be manually removable without tools and shall not separate from the ceiling panels when panels are dropped from ceiling height. Installation of colored metal disks shall follow completion of the finished surface on which the disks are to be fastened. The color code board shall have the approximate dimensions of 3 foot width, 30 inches height, and 1/2 inch thickness. The board shall be made of wood fiberboard and framed under glass or 1/16 inch transparent plastic cover. Unless otherwise directed, the color code symbols shall be approximately 3/4 inch in diameter and the related lettering in 1/2 inch high capital letters. The color code board shall be mounted and located in the mechanical or equipment room. The color code system shall be per base CE standard.

3.5.4 Non-Potable Water Systems

Non-potable water systems color, and marking shall comply with IPC Sections 608.9 thru 608.9.2.3.

3.6 ESCUTCHEONS

Escutcheons shall be provided at finished surfaces where bare or insulated piping, exposed to view, passes through floors, walls, or ceilings, except

in boiler, utility, or equipment rooms. Escutcheons shall be fastened securely to pipe or pipe covering and shall be satin-finish, corrosion-resisting steel, polished chromium-plated zinc alloy, or polished chromium-plated copper alloy. Escutcheons shall be either one-piece or split-pattern, held in place by internal spring tension or setscrew.

3.7 PAINTING

Painting of pipes, hangers, supports, and other iron work, either in concealed spaces or exposed spaces, is specified in Section 09 90 00 PAINTS AND COATINGS.

3.7.1 Painting of New Equipment

New equipment painting shall be factory applied or shop applied, and shall be as specified herein, and provided under each individual section.

3.7.1.1 Factory Painting Systems

Manufacturer's standard factory painting systems may be provided subject to certification that the factory painting system applied will withstand 125 hours in a salt-spray fog test, except that equipment located outdoors shall withstand 500 hours in a salt-spray fog test. Salt-spray fog test shall be in accordance with ASTM B117, and for that test the acceptance criteria shall be as follows: immediately after completion of the test, the paint shall show no signs of blistering, wrinkling, or cracking, and no loss of adhesion; and the specimen shall show no signs of rust creepage beyond 0.125 inch on either side of the scratch mark.

The film thickness of the factory painting system applied on the equipment shall not be less than the film thickness used on the test specimen. If manufacturer's standard factory painting system is being proposed for use on surfaces subject to temperatures above 120 degrees F, the factory painting system shall be designed for the temperature service.

3.7.1.2 Shop Painting Systems for Metal Surfaces

Clean, pretreat, prime and paint metal surfaces; except aluminum surfaces need not be painted. Apply coatings to clean dry surfaces. Clean the surfaces to remove dust, dirt, rust, oil and grease by wire brushing and solvent degreasing prior to application of paint, except metal surfaces subject to temperatures in excess of 120 degrees F shall be cleaned to bare metal.

Where more than one coat of paint is specified, apply the second coat after the preceding coat is thoroughly dry. Lightly sand damaged painting and retouch before applying the succeeding coat. Color of finish coat shall be aluminum or light gray.

a. Temperatures Less Than 120 Degrees F: Immediately after cleaning, the metal surfaces subject to temperatures less than 120 degrees F shall receive one coat of pretreatment primer applied to a minimum dry film thickness of 0.3 mil, one coat of primer applied to a minimum dry film thickness of one mil; and two coats of enamel applied to a minimum dry film thickness of one mil per coat.

b. Temperatures Between 120 and 400 Degrees F: Metal surfaces subject to temperatures between 120 and 400 degrees F shall receive two coats of 400 degrees F heat-resisting enamel applied to a total minimum

thickness of 2 mils.

c. Temperatures Greater Than 400 Degrees F: Metal surfaces subject to temperatures greater than 400 degrees F shall receive two coats of 600 degrees F heat-resisting paint applied to a total minimum dry film thickness of 2 mils.

3.8 TESTS, FLUSHING AND DISINFECTION

3.8.1 Plumbing System

The following tests shall be performed on the plumbing system in accordance with ICC IPC and UFC 3-420-01 including Change 10, October 26, 2015, except that the drainage and vent system final test shall include the smoke test. The Contractor has the option to perform a peppermint test in lieu of the smoke test. If a peppermint test is chosen, the Contractor must submit a testing procedure and reasons for choosing this option in lieu of the smoke test to the Contracting Officer for approval.

a. Drainage and Vent Systems Test. The final test shall include a smoke test.

b. Building Sewers Tests.

c. Water Supply Systems Tests.

3.8.1.1 Test of Backflow Prevention Assemblies

Backflow prevention assembly shall be tested using gauges specifically designed for the testing of backflow prevention assemblies.

Backflow prevention assembly test gauges shall be tested annually for accuracy in accordance with the requirements of State or local regulatory agencies. If there is no State or local regulatory agency requirements, gauges shall be tested annually for accuracy in accordance with the requirements of University of Southern California's Foundation of Cross Connection Control and Hydraulic Research or the American Water Works Association Manual of Cross Connection (Manual M-14), or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention assembly test gauges. Report form for each assembly shall include, as a minimum, the following:

Data on Device	Data on Testing Firm
Type of Assembly	Name
Manufacturer	Address
Model Number	Certified Tester
Serial Number	Certified Tester No.
Size	Date of Test
Location	

Test Pressure Readings	Serial Number and Test Data of Gauges

If the unit fails to meet specified requirements, the unit shall be repaired and retested.

3.8.2 Defective Work

If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. Caulking of screwed joints or holes will not be acceptable.

3.8.3 System Flushing

3.8.3.1 During Flushing

Before operational tests or disinfection, potable water piping system shall be flushed with hot potable water. Sufficient water shall be used to produce a water velocity that is capable of entraining and removing debris in all portions of the piping system. This requires simultaneous operation of all fixtures on a common branch or main in order to produce a flushing velocity of approximately 4 fps through all portions of the piping system. In the event that this is impossible due to size of system, the Contracting Officer (or the designated representative) shall specify the number of fixtures to be operated during flushing. Contractor shall provide adequate personnel to monitor the flushing operation and to ensure that drain lines are unobstructed in order to prevent flooding of the facility. Contractor shall be responsible for any flood damage resulting from flushing of the system. Flushing shall be continued until entrained dirt and other foreign materials have been removed and until discharge water shows no discoloration. All faucets and drinking water fountains, to include any device considered as an end point device by NSF/ANSI 61, Section 9, shall be flushed a minimum of 0.25 gallons per 24 hour period, ten times over a 14 day period.

3.8.3.2 After Flushing

System shall be drained at low points. Strainer screens shall be removed, cleaned, and replaced. After flushing and cleaning, systems shall be prepared for testing by immediately filling water piping with clean, fresh potable water. Any stoppage, discoloration, or other damage to the finish, furnishings, or parts of the building due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor. When the system flushing is complete, the hot-water system shall be adjusted for uniform circulation. Flushing devices and automatic control systems shall be adjusted for proper operation according to manufacturer's instructions. Comply with ASHRAE 90.1 - IP for minimum efficiency requirements. Unless more stringent local requirements exist, lead levels shall not exceed limits established by 40 CFR 141.80 (c)(1). The water supply to the building shall be tested separately to ensure that any lead contamination found during potable water system testing is due to work being performed inside the building.

3.8.4 Operational Test

Upon completion of flushing and prior to disinfection procedures, the Contractor shall subject the plumbing system to operating tests to demonstrate satisfactory installation, connections, adjustments, and

functional and operational efficiency. Such operating tests shall cover a period of not less than 8 hours for each system and shall include the following information in a report with conclusion as to the adequacy of the system:

a. Time, date, and duration of test.

b. Water pressures at the most remote and the highest fixtures.

c. Operation of each fixture and fixture trim.

d. Operation of each valve, hydrant, and faucet.

e. Pump suction and discharge pressures.

f. Temperature of each domestic hot-water supply.

g. Operation of each floor and roof drain by flooding with water.

h. Operation of each vacuum breaker and backflow preventer.

i. Complete operation of each water pressure booster system, including pump start pressure and stop pressure.

j. Compressed air readings at each compressor and at each outlet. Each indicating instrument shall be read at 1/2 hour intervals. The report of the test shall be submitted in quadruplicate. The Contractor shall furnish instruments, equipment, and personnel required for the tests; the Government will furnish the necessary water and electricity.

3.8.5 Disinfection

After all system components are provided and operational tests are complete, the entire domestic hot- and cold-water distribution system shall be disinfected. Before introducing disinfecting chlorination material, entire system shall be flushed with potable water until any entrained dirt and other foreign materials have been removed.

Water chlorination procedure shall be in accordance with AWWA C651 and AWWA C652 as modified and supplemented by this specification. The chlorinating material shall be hypochlorites or liquid chlorine. The chlorinating material shall be fed into the water piping system at a constant rate at a concentration of at least 50 parts per million (ppm). Feed a properly adjusted hypochlorite solution injected into the system with a hypochlorinator, or inject liquid chlorine into the system through a solution-feed chlorinator and booster pump until the entire system is completely filled.

Test the chlorine residual level in the water at 6 hour intervals for a continuous period of 24 hours. If at the end of a 6 hour interval, the chlorine residual has dropped to less than 25 ppm, flush the piping including tanks with potable water, and repeat the above chlorination procedures. During the chlorination period, each valve and faucet shall be opened and closed several times.

After the second 24 hour period, verify that no less than 25 ppm chlorine residual remains in the treated system. The 24 hour chlorination procedure must be repeated until no less than 25 ppm chlorine residual remains in the treated system.

Upon the specified verification, the system including tanks shall then be flushed with potable water until the residual chlorine level is reduced to less than one part per million. During the flushing period, each valve and faucet shall be opened and closed several times.

Take additional samples of water in disinfected containers, for bacterial examination, at locations specified by the Contracting Officer

Test these samples for total coliform organisms (coliform bacteria, fecal coliform, streptococcal, and other bacteria) in accordance with EPA SM 9223 and AWWA 10084. The testing method used shall be EPA approved for drinking water systems and shall comply with applicable local and state requirements. Sample analysis shall be conducted by a state certified laboratory.

Disinfection shall be repeated until bacterial tests indicate the absence of coliform organisms (zero mean coliform density per 100 milliliters) in the samples for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained.

3.9 WASTE MANAGEMENT

Place materials defined as hazardous or toxic waste in designated containers. Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal. Close and seal tightly partly used sealant and adhesive containers and store in protected, well-ventilated, fire-safe area at moderate temperature. Place used sealant and adhesive tubes and containers in areas designated for hazardous waste. Separate copper and ferrous pipe waste in accordance with the Waste Management Plan and place in designated areas for reuse.

3.10 POSTED INSTRUCTIONS

Framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, shall be posted where directed. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system shall be prepared in typed form, framed as specified above for the wiring and control diagrams and posted beside the diagrams. The framed instructions shall be posted before acceptance testing of the systems.

3.11 TABLES

TABLE I						
PIPE AND FITTING MATERIALS FOR DRAINAGE, WASTE, AND VENT PIPING SYSTEMS						
Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D	SERVICE E
1	Cast iron soil pipe and fittings, hub and spigot, ASTM A74 with compression gaskets. Pipe and fittings shall be marked with the CISPI trademark.	X	X	X	X	X
2	Cast iron soil pipe and fittings hubless, CISPI 301 and ASTM A888. Pipe and fittings shall be marked with the CISPI trademark.		X		X	X
3	Cast iron drainage fittings, threaded, ASME B16.12				X	
4	Cast iron screwed fittings (threaded) ASME B16.4				X	
5	Seamless red brass pipe, ASTM B43				X	
6	Bronzed flanged fittings, ASME B16.24				X	
7	Cast copper alloy solder joint pressure fittings, ASME B16.18				X	X
8	Seamless copper pipe, ASTM B42					
9	Cast bronze threaded fittings, ASME B16.15				X	X

TABLE I

PIPE AND FITTING MATERIALS FOR DRAINAGE, WASTE, AND VENT PIPING SYSTEMS

Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D	SERVICE E
10	Copper drainage tube, (DWV), ASTM B306	X*	X	X*	X	X
11	Wrought copper and wrought alloy solder-joint drainage fittings. ASME B16.29	X	X	X	X	X
12	Cast copper alloy solder joint drainage fittings, DWV, ASME B16.23	X	X	X	X	X

SERVICE:
A - Underground Building Soil, Waste and Storm Drain
B - Aboveground Soil, Waste, and Storm Drain In Buildings
C - Underground Vent
D - Aboveground Vent
E - Interior Rainwater Conductors Aboveground
* - Hard Temper

Note: Piping routed in air return plenums shall be plenum rated.

TABLE II

PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS

Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D
1	Malleable-iron threaded fittings:			X	
2	Steel pipe:				
	a. Seamless, black, ASTM A53/A53M, Type S, Grade B	X	X		X
3	Seamless red brass pipe, ASTM B43	X	X		X
4	Bronze flanged fittings, ASME B16.24 for use with Items 5 and 7	X	X		X

TABLE II					
PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS					
Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D
5	Seamless copper pipe, ASTM B42	X	X		X
6	Seamless copper water tube, ASTM B88, ASTM B88M	X**	X**		X***
7	Cast bronze threaded fittings, ASME B16.15 for use with Items 5 and 7	X	X		X
8	Wrought copper and bronze solder-joint pressure fittings, ASME B16.22 for use with Items 5, 7 and 8	X	X		X
9	Cast copper alloy solder-joint pressure fittings, ASME B16.18 for use with Item 8	X	X		X
10	Steel pipeline flanges, MSS SP-44	X	X		X
11	Fittings: brass or bronze; ASME B16.15, and ASME B16.18 ASTM B828	X	X		
12	Carbon steel pipe unions, socket-welding and threaded, MSS SP-83	X	X		X
13	Malleable-iron threaded pipe unions ASME B16.39				
14	Nipples, pipe threaded ASTM A733	X	X	X	

TABLE II					
PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS					
Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D
15	Notes: A - Cold Water Service Aboveground B - Hot and Cold Water Distribution 180 degrees F Maximum Aboveground C - Natural Gas Piping Above Ground D - Non-Potable Water Service Indicated types are minimum wall thicknesses ** - Type L - Hard *** - Type K - Hard temper with brazed joints only or type K-soft temper without joints in or under floors **** - In or under slab floors only brazed joints				

Piping materials used shall be per the particular system temperatures, pressures and operating characteristics and ratings (ASME/ASTM ratings).

Domestic water is randomly-linked polypropylene equal to SDR 11, or as listed on Table II.

-- End of Section --

SECTION 27 10 00

BUILDING TELECOMMUNICATIONS CABLING SYSTEM

AMENDMENT 0002

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D709	(2017) Standard Specification for Laminated Thermosetting Materials

ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION (ECIA)

ECIA EIA/ECA 310-E	(2005) Cabinets, Racks, Panels, and Associated Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA S-83-596	(2021) Indoor Optical Cable
ICEA S-90-661	(2021) Category 3 and 5E Individually Unshielded Twisted Pairs, Indoor Cables (With or Without an Overall Shield) for Use in General Purpose and LAN Communications Wiring Systems

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)

NECA/BICSI 568	(2006) Standard for Installing Building Telecommunications Cabling

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA WC 66	(2019) Performance Standard for Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pairs

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-455-21	(1988a; R 2012) FOTP-21 - Mating Durability of Fiber Optic Interconnecting

	Devices
TIA-526-7	(2015a; R 2022) Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, Adoption of IEC 61280-4-2 edition 2: Fibre-Optic Communications Subsystem Test Procedures - Part 4-2: Installed Cable Plant - Single-Mode Attenuation and Optical Return Loss Measurement
TIA-526-14	(2015c) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
TIA-568.0	(2020e) Generic Telecommunications Cabling for Customer Premises
TIA-568.1	(2020e) Commercial Building Telecommunications Infrastructure Standard
TIA-568.2	(2018d) Balanced Twisted-Pair Telecommunications Cabling and Components Standards
TIA-568.3	(2022e) Optical Fiber Cabling Components Standard
TIA-569	(2019e; Add 1 2022) Telecommunications Pathways and Spaces
TIA-606	(2021d) Administration Standard for Telecommunications Infrastructure
TIA-607	(2019d) Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
TIA-1152	(2016; R 2021) Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
TIA/EIA-598	(2014D; Add 2 2018) Optical Fiber Cable Color Coding
TIA/EIA-604-10	(2002a) FOCIS 10 Fiber Optic Connector Intermateability Standard - Type LC

U.S. FEDERAL COMMUNICATIONS COMMISSION (FCC)

FCC Part 68	Connection of Terminal Equipment to the Telephone Network (47 CFR 68)

UNDERWRITERS LABORATORIES (UL)

UL 50	(2015) UL Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations

UL 444	(2017; Reprint Jun 2021) UL Standard for Safety Communications Cables
UL 467	(2022) UL Standard for Safety Grounding and Bonding Equipment
UL 514C	(2014; Reprint Feb 2020) UL Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 723	(2018) UL Standard for Safety Test for Surface Burning Characteristics of Building Materials
UL 969	(2017; Reprint Mar 2018) UL Standard for Safety Marking and Labeling Systems
UL 1286	(2022) UL Standard for Safety Office Furnishings
UL 1666	(2007; Reprint Sep 2021) UL Standard for Safety Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
UL 1863	(2004; Reprint Oct 2019) UL Standard for Safety Communication Circuit Accessories

UNIFIED FACILITIES CRITERIA (UFC)

UFC 3-580-01	(2016) Telecommunications Building Cabling Systems Planning and Design

US AIR FORCE COMMUNICATIONS SQUADRON

TR No. ELIE-ISE-FH-21-010	(Sept. 2021) Telecommunications Outside Plant Planning and Design Criteria

1.2 RELATED REQUIREMENTS

Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and Section 33 82 00 TELECOMMUNICATIONS, OUTSIDE PLANT (OSP), apply to this section with additions and modifications specified herein.

1.3 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in this specification shall be as defined in TIA-568.1, TIA-568.2, TIA-568.3, TIA-569, TIA-606, and IEEE 100 and herein.

1.3.1 Campus Distributor (CD)

A distributor from which the campus backbone cabling emanates. (International expression for main cross-connect (MC).)

1.3.2 Building Distributor (BD)

A distributor in which the building backbone cables terminate and at which connections to the campus backbone cables may be made. (International

expression for intermediate cross-connect (IC).)

1.3.3 Floor Distributor (FD)

A distributor used to connect horizontal cable and cabling subsystems or equipment. (International expression for horizontal cross-connect (HC).)

1.3.4 Telecommunications Room (TR)

An enclosed space for housing telecommunications equipment, cable, terminations, and cross-connects. The room is the recognized cross-connect between the backbone cable and the horizontal cabling.

1.3.5 Entrance Facility (EF) (Telecommunications)

An entrance to the building for both private and public network service cables (including wireless) including the entrance point at the building wall and continuing to the equipment room.

1.3.6 Equipment Room (ER) (Telecommunications)

An environmentally controlled centralized space for telecommunications equipment that serves the occupants of a building. Equipment housed therein is considered distinct from a telecommunications room because of the nature of its complexity.

1.3.7 Open Cable

Cabling that is not run in a raceway as defined by NFPA 70. This refers to cabling that is "open" to the space in which the cable has been installed and is therefore exposed to the environmental conditions associated with that space.

1.3.8 Open Office

A floor space division provided by furniture, moveable partitions, or other means instead of by building walls.

1.3.9 Pathway

A physical infrastructure utilized for the placement and routing of telecommunications cable.

1.4 SYSTEM DESCRIPTION

The building telecommunications cabling and pathway system shall include permanently installed backbone and horizontal cabling, horizontal and backbone pathways, service entrance facilities, work area pathways, telecommunications outlet assemblies, conduit, raceway, and hardware for splicing, terminating, and interconnecting cabling necessary to transport telephone and data (including LAN) between equipment items in a building. The horizontal system shall be wired in a star topology from the telecommunications work area to the floor distributor or campus distributor at the center or hub of the star. The backbone cabling and pathway system includes intrabuilding and interbuilding interconnecting cabling, pathway, and terminal hardware. The intrabuilding backbone provides connectivity from the floor distributors to the building distributors or to the campus distributor and from the building distributors to the campus distributor as required. The backbone system shall be wired in a star topology with the

campus distributor at the center or hub of the star. The interbuilding backbone system provides connectivity between the campus distributors and is specified in Section 33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP). Provide telecommunications pathway systems referenced herein as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM, TR No. ELIE-ISE-FH-21-010 (Sept. 2021) Telecommunications Outside Plant Planning and Design Criteria and UFC 3-580-01.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Telecommunications Drawings; G

Telecommunications Space Drawings; G

In addition to Section 01 33 00 SUBMITTAL PROCEDURES, provide shop drawings in accordance with paragraph SHOP DRAWINGS.

Telecommunication Outside Plant Butterfly drawing depicting manhole duct usage.

SD-03 Product Data

Telecommunications Cabling (backbone and horizontal); G

Patch Panels; G

Telecommunications Outlet/Connector Assemblies; G

Equipment Support Frame; G

Spare Parts; G

Submittals shall include the manufacturer's name, trade name, place of manufacture, and catalog model or number. Include performance and characteristic curves. Submittals shall also include applicable federal, military, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified in paragraph REGULATORY REQUIREMENTS and as required in Section 01 33 00 SUBMITTAL PROCEDURES.

SD-06 Test Reports

Telecommunications Cabling Testing; G

SD-07 Certificates

Telecommunications Contractor Qualifications; G

Key Personnel Qualifications; G

Manufacturer Qualifications; G

Test Plan; G

SD-09 Manufacturer's Field Reports

Factory Reel Tests; G

SD-10 Operation and Maintenance Data

Telecommunications Cabling and Pathway System Data Package 5; G

SD-11 Closeout Submittals

Record Documentation; G

1.6 QUALITY ASSURANCE

1.6.1 Shop Drawings

In exception to Section 01 33 00 SUBMITTAL PROCEDURES, submitted plan drawings shall be a minimum of 11 by 17 inches in size using a minimum scale of 1/8 inch per foot. Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size, and capacity. Submittals shall also include applicable federal, military, industry, and technical society publication references.

1.6.1.1 Telecommunications Drawings

Provide registered communications distribution designer (RCDD) approved, drawings in accordance with TIA-606. The identifier for each termination and cable shall appear on the drawings. Drawings shall depict final telecommunications installed wiring system infrastructure in accordance with TIA-606. The drawings should provide details required to prove that the distribution system shall properly support connectivity from the EF telecommunications and ER telecommunications, CD's, BD's, and FD's to the telecommunications work area outlets. Provide a plastic laminated schematic of the as-installed telecommunications cable system showing cabling, CD's, BD's, FD's, and the EF and ER for telecommunications keyed to floor plans by room number. Mount the laminated schematic in the EF telecommunications space as directed by the Contracting Officer. The following drawings shall be provided as a minimum:

a. T1 - Layout of complete building per floor - Building Area/Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways. Layout of complete building per floor. The drawing indicates location of building areas, serving zones, vertical backbone diagrams, telecommunications rooms, access points, pathways, grounding system, and other systems that need to be viewed from the complete building perspective.

b. T2 - Serving Zones/Building Area Drawings - Drop Locations and Cable Identification (ID'S). Shows a building area or serving zone. These

drawings show drop locations, telecommunications rooms, access points and detail call outs for common equipment rooms and other congested areas.

c. T4 - Typical Detail Drawings - Faceplate Labeling, Firestopping, Americans with Disabilities Act (ADA), Safety, Department of Transportation (DOT). Detailed drawings of symbols and typicals such as faceplate labeling, faceplate types, faceplate population installation procedures, detail racking, and raceways.

1.6.1.2 Telecommunications Space Drawings

Provide T3 drawings in accordance with TIA-606 that include telecommunications rooms plan views, pathway layout (cable tray, racks, ladder-racks, etc.), mechanical/electrical layout, and cabinet, rack, backboard and wall elevations. Drawings shall show layout of applicable equipment including incoming cable stub or connector blocks, building protector assembly, outgoing cable connector blocks, patch panels and equipment spaces and cabinet/racks. Drawings shall include a complete list of equipment and material, equipment rack details, proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operation. Provide Registered Communications Distribution Designer (RCDD) approved drawings. Drawings may also be an enlargement of a congested area of T1 or T2 drawings.

1.6.2 Telecommunications Qualifications

Work under this section shall be performed by and the equipment shall be provided by the approved telecommunications contractor and key personnel. Qualifications shall be provided for: the telecommunications system contractor, the telecommunications system installer, and the supervisor (if different from the installer). A minimum of 30 days prior to installation, submit documentation of the experience of the telecommunications contractor and of the key personnel.

1.6.2.1 Telecommunications Contractor

The telecommunications contractor shall be a firm which is regularly and professionally engaged in the business of the applications, installation, and testing of the specified telecommunications systems and equipment. The telecommunications contractor shall demonstrate experience in providing successful telecommunications systems within the past 3 years of similar scope and size. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for the telecommunications contractor.

1.6.2.2 Key Personnel

Provide key personnel who are regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications systems and equipment. There may be one key person or more key persons proposed for this solicitation depending upon how many of the key roles each has successfully provided. Each of the key personnel shall demonstrate experience in providing successful telecommunications systems within the past 3 years.

Supervisors and installers assigned to the installation of this system or any of its components shall be Building Industry Consulting Services

International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel.

In lieu of BICSI certification, supervisors and installers assigned to the installation of this system or any of its components shall have a minimum of 8 years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for each of the key personnel. Documentation for each key person shall include at least two successful system installations provided that are equivalent in system size and in construction complexity to the telecommunications system proposed for this solicitation. Include specific experience in installing and testing telecommunications systems and provide the names and locations of at least two project installations successfully completed using optical fiber and copper telecommunications cabling systems. All of the existing telecommunications system installations offered by the key persons as successful experience shall have been in successful full-time service for at least 18 months prior to the issuance date for this solicitation. Provide the name and role of the key person, the title, location, and completed installation date of the referenced project, the referenced project owner point of contact information including name, organization, title, and telephone number, and generally, the referenced project description including system size and construction complexity.

Indicate that all key persons are currently employed by the telecommunications contractor, or have a commitment to the telecommunications contractor to work on this project. All key persons shall be employed by the telecommunications contractor at the date of issuance of this solicitation, or if not, have a commitment to the telecommunications contractor to work on this project by the date that the bid was due to the Contracting Officer.

Note that only the key personnel approved by the Contracting Officer in the successful proposal shall do work on this solicitation's telecommunications system. Key personnel shall function in the same roles in this contract, as they functioned in the offered successful experience. Any substitutions for the telecommunications contractor's key personnel requires approval from The Contracting Officer.

1.6.2.3 Minimum Manufacturer Qualifications

Cabling, equipment and hardware manufacturers shall have a minimum of 3 years experience in the manufacturing, assembly, and factory testing of components which comply with TIA-568.1, TIA-568.2, and TIA-568.3.

1.6.3 Test Plan

Provide a complete and detailed test plan for the telecommunications cabling system including a complete list of test equipment for the components and accessories for each cable type specified, 60 days prior to the proposed test date. Include procedures for certification, validation, and testing.

1.6.4 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.6.5 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.6.5.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.6.5.2 Material and Equipment Manufacturing Date

Products manufactured more than 1 year prior to date of delivery to site shall not be used, unless specified otherwise.

1.7 DELIVERY AND STORAGE

Provide protection from weather, moisture, extreme heat and cold, dirt, dust, and other contaminants for telecommunications cabling and equipment placed in storage.

1.8 ENVIRONMENTAL REQUIREMENTS

Connecting hardware shall be rated for operation under ambient conditions of 32 to 140 degrees F and in the range of 0 to 95 percent relative humidity, noncondensing.

1.9 WARRANTY

The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.10 MAINTENANCE

1.10.1 Operation and Maintenance Manuals

Commercial off the shelf manuals shall be furnished for operation, installation, configuration, and maintenance of products provided as a part of the telecommunications cabling and pathway system, Data Package 5. Submit operations and maintenance data in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA and as specified herein not later than 2 months prior to the date of acceptance of the facility by Contracting Officer. In addition to requirements of Data Package 5, include the requirements of paragraphs TELECOMMUNICATIONS DRAWINGS, TELECOMMUNICATIONS SPACE DRAWINGS, and RECORD DOCUMENTATION. Ensure that these drawings and documents depict the as-built configuration.

1.10.2 Record Documentation

Provide T5 drawings including documentation on cables and termination hardware in accordance with TIA-606. T5 drawings shall include schedules to show information for cut-overs and cable plant management, patch panel layouts and cover plate assignments, cross-connect information and connecting terminal layout as a minimum. T5 drawings shall be provided on electronic media using Windows based computer cable management software. A licensed copy of the cable management software including documentation, shall be provided. Provide the following T5 drawing documentation as a minimum:

a. Cables - A record of installed cable shall be provided in accordance with TIA-606. The cable records shall include the required data fields for each cable and complete end-to-end circuit report for each complete circuit from the assigned outlet to the entry facility in accordance with TIA-606. Include manufacture date of cable with submittal.

b. Termination Hardware - A record of installed patch panels, cross-connect points, distribution frames, terminating block arrangements and type, and outlets shall be provided in accordance with TIA-606. Documentation shall include the required data fields as a minimum in accordance with TIA-606. Provide as-installed rack details and elevations per drawing TN600 series for each communication room.

1.10.3 Spare Parts

In addition to the requirements of Section 01 78 23 OPERATION AND MAINTENANCE DATA, provide a complete list of parts and supplies, with current unit prices and source of supply, and a list of spare parts recommended for stocking.

1.11 INDEPENDENT ELECTRICAL QUALITY CONTROL (QC) AND SAFETY INSPECTOR

The Contractor shall provide an Independent Electrical Quality control (QC) and Safety Inspector to provide review and documentation of electrical equipment procurement, installation, and testing. The Independent Electrical QC and Safety Inspector shall maintain daily reports and logs of work performed.

PART 2 PRODUCTS

2.1 COMPONENTS

Components shall be UL or third party certified. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations, submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard. Provide a complete system of telecommunications cabling and pathway components using star topology. Provide support structures and pathways, complete with outlets, cables, connecting hardware and telecommunications cabinets/racks. Cabling and interconnecting hardware and components for telecommunications systems shall be UL listed or third party independent testing laboratory certified, and shall comply with NFPA 70 and conform to the requirements specified herein.

2.2 TELECOMMUNICATIONS PATHWAY

Provide telecommunications pathways in accordance with TIA-569 and as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Provide system furniture pathways in accordance with UL 1286.

2.3 TELECOMMUNICATIONS CABLING

Cabling shall be UL listed for the application and shall comply with TIA-568.0, TIA-568.1, TIA-568.2, TIA-568.3 and NFPA 70. Provide a labeling system for cabling as required by TIA-606 and UL 969. Ship cable on reels or in boxes bearing manufacture date for for unshielded twisted pair (UTP) in accordance with ICEA S-90-661 and optical fiber cables in accordance with ICEA S-83-596 for all cable used on this project. Cabling manufactured more than 12 months prior to date of installation shall not be used.

2.3.1 Backbone Cabling

2.3.1.1 Backbone Copper

Copper backbone cable shall be solid conductor, 24 AWG, 100 ohm, 50-pair, Category 3, UTP, in accordance with ICEA S-90-661, TIA-568.1, TIA-568.2 and UL 444, formed into 25 pair binder groups covered with a gray thermoplastic jacket. Cable shall be imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) at regular length marking intervals in accordance with ICEA S-90-661. Provide plenum (CMP) communications rated cabling in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70.

2.3.1.2 Backbone Optical Fiber

Provide in accordance with ICEA S-83-596, TIA-568.3, UL 1666 and NFPA 70. Cable shall be imprinted with fiber count, fiber type and aggregate length at regular intervals not to exceed 40 inches.

Provide the number of strands indicated, but not less than 12 strands between the main telecommunication room and each of the other telecommunication rooms, of fiber optic cable.

Provide tight buffered fiber optic multimode, 50/125-um diameter**<AM#0002>** ~~(OM2)~~(OM3)**</AM#0002>** cable as indicated.

Provide plenum (OFNP), fiber optic cable in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70. The cable cordage jacket, fiber, unit, and group color shall be in accordance with TIA/EIA-598.

2.3.2 Horizontal Cabling

Provide horizontal cable in compliance with NFPA 70 and performance characteristics in accordance with TIA-568.1.

2.3.2.1 Horizontal Copper

Provide horizontal copper cable, UTP, 100 ohm in accordance with TIA-568.2, UL 444, ANSI/NEMA WC 66, ICEA S-90-661. Provide four each individually twisted pair, minimum size 24 AWG conductors, Category 6, with a blue thermoplastic jacket. Cable shall be imprinted with manufacturers name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) and length marking at regular intervals in accordance with ICEA S-90-661. Provide plenum (CMP) communications rated cabling in accordance with NFPA 70. Substitution of a higher rated cable shall be permitted in accordance with NFPA 70. Cables installed in conduit within and under slabs shall be UL listed and labeled for wet locations in accordance with NFPA 70.

2.4 TELECOMMUNICATIONS SPACES

Provide connecting hardware and termination equipment in the telecommunications entrance facility and telecommunication equipment rooms to facilitate installation as shown on design drawings for terminating and cross-connecting permanent cabling. Provide telecommunications interconnecting hardware color coding in accordance with TIA-606.

2.4.1 Backboards

Provide void-free, certified wood, interior grade A-C plywood 3/4 inch thick as indicated. Backboards shall be fire rated by manufacturing process. Fire stamp shall be clearly visible on finished (A)side of wood and facing the racks/cabinets. Paint applied over fire retardant backboard shall be UL 723 fire retardant paint. Painted with two coats. Provide label including paint manufacturer, date painted, UL listing and name of Installer. When painted, paint label and fire stamp shall be clearly visible. Backboards shall be provided on a minimum of two adjacent walls in the telecommunication spaces.

2.4.2 Equipment Support Frame

Provide in accordance with ECIA EIA/ECA 310-E and UL 50.

a. Cabinets, lockable, freestanding modular type, 16 gauge steel construction , minimum, treated to resist corrosion. Cabinet shall have removable and lockable side panels, front and rear doors, and have adjustable feet for leveling. Cabinet shall be vented in the roof,

front, and rear door. Cabinet shall have cable access in the roof and base and be compatible with 19 inches panel mounting. Provide cabinet with grounding bar, roof mounted 550 CFM fan with filter and a surge protected power strip with **<AM#0002>**~~6~~12**</AM#0002>** duplex 20 amp receptacles. All cabinets shall be keyed alike. Dedicated 120v and 208v circuits shall be installed at bottom rear of each cabinet as indicated on the drawings. Final coordination with end user to determine specific circuit amperage and NEMA connector shall be performed prior to install. Cabinets shall be 45 rack units (45U) high.

2.4.3 Cable Guides

Provide cable guides specifically manufactured for the purpose of routing cables, and wires horizontally and vertically on 19 inches equipment racks or cabinets and telecommunications backboards. Cable guides of ring or bracket type devices mounted on rack or cabinet panels for horizontal cable management and individually mounted for vertical cable management. Mount cable guides with screws, and or nuts and lockwashers. Provide 6 inch side vertical cable management cabinet for each rack.

2.4.4 Patch Panels

Provide ports for the number of horizontal and backbone cables terminated on the panel plus 25 percent spare. Provide fiber optic patch cables with crossover orientation in accordance with TIA-568.3. Patch cords shall meet minimum performance requirements specified in TIA-568.1, TIA-568.2 and TIA-568.3 for cables, cable length and hardware specified. Copper patch panels shall be desgined to provide Leviton Brand interchangable components.

2.4.4.1 Modular to 110 Block Patch Panel

Provide in accordance with TIA-568.1 and TIA-568.2. Panels shall be third party verified and shall comply with EIA/TIA Category 6 requirements. Panel shall be constructed of 0.09 inches minimum aluminum and shall be cabinet or rack mounted and compatible with an ECIA EIA/ECA 310-E 19 inch equipment cabinet or rack. Panel shall provide 48 non-keyed, 8-pin modular ports, wired to T568A. Patch panels shall terminate the building cabling on Type 110 IDCs and shall utilize a printed circuit board interface. The rear of each panel shall have incoming cable strain-relief and routing guides. Panels shall have each port factory numbered and be equipped with laminated plastic nameplates above each port. Patch panels shall be designed to provide Leviton Brand interchangable components.

2.4.4.2 Fiber Optic Patch Panel

Provide panel for maintenance and cross-connecting of optical fiber cables. Panel shall be constructed of 16 gauge steel or 11 gauge aluminum minimum and shall be cabinet mounted and compatible with a ECIA EIA/ECA 310-E 19 inches equipment rack. Each panel shall provide 24 single-mode adapters as duplex LC in accordance with TIA/EIA-604-10 with zirconia ceramic alignment sleeves, alignment sleeves. Provide dust cover for unused adapters. The rear of each panel shall have a cable management tray a minimum of 8 inches deep with removable cover, incoming cable strain-relief and routing guides. Panels shall have each adapter factory numbered and be equipped with laminated plastic nameplates above each adapter. Patch panels shall be designed to provide Leviton Brand interchangable components.

2.5 TELECOMMUNICATIONS OUTLET/CONNECTOR ASSEMBLIES

2.5.1 Outlet/Connector Copper

Outlet/connectors shall comply with FCC Part 68, TIA-568.1, and TIA-568.2. UTP outlet/connectors shall be UL 1863 listed, non-keyed, 8-pin modular, constructed of high impact rated thermoplastic housing and shall be third party verified and shall comply with TIA-568.2 Category 6 requirements. Outlet/connectors provided for UTP cabling shall meet or exceed the requirements for the cable provided. Outlet/connectors shall be terminated using a Type 110 IDC PC board connector, color-coded for both T568A and T568B wiring. Each outlet/connector shall be wired T568A. UTP outlet/connectors shall comply with TIA-568.2 for 200 mating cycles. Outlet/connectors shall be Leviton Brand compatible.

2.5.2 Optical Fiber Connectors

Provide in accordance with TIA-455-21. Optical fiber connectors shall be duplex LC in accordance with TIA/EIA-604-10 with zirconia ceramic alignment sleeves, ferrule, epoxyless compatible with 62.5/125 multimode fiber. The connectors shall provide a maximum attenuation of 0.3 dB at 1300 nm with less than a 0.2 dB change after 500 mating cycles.

2.5.3 Cover Plates

Telecommunications cover plates shall comply with UL 514C, and TIA-568.1, TIA-568.2, TIA-568.3; flush design constructed to match color of receptacle/switch cover plates specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Provide labeling in accordance with the paragraph LABELING in this section.

2.6 GROUNDING AND BONDING PRODUCTS

Provide in accordance with UL 467, TIA-607, and NFPA 70. Components shall be identified as required by TIA-606. Provide ground rods, bonding conductors, and grounding busbars as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

2.7 FIRESTOPPING MATERIAL

Provide as specified in Section 07 84 00 FIRESTOPPING.

2.8 MANUFACTURER'S NAMEPLATE

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.9 FIELD FABRICATED NAMEPLATES

ASTM D709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device; as specified or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inches thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inches high normal block style.

2.10 TESTS, INSPECTIONS, AND VERIFICATIONS

2.10.1 Factory Reel Tests

Provide documentation of the testing and verification actions taken by manufacturer to confirm compliance with TIA-568.1, TIA-568.2, TIA-568.3, TIA-526-7 for single mode optical fiber, and TIA-526-14 for multimode optical fiber cables.

2.11 CCTV SYSTEM INFRASTRUCTURE AND PREMISES CABLING

The CCTV system infrastructure and premises cabling shall include telecommunications system pathways, Cat-6 patch bays, Cat-6 horizontal copper cabling, Cat-6 RJ-45 termination jacks, and system testing. Installation, components and testing shall match Cat-6 requirements as specified herein.

PART 3 EXECUTION

3.1 INSTALLATION

Install telecommunications cabling and pathway systems, including the horizontal and backbone cable, pathway systems, telecommunications outlet/connector assemblies, and associated hardware in accordance with NECA/BICSI 568, TIA-568.1, TIA-568.2, TIA-568.3, TIA-569, NFPA 70, and UL standards as applicable. Provide cabling in a star topology network. Pathways and outlet boxes shall be installed as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Install telecommunications cabling with copper media in accordance with the following criteria to avoid potential electromagnetic interference between power and telecommunications equipment. The interference ceiling shall not exceed 3.0 volts per meter measured over the usable bandwidth of the telecommunications cabling. Cabling shall be run with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

3.1.1 Cabling

Install UTP, and optical fiber telecommunications cabling system as detailed in TIA-568.1, TIA-568.2, TIA-568.3. Screw terminals shall not be used except where specifically indicated on plans. Use an approved insulation displacement connection (IDC) tool kit for copper cable terminations. Do not exceed manufacturers' cable pull tensions for copper and optical fiber cables. Provide a device to monitor cable pull tensions. Do not exceed 25 pounds pull tension for four pair copper cables. Do not chafe or damage outer jacket materials. Use only lubricants approved by cable manufacturer. Do not over cinch cables, or crush cables with staples. For UTP cable, bend radii shall not be less than four times the cable diameter. Cables shall be terminated; no cable shall contain unterminated elements. Cables shall not be spliced. Label cabling in accordance with paragraph LABELING in this section.

3.1.1.1 Backbone Cable

a. Copper Backbone Cable. Install intrabuilding backbone copper cable, in indicated pathways, between the campus distributor, located in the telecommunications entrance facility or room, the building distributors and the floor distributors located in telecommunications rooms and

telecommunications equipment rooms as indicated on drawings.

b. Optical fiber Backbone Cable. Install intrabuilding backbone optical fiber in indicated pathways. Do not exceed manufacturer's recommended bending radii and pull tension. Prepare cable for pulling by cutting outer jacket 10 inches leaving strength members exposed for approximately 10 inches. Twist strength members together and attach to pulling eye. Vertical cable support intervals shall be in accordance with manufacturer's recommendations.

3.1.1.2 Horizontal Cabling

Install horizontal cabling as indicated on drawings Do not untwist Category 6 UTP cables more than one half inch from the point of termination to maintain cable geometry. Provide slack cable in the form of a figure eight (not a service loop) on each end of the cable, 10 feet in the telecommunications room, and 12 inches in the work area outlet.

3.1.2 Pathway Installations

Provide in accordance with TIA-569 and NFPA 70. Provide building pathway as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

3.1.3 Service Entrance Conduit, Underground

Provide service entrance underground as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

3.1.4 Cable Tray Installation

Install cable tray as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Only OFNP type cable shall be installed in a plenum.

3.1.5 Work Area Outlets

3.1.5.1 Terminations

Terminate UTP cable in accordance with TIA-568.1, TIA-568.2 and wiring configuration as specified.

3.1.5.2 Cover Plates

As a minimum, each outlet/connector shall be labeled as to its function and a unique number to identify cable link in accordance with the paragraph LABELING in this section.

3.1.5.3 Cables

Unshielded twisted pair and fiber optic cables shall have a minimum of 12 inches of slack cable loosely coiled into the telecommunications outlet boxes. Minimum manufacturer's bend radius for each type of cable shall not be exceeded.

3.1.5.4 Pull Cords

Pull cords shall be installed in conduit serving telecommunications outlets that do not have cable installed.

3.1.5.5 Multi-User Telecommunications Outlet Assembly (MUTOA)

Run horizontal cable in the ceiling or underneath the floor and terminate each cable on a MUTOA in each individual zone. MUTOAs shall not be located in ceiling spaces, or any obstructed area. MUTOAs shall not be installed in furniture unless that unit of furniture is permanently secured to the building structure. MUTOAs shall be located in an open work area so that each furniture cluster is served by at least one MUTOA. The MUTOA shall be limited to serving a maximum of twelve work areas. Maximum work area cable length requirements shall also be taken into account. MUTOAs must be labeled to include the maximum length of work area cables. MUTOA labeling is in addition to the labeling described in TIA-606, or other applicable cabling administration standards. Work area cables extending from the MUTOA to the work area device must also be uniquely identified and labeled.

3.1.6 Telecommunications Space Termination

Install termination hardware required for Category 6 and optical fiber system. An insulation displacement tool shall be used for terminating copper cable to insulation displacement connectors.

3.1.6.1 Connector Blocks

Connector blocks shall be cabinet or rack mounted in orderly rows and columns. Adequate vertical and horizontal wire routing areas shall be provided between groups of blocks. Install in accordance with industry standard wire routing guides in accordance with TIA-569.

3.1.6.2 Patch Panels

Patch panels shall be mounted in equipment cabinets or racks with sufficient ports to accommodate the installed cable plant plus 25 percent spares.

a. Copper Patch Panel. Copper cable entering a patch panel shall be secured to the panel with cable ties to prevent movement of the cable.

b. Fiber Optic Patch Panel. Fiber optic cable loop shall be 3 feet in length. The outer jacket of each cable entering a patch panel shall be secured to the panel to prevent movement of the fibers within the panel, using clamps or brackets specifically manufactured for that purpose.

3.1.6.3 Equipment Support Frames

Install in accordance with TIA-569:

a. Racks, floor mounted modular type. Permanently anchor rack to the floor in accordance with manufacturer's recommendations.

b. Cabinets, freestanding modular type. When cabinets are connected together, remove adjoining side panels for cable routing between cabinets. Mount rack mounted fan in roof of cabinet. Secure cabinets to floor using industry approved, manufacturer's recommendation anchoring method.

3.1.7 Electrical Penetrations

Seal openings around electrical penetrations through fire resistance-rated

wall, partitions, floors, or ceilings as specified in Section 07 84 00 FIRESTOPPING.

3.1.8 Grounding and Bonding

Provide in accordance with TIA-607, NFPA 70 and as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

3.2 LABELING

3.2.1 Labels

Provide labeling in accordance with TIA-606. Handwritten labeling is unacceptable. Stenciled lettering for voice and data circuits shall be provided using thermal ink transfer process.

3.2.1.1 Wall Plate Labeling

3.2.1.1.1 Primary Telephone Room (PTR) or Secondary Telephone Room (STR)

PTR or STR where distant end of cable terminates.

3.2.1.1.2 Rack Number

Rack number where distant end of the cable terminates.

3.2.1.1.3 Patch Panel

Patch panel number where distant end of cable terminates.

3.2.1.1.4 Port Number

Port number at the patch panel where distant end of the cable terminates.

3.2.1.2 Patch Panel Labeling

Patch panels shall be labeled with corresponding jacks and wall plate numbers where distant end of cable terminates.

3.2.2 Cable

Cables shall be labeled using color labels on both ends with identifiers in accordance with TIA-606.

3.2.3 Termination Hardware

Workstation outlets and patch panel connections shall be labeled using color coded labels with identifiers in accordance with TIA-606.

3.3 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria. Painting shall be as specified in Section 09 90 00 PAINTS AND COATINGS.

3.3.1 Painting Backboards

If backboards are required to be painted, then the manufactured fire retardant backboard must be painted with two coats of fire retardant paint,

so as not to increase flame spread and smoke density and must be appropriately labeled. Label and fire rating stamp must be unpainted and pointed to the interior of the room.

3.4 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets.

3.5 TESTING

3.5.1 Telecommunications Cabling Testing

Perform telecommunications cabling inspection, verification, and performance tests in accordance with TIA-568.1, TIA-568.2, TIA-568.3. Test equipment shall conform to TIA-1152. Perform optical fiber field inspection tests via attenuation measurements on factory reels and provide results along with manufacturer certification for factory reel tests. Remove failed cable reels from project site upon attenuation test failure.

3.5.1.1 Inspection

Visually inspect UTP and optical fiber jacket materials for UL or third party certification markings. Inspect cabling terminations in telecommunications rooms and at workstations to confirm color code for T568A or T568B pin assignments, and inspect cabling connections to confirm compliance with TIA-568.1, TIA-568.2, TIA-568.3. Visually confirm Category 6, marking of outlets, cover plates, outlet/connectors, and patch panels.

3.5.1.2 Verification Tests

UTP backbone copper cabling shall be tested for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors, and between conductors and shield, if cable has overall shield. Test operation of shorting bars in connection blocks. Test cables after termination but prior to being cross-connected.

For multimode optical fiber, perform optical fiber end-to-end attenuation tests in accordance with TIA-568.3 and TIA-526-14 using Method A, Optical Power Meter and Light Source for multimode optical fiber. For single-mode optical fiber, perform optical fiber end-to-end attenuation tests in accordance with TIA-568.3 and TIA-526-7 using Method A, Optical Power Meter and Light Source for single-mode optical fiber. Perform verification acceptance tests.

3.5.1.3 Performance Tests

Perform testing for each outlet and MUTOA as follows:

a. Perform Category 6 link tests in accordance with TIA-568.1 and TIA-568.2. Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay, and delay skew.

b. Optical fiber Links. Perform optical fiber end-to-end link tests in accordance with TIA-568.3.

3.5.1.4 Final Verification Tests

Perform verification tests for UTP and optical fiber systems after the complete telecommunications cabling and workstation outlet/connectors are installed.

a. Voice Tests. These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and DSN telephone call.

b. Data Tests. These tests assume the Information Technology Staff has a network installed and are available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

3.6 CLEANING

All communication rooms shall be cleaned to a dust-free state. To include all surfaces: floors, walls, cabinets, cables, etc.

-- End of Section --

SECTION 31 00 00

EARTHWORK

AMENDMENT 0002

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 180	(2017) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600	(2017) Installation of Ductile-Iron Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2019) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D1140	(2017) Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D2167	(2015) Density and Unit Weight of Soil in Place by the Rubber Balloon Method

ASTM D2487	(2017; E 2020) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2937	(2017; E 2017; E 2018) Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4718/D4718M	(2015) Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety -- Safety and Health Requirements Manual

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 600/4-79/020	(1983) Methods for Chemical Analysis of Water and Wastes
EPA SW-846.3-3	(1999, Third Edition, Update III-A) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

Satisfactory materials comprise any materials classified by ASTM D2487 as GW, GP, GM, GC, SW, SP, SM, SC, CL, and CH. Satisfactory materials for grading comprise stones less than 8 inches, except for fill material for foundations, and pavements, which comprise stones less than 3 inches in any dimension.

1.2.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. Notify the Contracting Officer when encountering any contaminated materials.

1.2.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D2487 as GW,

GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C136/C136M and ASTM D1140.

1.2.4 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the maximum density in accordance with AASHTO T 180 and corrected with ASTM D4718/D4718M. To maintain the same percentage of coarse material, use the "remove and replace" procedure as described in NOTE 8 of Paragraph 7.2 in AASHTO T 180.

1.2.5 Topsoil

Material suitable for topsoils obtained from offsite areas is defined as: Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

1.2.6 Hard/Unyielding Materials

Hard/Unyielding materials comprise weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" with stones greater than 3 inch in any dimension or as defined by the pipe manufacturer, whichever is smaller. These materials usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.7 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.2.8 Unstable Material

Unstable materials are too wet to properly support the utility pipe, conduit, or appurtenant structure.

1.2.9 Select Granular Material

1.2.9.1 General Requirements

Select granular material consisting of satisfactory material having a

liquid limit not to exceed 35 percent when tested in accordance with ASTM D4318. The plasticity index must not be less than 8 percent nor greater than 18 percent when tested in accordance with ASTM D4318, and not more than 35 percent by weight may be finer than No. 200 sieve when tested in accordance with ASTM D1140.

1.2.10 Initial Backfill Material

Initial backfill consists of select granular material or satisfactory materials free from rocks 3 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, free the initial backfill material of stones larger than 3 inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

1.2.11 Expansive Soils

Expansive soils are defined as soils that have a plasticity index equal to or greater than 15 when tested in accordance with ASTM D4318.

1.2.12 Nonfrost Susceptible (NFS) Material

Nonfrost susceptible material are a uniformly graded washed sand with a maximum particle size of 3 inch and less than 5 percent passing the No. 200 size sieve, and with not more than 3 percent by weight finer than 0.02 mm grain size.

1.2.13 Pile Supported Structure

As used herein, a structure where both the foundation and floor slab are pile supported.

1.3 SYSTEM DESCRIPTION

Subsurface soil boring logs are shown on the drawings. The subsoil investigation report and samples of materials taken from subsurface investigations may be examined at USACE Fort Worth District Office. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.3.1 Classification of Excavation

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

1.3.2 Blasting

Blasting will not be permitted.

1.3.3 Dewatering Work Plan

Submit procedures for accomplishing dewatering work.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring; G

Dewatering Work Plan; G

SD-03 Product Data

Utilization of Excavated Materials; G

SD-06 Test Reports

Testing

Borrow Site Testing

Within 24 hours of conclusion of physical tests, submit 3 copies of test results, including calibration curves and results of calibration tests.

SD-07 Certificates

Testing

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR OFFSITE SOILS

Test offsite soils brought in for use as backfill for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and full Toxicity Characteristic Leaching Procedure (TCLP) including ignitability, corrosivity and reactivity. Provide backfill containing a maximum of 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and a maximum of 10 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and passing the TCPL test. Determine TPH concentrations by using EPA 600/4-79/020 Method 418.1. Determine BTEX concentrations by using EPA SW-846.3-3 Method 5030/8020. Perform TCLP in accordance with EPA SW-846.3-3 Method 1311. Provide Borrow Site Testing for TPH, BTEX and TCLP from a composite sample of material from the borrow site, with at least one test from each borrow site. Do not bring material onsite until tests have been approved by the Contracting Officer. All soils must comply with the requirements of the BSA Soil Management Plan.

2.2 BURIED WARNING AND IDENTIFICATION TAPE

Provide metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inches minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Provide permanent color and printing, unaffected by moisture or soil.

Warning Tape Color Codes	
Red	Electric
Yellow	Gas, Oil; Dangerous Materials
Orange	Telephone and Other Communications
Blue	Water Systems
Green	Sewer Systems

2.2.1 Warning Tape for Metallic Piping

Provide acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.003 inch and a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.2.2 Detectable Warning Tape for Non-Metallic Piping

Provide polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.004 inch, and a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Manufacture tape with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.3 DETECTION WIRE FOR NON-METALLIC PIPING

Insulate a single strand, solid copper detection wire with a minimum of 12 AWG.

2.4 CAPILLARY WATER BARRIER

Capillary Water Barrier shall consist of clean, crushed, nonporous rock, crushed gravel, or uncrushed gravel. The maximum particle size shall be 1-1/2 inches and no more than 2 percent by weight shall pass the 3/16 inch size (No. 4) sieve.

2.5 DISPOSAL OF EXCESS MATERIAL

All excess material must be disposed of in accordance with the JBSA Soil Management Plan.

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

Where indicated or directed, strip topsoil to a depth of 4 inches. Spread topsoil on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Keep topsoil separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2 inches in diameter, and other materials that would interfere with planting and maintenance

operations. Stockpile in locations indicated any surplus of topsoil from excavations and gradings.

3.2 GENERAL EXCAVATION

Perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Perform the grading in accordance with the typical sections shown and the tolerances specified in paragraph FINISHING. Transport satisfactory excavated materials and place in fill or embankment within the limits of the work. Excavate unsatisfactory materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Include such excavated material and the satisfactory material ordered as replacement in excavation. Dispose surplus satisfactory excavated material not required for fill and unsatisfactory excavated material as specified in paragraph DISPOSITION OF SURPLUS MATERIAL. During construction, perform excavation and fill in a manner and sequence that will provide proper drainage at all times. Excavate material required for fill or embankment in excess of that produced by excavation within the grading limits from other approved areas selected by the Contractor as specified.

3.2.1 Ditches, Gutters, and Channel Changes

Finish excavation of ditches, gutters, and channel changes by cutting accurately to the cross sections, grades, and elevations shown on Drawings. Do not excavate ditches and gutters below grades shown. Backfill the excessive open ditch or gutter excavation with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Dispose excavated material as shown or as directed, except in no case allow material be deposited a maximum 4 feet from edge of a ditch. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.2.2 Drainage Structures

Make excavations to the lines, grades, and elevations shown, or as directed. Provide trenches and foundation pits of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or other hard foundation material of loose debris and cut to a firm, level, stepped, or serrated surface. Remove loose disintegrated rock and thin strata. Do not disturb the bottom of the excavation when concrete or masonry is to be placed in an excavated area. Do not excavate to the final grade level until just before the concrete or masonry is to be placed.

3.2.3 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction. Completely drain construction site during periods of construction to keep soil materials sufficiently dry. Construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of

the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed.

3.2.4 Dewatering

Control groundwater flowing toward or into excavations to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Do not permit French drains, sumps, ditches or trenches within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Take control measures by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, maintain the water level continuously, at least 2 feet below the working level. Operate dewatering system continuously until construction work below existing water levels is complete. Submit performance records weekly. Relieve hydrostatic head in previous zones below subgrade elevation in layered soils to prevent uplift.

3.2.5 Trench Excavation Requirements

Excavate the trench as recommended by the manufacturer of the pipe to be installed. Slope trench walls below the top of the pipe, or make vertical, and of such width as recommended in the manufacturer's printed installation manual. Provide vertical trench walls where no manufacturer's printed installation manual is available. Shore trench walls, cut back to a stable slope, or provide with equivalent means of protection for employees who may be exposed to moving ground or cave in, as determined by the Contractor’s Safety Engineer or other competent person; refer to USACE publication EM 385-1-1. Excavate trench walls which are cut back to at least the angle of repose of the soil. Give special attention to slopes which may be adversely affected by weather or moisture content. Do not exceed the trench width below the pipe top of 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter, and do not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, provide redesign, stronger pipe, or special installation procedures by the Contractor. The Contractor is responsible for the cost of redesign, stronger pipe, or special installation procedures without any additional cost to the Government.

3.2.5.1 Bottom Preparation

Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Excavate bell holes to the necessary size at each joint or coupling to eliminate point bearing. Remove stones of 3 inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, to avoid point bearing.

3.2.5.2 Removal of Unyielding Material

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, remove such material 4 inch below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

3.2.5.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it without additional cost to the Government.

3.2.5.4 Excavation for Appurtenances

Provide excavation for manholes, catch-basins, inlets, or similar structures of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Remove loose disintegrated rock and thin strata. Specify removal of unstable material. When concrete or masonry is to be placed in an excavated area, take special care not to disturb the bottom of the excavation. Do not excavate to the final grade level until just before the concrete or masonry is to be placed.

3.2.6 Underground Utilities

The Contractor is responsible for movement of construction machinery and equipment over pipes and utilities during construction. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within 2 feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

3.2.7 Structural Excavation

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement.

3.3 SELECTION OF BORROW MATERIAL

Select borrow material to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Obtain borrow material from the borrow areas from approved private sources. Unless otherwise provided in the contract, the Contractor is responsible for obtaining the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling from the owners. Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, do not obtain borrow within the limits of the project site without prior written approval. Consider necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon related operations to the borrow excavation.

3.4 OPENING AND DRAINAGE OF EXCAVATION AND BORROW PITS

Except as otherwise permitted, excavate borrow pits and other excavation areas providing adequate drainage. Transport overburden and other spoil material to designated spoil areas or otherwise dispose of as directed. Provide neatly trimmed and drained borrow pits after the excavation is completed. Ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on natural environmental conditions.

3.5 SHORING

3.5.1 General Requirements

Submit a Shoring and Sheeting plan for approval 15 days prior to starting work. Submit drawings and calculations, certified by a registered professional engineer, describing the methods for shoring and sheeting of excavations. Finish shoring, including sheet piling, and install as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Remove shoring, bracing, and sheeting as excavations are backfilled, in a manner to prevent caving.

3.5.2 Geotechnical Engineer

Hire a Professional Geotechnical Engineer to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical Engineer is responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical Engineer is responsible for updating the excavation, sheeting and dewatering plans as construction progresses to reflect changing conditions and submit an updated plan if necessary. Submit a monthly written report, informing the Contractor and Contracting Officer of the status of the plan and an accounting of the Contractor's adherence to the plan addressing any present or potential problems. The Contracting Officer is responsible for arranging meetings with the Geotechnical Engineer at any time throughout the contract duration.

3.6 GRADING AREAS

Where indicated, divide work into grading areas within which satisfactory excavated material will be placed in embankments, fills, and required backfills. Do not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing. Place and grade stockpiles of satisfactory and unsatisfactory as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations; separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, remove and replace such material with satisfactory material from approved sources.

3.7 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Do not excavate to final grade until just before concrete is to be placed. Only use excavation methods that will leave the foundation rock in a solid and unshattered condition. Roughen the level surfaces, and cut the sloped surfaces, as indicated, into rough steps or benches to provide a

satisfactory bond. Protect shales from slaking and all surfaces from erosion resulting from ponding or water flow.

3.8 GROUND SURFACE PREPARATION

3.8.1 General Requirements

Remove and replace unsatisfactory material with satisfactory materials, as directed by the Contracting Officer, in surfaces to receive fill or in excavated areas. Scarify the surface to a depth of 6 inches before the fill is started. Plow, step, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that the fill material will bond with the existing material. When subgrades are less than the specified density, break up the ground surface to a minimum depth of 6 inches, pulverizing, and compacting to the specified density. When the subgrade is part fill and part excavation or natural ground, scarify the excavated or natural ground portion to a depth of 12 inches and compact it as specified for the adjacent fill.

3.8.2 Frozen Material

Do not place material on surfaces that are muddy, frozen, or contain frost. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Moisten material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.

3.9 UTILIZATION OF EXCAVATED MATERIALS

Use satisfactory material removed from excavations, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. Submit procedure and location for disposal of unused satisfactory material. Dispose surplus satisfactory excavated material not required for fill and unsatisfactory excavated material as specified in paragraph DISPOSITION OF SURPLUS MATERIAL. Stockpile and use coarse rock from excavations for constructing slopes or embankments adjacent to streams, or sides and bottoms of channels and for protecting against erosion. Do not dispose excavated material to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

3.10 BURIED TAPE AND DETECTION WIRE

3.10.1 Buried Warning and Identification Tape

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.10.2 Buried Detection Wire

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. Extend the wire continuously and unbroken, from manhole to manhole. Terminate the ends of the wire inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. Furnish insulated wire over its entire length. Install wires at manholes between the top of the corbel

and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, terminate the wire in the valve pit at the pump station end of the pipe.

3.11 FILLING, BACKFILLING AND COMPACTION

Place fill and backfill beneath and adjacent to any and all type of structures, in successive horizontal layers of loose material not more than 8 inches in depth, or in loose layers not more than 5 inches in depth when using hand-operated compaction equipment. Compact to at least 90 percent of laboratory maximum density for cohesive materials or 95 percent of laboratory maximum density for cohesionless materials, except as otherwise specified. Perform compaction in such a manner as to prevent wedging action or eccentric loading upon or against the structure. Moisture condition fill and backfill material to within range of +2 or -2 percent of optimum moisture content at the time of compaction.

Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in conformance with the applicable portions of paragraphs GROUND SURFACE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.11.1 Trench Backfill

Backfill trenches to the grade shown. Do not backfill the trench until all specified tests are performed.

3.11.1.1 Replacement of Unyielding Material

Replace unyielding material removed from the bottom of the trench with select granular material or initial backfill material.

3.11.1.2 Replacement of Unstable Material

Replace unstable material removed from the bottom of the trench or excavation with select granular material placed in layers not exceeding 6 inches loose thickness.

3.11.1.3 Bedding and Initial Backfill

Provide bedding of the type and thickness shown. Place initial backfill material and compact it with approved tampers to a height of at least one foot above the utility pipe or conduit. Bring up the backfill evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe. Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Compact backfill to top of pipe to 95 percent of ASTM D698 maximum density. Provide plastic piping with bedding to spring line of pipe. Provide materials as follows:

3.11.1.3.1 Class II

Coarse sands and gravels with maximum particle size of 1.5 inch, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D2487.

3.11.1.3.2 Sand

Clean, coarse-grained sand classified as indicated.

3.11.1.3.3 Gravel and Crushed Stone

Clean, coarsely graded natural gravel, crushed stone or a combination thereof.

3.11.1.3.4 Pea Gravel

Durable particles composed of small, smooth, rounded stones or pebbles and graded within the following limits when tested in accordance with ASTM C136/C136M:

Sieve	Percent Passing
1/2 inch	100
3/8 inch	85 - 100
No. 4	10 - 30
No. 8	0 - 10
No. 16	0 - 5

3.11.1.3.5 Crushed Aggregates

Crushed aggregates consist of durable particles obtained from an approved source and meeting the following requirements:

a. Materials of one product delivered for same construction activity from single source, unless otherwise approved by American Water Project Manager.

b. Non-plastic fines.

c. Los Angeles abrasion test wear not exceeding 45 percent when tested in accordance with ASTM C131/C131M.

d. Crushed aggregate shall have minimum of 90 percent of particles retained on No. 4 sieve with 2 or more crushed faces.

e. Crushed stone: Produced from oversize plant processed stone or gravel, sized by crushing to predominantly angular particles from naturally occurring single source. Uncrushed gravel is not acceptable materials for embedment where crushed stone is shown on applicable utility embedment drawing details.

f. Gradations, as follows:

(1) Percent Passing by Weight for Pipe
(2) Embedment by Ranges of Nominal Pipes Sizes

Sieve	Pipe > 15"	Pipe 15" - 8"	Pipe < 8"
1 inch	95	100	100
3/4 inch	60 - 90	90 - 100	100
1/2 inch	25 - 60	-	90 - 100
3/8 inch	-	20 - 55	40 - 70
No. 4	0 - 5	0 - 10	0 - 15
No. 8	0	0 - 5	0 - 5

3.11.1.4 Final Backfill

Fill the remainder of the trench, except for special materials for roadways, railroads and airfields, with satisfactory material. Place backfill material and compact as follows:

3.11.1.4.1 Roadways

Place backfill up to the required elevation as specified. Do not permit water flooding or jetting methods of compaction.

3.11.1.4.2 Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas

Deposit backfill in layers of a maximum of 12 inches loose thickness, and compact it to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Do not permit compaction by water flooding or jetting. Apply this requirement to all other areas not specifically designated above.

3.11.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed, place backfill in such a manner that the structure is not be damaged by the shock of falling earth. Deposit the backfill material, compact it as specified for final backfill, and bring up the backfill evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.12 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.12.1 Gas Distribution

Excavate trenches to a depth that will provide a minimum 18 inches of cover in rock excavation and a minimum 24 inch of cover in other excavation.

3.12.2 Water Lines

Excavate trenches to a depth that provides a minimum cover of 3 feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.12.3 Electrical Distribution System

Provide a minimum cover of 24 inches from the finished grade to direct burial cable and conduit or duct line, unless otherwise indicated.

3.13 EMBANKMENTS

3.13.1 Earth Embankments

Construct earth embankments from satisfactory materials free of organic or frozen material and rocks with any dimension greater than 3 inches. Place the material in successive horizontal layers of loose material not more than 8 inches in depth. Spread each layer uniformly on a soil surface that has been moistened or aerated as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, plow, disk, or otherwise break up each layer; moisten or aerate as necessary; thoroughly mix; and compact to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials. Backfill and fill material must be within the range of -2 to +2 percent of optimum moisture.

Compaction requirements for the upper portion of earth embankments forming subgrade for pavements are identical with those requirements specified in paragraph SUBGRADE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.14 SUBGRADE PREPARATION

3.14.1 Proof Rolling

Finish proof rolling on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. After stripping, proof roll the existing subgrade with six passes of a dump truck loaded with 4 cubic yards of soil. Operate the truck in a systematic manner to ensure the number of passes over all areas, and at speeds between 2-1/2 to 3-1/2 mph. When proof rolling, provide one-half of the passes made with the roller in a direction perpendicular to the other passes. Notify the Contracting Officer a minimum of 3 days prior to proof rolling. Perform proof rolling in the presence of the Contracting Officer. Undercut rutting or pumping of material as directed by the Contracting Officer.

3.14.2 Construction

Shape subgrade to line, grade, and cross section, and compact as specified. Include plowing, disking, and any moistening or aerating required to obtain specified compaction for this operation. Remove soft or otherwise unsatisfactory material and replace with satisfactory excavated material or other approved material as directed. Excavate rock encountered in the cut section to a depth of 6 inches below finished grade for the subgrade. Bring up low areas resulting from removal of unsatisfactory material or excavation of rock to required grade with satisfactory materials, and shape the entire subgrade to line, grade, and cross section and compact as specified. After rolling, do not show deviations for the surface of the subgrade for roadways greater than 1/2 inch when tested with a 12-foot straightedge applied both parallel and at right angles to the centerline of the area. Do not vary the elevation of the finish subgrade more than 0.05 foot from the established grade and cross section.

3.14.3 Compaction

Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Except for paved areas and railroads, compact each layer of the embankment to at least 90 percent of laboratory maximum density.

3.14.3.1 Subgrade for Pavements

Compact subgrade for pavements to at least 90 percentage laboratory maximum density for the depth below the surface of the pavement shown. When more than one soil classification is present in the subgrade, thoroughly blend, reshape, and compact the top 6 inch of subgrade.

3.14.3.2 Subgrade for Shoulders

Compact subgrade for shoulders to at least 90 percentage laboratory maximum density for the full depth of the shoulder.

3.15 FINISHING

Finish the surface of excavations, embankments, and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades specified in paragraph SUBGRADE PREPARATION. Finish gutters and ditches in a manner that will result in effective drainage. Finish the surface of areas to be turfed to a smoothness suitable for the application of turfing materials. Repair graded, topsoiled, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

3.15.1 Subgrade and Embankments

During construction, keep embankments and excavations shaped and drained. Maintain ditches and drains along subgrade to drain effectively at all times. Do not disturb the finished subgrade by traffic or other operation. Protect and maintain the finished subgrade in a satisfactory condition until ballast, subbase, base, or pavement is placed. Do not permit the storage or stockpiling of materials on the finished subgrade. Do not lay subbase, base course, ballast, or pavement until the subgrade has been checked and approved, and in no case place subbase, base, surfacing, pavement, or ballast on a muddy, spongy, or frozen subgrade.

3.15.2 Capillary Water Barrier

Place a capillary water barrier under concrete floor and area-way slabs grade directly on the subgrade and compact with a minimum of two passes of a hand-operated plate-type vibratory compactor.

3.15.3 Grading Around Structures

Construct areas within 5 feet outside of each building and structure line true-to-grade, shape to drain, and maintain free of trash and debris until final inspection has been completed and the work has been accepted.

3.16 PLACING TOPSOIL

On areas to receive topsoil, prepare the compacted subgrade soil to a 2 inches depth for bonding of topsoil with subsoil. Spread topsoil evenly to a thickness of 6 inch and grade to the elevations and slopes shown. Do not spread topsoil when frozen or excessively wet or dry. Obtain material required for topsoil in excess of that produced by excavation within the grading limits from offsite areas.

<AM#0002>3.17 TIRE WASH REMOVAL

Remove tire wash, cap water service and backfill with structural fill.

</AM#0002>3.18 TESTING

Perform testing by a Corps validated commercial testing laboratory or the Contractor's validated testing facility. Submit qualifications of the Corps validated commercial testing laboratory or the Contractor's validated testing facilities. If the Contractor elects to establish testing facilities, do not permit work requiring testing until the Contractor's facilities have been inspected, Corps validated and approved by the Contracting Officer.

a. Determine field in-place density in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938. When ASTM D6938 is used, check the calibration curves and adjust using only the sand cone method as described in ASTM D1556/D1556M. ASTM D6938 results in a wet unit weight of soil in determining the moisture content of the soil when using this method.

b. Check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938; check the calibration of both the density and moisture gauges at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer. ASTM D2937, use the Drive Cylinder Method only for soft, fine-grained, cohesive soils. When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, remove the material, replace and recompact to meet specification requirements.

c. Perform tests on recompacted areas to determine conformance with specification requirements. Appoint a registered professional civil engineer to certify inspections and test results. State that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

3.18.1 Fill and Backfill Material Gradation

One test per 500 cubic yards stockpiled or in-place source material. Determine gradation of fill and backfill material in accordance with ASTM C136/C136M.

3.18.2 In-Place Densities

a. One test per 2500 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines.

b. One test per 500 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.

c. One test per 100 linear feet, or fraction thereof, of each lift of embankment or backfill for roads.

3.18.3 Moisture Contents

In the stockpile, excavation, or borrow areas, perform a minimum of two tests per day per type of material or source of material being placed during stable weather conditions. During unstable weather, perform tests as dictated by local conditions and approved by the Contracting Officer.

3.18.4 Optimum Moisture and Laboratory Maximum Density

Perform tests for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 500 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.18.5 Tolerance Tests for Subgrades

Perform continuous checks on the degree of finish specified in paragraph SUBGRADE PREPARATION during construction of the subgrades.

3.18.6 Displacement of Sewers

After other required tests have been performed and the trench backfill compacted to 2 feet above the top of the pipe, inspect the pipe to determine whether significant displacement has occurred. Conduct this inspection in the presence of the Contracting Officer. Inspect pipe sizes larger than 36 inches, while inspecting smaller diameter pipe by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgment of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, replace or repair the defects as directed at no additional cost to the Government.

3.19 DISPOSITION OF SURPLUS MATERIAL

Remove surplus material and excavated unsatisfactory material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber from Government property and properly disposed of in accordance with all applicable laws and regulations.

-- End of Section --

W9126G26RA028-0002

LACKLAND AIR FORCE BASE, TEXAS

AIRMEN TRAINING COMPLEX
DINING CLASSROOM FACILITY 4

FOUNDATION AND PAVEMENT DESIGN ANALYSIS

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

ENGINEERING AND CONSTRUCTION DIVISION

GEOTECHNICAL BRANCH

CESWF-EC-G

AUGUST 2020

W9126G26RA028-0002

LACKLAND AIR FORCE BASE, TEXAS
ATC DINING CLASSROOM FACILITY 4

FOUNDATION AND PAVEMENT DESIGN ANALYSIS

CESWF-EC-G provided foundation and pavement design recommendations for this project in a report dated August 2017. The report has been revised to provide recommendations for pavement structures included in the 15% design submittal received on 28 September 2017, exclude recommendations for the geotextile originally provided for the subdrainage system, exclude recommendations for the utility tunnel, and include sheet B102. The report was further amended in January 2018 to incorporate revisions to B102. This report was further amended in June 2018 to incorporate recommended values for LPILE parameters. The report was amended in October 2018 to include recommendations for the utility tunnel and correction to sheet B201. The report was amended in August 2020 to incorporate revisions to B-102 and to include sheets B-103 and B-104.

1. General. The purpose of this report is to provide subsurface information, and foundation and pavement design and construction considerations, guidance, and requirements for the new Airmen Training Complex (ATC) Dining Classroom Facility 4 at Lackland Air Force Base, Texas. The new facility is the fourth of its type to be designed and constructed as part of the Airmen Training Complex (ATC) (Basic Military Training (BMT) Campus) program at Lackland Air Force Base, and the second at the ATC West Campus. The ATC Dining Classroom Facility 4 is anticipated to be three-story structure and will be designed with a maximum total gross area of approximately 106,532 GSF, based on information available at the time of this report. A dining facility, to accommodate 674 trainees, will be situated on the first level, along with food preparation areas, storage rooms, administrative areas, restrooms, and mechanical/electrical/communications rooms. The second and third levels will each accommodate thirteen 120-trainee classrooms (to accommodate up to 1,920 trainees simultaneously in addition to the 674 trainees in the first floor dining facility), as well as restrooms, and mechanical/electrical/communications rooms. It is anticipated that the ATC Dining Classroom Facility 4 will incorporate a structural framing system consisting of steel

columns and beams and a structural steel roof deck. Exterior wall construction is anticipated to include of 7-inch thick insulated precast concrete sandwich panels, and 2-inch thick, insulated pre-finished metal wall panels. The ground level will be structurally supported over a void and crawl space, and will be post-tensioned concrete spanning to concrete grade beams. New rigid pavement structures are anticipated to include all-weather fire/emergency medical vehicle access lanes and concrete aprons in front of trash dumpster pads and loading docks, and mechanical yards. New flexible pavement structures are anticipated to include privately-owned vehicle (POV) parking spaces. Support features include sidewalks, new utilities, landscaping, and site improvements.

An Equipment Building (mechanical/electrical) is anticipated to be constructed as part of the adjoining Airmen Training Complex – Dormitory 7 located immediately to the east of the ATC Dining Classroom Facility 4. Mechanical and electrical utilities will be connected between the Equipment Building and the ATC Dining Classroom Facility 4 (and other ATC West Campus facilities) through a network of tunnels. The bottom of the tunnels (which are approximately 10-foot by 10-foot square conduits) are anticipated to be situated approximately 15 feet below existing grade.

The ATC Dining Classroom Facility 4 project site is located in the northwest central part of Lackland Air Force Base. Specifically, the site is generally bounded to the east by Carswell Avenue, with an open field to the north, south and west of the proposed project area. The nearest street on the north, south and west are Luke Boulevard, Truemper Street, and Springvale Drive, respectively. The project site is an open field that is in part used for physical training/athletic activities (particularly in the eastern part of the site). Apart from a few scattered trees, brush, and utility poles, the site is generally an open, grass-covered area. Topographically, the majority of the ATC Dining Classroom Facility 4 site is very level, generally sloping very slightly from north-northwest to south-southeast. The existing gradient in the area of ATC Dining Classroom Facility 4 is generally less than 1 percent, although localized gradients (e.g., for drainage ditches which cross the site) are larger ($\geq$ 10 percent).

According to a recent survey, existing grades within the proposed ATC Dining Classroom Facility 4 building footprint range from approximately 778 feet to 779 feet National Geodetic Vertical Datum (NGVD). Existing grades across the entire ATC Dining Classroom Facility 4 project site range from approximately 778 feet to 783 feet (NGVD). A finish floor elevation for the ATC Dining Classroom Facility 4 was not known at the time of this report.

2. <u>Subsurface Investigation.</u> The U.S. Army Corps of Engineers, Fort Worth District, drilled seven (7) test holes at the ATC Dining Classroom Facility 4 project site between April and May 2017. Specifically, borings 8A4C-1687 through 8A4C-16790, and 10A-1691 through 10A-1693 were drilled at the ATC Dining Classroom Facility 4 project site to determine subsurface conditions and to obtain representative soil and rock samples for laboratory testing. Test hole advancement and sample recovery was performed using 8-inch by 4¼-inch inner hollow stem auger and inner barrel sampler, 6-inch roller bit, a 4-inch gator bit, a nominal 3-inch diameter shelby tube sampler, and 2-inch diameter splitspoon sampler. Samples recovered from selective borings were sealed in airtight containers and taken to the laboratory of TEAM Consultants, Incorporated (Arlington, Texas) for testing. Borings were drilled to total depths ranging from 10.0 feet to 80.6 feet below existing grade.

The field investigation was performed using a Failing 1500 truck-mounted drill rig, a Gus Pech 1300C truck-mounted drill rig, and conventional drilling attachments. Results of the field investigation are shown on the Boring Locations, Sheet B101, and on the Logs of Borings, Sheets, B201 through B202 (Appendix A).

a. <u>Groundwater Conditions.</u> Groundwater conditions were monitored during drilling operations and after an observation periods of up to 24 hours. Static water levels were measured in three of the seven borings drilled at the ATC Dining Classroom Facility 4 project site, specifically, at a depth of 8.6 feet after 90 minutes in 8A4C-1687 and at a depth of 8.7 feet after 24 hours in 8A4C-1689. The depth to groundwater encountered in 8A4C-1688 was not recorded. It should also be noted that some borings were backfilled immediately after drilling was completed and before a static water level could develop.

Tabulated below is the static level measured at the time of the field investigation. It should be noted that groundwater conditions are relative to the time of drilling, annual precipitation, and drainage conditions at the site.

Boring	Static Level, feet
8A4C-1687	8.6
8A4C-1689	8.7

b. Dynamic Cone Penetrometer Testing. Dynamic Cone Penetrometer (DCP) testing was performed for pavement design considerations at the ATC Dining Classroom Facility 4 project site in borings 10A-1691, 10A-1692, and 10A-1693. Results of DCP testing are presented in Appendix D and discussed in paragraphs 4 and 5.

c. Soil Resistivity Testing. A soil resistivity test was performed during the geotechnical field investigation at the approximate location of boring 8A4C-1688. The resistivity value measured in the field at this location is 23.94 ohm-cm. Soil resistivity test results are provided in the 'Remarks' column of the aforementioned log of boring (Appendix A).

3. Subsurface Conditions.

a. General Geology. Lackland Air Force Base is located on the western edge of San Antonio in south central Texas. Physiographically, the base is situated in the West Gulf Coastal Plains Section of the Coastal Plains physiographic province. The topography is characterized by a gently rolling land surface that slopes southeastward toward the Gulf of Mexico. Local drainage flows into Leon Creek along the eastern boundary of the base.

Primary material underlying Lackland Air Force Base consists of strata belonging to three geologic formations. The Taylor Marl, found only along the northern edge of the base, is Cretaceous in age, and consists of soft to moderately hard, calcareous shale. The southern one-third of the base is underlain by the Navarro Group, Cretaceous in age, and consisting of sandy, silty clay shale. The tertiary age Midway Group underlies the remainder of the base and

consists of glauconitic sands and clays with occasional bentonite in the lower part, and highly plastic montmorillonitic clay shale in the upper part.

Overburden materials have an average thickness of about 20 feet and generally consist of silty, limy clay, overlying chert and limestone gravel. Varying amounts of clay are present in the gravel. Groundwater is usually present in the gravel beds immediately above the primary strata.

Lackland Air Force Base is located within the Balcones fault zone, an area characterized by numerous parallel and en echelon faults, usually downthrown to the south and traceable up to 30 to 40 miles. Faulting and jointing associated with the Balcones are present within the base area.

b. Site Conditions. The ATC Dining Classroom Facility 4 project site is an open field that is in part used for physical training/athletic activities. Apart from a few scattered trees, brush, and utility poles, the site is generally an open, grass-covered area. It is anticipated that any existing surface obstacles to construction will be demolished in conjunction with the new project construction. Topographically, the majority of the ATC Dining Classroom Facility 4 site is very level, generally sloping very slightly from north-northwest to south-southeast. The existing gradient in the area of ATC Dining Classroom Facility 4 is generally less than 1 percent, although localized gradients (e.g., for drainage ditches which cross the site) are larger ($\geq$ 10 percent). According to a recent survey, existing grades within the proposed ATC Dining Classroom Facility 4 building footprint range from approximately 778 feet to 779 feet (NGVD). Existing grades across the entire ATC Dining Classroom Facility 4 project site range from approximately 777 feet to 783 feet (NGVD). A finish floor elevation for the ATC Dining Classroom Facility 4 was not known at the time of this report.

Stratigraphically, the site is characterized by typically high plasticity clay (CH) and clayey and sandy gravel/cobble overburden strata, and by deeper formations of weathered and unweathered clay shale primary. NOTE: Stratigraphic contact depths referenced herein are measured with respect to the original (pre-site construction) existing grades (i.e., the grades

existing at the time of the geotechnical field investigation).

The uppermost overburden stratum typically consists of high plasticity clay (CH). The highly plastic overburden clay is typically very stiff to hard, dry to moist, black to dark brown within the upper 18.6 feet, transitioning to brown, light brown and white (limy) thereafter. The upper, black to dark brown overburden clay is typically slightly sandy and slightly gravelly, while the lower, brown to light brown overburden clay is generally, silty, slightly sandy to sandy, slightly gravelly to gravelly, and slightly limy to limy. It should be noted that sandy and gravelly seams have been noted within the overburden clay. Liquid limits measured from representative samples of the highly plastic clays collected across the ATC Dining Classroom Facility 4 project site range from 31 to 91 percent, plastic limits vary from 13 to 28 percent (with plasticity indices ranging from 18 to 66 percent), and in situ moisture contents vary between 14 and 35 percent. It should be noted that within some borings at depths between approximately 5 and 9 feet the yellow brown to gray clayey soils are described with significant amounts of caliche. These caliched clayey soils are much lower in plasticity than the overlying dark brown to gray and yellow brown clayey soils, and are determined to be of low to medium plasticity. Liquid limits measured from representative samples of the low to medium plasticity caliched clayey soils range from 32 to 65 percent, plastic limits vary from 13 to 19 percent (with plasticity indices ranging from 19 to 46 percent), and in situ moisture contents vary between 13 and 38 percent. It is not known whether the caliche content in clayey soils in this depth range is naturally-occurring or if the caliche is possibly lime that may have been mixed/injected into the subsurface materials previously to mitigate the high shrink-swell soil characteristics.

A stratum of clayey and sandy gravel and cobble is typically present between the high plasticity clay overburden and the underlying clay shale primary. The top of the gravel and cobble stratum was encountered at depths ranging from approximately 4.0 to 11.3 feet below existing grade at the boring location. In borings that penetrated the underlying clay shale primary, the gravel/cobble varies in thickness from approximately 6.2 to 10.0 feet at the

locations of borings drilled within the proposed ATC Dining Classroom Facility 4 building footprint. The gravel/cobble is described as medium dense to very dense, coarse to fine, dry to moist, and brown to yellow brown to light brown to light gray (clay and sand matrix), with caliche noted. Cobbles up to at least 6 inches in diameter have been recovered from the gravel/cobble stratum during USACE Fort Worth District geotechnical subsurface investigations at Lackland Air Force Base. **It should be noted that the gravel/cobble stratum is a known water-bearing stratum at Lackland Air Force Base (as indicated by the water levels measured during and after completion of drilling in the boring noted in Paragraph 2.a., above).** Atterberg limits were not determined for the samples of the clayey and sandy matrix materials of the gravel/cobble stratum (and seams within the high plasticity clay overburden clay) collected across the ATC Dining Classroom Facility 4 project site.

Beneath the overburden materials are formations of weathered and unweathered clay shale primary. The top of the weathered clay shale primary was encountered at depths ranging from 11.2 to 18.6 feet below existing grade at the boring locations. The weathered clay shale is yellow brown and light gray to strong brown, very soft to soft (rock classification), massive, silty, noncalcareous, with blocky structure, scattered arenaceous zones, and limonitic seams. The weathered clay shale is fractured throughout. The fractures are low to high-angle, weakly to well-healed (with calcite or gypsum); slickensides are also noted within some fractures. The clay shale typically becomes less weathered at depths between approximately 56.8 to 61.2 feet below existing grade, with layers of olive to dark gray slightly weathered clay shale interbedded with the yellow brown and gray weathered material. This is considered a transitional zone between the fully weathered clay shale primary and the essentially unweathered (uniformly dark gray) clay shale. This decrease in weathering is reflected by a moderate increase in strength of the clay shale primary materials within this transitional zone. Liquid limits measured from representative samples of the weathered clay shale primary collected at the ATC Dining Classroom Facility 4 project site range from 84 to 95 percent, plastic limits of 25 percent (with plasticity indices ranging from 59 to 70 percent), and in situ

moisture contents vary between 27 and 29 percent. The top of the dark gray, transitional slightly weathered to essentially unweathered (transitional/unweathered) clay shale was encountered at depths ranging from 56.8 to 61.2 feet below existing grade. Liquid limits measured from representative samples of the transitional/unweathered clay shale primary collected at the ATC Dining Classroom Facility 4 project site range from 79 to 93 percent, plastic limits vary from 24 to 28 percent (with plasticity indices ranging from 52 to 66 percent), and in situ moisture contents vary between 24 and 28 percent.

Subsurface conditions representative of the ATC Dining Classroom Facility 4 project site are shown on the logs of borings, Sheets B201 and B202 (Appendix A). The legend on the individual boring logs show overburden materials as classified in the laboratory using procedures presented in ASTM D 2488. It should be noted that the actual interface between material types may be far more gradual or abrupt than presented; therefore, actual subsurface conditions in areas not sampled may differ from those predicted. The nature and extent of variations across the sites may not become evident until construction commences, and the actual construction process may alter subsurface conditions as well. If variations become evident at the time of construction, CESWF-EC-G should be contacted to determine if the recommendations presented in this report need to be reevaluated.

4. Testing.

a. Laboratory Testing. Representative soil and rock samples recovered from selective test holes were subjected to laboratory testing for identification, moisture content, grain-size distribution, Atterberg limits, density, strength, and controlled expansion-consolidation. The accumulative test results are tabulated and presented in Appendix C. Results of identification and moisture content testing are shown on the individual boring logs, Appendix A.

Results of laboratory testing performed on samples obtained from the ATC Dining Classroom Facility 4 site are presented graphically in Appendix B as follows: Plasticity characteristics are shown on Plate 1, Plasticity Chart. Moisture content values of representative samples are shown with respect to depth on Plate 2. Atterberg limits test results

are shown with respect to depth on Plate 3. Dry density values of representative undisturbed samples and their corresponding moisture contents are shown with respect to depth on Plate 4. Ultimate compressive strengths of the clay shale primary are shown with respect to depth on Plate 5.

(1) Shear Strength Testing. Shear strength characteristics of the high plasticity clay overburden and clay shale primary were analyzed in the laboratory using one-point unconsolidated-undrained triaxial compression testing, confining the specimens to overburden pressure and then loading to failure. Tabulated below are the ultimate compressive strengths and respective dry densities of the high plasticity clay overburden and clay shale primary specimens. Shear strength test results are also presented in Appendix C at the end of this report.

Boring	Depth, feet	γ_d, pcf	Q_u, tsf	Material Type
8A4C-1687	63.3	94.5	5.40	Transitional/Unweathered Shale
8A4C-1687	67.2	98.3	8.97	Transitional/Unweathered Shale
8A4C-1688	61.9	96.8	9.01	Transitional/Unweathered Shale
8A4C-1688	63.2	98.3	9.01	Transitional/Unweathered Shale
8A4C-1688	66.6	99.9	9.69	Transitional/Unweathered Shale
8A4C-1688	79.1	101.0	14.28	Transitional/Unweathered Shale
8A4C-1689	3.0	86.6	0.80	CH Clay Overburden
8A4C-1689	9.0	117.8	1.75	CL Clay Overburden
8A4C-1689	49.6	94.3	6.53	Weathered Shale
8A4C-1689	65.5	101.6	9.95	Transitional/Unweathered Shale
8A4C-1690	61.1	97.2	9.00	Transitional/Unweathered Shale
8A4C-1690	69.6	99.5	8.85	Transitional/Unweathered Shale

(2) Controlled Expansion-Consolidation Testing and Swell Pressure Testing. Controlled expansion-consolidation (CEC) testing was performed on one specimens of high plasticity (CH) clay overburden, one specimen of low plasticity (CL) clay overburden, and two specimens of weathered clay shale primary collected at the ATC Dining Classroom Facility 4 site.

A specimen of high plasticity (CH) clay overburden collected at a depth of 3.0 feet within boring 8A4C-1689 was subjected to controlled expansion-consolidation testing. This

high plasticity clay specimen has a liquid limit of 87 percent, a plastic limit of 23 percent (PI = 64 percent), and natural moisture content of approximately 29 percent. An expansion pressure (p_{exp}) of approximately 1.5 tsf was recorded during CEC testing of the low plasticity clay specimen. Based on CEC test results, the low plasticity clay specimen collected at a depth of 3.0 feet within boring 8A4C-1689 has a very high expansion potential (C_s = 0.098; p_{exp}/p_0 = 8.0) and a high consolidation potential (C_c = 0.250).

A specimen of low plasticity (CL) clay overburden collected at a depth of 9.0 feet within boring 8A4C-1689 was subjected to controlled expansion-consolidation testing. This low plasticity clay specimen has a liquid limit of 31 percent, a plastic limit of 13 percent (PI = 18 percent), and natural moisture content of approximately 14 percent. An expansion pressure (p_{exp}) of approximately 0.3 tsf was recorded during CEC testing of the low plasticity clay specimen. Based on CEC test results, the low plasticity clay specimen collected at a depth of 9.0 feet within boring 8A4C-1689 has a low expansion potential (C_s = 0.016; p_{exp}/p_0 = 0.4) and a low consolidation potential (C_c = 0.076). Since the low plasticity clayey soils with caliche as tested in this specimen is uncharacteristically low in terms of their shrink-swell characteristics, it is considered a possibility that these materials may potentially have been treated with lime at some prior time (as evidenced by the lime/caliche nodules). As the overlying soils are not specifically described as fill, however, the prior lime treatment of the soils is limited to speculation.

Controlled expansion-consolidation testing was performed on two specimens of the weathered clay shale primary. A specimen of weathered clay shale primary collected at a depth of 42.7 feet within boring 8A4C-1688 was subjected to controlled expansion-consolidation testing. This weathered clay shale primary specimen has a liquid limit of 95 percent, a plastic limit of 25 percent (PI = 70 percent), and a natural moisture content of approximately 29 percent. An expansion pressure (p_{exp}) of approximately 1.0 tsf was recorded during CEC testing on this weathered shale primary specimen. Based on CEC test results, the weathered clay shale primary specimen collected at a depth of 42.7 feet within boring 8A4C-

1688 has a moderate to very high expansion potential (C_s = 0.07; p_{exp}/p_0 = 0.4) and a moderate consolidation potential (C_c = 0.150). Controlled expansion-consolidation testing also was performed on a weathered clay shale primary specimen collected at a depth of 49.6 feet within boring 8A4C-1689. This weathered clay shale primary specimen has a liquid limit of 84 percent, a plastic limit of 25 percent (PI = 59 percent), and a natural moisture content of approximately 27 percent. An expansion pressure (p_{exp}) of approximately 1.0 tsf was recorded during CEC testing on this weathered shale primary specimen. Based on the CEC test results, the weathered clay shale specimen collected at a depth of 49.6 feet within boring 8A4C-1689 has a moderate to very high expansion potential (C_s = 0.077; p_{exp}/p_0 = 0.3) and a moderate consolidation potential (C_c = 0.155).

Controlled expansion-consolidation testing was not performed on specimens of the transitional/unweathered clay shale primary.

Controlled Expansion-Consolidation Tests

Boring	Depth, feet	LL & PI		P_{exp}, tsf	P_{exp}/P_o	C_s & C_c		Material Type
8A4C-1689	3.0	87	23	1.5	8.0	0.098	0.250	CH Clay Overburden
8A4C-1689	9.0	31	18	0.3	0.4	0.016	0.076	CL Clay Overburden
8A4C-1688	42.7	95	70	1.0	0.4	0.066	0.150	Weathered Shale
8A4C-1689	49.6	84	59	1.0	0.3	0.077	0.155	Weathered Shale

b. Field Testing. Dynamic Cone Penetrometer (DCP) testing was performed for pavement design considerations at the ATC Dining Classroom Facility 4 project site in borings 10A-1691, 10A-1692, and 10A-1693. A DCP consists of a steel rod with a steel cone attached to one end and a sliding single-mass hammer. For this project, the DCP test was performed by driving the steel cone into the soil using a 10.1-pound sliding hammer dropped from a height of 22.6 inches (574 millimeters). The number of blows required for each 0.4 inch (10-mm) or higher of penetration was recorded as the "penetration per blow set"; therefore, the more penetration achieved per blow indicates that a "weaker" soil layer was

encountered. Typically, penetration measurements are taken to a depth of 39.4 inches (1,000 millimeters) or when refusal is achieved. Refusal is defined as the point when the cone cannot penetrate the soil more than 0.4 inches (10 millimeters). Presented below are the average in situ strength parameters derived from the DCP tests. DCP test results are also presented in Appendix D at the end of this report.

Depth, in	CBR, %	k, pci
0 – 6	6 - 9	137 - 169
6 – 12	8 - 12	176 - 224
>12	5 - 17	135 - 273

5. Discussions. The following discussions are provided in support of the foundation and pavement design recommendations made for the proposed ATC Dining Classroom Facility 4.

a. Soil Activity Considerations. The ATC Dining Classroom Facility 4 site is characterized by a typically high plasticity clay and clayey and sandy gravel/cobble overburden strata that are further underlain by formations of weathered and unweathered clay shale primary. The typically high plasticity overburden clay was encountered to a depth of up to 18.6 feet below existing grade; the overburden clays have liquid limits ranging from 31 to 91 percent, plastic limits ranging from 13 to 28 percent (with plasticity indices varying from 18 to 66 percent), and in situ moisture contents ranging from 14 to 35 percent. (It should be noted that the lower plasticity and caliched clayey soils (CL) were encountered in select borings at depths typically between 4.0 and 18.6 feet below existing grade; the clayey soils at a depth of up to 8 feet are very highly expansive, as discussed in Section 3.b., above.) The top of the underlying clayey and sandy gravel/cobble stratum was encountered at depths ranging from 4.0 feet to 11.3 feet below existing grade at the test hole locations and ranges from approximately 6.2 to 10.0 feet in thickness at the locations of test holes drilled across the proposed building footprint [the underlying weathered clay shale primary was not penetrated (thus providing a gravel/cobble stratum thickness) in any of the “10A-” pavement borings drilled outside of the proposed building footprint]. Atterberg limits were not determined for the specimens of the clayey and sandy matrix soils within the gravel cobble stratum. The top of the weathered clay

shale was encountered at depths ranging from 11.2 feet to 18.6 feet below existing grade at the test hole locations; specimens of the weathered clay shale primary have liquid limits ranging from 84 to 95 percent, plastic limit of 25 percent (with plasticity indices varying from 59 to 70 percent), and in situ moisture contents ranging from 27 to 29 percent. The top of the dark gray, transitional slightly weathered to essentially unweathered (transitional/unweathered) clay shale was encountered at depths ranging from 56.8 to 61.2 feet below existing grade. Liquid limits measured from representative samples of the transitional/unweathered clay shale primary collected at the ATC Dining Classroom Facility 4 project site range from 79 to 93 percent, plastic limits vary from 24 to 28 percent (with plasticity indices ranging from 52 to 66 percent), and in situ moisture contents vary between 24 and 28 percent. Moisture content and Atterberg limits test results indicate that these materials are potentially moisture deficient throughout the total depth investigated (74.5 feet below existing grade).

The results of controlled expansion-consolidation testing performed on specimens of the low to high plasticity clay (CL to CH, respectively) overburden soils and the weathered and transitional/unweathered clay shale primary collected at the ATC Dining Classroom Facility 4 project site are discussed in Paragraph 4.a.(2), above. In addition, extensive controlled expansion-consolidation testing was recently performed for the adjoining Airmen Training Complex 7 (Dormitory 7), in late 2013 and early 2014 for the neighboring ATC – West Campus Airmen Training Complex 5 (Dormitory 5) and ATC Dining Classroom Facility 3. The stratigraphy and materials properties (Atterberg limits and in situ moisture content ranges) of the representative specimens collected at the ATC Dormitory 5 and TC Dining Classroom Facility 4 sites are very similar to those collected at the ATC Dining Classroom Facility 4 site. Therefore, the expansive soils analysis also considers the controlled expansion-consolidation testing data collected at the adjoining Airmen Training Complex project sites (and the laboratory testing data collected at the remaining ATC – West Campus project sites) to supplement the testing data for the current project. Based on the results of controlled expansion-consolidation testing conducted on the selected shelby tube and core specimens, the

clay overburden has a very high potential for expansion and the weathered and transitional/unweathered clay shale primary have a moderate to very high potential for expansion. Also, based on the cited testing data, the clay overburden has a moderate to very high potential for consolidation, the weathered clay shale has a moderate potential for consolidation. No controlled expansion consolidation tests were performed on the transitional/unweathered clay shale.

An expansive soils analysis was performed to quantify the response of the active clay overburden and clay shale primary when subjected to increased load conditions during periods of seasonal moisture fluctuations. In the analysis, the plastic overburden soils and clay shale primary are assumed to be in a saturated condition, and initially, surcharge loads (fill and building) were neglected. Due to the fractured nature of the clay shale primary, particularly in the weathered zone, and the results of the previously discussed Atterberg limits, moisture content, and controlled expansion-consolidation testing, an active zone potentially extending to at least 65 feet below existing grade was considered (approximately the full anticipated length of the pier foundations, as discussed further in Paragraphs 5.b. and 6.a., below). The expansive soils analysis considers the following idealized stratigraphy: 0.0 feet to 5.0 feet – dark brown to black and yellow brown to gray high plasticity (CH) clay; 5.0 feet to 15.0 feet – medium to high plasticity clay (CL to CH, respectively) and clayey gravel/cobble; 15.0 feet to 58.0 feet – yellow brown and gray weathered clay shale; 58.0 feet to 65.0+ feet – yellow brown and gray to dark gray weathered to transitional/unweathered clay shale. The expansive soils analysis is based on the following material properties, by layer/depth interval:

Depth, feet	LL	PI	P_{exp}, tsf	P_{exp}/P_o	C_s	C_c	Material Type
2.0 – 5.0	87	23	1.5	8.0	0.098	0.250	CH Clay Overburden[1]
5.0 – 15.0	31	18	0.3	0.4	0.016	0.076	CL Clay Overburden[2]
15.0 – 58.0	98	67	1.0	1.9	0.102	0.226	Weathered Shale[3]
58.0 – 65.0	89	64	3.0	0.9	0.070	0.145	Weath. to Trans./UW Shale[4]

1. Boring 8A4C-1689, specimen ST-1 (sample depth = 3.0 feet) – this investigation;
2. Boring 8A4C-1689, specimen ST-2 (sample depth = 9.0 feet) – this investigation;

3. Boring 8A4C-1688, specimen ST-1 (sample depth = 17.0 feet) – ATC Dormitory 7 investigation;
4. Boring 8A4C-1645, specimen C-5 (sample depth = 55.6 feet) – ATC Dormitory 5 investigation.

Based on these conditions, the heave potential of the overburden and primary materials within an active zone equal to 65 feet was determined to be approximately 3.3 inches. A residual heave potential of 2.7 inches is anticipated even with a building surcharge of 100 psf. Less than an inch of heave (for both surface loading conditions) is attributable to the weathered clay shale. The settlement potential of the overburden clay and clay shale primary is anticipated to be about 1 inch considering a building surcharge of 100 psf. Considering fill surcharges (in addition to the building surcharge) ranging from 1 to 5 feet in thickness, the settlement potential of the overburden clay and clay shale primary is anticipated to range from approximately 1.6 inches to 3.3 inches. Fill surcharges exceeding 5 feet are not anticipated, however, settlement potentials for greater fill surcharges can be provided by CESWF-EC-G upon request. Settlement analyses for drilled and underreamed piers designed and constructed as specified herein indicate that total and differential settlement of the individual piers should not exceed 1 inch.

The expansive soils analysis demonstrates the very high expansion potential of the overburden clay and the clay shale primary. Due to the high potential volumetric changes that may be expected of the high plasticity clay overburden and clay shale primary, it is required that ground level floor slabs and grade beams for the ATC Dining Classroom Facility 4 be structurally-supported. Special foundation and subgrade preparation requirements for the primary facility and any relatively lightly-loaded secondary project facilities (if used) are provided herein to withstand the effects of the highly expansive subsurface conditions.

b. Foundation Design Considerations. The foundation design recommendations and requirements presented in this report are based on criteria contained in *TM 5-818-1*, *TM 5-818-7*, and engineering judgment.

The foundation for the proposed facility must meet several criteria. The foundation must be compatible with the superstructure it supports, its movements must be within

acceptable tolerances, it must meet functional requirements of the facility (such as a crawlspace), and it must be economical. Due to the potentially moderate to large anticipated column loads, the anticipated building geometry, the requirement for a crawl space, the anticipated differential heave and settlement potential of the high plasticity clay and the relatively low allowable bearing capacity that can be assigned to this stratum, the varying topography, the variable elevation, thickness, and consistency of the underlying gravel stratum, the heave potential of the underlying clay shale, and the cost of framework construction, shallow foundations such as a mat slab and dug and formed spot and continuous spread footings are not considered viable foundation systems for the ATC Dining Classroom Facility 4. However, a deep foundation system consisting of drilled and underreamed piers, when properly designed and constructed, has historically performed very well at Lackland Air Force Base, can be assigned a larger allowable end-bearing value (while also meeting the other criteria stated above), and can be constructed economically compared to a shallow footing system. Therefore a reinforced concrete drilled and underreamed pier foundation is considered to be the optimum foundation system for the ATC Dining Classroom Facility 4.

There are two potential bearing strata for the drilled and underreamed piers, namely the weathered clay shale and the transitional/unweathered clay shale. The gravel/coble would normally be considered as a preferable founding material since it can be assigned a moderately high allowable bearing capacity, and is above the highly expansive clay shale. Unfortunately, there are two problems associated with the gravel/cobble at this site. The first is that the anticipated contact depth of the gravel/cobble stratum is considered too shallow (less than 10 feet at most of the test hole locations within the proposed building footprint) for adequately formed underreamed piers. Second, and more importantly, the gravel/cobble stratum at the ATC Dining Classroom Facility 4 site is typically much less than 10 feet in thickness and occurs at variable depths. This is considered an inadequate thickness on which to bear piers carrying the magnitude of loads anticipated for the proposed ATC Dining Classroom Facility 4 and inconsistencies would require further reductions in allowable loads to limit differential

settlements, particularly given the presence of clayey, silty, and sandy zones within the gravel/cobble stratum. Furthermore, the gravel/cobble stratum can be expected to convey water into a pier excavation (and this has occurred during the recent previous phase Airmen Training Complex facility pier foundation construction), with gravel and cobbles likely sloughing into the excavation, further increasing the difficulties of attempting to form an underream in this material. Therefore, based upon these factors, the gravel/cobble stratum shall not be considered as a bearing stratum.

The weathered and unweathered clay shales are considered potential bearing strata for drilled and underreamed piers. Selecting a bearing stratum/elevation for drilled piers in expansive clay shales, such as those present at this site, must take into account constructability, bearing capacity, settlement, potential heave, and cost. These can be conflicting requirements and the final selection must strike a reasonable compromise between these considerations. The weathered shale has the obvious advantage of being shallower, thus piers would not have to extend as deep and would have a lesser cost. It has the disadvantages of being jointed and fissured with limonitic seams (which present constructability problems with forming underreams), has lower shear strengths, and is more compressible when compared to the transitional/unweathered clay shale. Furthermore, movements have been observed in pier foundations bearing in the shallower depths (less than 50 feet below existing grade) of the weathered clay shale at Lackland Air Force Base. Hence, the unweathered clay shale constitutes a significantly better bearing material than the weathered clay shale. Unfortunately, as previously stated, the completely unweathered shale is typically present at depths exceeding 70 feet below existing grade. Attempting to found piers within the uniformly dark gray unweathered shale would not only be much more costly than founding in the transitional zone between the weathered and unweathered clay shale, but much more difficult in terms of constructability (including pier construction quality control and quality assurance). However, the deepest sections of the transitional zone between the weathered and unweathered clay shale primary possess significantly higher strengths and typically lower compressibility

characteristics compared to the overlying weathered clay shale. Based upon the strength testing data within the transitional to unweathered clay shale, it is recommended that the piers for the ATC Dining Classroom Facility 4 be founded no shallower than elevation 715.0 feet (NGVD) to ensure adequate bearing capacity and an acceptable amount of settlement. Piers founded at this elevation (or deeper) within the transitional zone between the weathered and unweathered clay shale can be expected to experience approximately 1 inch of total and differential settlement, when designed in accordance with the recommendations provided herein. Based on the discussions presented above, the ATC Dining Classroom Facility 4 shall be founded on a reinforced concrete drilled and underreamed foundation system in accordance with the recommendations and requirements specified herein.

c. Pavement Design Considerations. The pavement designs presented in this report are based on criteria contained in *UFC 3-250-01FA*, *UFC 3-250-18FA*, and engineering judgment.

(1) Traffic Types and Conditions. Three (3) pavement structures were analyzed and designed for this project. New rigid pavement structures are anticipated to include an all-weather fire/emergency medical vehicle access lanes and concrete aprons in front of trash dumpster pads, loading docks, and hardstands for mechanical yards. New flexible pavement structures are anticipated to include privately-owned vehicle (POV) parking area(s). Types of vehicles to occupy the POV parking areas are anticipated to be limited to passenger cars and trucks (Category II Traffic) making potentially more than 25 passes per hour (peak) (Class E Street), resulting in a pavement Design Index of 2. Types of vehicles to occupy the remaining pavement structures are anticipated to consist of fire/emergency medical vehicles, trash trucks, troop busses, and vehicles up to large multi-axle trucks (i.e., Category IVA Traffic). The remaining pavement structures are assigned a Street Class F due to the anticipated low frequency of truck traffic passes (for a pavement Design Index of 4).

Based on criteria contained in the aforementioned United Facilities Criteria, the following traffic conditions were assigned:

	Pavement Structure	Traffic Category	Street Class	Design Index
Rigid	Emergency Access Lane	IVA	F	4
	Apron (Trash, Loading Dock, and Mechanical Yard)	IVA	F	4
Flexible	POV Parking Spaces	II	E	2

(2) Pavement Design Parameters. California Bearing Ratio (CBR) and plate bearing tests were not performed for this project. Instead, dynamic cone penetrometer (DCP) testing was conducted to evaluate the raw subgrade for pavement design considerations. The penetration resistance obtained from the DCP test is a measure of the soil's relative density, which in turn is used to derive "in situ" CBR and modulus of subgrade reaction values.

The in situ CBR values measured within the upper 12 inches of soils tested at the ATC Dining Classroom Facility 4 site range from approximately 6 to 12 percent, and below this depth, CBR values ranging from 5 to 17 percent were recorded. Modulus of subgrade reaction values measured within the upper 12 inches of soils tested at the ATC Dining Classroom Facility 4 site range from 0 to 285 pci, and below this depth, modulus of subgrade reaction values ranging from 113 to 301 pci were recorded. In the past, the clayey subgrade indicative of Lackland AFB has been assigned CBR values ranging from 4 to 6 percent when compacted to 90 percent of laboratory maximum density, and around 19 percent when lime-stabilized and compacted to 95 percent. Previously conducted plate-bearing tests indicate that a modulus of subgrade reaction ranging from 75 pci to 150 pci can be assigned to the in situ soils when compacted to 90 percent of laboratory maximum density. This value has been upgraded to as high as 200 pci when the same soils are lime-stabilized and compacted to 95 percent. The CBR and subgrade modulus values determined from in situ DCP testing are generally consistent with the historical CBR and subgrade modulus values described above. Some of the higher correlated CBR and subgrade modulus values are believed to be attributable to the presence of gravel in the soils at the test locations, and also potentially to temporary hardening of the near-surface soils due to desiccation at the time of the geotechnical field investigation.

Previous DCP testing performed by USACE, Fort Worth District, within similar soils at Lackland Air Force Base and nearby Fort Sam Houston (with similar subsurface conditions) during wetter periods has demonstrated that the soil's CBR and subgrade modulus decrease significantly at those times. Based on these considerations, and the possibility that some of the pavement sections may be constructed in areas of fill placement, design CBR and modulus of subgrade reaction values of 4 percent and 100 pci, respectively, were assigned to the raw subgrade for each site when compacted to 90 percent of laboratory maximum density (ASTM D 1557).

(3) Lime Stabilization. Atterberg limits test results indicate that the clay overburden is highly expansive. A layer of lime-stabilized subgrade is typically recommended to improve the strength characteristics of pavement sections at Lackland Air Force Base. Properly designed and constructed existing pavement structures at Lackland Air Force Base and pavement structures constructed on similar subgrade soils at nearby Fort Sam Houston have achieved excellent performance. Therefore, lime stabilization is recommended for new pavement structures.

(4) Material Sources. Material sources in the San Antonio area are capable of producing a high quality crushed aggregate for concrete mixes to meet strength requirements. For this reason, a concrete flexural strength of 650 psi at 28 days was considered in the design of rigid pavements. To date, Alkali/Silica Reaction with Portland Cement Concrete has never been a problem when using local aggregate sources.

6. Recommendations. The following foundation and pavement design recommendations and requirements are based on results of the field investigation, laboratory testing, and engineering studies.

a. Foundation Design Recommendations.

(1) Foundation System.

(a) ATC Dining Classroom Facility 4. The proposed ATC Dining Classroom Facility 4 shall be supported on a reinforced concrete drilled and underreamed pier

foundation system. The bearing stratum for the drilled and underreamed piers is the transitional zone between the weathered and unweathered clay shale primary. This material is characterized by seams of dark gray unweathered shale interbedded with lighter gray and yellow brown seams of weathered shale. Piers for the ATC Dining Classroom Facility 4 shall be founded within this clay shale bearing material at an elevation no shallower than 715.0 feet (NGVD). An allowable end bearing capacity of 20.0 ksf (net) should not be exceeded when sizing pier underreams founded at this elevation. It should be noted that this allowable bearing capacity is based on a factor of safety equal to 3 against shear failures. The number/layout and sizing for piers/underreams should be designed, and pier loading should be distributed in such a manner as to maximize the loading to as close as possible to the allowable end bearing in order to counteract the uplift forces acting on the piers, in accordance with the requirements specified herein. Based on structural requirements, the load used to size the piers shall consist of full dead load plus that portion of the live load that acts more or less continuously, usually 50 percent.

The following values are recommended for the parameters to be used in LPILE:

Layer 1 (CL to CH Clay Overburden)
Suggested L-Pile Soil Type = Stiff Clay w/o Free Water
Depth = 0 to 15.0 feet
Dry Density = 100 pcf
Undrained Cohesion = 1,000psf

Layer 2 (Weathered Clay Shale Primary)
Suggested L-Pile Soil Type = Stiff Clay w/o Free Water
Depth = 10.0 to 58.0 feet
Dry Density = 95 pcf
Undrained Cohesion = 3,000psf

Layer 3 (Transitional/Weathered Clay Shale Primary)
Suggested L-Pile Soil Type = Stiff Clay w/o Free Water
Depth = 58.0 to 70.0 feet
Dry Density = 100 pcf
Undrained Cohesion = 6,000psf

To facilitate clean out and inspection of the pier holes during construction, pier shafts shall be at least 24 inches in diameter; however, it is recommended that the smallest possible

shaft diameter should be used to minimize the surface area on which pier heave can act. Pier underream diameters shall be at least 2.5 times the diameter of the pier shaft but shall not exceed 3.0 times the diameter of the pier shaft. Once design pier underream sizes are determined, they shall be fixed to that diameter in the field. A minimum 12-inch void shall be maintained beneath all grade beams, and the void area shall be protected with concrete retainer blocks as shown in the latest edition of the SWD-AEIM. ***The bottom of all grade beams shall be formed with carton forms to provide the 12-inch void.***

To limit the potential for large differential movements from occurring, the following measures shall be implemented: (1) shaft diameters shall be the minimum required to limit the contact area with the surrounding expansive soils; (2) piers shall be widely spaced (not less than 20 feet center to center) in an attempt to impose a significant amount of dead load on the foundation; the most heavily loaded piers shall not be placed next to lightly loaded piers; (3) piers shall be properly reinforced to prevent stress (tensile) cracking within the pier concrete when subjected to uplift forces. Based on the results of analyses taking into account the expansion pressures of the soil and clay shale in combination with dead loads acting on individual piers, it was determined that piers 24 inches in diameter (shaft size) require a minimum of 3.0 percent reinforcing steel, piers 30 inches in diameter require a minimum of 2.75 percent reinforcing steel, and piers 36 inches in diameter require a minimum of 2.25 percent reinforcing steel; piers smaller than 24 inches in diameter shall not be used based on the anticipated bearing depth (>40 feet). ***For piers for which the dead load is LESS THAN 200 kips (which is anticipated in the single-story section(s) of the building), the following minimum tensile reinforcing steel requirements shall apply:*** **Piers 24 inches in diameter (shaft size) require a minimum of 3.25 percent reinforcing steel**, piers 30 inches in diameter require a minimum of 2.75 percent reinforcing steel, and piers 36 inches in diameter require a minimum of 2.25 percent reinforcing steel ***It is requested that the structural designer submit the proposed pier loading scheme to CESWF-EC-G for review and analysis of actual pier loads with respect to heave and settlement considerations. This information should include***

a the total load, as well as the dead load and live load for each pier, and also state whether the loads are factored or unfactored.

As previously noted, minimum pier spacing shall not be less than 20 feet (center-to-center). At expansion joints, the two piers on either side of the joint should be combined into one larger pier spanning across the joint. An additional concern that couples with the spacing requirements is lightly loaded piers. Lightly loaded piers (i.e., those with column loads less than 200 kips) dissipate most or all of their load in side shear and none of the end bearing will be mobilized. Thus, the expansive clay shale below the pier has no structural restraint when this material begins to heave and the full expansion potential of the material is realized. To reduce this risk, any pier supporting a column load of less than 200 kips shall be deleted and the load redistributed to adjacent piers by grade beams. This normally requires special structural spans at stoops and elevator pits as well as not allowing grade beams to be supported independently from column locations. Transferring load by grade beams may not be economical, but is required for adequate performance of the foundation system. In addition, to minimize the effects of differential movements, large differences (>50%) in column loading between adjacent piers should be avoided. Compression or settlements of individual piers should be checked to ensure acceptable deflections which will not cause cracking or distress to the building structural wall/floor units and building facade. Perimeter piers at the ends of the building wings are typically less heavily loaded than adjacent piers; special attention should be paid to the pier and grade beam design to ensure that piers in these locations also achieve the loads specified herein.

Proper sizing of the piers, both shafts and bells, is essential. Shaft and bell diameters must be within -0 to +2 inches of the specified dimension. The contract shall require that the belling tool have some means, such as a chain, to restrict the travel of the underreamer to the required dimension.

Concrete slump for piers shall be from 6 to 8 inches.

The detail illustrated on Sheet B-102 shows a wedge-shaped mound of Select Clay

Cap placed around the pier top that is 1 foot high and sloped at a 1V on 2H slope. This will prevent water from ponding directly around the top of the pier.

The contractor shall have temporary steel casing and pumps at the job site prior to construction of drilled piers. Groundwater should be anticipated during drilling operations; therefore, the above information should be provided in the contract documents as foundation notes. ***It should be assumed that approximately 100 percent of all piers will have to be cased to at least 40 feet below existing grade. Individual bid items should be provided in the contract bid schedule for each shaft and casing size. Final pier depths shall be determined in the field by the Contracting Officer's representative.***

Drilling equipment should be of suitable type and of sufficient size to satisfactorily perform the required drilling for the soil conditions identified. To this end, **all drill rigs shall have a 6-inch Kelly bar** and be capable of producing minimum torque and crowd capacities of 50,000 lb-ft and 30,000 lb-ft, respectively.

Piers shall be installed plumb within a maximum of 1.5 inches for the first 10 feet and within 0.5-inch for each 10 feet of additional depth (for example, a 65-foot deep pier would therefore have a plumb tolerance of 4.25 inches).

Drilled pier construction, placement of the reinforcing steel cage, and concrete placement shall be a CONTINUOUS OPERATION performed and completed the same day that the excavation is completed. Concrete shall be placed within pier excavations within 3 hours of completion of the approved pier excavation. NO PIER EXCAVATION SHALL BE LEFT OPEN OVERNIGHT.

The above criteria for drilled pier construction should be included in guide specification UFGS-31 63 26 – DRILLED CAISSONS.

(b) Small Support-type Structures. Small support-type structures (≤500GSF), if applicable, can be supported on a reinforced concrete slab-on-grade with turned-down edge beam foundation. The turned-down edge beam should extend a minimum of 12 inches below outside finished grade, and can be sized for a safe bearing pressure of 2,000 psf

(net). Subgrade preparation should consist of removing at least 5.0 feet of existing materials within the building footprint, and replacing with at least 5.0 feet of compacted non-expansive fill. Any additional fill required to achieve the final subgrade elevation below the floor slab system shall be nonexpansive material as well. The upper 6 inches of existing subgrade exposed after excavation operations, or cleared prior to fill placement shall be scarified, moistened, manipulated, and recompacted to the same density required for nonexpansive fill materials. Nonexpansive fill shall be placed in controlled lifts not exceeding 8 inches in loose thickness and compacted to at least 95 percent of laboratory maximum density (in accordance with ASTM D 1557).

(2) Ground-Level Floor Slab System. Ground-level floor slabs within ATC Dining Classroom Facility 4 shall be supported above a minimum 12-inch void or crawl space. The void area shall be protected with concrete retainer blocks as shown in the latest edition of the SWD-AEIM. The bottom of all grade beams and floor slabs shall be formed with carton forms to provide the 12-inch void. Stoops, porches, approaches, etc. shall also be structurally-supported to compensate for the active subgrade. Since the design requires the incorporation of a crawl space beneath the building, the underfloor area shall be sloped to collection points and drained using sumps and pumps. Swales shall drain away from pier column locations such that ponded water never occurs adjacent to piers.

(3) Subgrade Preparation and Fill Requirements. For portions of the building pad that will be in a fill section (which is anticipated to be most if not all of the building pad), subgrade preparation for ATC Dining Classroom Facility 4 shall consist of removing the upper 12 inches of existing materials and replacing with a compacted select backfill. Any additional fill required to raise the subgrade to the final elevation(s) below the building floor slab system shall be select material as well. Select fill should be placed in controlled lifts not exceeding 8 inches in loose thickness and compacted to at least 90 percent of laboratory maximum density as determined in accordance with ASTM D 1557. For portions of the building pad that will be a cut section, subgrade preparation should consist of removing all existing materials to a depth

that allows a minimum 12-inch void to be formed below the floor slab system. The upper 6 inches of existing subgrade exposed after cut and/or fill operations shall be scarified, moistened, and recompacted to the same density required for select fill.

Based on previous experience, if nonexpansive fill is placed outside the limits of the building footprint, the relatively higher permeability of the nonexpansive fill will allow moisture to infiltrate to the highly expansive soils adjacent to and beneath the foundation, potentially resulting in heave of the foundation. To limit moisture penetration to the area around and beneath the foundation, excavated areas beyond the limits of the building footprint shall be backfilled with select clay backfill materials. This select clay cap shall be a minimum of 2 feet in thickness and shall extend from the building perimeter to the limits of the excavation (completely capping/covering the compacted nonexpansive fill). Select clay backfill materials should be compacted to at least 92 percent of laboratory maximum density (with all other subgrade preparation and fill placement requirements being the same as those for nonexpansive fill).

(4) Material Testing Requirements. Testing shall be the responsibility of the contractor to ensure that the subgrade, fill, and backfill materials are properly compacted. To this end, the following minimum testing frequencies should be included in the contract specifications:

- In-place density of the subgrade, fills, and backfills shall be performed for every 2,500 square feet per lift in accordance with ASTM D 1556 or ASTM D 6938.
- Optimum Moisture and Laboratory Maximum Density of nonexpansive fill and backfill shall be performed for every 500 cubic yards or when any change in material occurs.

(5) Below-Grade Structures (Grade Beams). The following parameters are provided for the design of all below-grade structures. For the high plasticity clay and badly weathered clay shale, an at-rest lateral earth pressure coefficient (K_o) of 0.7, an active earth pressure coefficient (K_a) of 0.7, an angle of internal friction (ϕ) of 10°, a cohesion value (c) of

100 psf, and an allowable bearing capacity of 2,000 psf shall be used. For select lean clay backfill placed behind below grade structures, an at-rest lateral earth pressure coefficient (K_o) of 0.7 and an angle of internal friction (ϕ) of 20°, be used; an active earth pressure coefficient (K_a) of 0.7 shall be used (as it is anticipated that highly expansive soils will be in contact with the lean clay backfill and these highly expansive materials will transmit their earth pressures to the below-grade structures through the lean clay fill). The clay, clay shale, and backfill material should be assumed to have a moist unit weight of 125 lb/ft^3. All backfill shall be select lean clay soil. Backfill details for grade beams are shown on ***Sheet B-104***. The analyses and designs shall also account for surcharge loadings (e.g., due to vehicular traffic) where applicable.

(6) Drainage Conditions. Proper site drainage is imperative to ensure satisfactory long-term foundation performance. Exterior grading adjacent to the building shall be sloped away from the structure a minimum of 5 percent for the first 10 feet. Runoff from the roofs shall be adequately discharged away from foundation edges. In no case should water be allowed to pond adjacent to or beneath the buildings, both during and after construction.

(7) Care of Water. Drainage of ground and surface water from the project site continually throughout the construction contract is essential. The contractor shall be required to protect the excavation and all constructed work throughout the life of the contract by means of ditches, berms, sumps with pumps, and any other means required to continually and effectively remove water from the site at all times. Ponding of water in the excavation or around the piers is unacceptable at any time. In addition, site excavations to include the crawl space excavation, utility trenching, grading, and retention basins shall be constructed so as not to supply water directly or indirectly to the building or underlying active clay shale via the pervious gravel stratum. Such exposure of the underlying clay shale primary to surface runoff during construction could extend the active zone (via fractures) to much greater depths within the clay shale. This would activate these highly expansive materials and result in expansion

pressures on the foundation elements that could create distress on the structural system of the facility. ***These requirements shall be reflected in the specifications and in the structural notes.***

The designer shall grade the site to ensure positive drainage of all water away from the structure. Crawl spaces shall be graded to collect water and carry it to sumps. The sumps shall drain by gravity or be equipped with automatic pumps to direct the water to the storm drainage system. Sumps shall be located at least 10 feet away from any pier in the crawlspace.

Additional care of water and shale protection measures associated with the utility tunnel ("utilidor") connecting the Equipment Building and the ATC Dining Classroom Facility 4 are provided in Paragraph 6.a.(13), below.

(8) Mechanical Connections. All exterior mechanical connections should be of the flexible type. Flexible connections shall be capable of resisting a minimum of 4 inches of both vertical and horizontal movement. All mechanical/structural connections between slabs on grade and structurally supported units or building perimeter entry/exit points must be designed and constructed to handle up to 4 inches of vertical movement. All condensate lines shall drain away from foundation edges. It is recommended that below-grade utility lines connecting to the buildings be aligned under the centerline of the respective building footprints. The use of exterior lines connecting to the buildings by numerous utility trenches is discouraged, as this would create high permeability pathways for moisture to gain access to, and activate, the expansive clay and clay shale materials within the building footprint.

(9) Backfill Adjacent to Exterior Grade Beam Excavation. Use select clay backfill adjacent to exterior grade beam excavation to minimize water penetration to expansive subsoils. Reference below-grade wall backfill details shown on Sheet B102.

(10) Foundation Material Definitions.

(a) Satisfactory Materials. Satisfactory materials include materials classified in ASTM D 2487 as GW, GM, GC, GP, SW, SP, SM, SC, CL, and CH and shall be

free of trash, debris, roots or other organic matter, or stones larger than 3 inches in any dimension.

(b) Unsatisfactory Materials. Unsatisfactory materials include materials classified in ASTM D 2487 as Pt, OH, OL, ML, MH and any other materials not defined as satisfactory.

(c) Nonexpansive Soils. Nonexpansive soils should meet the requirements of Texas Department of Transportation Standard Specification for Base Course, Item 247, Type A, Grade 1 or 2, with plasticity index of not less than 4 percent nor greater than 12 percent when tested in accordance with ASTM D 4318.

(d) Select Soils. Select soils are satisfactory material having a liquid limit of 35 percent or less and a plasticity index not less than 8 nor greater than 18 when tested in accordance with ASTM D 4318.

(e) Select Clay Backfill. Select clay backfill shall be a satisfactory material having a liquid limit of 35 percent or less, and a plasticity index of not less than 8 nor greater than 20 when tested in accordance with ASTM D 4318, and classifying as a CL in accordance with ASTM D 2487.

(f) Cohesionless and Cohesive Materials. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

(g) Capillary Water Barrier. Capillary Water Barrier shall consist of clean, crushed, nonporous rock, crushed gravel, or uncrushed gravel. The maximum particle size shall be 1.5 inches and no more than 2 percent by weight shall pass the 3/16-inch size (No. 4) sieve.

The above material definitions, subgrade preparation procedures, and material testing requirements should be presented in guide specification ***UFGS-31 00 00 EARTHWORK***.

(11) Instrumentation. Perimeter grade beam benchmarks, as shown in the

SWD-AEIM, Chapter IV (Plate S53), shall be installed around the perimeter of the ATC Dining Classroom Facility 4 at select pier and grade beam locations. Additional benchmarks similar in design shall be installed on select interior columns. ***Final location of the benchmarks shall be determined by CESWF-EC-G when the 65% design is complete.*** The benchmarks should be surveyed to the nearest 1/100th of a foot from a permanent benchmark as soon as the forms are stripped and shall be surveyed monthly throughout the remainder of the construction contract from a permanent deep benchmark. Elevations for the benchmarks shall be supplied to the contracting officer for forwarding to CESWF-EC-G within 7 days of completing the survey. ***A typical construction detail for the benchmarks and the benchmark installation locations shall be presented in the construction drawings***.

(12) Elevator Equipment Jack Shafts/Casings. It is anticipated that elevator equipment jack shafts will be drilled deeply into the clay shale primary, potentially extending to the depth of the pier foundations. Based on previous experience, some of these elevator equipment jack shafts may be situated in close proximity (much less than 20 feet) to pier locations. Unless special measures are implemented, these elevator jack shafts (which will have permanent casing/pipes installed within them) will serve as conduits for moisture to penetrate deeply within the clay shale formation, potentially to the pier bearing depth. Over time (and over the project life cycle), the moisture front spreading from the elevator jack shaft horizontally and vertically within the fractured clay shale formation will potentially induce heave forces upon the pier foundations. To minimize the potential for these effects, **the following measures shall be implemented during the construction of the elevator equipment jack shafts:** 1) the elevator jack shafts should be located as far as possible away from the pier foundations, but no closer than 10 feet; 2) the elevator jack shafts shall be cleaned of loose subsurface material cuttings prior to installation of the permanent jack casing; 3) a welded plate completely and effectively sealing the base of the jack casing shall be used to prevent any water that might accumulate within the jack casing over the life of the project from seeping into the underlying fractured, expansive clay shale formation; 4) if the bottom of the

elevator jack casing is not sealed with a welded plate, but is open to the underlying clay shale formation, a minimum of 12 inches of lean bentonitic grout shall be placed at the bottom of the elevator jack shaft prior to placement of the casing; 5) the annular space between the elevator jack casing and the exposed subsurface materials within the shaft shall be completely filled (no open voids or pockets shall be permitted) from bottom to the surface with a lean bentonitic grout – placement of sand or other granular material, cuttings from the shaft excavation, or soil materials of any type **shall not be permitted**.

(13) Utility Tunnel Excavation and Protective Measures for the Weathered Clay Shale Primary During Construction. Based on information currently available to CESWF-EC-G, the depth (invert) of the excavation for the utility tunnel connecting the Equipment Building and the ATC Dining Classroom Facility 4 will vary but is estimated to be approximately 15 feet below existing grade. Based on the logs of borings drilled for the ATC Dormitory 7 project and the adjoining ATC Dining Classroom Facility 4 project, the contact with the weathered clay shale at the base of the gravel/cobble stratum is anticipated to occur at depths of 9 to 15 feet below the existing grade. The subsurface information indicates that the clay shale stratum potentially may be penetrated by the excavation for the utility tunnels. Therefore, the following excavation and protective measures for the weathered clay shale primary are provided, below, for the utility tunnel construction.

Based upon the anticipated limited extent of penetration of the weathered clay shale stratum by the utility tunnel excavation, the construction of a soil-bentonite slurry cutoff wall is not recommended as a measure to protect the clay shale material. Construction of such a feature is anticipated to add significant cost and may not be effective if the exposed clay shale area is not completely encapsulated and cut off from the gravel/cobble stratum (which, again, is anticipated to be both difficult and expensive to effectively achieve). Instead, the shale surface protection measures described below are recommended.

Once excavation operations have begun, it is critically important that water not be allowed to accumulate in or adjacent to the excavation. Water that enters the excavation shall

be removed by pumps, ditches, or any other suitable methods. A network of dewatering wells along and adjacent to the utility tunnel excavation may be used as an alternative or additional measure to prevent water from the gravel/cobble stratum from entering the excavation. The bottom of the excavation shall be shaped to drain to a sump where the water can be continually removed throughout construction.

The excavated surface of the clay shale primary must be protected from exposure to 1) ensure the material does not deteriorate due to loss of moisture (a phenomenon that can happen rapidly (in a matter of hours) upon exposure to the atmosphere), and 2) ensure water is not absorbed into the material that will cause it to swell to its maximum potential. Excavation of the final 2 feet of material should not be performed during inclement weather. Lastly, it is important that the amount of time between excavation and vertical construction be minimized. In addition to the aforementioned care of water and clay shale protection concerns, it should also be considered that once the overlying materials have been removed (stress relief), the fractured weathered clay shale primary will experience elastic rebound, which will result in the formation of additional cracks within this material. This situation will serve to exacerbate the potential for moisture infiltration and heave of this material.

For areas in which the utility tunnel invert occurs within the gravel/cobble overburden stratum, it is recommended that a polyethylene vapor barrier (10-mil minimum thickness) and a minimum 6-inch capillary water barrier should be placed beneath the base of the utility tunnel (in accordance with mat slab/slab-on-grade recommendations provided herein). A 4-inch mud slab may be incorporated as added protection for the subgrade and to facilitate construction.

For areas in which the utility tunnel invert occurs within the weathered clay shale primary stratum, it is recommended that a 4-inch mud slab underlain by a 30-mil EPDM geomembrane liner should be placed beneath the utility tunnel conduit structure and directly over the exposed weathered clay shale primary. The geomembrane liner and 4-inch mud slab shall be placed over **ALL** exposed portions of the weathered clay shale primary within the utility tunnel excavation. The mud slab can incorporate reinforcing wire to limit cracking.

Implementing the above measures should provide satisfactory protection of the weathered clay shale primary during and after construction. Shale protection measures shall be coordinated with and submitted for approval to CESWF-EC-G.

b. Pavement Design Recommendations and Requirements. The pavement sections presented below are based on criteria contained in *UFC 3-250-01FA, UFC 3-250-18FA*, and engineering judgment.

(1) Rigid Pavement. The following pavement sections are recommended for the all-weather fire/emergency medical vehicle access lanes, and for aprons for a minimum distance of 15 feet in front of trash dumpster pad(s), for aprons in front of loading docks, and for mechanical yard hardstands. The rigid pavement designs consider a modulus of subgrade reaction equal to 100 pci for the raw subgrade when compacted to 90 percent of laboratory maximum density, and a concrete flexural strength of 650 pci at 28 days.

(a) Fire/Emergency Vehicle Access Lanes (Rigid Pavement Option). The design is based on Category IVA Traffic and a Class F Street (Design Index = 4).

7” Portland Cement Concrete (nonreinforced)

6” Aggregate Base Course compacted to at least 95 percent of maximum laboratory density (ASTM D 1557)

6” Lime-Stabilized Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

6” Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

(b) Aprons in Front of Trash Dumpster Pads, Aprons in Front of Loading Docks, and Mechanical Yard Hardstands. The design is based on Category IVA Traffic and a Class F Street (Design Index = 4).

6” Portland Cement Concrete reinforced with No. 4 bars spaced 16 inches o.c.e.w.

6” Aggregate Base Course compacted to at least 95

percent of maximum laboratory density (ASTM D 1557)

6" Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

Reinforcement for odd-shaped slabs, joint design, joint spacing, and other details should be in accordance with the latest edition of the SWD-AEIM and UFC 3-250-01FA, where applicable. The reinforcement bars should be placed a minimum of 1.5 inches clear distance from the surface of the pavement.

(2) Flexible Pavement. The following pavement sections are recommended for privately-owned vehicle (POV) parking area. The flexible pavement designs consider a CBR value of 4 percent for the raw subgrade when compacted to 90 percent of laboratory maximum density.

(a) POV Parking Area. The design is based on Category II Traffic and a Class E Street (DI=2).

1.5" Hot-Mix Surface Course

7" Aggregate-Base Course compacted to at least 100 percent of maximum laboratory density (ASTM D 1557)

6" Lime-Stabilized Subgrade compacted to at least 95 percent of maximum laboratory density (ASTM D 1557)

6" Raw Subgrade compacted to at least 90 percent of maximum laboratory density (ASTM D 1557)

The following note should be incorporated as part of the pavement details shown on the contract drawings.

"1. The moisture content shall be at least 1 percent above optimum during compaction of the raw subgrade."

(3) Pavement Material Definitions.

(a) Hot-Mix Surface Course (50 Blow Mix). Aggregates and asphaltic

materials shall conform to the requirements of the Texas Department of Transportation, Standard Specifications for Construction of Highways, Streets and Bridges, (TXDOT, Std Spec), Items 300 and 340. The paving mixture shall conform to the requirements for Type "D" (Fine-Graded surface course) grading. Asphaltic material for the paving mixture should be asphaltic cement, viscosity grade AC-20, or performance grade PG64-22. Edit guide specification ***UFGS-32 12 16 HOT-MIX ASPHALT (HMA) FOR ROADS*** to the above requirements.

(b) Prime and Tack Coats. Asphaltic material for the prime coat shall be cut-back asphalt, grade MC-30, conforming to the requirements of TXDOT, Std Spec, Item 300, Asphalts, Oils, Emulsions. Prime coat should be applied to the surface of the aggregate base coarse. Asphaltic material for the tack coat shall be cut-back asphalt, grade RC-250, or emulsified asphalt, grade SS-1, conforming to the requirements of TXDOT, Std Spec, Item 300, Asphalts, Oils, Emulsions. Tack coat should be applied to all surfaces that contact new asphalt pavement. Edit guide specification ***UFGS-32 12 10 BITUMINOUS TACK AND PRIME COATS*** to the above requirements.

(c) Aggregate Base Course. Aggregates shall conform to the requirements of the ***UFGS-32 11 23 AGGREGATE BASE COURSE***. The gradation should conform to the requirements of TXDOT, Std Spec, Item 247, for Type "A", Grade 1 Material.

(d) Raw Subgrade. Material should conform to the requirements of ***UFGS-31 00 00 EARTHWORK***.

(e) Portland Cement Concrete. The material shall conform to the requirements of ***UFGS-32 13 11 CONCRETE PAVEMENT FOR AIRFIELDS AND OTHER HEAVY-DUTY PAVEMENT***. The maximum nominal size coarse aggregate shall be 1.5 inches, and the mixture shall be designed to attain a flexural strength of 650 psi at 28 days.

(f) Lime-Stabilized Subgrade. The material shall consist of a mixture of raw subgrade and hydrated lime. The application rate of lime should be 6 percent by dry

weight of the raw soil. Guide Specification ***UFGS-32 11 29 LIME-STABILIZED BASE COURSE, SUBBASE, OR SUBGRADE*** should be edited to include the above criteria.

(4) Vehicular Pavement Material Testing Requirements. Testing shall be the responsibility of the contractor to ensure that the subgrade, aggregate base course, hot-mix surface course, and Portland cement concrete are properly constructed. To this end, the following testing requirements shall be included in the contract specifications as a minimum:

- In-place density testing of the subgrade, aggregate base course, and lime-stabilized subgrade shall be performed, at a minimum, every 600 square yards per lift in accordance with ASTM D 1556 and ASTM D 6938. ASTM D 1556 shall be used as a check at least once per lift for each 3,000 square yards of completed subgrade, aggregate base course, and lime-stabilized subgrade.

- Before starting work, at least one sample of aggregate base course and lime-stabilized subgrade shall be tested in accordance with ASTM C 136. After the initial test, a minimum of one sieve analysis (ASTM C 136 and ASTM D 422) shall be performed for each 1,000 tons of aggregate base course and lime-stabilized subgrade placed, with a minimum of one analysis performed for each day's run until the course is completed. One liquid limit and plasticity index shall be performed for each sieve analysis per ASTM D 4318

- Wear tests shall be performed in accordance with ASTM C 131. A minimum of one test per aggregate base course material source shall be run.

- Thickness of the aggregate base course and lime-stabilized subgrade shall be measured for each 600 square yards of material placed. Compacted thickness of the aggregate base and lime-stabilized subgrade shall be as presented in this report and the completed section shall be within 3/8-inch of the thickness presented.

- Hot Bin gradations for the asphalt wearing course shall be tested in accordance with ASTM C 136 and ASTM C 117. A minimum of one test shall be conducted. Marshall specimens shall be taken in accordance with methods described in AI MS-2. At least two sets of specimens shall be taken. Asphalt extractions shall be performed in accordance with ASTM D 2172, Method A or B. At least one asphalt extraction shall be conducted. Field density tests shall be conducted in accordance with ASTM D 2950. One test shall be conducted for each 300 square yards of pavement placed. The mat density shall be 97.5 to 100.5 percent and the joint density shall be 95.5 to 100.5 percent of the density obtained from laboratory-compacted specimens. Thickness measurements shall be taken at a minimum of one measurement for each 1,000 square yards of pavement placed.

- The Job Mix Formula for the bituminous mixture shall be furnished to the Contracting Officer for approval. The formula will indicate the percentage of each stockpile and mineral filler, the percentage of each size aggregate, the percentage of bitumen, and the temperature of the completed mixture when

discharged from the mixer. The Contractor shall file with the Contracting Officer certified delivery tickets for all aggregates and bituminous materials actually used in construction. The finished mixture shall be designed using procedures contained in AI MS-2 and the criteria shown below.

Test Property	50 Blows
Stability (minimum), lbs	1,000
Flow (maximum), 1/100-inch	8-18
Air Voids, percent	3% to 5%
Percent Voids in mineral aggregate	14
TSR, minimum percent	75

- The contractor shall be responsible for the development of the mixture proportion study for cementitious materials and chemical admixtures. The concrete mix design shall include a statement giving the maximum nominal coarse aggregate size and the proportions of all ingredients that will be used in the manufacture of concrete at least 60 days prior to commencing concrete operations. Trial design batches, mixture proportioning studies, and testing requirements shall be the responsibility of the Contractor. Strength requirements shall be based on flexural strength. Trial mixtures having proportions, slumps, and air content suitable for the work shall be based on methodology described in ACI 211.1, modified as necessary to accommodate flexural strength. The maximum water-cementitious material ratio is 0.45. Coarse and fine aggregates shall have a satisfactory service record of at least 5 years successful service in three paving projects, or if a new source is used, shall meet the requirements when tested for resistance to freezing and thawing. Coarse and fine aggregates not having a satisfactory demonstrable service record shall have a durability factor of 50 when subjected to freezing and thawing in concrete in accordance with COE CRD-C 114 (Test Method for Soundness of Aggregates by Freezing and Thawing of Concrete Specimens).

- Smoothness measurements shall be taken in successive positions parallel to the pavement (flexible and rigid) centerline with a 12-foot straightedge. Measurements shall be taken perpendicular to the pavement (flexible and rigid) centerline at 15-foot intervals. Surface smoothness shall not exceed 3/8-inch.

W9126G26RA028-0002

References:

- TEAM Consultants, Incorporated Report No. 132050, 172066, and 172067
- TM 5-818-1 – Soils and Geology Procedures for Foundation Design of Buildings and Other Structures (Except Hydraulic Structures)
- TM 5-818-7 – Foundations in Expansive Soils
- CESWD-ED-TS/G Criteria Letter, dated 29 January 1988 – Design Criteria for Ribbed Mat Foundations (APPENDIX E)
- UFC 3-250-01 – Pavement Design for Roads, Streets, Walks, and Open Storage Areas
- UFC 3-250-18FA – General Provisions and Geometric Design For Roads, Streets, Walks, and Open Storage Areas
- Texas Department of Transportation - Standard Specifications For Construction of Highways, Streets and Bridges
- SWD-AEIM Architectural-Engineering Manual
- UFGS Guide Specifications For Construction

FORT WORTH DISTRICT
AUGUST 2017

(Revised NOVEMBER 2017)

(Amended November 2017 to provide recommendations for pavement structures included in the 15% design submittal received on 28 September 2017, exclude recommendations for the geotextile originally provided for the subdrainage system, exclude recommendations for the utility tunnel, and include sheet B102.)

(Further amended January 2018 to incorporate revisions to B102.)

(Further amended in June 2018 to incorporate recommended values for LPILE parameters.)

(Further amended in October 2018 to include recommendations for the utility tunnel and correction to sheet B201.)

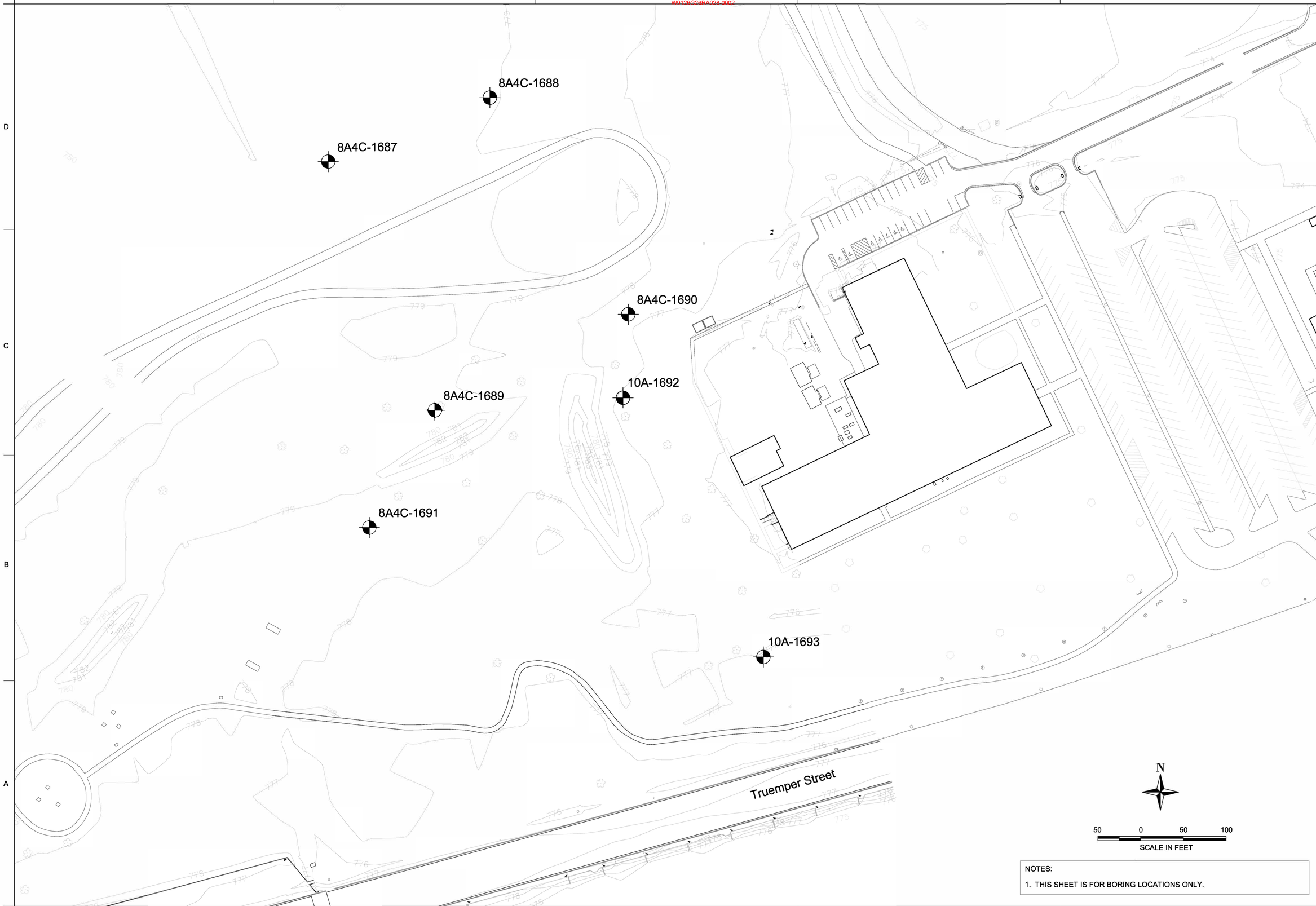
(The report was amended in August 2020 to incorporate revisions to B-102 and to include sheets B-103 and B-104.)

APPENDIX A

BORING LOCATIONS & LOGS OF BORINGS

W9126G26RA028-0002

\\swf-netapp2\common\ec\MILCON\Air Force\Lackland AFB\Airmen Training Complex\DCF4\CADD\k-DCF4-B101.dwg 8/3/2017



NOTES:

1. THIS SHEET IS FOR BORING LOCATIONS ONLY.

US ARMY CORPS OF ENGINEERS ®
FORT WORTH DISTRICT

Symbol	Description	Tracking No.	Action	Date

Designed by: C. BERRY
Drawn by: C. BERRY
Reviewed by: K. McCLESKEY
Submitted by: KENNETH McCLESKEY, P. G. CHIEF, DAM & LEVEE SAFETY

Date: AUG 2017
Rev: -
Solicitation No.: 888888888
Contract No.: -
File Name: 8A4C-B101.dwg
PLOT DATE: 03/AUG/2017
PLOT SCALE: 1:50

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION GEOTECHNICAL BRANCH

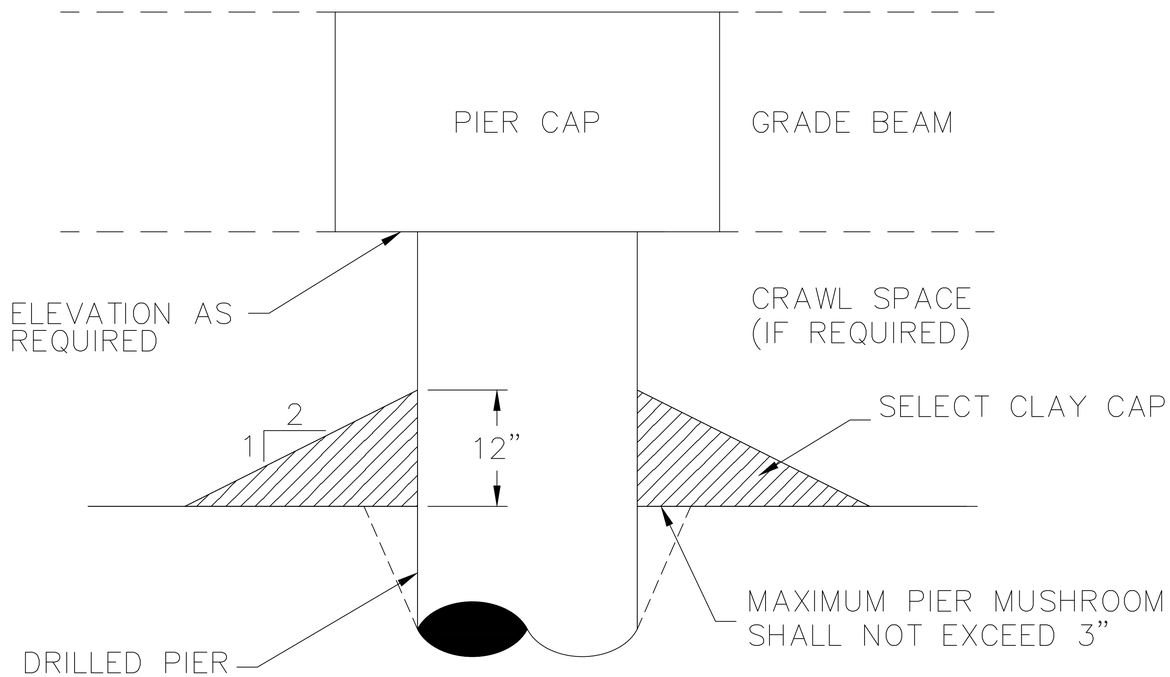
LACKLAND AIRFORCE BASE, TEXAS
FY18 DINING CLASSROOM FACILITY 4
PN: MPLS08373S4

BORING LOCATIONS - 1 OF 1

SHEET SEQUENCE NUMBER

B-101

\\swf-netapp2\common\ec\MILCON\Air Force\Lackland AFB\Airmen Training Complex\DCF4\CADD\lk-DCF4-B102.dwg 12 NOV 2018



CLAY CAP DETAILS

NOT TO SCALE

NOTE:
1. REFER TO THE GOVERNMENT GEOTECHNICAL REPORT FOR SELECT CLAY FILL MATERIAL DEFINITIONS AND REQUIREMENTS.

US ARMY CORPS OF ENGINEERS ®
FORT WORTH DISTRICT

Symbol	Description	Tracking No.	Action	Date

Date: 12 NOV 2018
Rev: -
Solicitation No.: 698888888
Contract No.: -
File Name: FWCF4-B102.dwg
PLOT DATE: 12NOV2018
PLOT SCALE: NTS

Designed by: C. BERRY
Drawn by: C. BERRY
Reviewed by: K. McCLESKEY
Submitted by: KENNETH McCLESKEY, P. G. CHIEF, DAM & LEVEE SAFETY

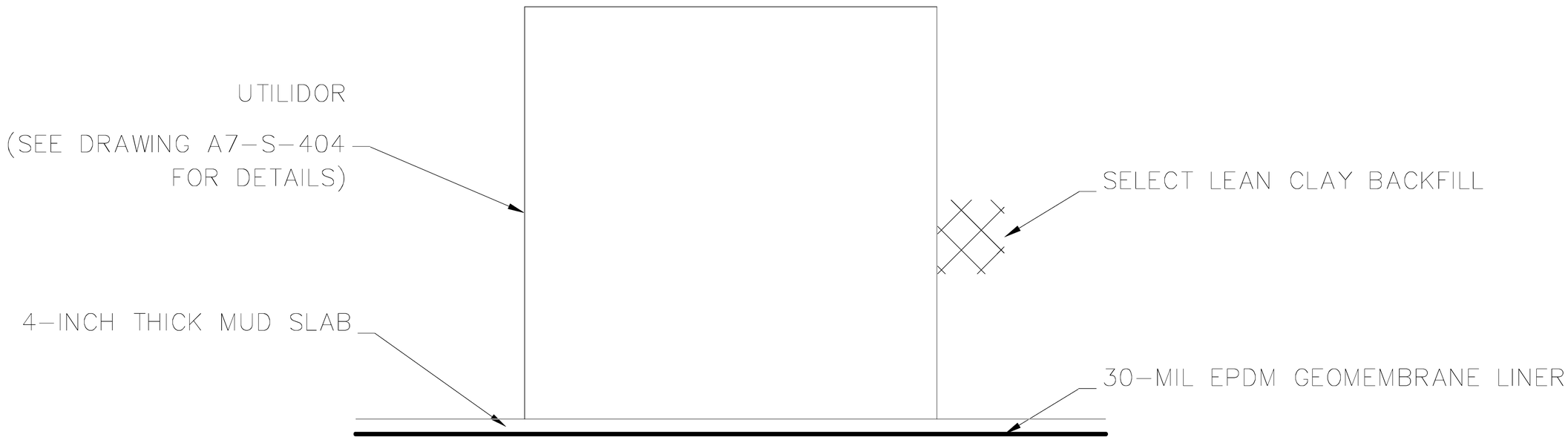
U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION GEOTECHNICAL BRANCH

LACKLAND AIRFORCE BASE, TEXAS
FY18 DINING CLASSROOM FACILITY 4
PN: MPLS083737S4

CLAY CAP DETAILS

SHEET SEQUENCE NUMBER
B-102



UTILIDOR FOUNDATION DETAILS

NOT TO SCALE

NOTES:

1. SELECT LEAN CLAY FILL SHALL BE PLACED IN CONTROLLED LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS AND COMPACTED TO AT LEAST 90 PERCENT OF LABORATORY MAXIMUM DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D 1557.

2. REFER TO THE GOVERNMENT GEOTECHNICAL REPORT FOR NONEXPANSIVE FILL, SELECT FILL, AND SELECT CLAY FILL MATERIAL DEFINITIONS AND REQUIREMENTS, AND FOR COMPLETE FILL AND SUBGRADE PREPARATION MINIMUM REQUIREMENTS.

3. THE LOGS OF BORINGS (SHEETS B-201 AND B-202) INDICATE THE YELLOW BROWN AND GRAY WEATHERED CLAY SHALE PRIMARY MAY BE PENETRATED BY THE UTILIDOR EXCAVATION. THE ESTIMATED CONTACT DEPTH WITH THE CLAY SHALE PRIMARY ALONG THIS ALIGNMENT IS ANTICIPATED TO OCCUR AT AN APPROXIMATE DEPTH OF BETWEEN 8 AND 14 FEET BELOW EXISTING (PRE-CONSTRUCTION) SURFACE GRADE. ONCE EXCAVATION OPERATIONS HAVE BEGUN, IT IS CRITICALLY IMPORTANT THAT WATER THAT ENTERS THE EXCAVATION SHALL BE REMOVED BY PUMPS, DITCHES, OR ANY OTHER SUITABLE METHODS. THE BOTTOM OF THE EXCAVATION SHALL BE SHAPED TO DRAIN TO A SUMP WHERE WATER CAN BE CONTINUALLY REMOVED THROUGHOUT CONSTRUCTION. EXCAVATION OF THE FINAL 2 FEET OF MATERIAL SHOULD NOT BE PERFORMED DURING INCLEMENT WEATHER.

US ARMY CORPS OF ENGINEERS ®
FORT WORTH DISTRICT

Symbol	Description	Tracking No.	Action	Date

Date: 04 OCT 2018
Rev: -
Solicitation No.: 888888888
Contract No.: -
File Name: fk-ATC7-B103.dwg
Date Plotted: 04-OCT-2018
PLOT SCALE: NTS

Designed by: C. BERRY
Drawn by: C. BERRY
Reviewed by: K. McCLESKEY
Submitted by: FAISAL AHMED, P. E. CHIEF, GEOT. ENG. & DES. SEC.

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION GEOTECHNICAL BRANCH

LACKLAND AIRFORCE BASE, TEXAS
FY18 DINING CLASSROOM FACILITY 4
PN MPLS083737S4

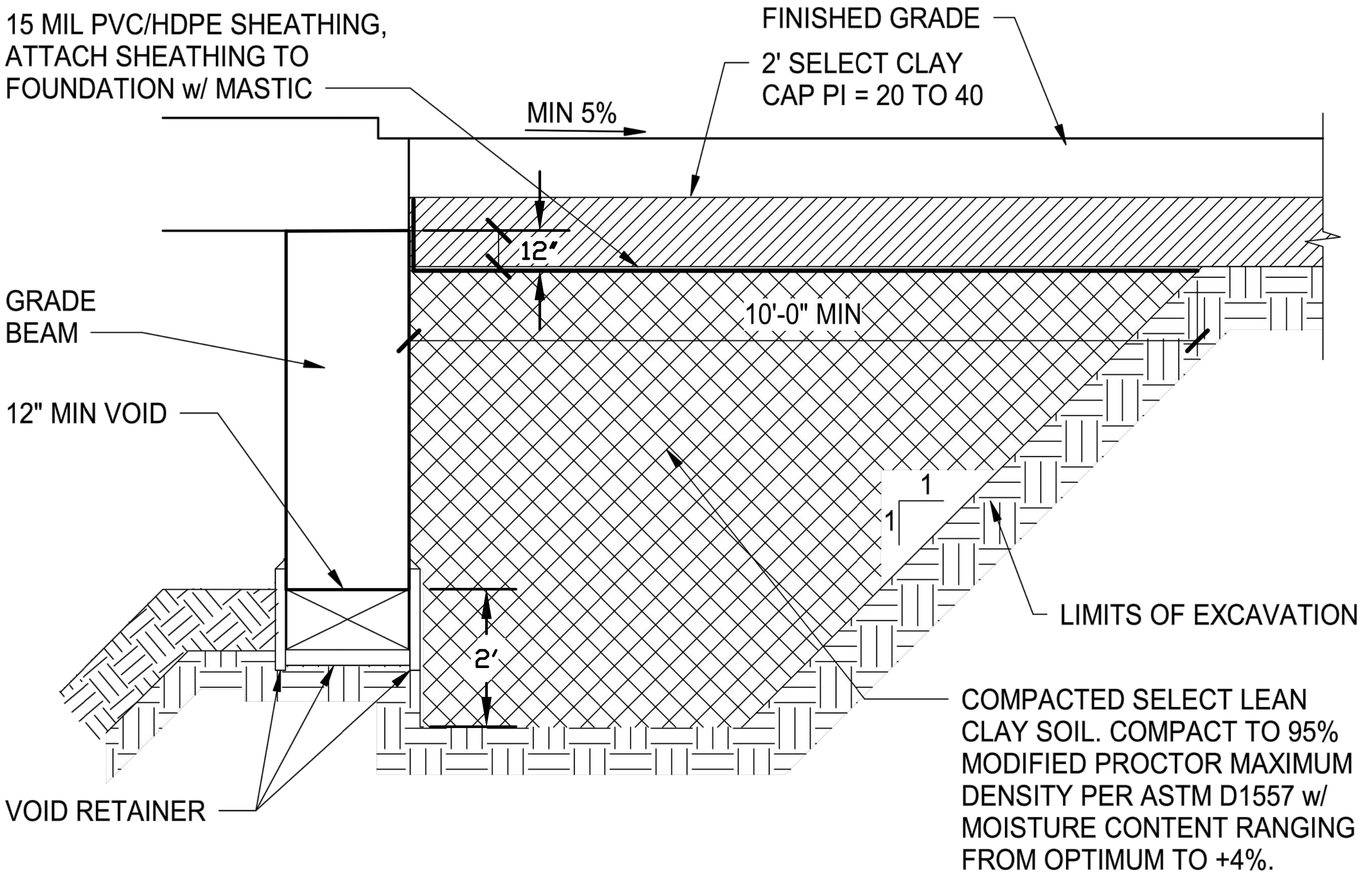
UTILIDOR FOUNDATION DETAILS

SHEET SEQUENCE NUMBER
B-103

\\swf-netapp2\common\ec\MILCON\Air Force\Lackland AFB\Airmen Training Complex\Dorm 7\CADD\lk-ATC7-B103.dwg 04 OCT 2018

NOTES:

1. SELECT FILL SHALL BE PLACED IN CONTROLLED LIFTS NOT EXCEDDING 8 INCHES IN LOOSE THICKNESS AND COMPACTED TO AT LEAST 95 PERCENT OF LABORATORY MAXIMUM DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D 1557.
2. REFER TO THE GEOTECHNICAL REPORT FOR SELECT FILL, AND CLAY FILL MATERIAL DEFINITIONS AND REQUIREMENTS, AND FOR COMPLETE FILL AND SUBGRADE PREPARATION MINIMUM REQUIREMENTS.



GRADE BEAM BACKFILL DETAIL

US ARMY CORPS OF ENGINEERS ®
FORT WORTH DISTRICT

Symbol	Description	Tracking No.	Action	Date

Designed by: FAISAL AHMED
Drawn by: DAVID CHOUNG
Reviewed by: FAISAL AHMED
Submitted by: KENNETH McCLESKEY, P. G. CHIEF, DAM & LEVEE SAFETY
Date: JULY 2020
Rev: -
Solicitation No.: 9999999999
Contract No.: -
File Name: Backfill101.dwg
PLOT DATE: 03AUG2017
PLOT SCALE: 1:50

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION GEOTECHNICAL BRANCH

LACKLAND AIRFORCE BASE, TEXAS
FY18 DINING CLASSROOM FACILITY 4
PN: MPLS983737S4

GRADE BEAM BACKFILL DETAIL

SHEET SEQUENCE NUMBER
B-104

\\swf-netapp2\common\ec\MILCON\Air Force\Lackland AFB\Airmen Training Complex\Dorm 7\CADD\k-ATC7-B101.dwg 8/3/2017

\\swf-netapp2\common\ect\MILCON\Air Force\Lackland AFB\Airmen Training Complex\DCF 4\lk-DCF4-B201.dwg 10/08/2018

Hole No. 8A4C–1687

DRILLING LOG | DIVISION SWD | INSTALLATION FORT WORTH DISTRICT | SHEET 1 OF 1 SHEETS

1. PROJECT: DINING CLASSROOM FACILITY, DFC–4
2. LOCATION (Coordinates or Station): LACKLAND AIRFORCE BASE (AFB), TEXAS
3. DRILLING AGENCY: USACE
4. HOLE NO. (As shown on drawing title and file number): 8A4C–1687
5. NAME OF DRILLER: BEAN
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 18.6'
8. DEPTH DRILLED INTO ROCK: 49.6'
9. TOTAL DEPTH OF HOLE: 68.2'
10. SIZE AND TYPE OF BIT: SEE REMARKS
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: GUS PECH 1300C
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5, UNDISTURBED 4
14. TOTAL NUMBER CORE CARTONS: 10
15. ELEVATION GROUND WATER: 8.6' AFTER 90MIN
16. DATE HOLE: STARTED 5 MAY 17, COMPLETED 6 MAY 17
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 98%
19. SIGNATURE OF INSPECTOR: JOEL WEBSTER

% MOISTURE CONTENT	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
		VISUAL	0.0' TO 18.6' CLAY 0.0' TO 4.0' – HIGH PLASTICITY, VERY STIFF TO STIFF, MOIST, VERY DARK GRAY, LITTLE FINE GRAINED SUBANGULAR GRAVEL, FEW ROOTLETS AND LINE NODULES TO 1/2", TRACE FINE GRAINED SAND POCKETS. 4.0' TO 8.0' – HIGH PLASTICITY, VERY STIFF, MOIST, VERY PALE BROWN, FEW TO TRACE SCATTERED SUBANGULAR GRAVEL. 8.0' TO 18.6' – LOW TO MEDIUM PLASTICITY, STIFF TO FIRM, VERY MOIST TO WET FROM 9.0' TO 10.5', VERY PALE BROWN AND WHITE, CALCAREOUS, TRACE SCATTERED SUBANGULAR GRAVEL AND SCATTERED THICK BEDS OF CALICHE.			BORING LOCATION N: 29.38530° W: 98.63330° DRILLING 2.0' TO 4.0', 12.0' TO 13.5', 24.0' TO 26.0', AND 32.0' TO 34.0' – PUSHED 3" SHELBY TUBE. 4.0' TO 34.5' – 8" HSA X 4–1/4" INNER DIAMETER. PULL AUGERS AND DRIVE 6" METAL CASING TO 35.5'. SET MUD PAN. CLEAN OUT TO 36.0' WITH 6" ROLLER BIT. *WATER LEVEL AT 10.0' AFTER REFUSAL OF ST–2 + 10 MIN. WATER LEVEL AT 8.6' AFTER RETRIEVAL OF ST–4 + 90MIN. GROUT TO SURFACE. JAR SAMPLES A: 0.5' TO 2.0' B: 4.0' TO 8.0' C: 8.0' TO 12.0' D: 14.0' TO 18.6' E: 18.6' TO 20.0' SHELBY TUBE SAMPLES ST–1: 2.0' TO 4.0', 425PSI/71SEC ST–2: 12.0' TO 13.5', NOT RECORDED ST–3: 24.0' TO 26.0', 500PSI/16SEC ST–4: 32.0' TO 34.0', 500PSI/14SEC CARTON SAMPLES C–1: 36.5' TO 37.3' C–2: 42.1' TO 43.0' C–3: 45.2' TO 46.1' C–4: 50.4' TO 51.3' C–5: 54.4' TO 55.3' C–6: 57.5' TO 58.4' C–7: 62.8' TO 63.7' C–8: 66.7' TO 67.6'
	10				A	
					ST–1	
					B	
	20				C	
					ST–2	
					D	
					E	
	30				ST–3	
					ST–4	
	40					
				36'–40' NO LOSS	C–1	
				42'–44' LOST 0.7'	C–2	
	50			44'–48' NO LOSS	C–3	
				48'–52' NO LOSS	C–4	
				52'–56' GAIN 0.7'	C–5	
				56'–60' LOST 0.8'	C–6	
	60			60'–64' GAIN 0.8'	C–7	
27.8				64'–68.2' LOST 0.8'	C–8	
25.3	70					
	80					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT DCF–4, LACKLAND AFB | HOLE NO. 8A4C–1687

Hole No. 8A4C–1688

DRILLING LOG | DIVISION SWD | INSTALLATION FORT WORTH DISTRICT | SHEET 1 OF 1 SHEETS

1. PROJECT: DINING CLASSROOM FACILITY, DFC–4
2. LOCATION (Coordinates or Station): LACKLAND AIRFORCE BASE (AFB), TEXAS
3. DRILLING AGENCY: USACE
4. HOLE NO. (As shown on drawing title and file number): 8A4C–1688
5. NAME OF DRILLER: SPENCER
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 11.2'
8. DEPTH DRILLED INTO ROCK: 69.4'
9. TOTAL DEPTH OF HOLE: 80.6'
10. SIZE AND TYPE OF BIT: SEE REMARKS
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: GUS PECH 1300C
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3, UNDISTURBED 4
14. TOTAL NUMBER CORE CARTONS: 9
15. ELEVATION GROUND WATER: SEE REMARKS
16. DATE HOLE: STARTED 27 APR 17, COMPLETED 3 MAY 17
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 73%
19. SIGNATURE OF INSPECTOR: JOEL WEBSTER

% MOISTURE CONTENT	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
			0.0' TO 5.0' CLAY – HIGH PLASTICITY, HARD TO VERY STIFF, MOIST, BLACK TO VERY DARK GRAY, FEW LIME NODULES TO 1/8", TRACE ROOTLETS AND SUBANGULAR TO SUBROUNDED GRAVEL.. 5.0' TO 11.2' GRAVEL – COARSE TO FINE GRAINED WITH COBBLES TO 4", LIMESTONE AND CHERT, ANGULAR TO SUBROUNDED AND VERY SANDY TO 6", MEDIUM DENSE, MOIST, VERY PALE BROWN AND WHITE, LIMY, SUBROUNDED TO SUBANGULAR WITH SOME CALICHE AND CALCAREOUS CLAY AFTER 6.0'. 11.2' TO 79.7' SHALE 11.2' TO 21.0' – HIGHLY WEATHERED LIGHT BROWNISH GRAY WITH YELLOWISH BROWN STAINING, SOFT (RX), MASSIVE BEDDED, HIGHLY FRACTURED, SLIGHTLY BLOCKY, LITTLE SILT, FEW TO LITTLE MgO STAINING, HARD (RX) LIMONITE SEAM FROM 16.7' TO 17.0'. 21.0' TO 36.7' – AS ABOVE, BROWNISH GRAY, GREENISH GRAY, WITH YELLOWISH BROWN STAINING, SOFT TO MODERATELY HARD (RX), HIGHLY FRACTURED WITH HIGH AND LOW ANGLE, VERTICAL AND HORIZONTAL FRACTURES, SOME WELL HEALED AND OPEN – TYPICALLY FILLED WITH Fe/MgO STAINING/DEPOSITS. 36.7' TO 61.2' – AS ABOVE, DARK GRAYISH BROWN TO GRAYISH BROWN WITH FEW TO LITTLE YELLOWISH BROWN AND BLACK STAINING, MODERATELY HARD (RX), GYPSIFEROUS, MODERATELY FRACTURED AFTER 44', HARD (RX), LIMONITIC SEAM FROM 54.8' TO 55.0', SOME DARK GRAY AFTER 55.4'. 61.2' TO 79.7' – UNWEATHERED VERY DARK GRAY TO BLACK, MODERATELY HARD (RX), MASSIVE BEDDED, MODERATELY TO SLIGHTLY FRACTURED, SLIGHTLY BLOCKY, FEW TO LITTLE SILT, TRACE OLIVE BROWN STAINING AT HORIZONTAL FRACTURES TO 66.0'; VERY HARD (RX) NODULE WITH 5" DIAMETER FROM 71.6' TO 71.9', WEATHERED YELLOWISH BROWN LAYER FROM 75.3' TO 76.5', HIGH ANGLE FRACTURE FROM 77.0' TO 77.8'. NOTE: CORE HOLE WALL COLLAPSING INTO HOLE FROM 62.0' TO 32.0' DURING CORING ACTIVITIES. BOREHOLE WAS CASED TO 32.0'. SRT = 191.5 X 2.5' X 0.1(MULTI) X 0.5(ZERO) = 23.94 OHMS–CM			BORING LOCATION N: 29.38550° W: 98.63270° DRILLING 0.0' TO 2.0' – SPLIT BARREL SAMPLER. 2.0' TO 4.0' – 3" SHELBY TUBE 4.0' TO 30.0' – 8" HSA + INNER BARREL SAMPLER. 12.0' TO 14.0', 20.0' TO 22.0', 28.0' TO 30.0' – PUSH 3" SHELBY TUBES IN HIGHLY FRACTURED SHALE. PULL AUGERS AND DRIVE 6" METAL CASING TO 30.5' SET MUD PAN. CLEANOUT TO 32.0' WITH 6" ROLLER BIT. 32.0' TO 80.6' – 4" GATOR BIT. LOST ~ 25 GAL WATER AT 39.7', SHALE STUCK IN CORE BARREL – DIG OUT AND CLEAN OUT HOLE WITH 6" ROLLER BIT. DRILL OUT TO 50.0' AFTER 46.0' TO 49.5' CORE RUN. CORE RUNS NOT YELDING ANY OR NOT MUCH SAMPLE, MATERIAL COLLAPSING INTO HOLE UPON CORE BARREL RETRIEVAL AFTER RUNS. DRILLER USED LOW PRESSURE AND SLOW REVOLUTIONS ON 54.0' TO 58.0' RUN, ~3' MATERIAL STUCK N BARREL, DIG OUT. BAILED TO 44.0', PULL UP CASING 3', WITH HOLE OPEN TO 48'. NO CHANGE AFTER 24 HOURS. JAR SAMPLES A: 0.0' TO 5.0' B: 6.0' TO 8.0' C: 8.0' TO 11.2' SHELBY TUBE SAMPLES ST–1: 2.0' TO 4.0', 500PSI/39SEC ST–2: 12.0' TO 14.0' 500PSI/14SEC ST–3: 20.0' TO 22.0' 500PSI/22SEC ST–4: 28.0' TO 30.0' CARTON SAMPLES C–1: 41.0' TO 41.7' C–2: 42.2' TO 43.1' C–3: 43.1' TO 44.0' C–4: 61.4' TO 62.3' C–5: 62.7' TO 63.6' C–6: 66.2' TO 67.0' C–7: 69.1' TO 70.0' C–8: 74.1' TO 75.0' C–9: 78.6' TO 79.5' GROUT TO SURFACE
	10				A	
					B	
					C	
	20				ST–2	
					ST–3	
	30				ST–4	
	40			32'–36' LOST 4.0'		
				36'–40' NO LOSS	C–1	
				42'–44' LOST 1.6'	C–2	
28.7					C–3	
	50			44'–46' LOST 1.5'		
				46'–49.5' GAIN 1.5'		
				50'–54' LOST 3.5'		
				54'–58' LOST 1.2'		
	60			58'–62' LOST 4.0'		
26.8					C–4	
26.2				62'–65.6' GAIN 1.0'	C–5	
25.0				65.6'–69.6' LOST 2.3'	C–6	
	70			69.6'–72.6' GAIN 2.0'	C–7	
				72.6'–76.6' NO LOSS	C–8	
24.3				76.6'–80.6' GAIN 0.3'		
	80					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT DCF–4, LACKLAND AFB | HOLE NO. 8A4C–1688

Hole No. 8A4C–1689

DRILLING LOG | DIVISION SWD | INSTALLATION FORT WORTH DISTRICT | SHEET 1 OF 1 SHEETS

1. PROJECT: DINING CLASSROOM FACILITY, DFC–4
2. LOCATION (Coordinates or Station): LACKLAND AIRFORCE BASE (AFB), TEXAS
3. DRILLING AGENCY: USACE
4. HOLE NO. (As shown on drawing title and file number): 8A4C–1689
5. NAME OF DRILLER: BEAN
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 18.5'
8. DEPTH DRILLED INTO ROCK: 49.5'
9. TOTAL DEPTH OF HOLE: 68.0'
10. SIZE AND TYPE OF BIT: SEE REMARKS
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: GUS PECH 1300C
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4, UNDISTURBED 4
14. TOTAL NUMBER CORE CARTONS:
15. ELEVATION GROUND WATER: 8.7' AFTER 24 HRS
16. DATE HOLE: STARTED 10 MAY 17, COMPLETED 16 MAY 17
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 99%
19. SIGNATURE OF INSPECTOR: JOEL WEBSTER

% MOISTURE CONTENT	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
			0.0' TO 11.3' CLAY 0.0' TO 5.2' – HIGH PLASTICITY, VERY STIFF TO STIFF, MOIST, BLACK TO VERY DARK GRAY, FEW TO LITTLE LIME NODULES TO 1/4", TRACE ROOTLETS AND FINE GRAINED, SUBANGULAR GRAVEL. 5.2' TO 11.3' – HIGH TO MEDIUM PLASTICITY, STIFF, VERY MOIST FROM 10.0' TO 11.3', VERY PALE BROWN AND WHITE CALCAREOUS, SOME CALICHE, TRACE BLACK GRAVEL, VERY GRAVELLY FROM 9.5' TO 10.0'. 11.3' TO 18.5' GRAVEL – COARSE TO FINE GRIANED SUBROUNDED TO SUBANGULAR, WITH COBBLES TO 6", DENSE TO VERY DENSE, MOIST, VERY PALE BROWN, WHITE, AND BROWNISH YELLOW, LIMY, SANDY, LITTLE TO SOME CALICHE AND CALCAREOUS CLAY, LIMONITIC SEAM FROM 15.8' TO 16.0'. 18.5' TO 68.0' SHALE 18.5' TO 39.3' – HIGHLY WEATHERED, LIGHT BROWNISH GRAY AND BROWNISH YELLOW, SOFT (RX), MASSIVE BEDDED, HIGHLY FRACTURED WITH HIGH AND LOW ANGLE, HORIZONTAL AND VERTICAL FRACTURES – SOME FILLED WITH Fe/MgO STAINING/THIN DEPOSITS, SLIGHTLY BLOCKY, LITTLE SILT, FRACTURES ARE OPEN TO WELL HEALED, HARD (RX) LIMONITIC DEPOSITS < 0.2' THICK AT 20.0', 24.0', 28.0' AND 36.5'. 39.3' TO 56.8' – WEATHERED BROWNISH GRAY TO DARK BROWNISH GRAY, MODERATELY HARD (RX), MODERATELY FRACTURED WITH HORIZONTAL FRACTURES FILLED WITH YELLOWISH BROWN FeO STAINING/DEPOSITS, MASSIVE BEDDED, SLIGHTLY BLOCKY, LITTLE SILT, TRACE GYPSUM, GYPSUM – FILLED FRACTURE ~0.1' THICK AT 56.5'. 56.8' TO 68.0' – UNWEATHERED VERY DARK GRAY TO BLACK, MODERATELY HARD (RX), MODERATELY FRACTURED AS ABOVE TO 60.2', MASSIVE BEDDED, SLIGHTLY BLOCKY, LITTLE SILT.			BORING LOCATION N: 29.38450° W: 98.63290° DRILLING 0.0' TO 4.0' – 3" OR 2" SPT SAMPLER. 4.0' TO 34.5' – 8" X 4–1/4" HSA + INNER BARREL SAMPLER. 2.0' TO 4.0', 8.0' TO 10.0', 26.0' TO 28.0', AND 30.0' TO 32.0' – 3" SHELBY TUBE PUSHES. REFUSAL AT 13.5' DURING 12.0' TO 16.0' RUN, USED CENTER BIT TO DRILL TO 16.0' WITH NO RECOVERY FROM 13.5' TO 16.0'. INNER BARREL SAMPLER BLOCKED OFF IN SHOE AT ~18.0' WITH NO RECOVERY FROM 18.0' TO 20.0'. PULL AUGERS AND DRIVE 6" METAL CASING TO 35.5'. SET MUD PAN AND CLEANOUT TO 36.0' WITH 6" ROLLER BIT. 36.0' TO 68.0' – 4" GATOR BIT. BAIL DRY. GROUT TO SURFACE JAR SAMPLES A: 0.5' TO 5.2' B: 5.2' TO 8.0' C: 10.0' TO 11.3' D: 20.0' TO 24.0' SHELBY TUBE SAMPLES ST–1: 2.0' TO 4.0' ST–2: 8.0' TO 10.0' ST–3: 26.0' TO 28.0' ST–4: 30.0' TO 32.0' CARTON SAMPLES C–1: 38.6' TO 39.5' C–2: 45.1' TO 46.0' C–3: 49.1' TO 50.0' C–4: 55.1' TO 56.0' C–5: 60.6' TO 61.5' C–6: 65.0' TO 65.9'
28.7	10				A	
					ST–1	
					B	
					ST–2	
14.0					C	
	20					
					D	
					ST–3	
	30				ST–4	
	40			36'–40' LOST 0.5'		
				42'–44' LOST 0.9'	C–1	
				44'–48' LOST 0.7'	C–2	
	50			48'–52' NO LOSS	C–3	
				52'–56' NO LOSS		
				56'–60' LOST 0.4'	C–4	
	60			60'–64' NO LOSS	C–5	
26.9						
23.8				64'–68' NO LOSS	C–6	
	70					
	80					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT DCF–4, LACKLAND AFB | HOLE NO. 8A4C–1689

Hole No. 8A4C–1690

DRILLING LOG | DIVISION SWD | INSTALLATION FORT WORTH DISTRICT | SHEET 1 OF 1 SHEETS

1. PROJECT: DINING CLASSROOM FACILITY, DFC–4
2. LOCATION (Coordinates or Station): LACKLAND AIRFORCE BASE (AFB), TEXAS
3. DRILLING AGENCY: USACE
4. HOLE NO. (As shown on drawing title and file number): 8A4C–1690
5. NAME OF DRILLER: SPENVER
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: ~14.0'
8. DEPTH DRILLED INTO ROCK: ~56.2'
9. TOTAL DEPTH OF HOLE: 70.2'
10. SIZE AND TYPE OF BIT: SEE REMARKS
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: GUS PECH 1300 C
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4, UNDISTURBED 0
14. TOTAL NUMBER CORE CARTONS: N/A
15. ELEVATION GROUND WATER: SEE REMARKS
16. DATE HOLE: STARTED 18 APR 17, COMPLETED 19 APR 17
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 100%
19. SIGNATURE OF INSPECTOR: JOEL WEBSTER

% MOISTURE CONTENT	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY (%)	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
			0.0' TO 4.0' CLAY – HIGH PLASTICITY, VERY STIFF TO STIFF, MOIST, BLACK TO VERY DARK GRAY, SLIGHTLY SILTY, FEW LIME NODULES TO 1/8" AND DEPOSITS, TRACE ROOTLETS. 4.0' TO 14.0' GRAVEL AND CALICHE – COARSE TO FINE GRAINED WITH COBBLES TO 5.5", SUBROUNDED TO ROUNDED, CHERT AND LIMESTONE, MEDIUM DENSE TO DENSE, DRY, WHITE AND VERY PALE BROWN, LIMY, LITTLE CLAY AND SILT, TRACE Fe/MgO DEPOSITS/STAINING. 14.0' TO 70.2' SHALE 14.0' TO 39.1' – WEATHERED LIGHT GRAY AND YELLOWISH BROWN, SOFT (RX), HIGHLY FRACTURED, MASSIVE BEDDED, VERY HARD (RX) TO HARD (RX) LIMONITE SEAMS FROM 22.2' TO 22.4' AND 24.0' TO 24.4', BECOMING LIGHT BROWNISH GRAY WITH YELLOWISH BROWN STAINING, TRACE TO FEW BLACK STAINING, SCATTERED HORIZONTAL AND HIGH ANGLE GYPSUM–FILLED FRACTURES AFTER 34.6'. 39.1' TO 57.8' – WEATHERED OLIVE BROWN AND LIGHT OLIVE BROWN, MODERATELY HARD (RX), MASSIVE BEDDED, MODERATELY FRACTURED, SCATTERED FINE GRAINED LIGHT GRAY SAND LENSES <1/16" THICK, TYPICALLY BOUNDED BY LIMONITIC Fe/MgO STAINING/DEPOSITS, SOME MgO/FeO DEPOSIT/STAINING–FILLED FRACTURES, VERY HARD 9RX) LIMONITE SEAM FROM 56.1' TO 56.2'. 57.8' TO 70.2' – UNWEATHERED VERY DARK GRAY, MODERATELY HARD (RX), MASSIVE BEDDED, SLIGHTLY FRACTURED, FRACTURES HAVE LIMONITIC DEPOSITS <1/8" THICK, SCATTERED WEATHERED LAYERS TO 62.8'.			BORING LOCATION A N: 29.38480° W: 98.63220° DRILLING 0.0' TO 4.0' – SPLIT BARREL SAMPLER. 4.0' TO 16.0' – 8"X4–1/4" HSA + INNER BARREL SAMPLER (IBS). IBS SLEEVE BLOCKED OFF AT 10.5' DUE TO COBBLES, CLEANOUT TO 12.0'. IBS BLOCKED OFF FROM 12.0' TO 14.0'. DRILLER HIT SOFTER/SMOOTHER MATERIAL AFTER ~14.0'. GRAVELS MIXED IN WITH SHALE ON 12.0' TO 16.0' IBS RUN. SHALE POSSIBLY "REWORKED" FROM 14.0' TO 16.0'. 16.0' TO 18.0' – 2" SPT SAMPLER WITH 4–6–9–11 BLOW COUNT. CLEANOUT WITH IBS TO 18.0' – RECOVED COBBLE >5". PULL AUGERS. 18.0' TO 20.0' – SET 6" METAL CASING TO 19.5', CLEANOUT TO 20.0' WITH 6" ROLLER BIT. LOST >25GAL WATER DURING 22.4' TO 26.4' RUN, WALL CAVING, DRIVE 10.0' OF 6" METAL CASING TO 29.5' CLEANOUT WITH 6" ROLLER BIT TO 30.8'. JAR SAMPLES A: 0.0' TO 4.0' B: 4.0' TO 8.0' C: 8.0' TO 10.5' D: 14.0' TO 18.0' CARTON SAMPLES C–1: 23.1' TO 24.0' C–2: 32.3' TO 33.2' C–3: 37.0' TO 37.9' C–4: 40.7' TO 41.6' C–5: 45.7' TO 46.4' C–6: 50.3' TO 51.2' C–7: 57.1' TO 58.0' C–8: 60.6' TO 61.5' C–9: 65.9' TO 66.8' C–10: 69.1' TO 70.0'
	10				A	
					B	
					C	
	20			20'–22.4' NO LOSS		
				22.4'–27.5' NO LOSS	C–1	
				27.5'–33.8' LOSS 0.3'		
	30			33.8'–38' NO LOSS	C–2	
				38'–42' NO LOSS	C–3	
	40			42'–46.5' NO LOSS	C–4	
				46.5'–50.5' NO LOSS	C–5	
	50			50.5'–54' NO LOSS	C–6	
				54'–58' NO LOSS		
				58'–62.5' NO LOSS	C–7	
	60				C–8	
25.3				62.5'–67.2' NO LOSS		
					C–9	
	70			67.2'–70.2' NO LOSS	C–10	
25.2						
	80					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. | PROJECT DCF–4, LACKLAND AFB | HOLE NO. 8A4C–1690

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

US ARMY CORPS OF ENGINEERS ®
FORT WORTH DISTRICT

Symbol	Description	Tracking No.	Action	Date

Date: SEPTEMBER 2018 | Rev: -
Solicitation No.: 888888888
Contract No.: -
File Name: 1836logs.dwg PLOT DATE: 08/08/2018 PLOT SCALE: 1:5

Designed by: K. McCLESKEY
Drawn by: C. BERRY
Reviewed by: K. McCLESKEY
Submitted by: KENNETH McCLESKEY, P. G. CHIEF, DAM & LEVEE SAFETY

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION GEOTECHNICAL BRANCH

LACKLAND AIRFORCE BASE, TEXAS
FY18 DINING CLASSROOM FACILITY 4
PN: MPLS08373734

LOGS OF BORINGS 1 OF 2

SHEET SEQUENCE NUMBER
B-201

W9126G26RA028-0002

Hole No. 10A-1691

DRILLING LOG	DIVISION SWD	INSTALLATION FORT_WORTH_DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT: DINING CLASSROOM FACILITY, DFC-4		10. SIZE AND TYPE OF BIT: 2" SPT SPLIT BARREL SAMPLER	
2. LOCATION (Coordinates or Station): LACKLAND AIRFORCE BASE (AFB), TEXAS		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USACE		12. MANUFACTURER'S DESIGNATION OF DRILL: GUS PECH 1300C	
4. HOLE NO. (As shown on drawing title and file number): 10A-1691		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0	
5. NAME OF DRILLER: BEAN		14. TOTAL NUMBER CORE CARTONS: N/A	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER: DRY	
		16. DATE HOLE: STARTED 6 APR 17; COMPLETED 6 APR 17	
7. THICKNESS OF OVERBURDEN: ---		17. ELEVATION TOP OF HOLE: ---	
8. DEPTH DRILLED INTO ROCK: ---		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
9. TOTAL DEPTH OF HOLE: 10'		19. SIGNATURE OF INSPECTOR: JOEL WEBSTER	

% MOISTURE CONTENT (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
29.0			0.0' TO 8.0' CLAY 0.0' TO 4.7' – HIGH PLASTICITY, VERY STIFF, MOIST, BLACK, BECOMING GRAY WITH DEPTH, SLIGHTLY SILTY, FEW TO LITTLE LIME NODULES TO 1/2", TRACE ROOTLETS AND SUBROUNDED FINE GRAINED GRAVEL.		A	BORING LOCATION N: 29.38412° W: 98.63314°
23.9			4.7' TO 8.0' – HIGH TO MEDIUM PLASTICITY, STIFF, MOIST, PALE BROWN, CALCAREOUS, GYPSIFEROUS, FEW TO LITTLE LIME NODULES TO 1/4".		B	SEE CONE TEST BACKFILLED TO SURFACE
12.5	10		8.0' TO 10.0' CALICHE AND GRAVEL – CHALKY SILT AND CLAY, STIFF, MOIST, PALE BROWN TO YELLOWISH BROWN AND WHITE, LIMY, SCATTERED GRAVELLY SEAMS.		C	JAR SAMPLES A: 0.0' TO 4.7' B: 4.7' TO 8.0' C: 8.0' TO 10.0'
	20					
	30					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT: DCF-4, LACKLAND AFB HOLE NO. 10A-1691

Hole No. 10A-1692

DRILLING LOG	DIVISION SWD	INSTALLATION FORT WORTH DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT: DINING CLASSROOM FACILITY, DFC-4		10. SIZE AND TYPE OF BIT: 2" SPT SPLIT BARREL SAMPLER	
2. LOCATION (Coordinates or Station): LACKLAND AIRFORCE BASE (AFB)		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USACE		12. MANUFACTURER'S DESIGNATION OF DRILL: GUS PECH 1300C	
4. HOLE NO. (As shown on drawing title and file number): 10A-1692		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0	
5. NAME OF DRILLER: BEAN		14. TOTAL NUMBER CORE CARTONS: N/A	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER: DRY	
		16. DATE HOLE: STARTED 6 APR 17; COMPLETED 6 APR 17	
7. THICKNESS OF OVERBURDEN: ---		17. ELEVATION TOP OF HOLE: ---	
8. DEPTH DRILLED INTO ROCK: ---		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
9. TOTAL DEPTH OF HOLE: 10.0'		19. SIGNATURE OF INSPECTOR: JOEL WEBSTER	

% MOISTURE CONTENT (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
35.4			0.0' TO 3.8' CLAY – HIGH PLASTICITY, VERY STIFF, MOIST, BLACK TO VERY DARK GRAY, SLIGHTLY SILTY, SOME TO LITTLE LIME NODULES TO 1/2", TRACE ROOTLETS.		A	BORING LOCATION N: 29.38454° W: 98.63222°
29.0			3.8' TO 5.8' CALICHE – WITH MEDIUM TO LOW PLASTICITY CLAY AND SILT, STIFF, MOIST, WHITE AND VERY PALE BROWN, HIGHLY GYPSIFEROUS, FEW TO LITTLE LIME NODULES TO 1/2".		B	SEE CONE TEST BACKFILLED TO SURFACE
37.9	10		5.8' TO 10.0' CALICHE AND GRAVEL – CALICHE AS ABOVE, FEW TO LITTLE YELLOWISH BROWN AND Fe/MgO DEPOSITS; GRAVEL – COARSE TO FINE GRAINED WITH COBBLES TO 5", MEDIUM DENSE TO DENSE, DRY, VERY PALE BROWN AND WHITE, LIMY. NOTE: CLASSIFICATION OF CLAY MATRIX (BINDER) SHOWN ON THE LEGEND.		C	JAR SAMPLES A: 0.0' TO 3.8' B: 3.8' TO 5.8' C: 5.8' TO 10.0' (BINDER ONLY)
	20					
	30					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT: DCF-4, LACKLAND AFB HOLE NO. 10A-1692

Hole No. 10A-1693

DRILLING LOG	DIVISION SWD	INSTALLATION FORT WORTH DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT: DINING CLASSROOM FACILITY, DFC-4		10. SIZE AND TYPE OF BIT: 2" SPT SPLIT BARREL SAMPLER	
2. LOCATION (Coordinates or Station): LACKLAND AIRFORCE BASE (AFB), TEXAS		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USACE		12. MANUFACTURER'S DESIGNATION OF DRILL: GP-1300 C	
4. HOLE NO. (As shown on drawing title and file number): 10A-1693		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0	
5. NAME OF DRILLER: BEAN		14. TOTAL NUMBER CORE CARTONS: N/A	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER: DRY	
		16. DATE HOLE: STARTED 06 APR 17; COMPLETED 06 APR 17	
7. THICKNESS OF OVERBURDEN: ---		17. ELEVATION TOP OF HOLE: ---	
8. DEPTH DRILLED INTO ROCK: ---		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
9. TOTAL DEPTH OF HOLE: 10'		19. SIGNATURE OF INSPECTOR: JOEL WEBSTER	

% MOISTURE CONTENT (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
25.8			0.0' TO 8.0' CLAY 0.0' TO 4.3' – HIGH PLASTICITY, HARD TO VERY STIFF, DRY, BLACK, FEW TO LITTLE LIME NODULES TO 1/2", TRACE ROOTLETS AND SUBROUNDED GRAVEL.		A	BORING LOCATION N: 29.38370° W: 98.63170°
26.5			4.3' TO 8.0' – MEDIUM PLASTICITY, VERY STIFF, MOIST, VERY PALE BROWN, LIMY, VERY GYPSIFEROUS, TRACE LIME NDOULES TO 1/2", TRACE BLACK MgO DEPOSITS.		B	SEE CONE TEST BACKFILLED TO SURFACE
12.7	10		8.0' TO 10.0' GRAVEL AND CALICHE – COARSE TO FINE GRAINED, WITH COBBLES TO 5.5", MEDIUM DENSE, DRY, WHITE AND VERY PALE BROWN, WITH CHALKY WHITE SILTY AND CLAYEY CALICHE.		C	JAR SAMPLES A: 0.0' TO 4.3' B: 4.3' TO 8.0' C: 8.0' TO 10.0'
	20					
	30					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT: DCF-4, LACKLAND AFB HOLE NO. 10A-1693

NOTES:

1. USE THIS SHEET FOR BORING LOGS ONLY.
2. MOISTURE CONTENT, WHERE SHOWN, IS EXPRESSED AS PERCENT DRY WEIGHT AT TIME OF LABORATORY CLASSIFICATION.
3. LEGEND SHOWS OVERBURDEN MATERIALS CLASSIFIED ACCORDING TO ASTM D 2487 AND ASTM D 2488.
4. DESCRIPTION OF OVERBURDEN MATERIALS CHANGED TO CORRESPOND WITH LABORATORY CLASSIFICATION AS NECESSARY.
5. ORIGINAL DRILLING LOGS AVAILABLE AT CORPS OF ENGINEERS OFFICES.

US ARMY CORPS OF ENGINEERS ®
FORT WORTH DISTRICT

Symbol	Description	Tracking No.	Action	Date

Designed by: K. McCLESKEY
Drawn by: C. BERRY
Reviewed by: K. McCLESKEY
Submitted by: KENNETH McCLESKEY, P. G. CHIEF, DAM & LEVEE SAFETY

Date: SEPTEMBER 2016
Rev: -
Solicitation No.: 0000000000
Contract No.: -
File Name: ACOE_FTWorth_Dam_Levee_Safety_Program_Rep2016
PLOT SCALE: 1:5

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

ENGINEERING/ CONSTRUCTION DIVISION GEOTECHNICAL BRANCH

LACKLAND AIRFORCE BASE, TEXAS
FY18 DINING CLASSROOM FACILITY 4
PN: MPLS083737S4

LOGS OF BORINGS 2 OF 2

SHEET SEQUENCE NUMBER

B-202

SECTION 33 71 02

UNDERGROUND ELECTRICAL DISTRIBUTION

AMENDMENT 0002

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO HB-17	(2002; Errata 2003; Errata 2005, 17th Edition) Standard Specifications for Highway Bridges

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 318M	(2014; ERTA 2015) Building Code Requirements for Structural Concrete & Commentary
ACI SP-66	(2004) ACI Detailing Manual

ASTM INTERNATIONAL (ASTM)

ASTM A48/A48M	(2003; R 2021) Standard Specification for Gray Iron Castings
ASTM B1	(2013) Standard Specification for Hard-Drawn Copper Wire
ASTM B3	(2013) Standard Specification for Soft or Annealed Copper Wire
ASTM B8	(2011; R 2017) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM C32	(2013; R 2017) Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C139	(2017) Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
ASTM C309	(2019) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C478	(2018) Standard Specification for Circular

	Precast Reinforced Concrete Manhole Sections
ASTM C857	(2016) Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
ASTM C990	(2009; R 2019) Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM F2160	(2022a) Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD)

CPS ENERGY

Standard Design Requirements	(2021) CPS Energy Standard Design Requirements

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 81	(2012) Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
IEEE C2	(2023) National Electrical Safety Code
IEEE Stds Dictionary	(2009) IEEE Standards Dictionary: Glossary of Terms & Definitions

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS	(2021) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C119.1	(2016) Electric Connectors - Sealed Insulated Underground Connector Systems Rated 600 Volts
NEMA RN 1	(2005; R 2013) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA TC 2	(2020) Standard for Electrical Polyvinyl Chloride (PVC) Conduit
NEMA TC 7	(2021) Smooth-Wall Coilable and Straight Electrical Polyethylene Conduit
NEMA TC 9	(2020) Standard for Fittings for Polyvinyl Chloride (PVC) Plastic Utilities Duct for Underground Installation

NEMA WC 70	(2021) Power Cable Rated 2000 Volts or Less for the Distribution of Electrical Energy

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023) National Electrical Code

SOCIETY OF CABLE TELECOMMUNICATIONS ENGINEERS (SCTE)

ANSI/SCTE 77	(2013) Specification for Underground Enclosure Integrity

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-758	(2012b) Customer-Owned Outside Plant Telecommunications Infrastructure Standard

U.S. DEPARTMENT OF AGRICULTURE (USDA)

RUS Bull 1751F-644	(2002) Underground Plant Construction

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-60005	(Basic; Notice 2) Frames, Covers, Gratings, Steps, Sump And Catch Basin, Manhole

UNDERWRITERS LABORATORIES (UL)

UL 6	(2022) UL Standard for Safety Electrical Rigid Metal Conduit-Steel
UL 44	(2018; Reprint May 2021) UL Standard for Safety Thermoset-Insulated Wires and Cables
UL 83	(2017; Reprint Mar 2020) UL Standard for Safety Thermoplastic-Insulated Wires and Cables
UL 94	(2013; Reprint Apr 2022) UL Standard for Safety Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
UL 467	(2022) UL Standard for Safety Grounding and Bonding Equipment
UL 486A-486B	(2018; Reprint May 2021) UL Standard for Safety Wire Connectors
UL 510	(2020) UL Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape
UL 514A	(2013; Reprint Jun 2022) UL Standard for Safety Metallic Outlet Boxes
UL 514B	(2012; Reprint May 2020) Conduit, Tubing

	and Cable Fittings
UL 651	(2011; Reprint May 2022) UL Standard for Safety Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL 854	(2020) Standard for Service-Entrance Cables
UL 1242	(2006; Reprint Apr 2022) UL Standard for Safety Electrical Intermediate Metal Conduit -- Steel

1.2 SYSTEM DESCRIPTION

Items provided under this section must be specifically suitable for the following service conditions. Seismic details must be as indicated.

a. Altitude 1,000 feet.

b. Ambient Temperature 98 degrees F.

c. Frequency 60 Hz.

1.3 RELATED REQUIREMENTS

Section 26 08 00 APPARATUS INSPECTION AND TESTING applies to this section, with the additions and modifications specified herein.

1.4 DEFINITIONS

a. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, are as defined in IEEE Stds Dictionary.

b. In the text of this section, the words conduit and duct are used interchangeably and have the same meaning.

c. In the text of this section, "medium voltage cable splices," and "medium voltage cable joints" are used interchangeably and have the same meaning.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Precast Underground Structures; G

SD-03 Product Data

Precast Concrete Structures; G

Sealing Material

Pulling-In Irons

Manhole Frames and Covers; G

Handhole Frames and Covers; G

Ductile Iron Frames and Covers for Fire Lanes and Roadways

Composite/Fiberglass Handholes; G

Cable Supports (racks, arms and insulators); G

SD-06 Test Reports

Field Acceptance Checks and Tests; G

Cable Installation Plan and Procedure for cabling <600 Volts; G

For cabling <600 Volts, six copies of the information described below in 8-1/2 by 11 inch binders having a minimum of three rings from which material may readily be removed and replaced, including a separate section for each cable pull. Separate sections by heavy plastic dividers with tabs, with all data sheets signed and dated by the person supervising the pull.

a. Site layout drawing with cable pulls numerically identified.

b. A list of equipment used, with calibration certifications. The manufacturer and quantity of lubricant used on pull.

c. The cable manufacturer and type of cable.

d. The dates of cable pulls, time of day, and ambient temperature.

e. The length of cable pull and calculated cable pulling tensions.

f. The actual cable pulling tensions encountered during pull.

SD-07 Certificates

Cable Installer Qualifications for cabling <600 Volts; G

Directional Boring Certificate of Conformance; G

1.6 QUALITY ASSURANCE

1.6.1 Precast Underground Structures

Submittal required for each type used. Provide calculations and drawings for precast manholes and handholes bearing the seal of a registered professional engineer including:

a. Material description (i.e., f'c and Fy).

b. Manufacturer's printed assembly and installation instructions.

c. Design calculations.

d. Reinforcing shop drawings in accordance with ACI SP-66.

e. Plans and elevations showing opening and pulling-in iron locations and details.

1.6.2 Cable Installer Qualifications

Provide at least one onsite person in a supervisory position with a documentable level of competency and experience to supervise all cable pulling operations. Provide a resume showing the cable installers' experience in the last three years, including a list of references complete with points of contact, addresses and telephone numbers. Cable installer must demonstrate experience with a minimum of three medium voltage cable installations. The Contracting Officer reserves the right to require additional proof of competency or to reject the individual and call for an alternate qualified cable installer.

1.6.3 Directional Boring Certificate of Conformance

Provide certification of compliance with the registered Professional Engineer's design requirements for each directional bore, including: HDPE conduit size and type, bend radius, elevation changes, vertical and horizontal path deviations, conductor size and type and any conductor derating due to depth of conduit. Record location and depth of all directional-bore installed HDPE conduits using Global Positioning System (GPS) recording means with "resource grade" accuracy.

1.6.4 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "must" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Equipment, materials, installation, and workmanship must be in accordance with the mandatory and advisory provisions of IEEE C2 and NFPA 70 unless more stringent requirements are specified or indicated.

1.6.5 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products must have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period must include applications of equipment and materials under similar circumstances and of similar size. The product must have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items must be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.6.5.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.6.5.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site are not acceptable, unless specified otherwise.

PART 2 PRODUCTS

2.1 CONDUIT, DUCTS, AND FITTINGS

2.1.1 Rigid Metal Conduit

UL 6.

2.1.1.1 Rigid Metallic Conduit, PVC Coated

NEMA RN 1, Type A40, except that hardness must be nominal 85 Shore A durometer, dielectric strength must be minimum 400 volts per mil at 60 Hz, and tensile strength must be minimum 3500 psi.

2.1.2 Intermediate Metal Conduit

UL 1242.

2.1.2.1 Intermediate Metal Conduit, PVC Coated

NEMA RN 1, Type A40, except that hardness must be nominal 85 Shore A durometer, dielectric strength must be minimum 400 volts per mil at 60 Hz, and tensile strength must be minimum 3500 psi.

2.1.3 Plastic Conduit for Direct Burial and Riser Applications

UL 651 and NEMA TC 2, EPC-40 or EPC-80 as indicated.

2.1.4 Plastic Duct for Concrete Encasement

Provide Type EPC-40 per UL 651 and NEMA TC 2, as indicated.

2.1.5 High Density Polyethylene (HDPE) Electrical Conduit for Directional Boring

Smoothwall, approved/listed for directional boring, minimum Schedule 80, ASTM F2160, NEMA TC 7.

2.1.6 Innerduct

Provide MaxCell fabric-mesh innerducts, with pullwire. Size as indicated.

2.1.7 Duct Sealant

UL 94, Class HBF. Provide high-expansion urethane foam duct sealant that expands and hardens to form a closed, chemically and water resistant, rigid structure. Sealant must be compatible with common cable and wire jackets and capable of adhering to metals, plastics and concrete. Sealant must be capable of curing in temperature ranges of 35 degrees F to 95 degrees F. Cured sealant must withstand temperature ranges of -20 degrees F to 200 degrees F without loss of function.

2.1.8 Fittings

2.1.8.1 Metal Fittings

UL 514B.

2.1.8.2 PVC Conduit Fittings

UL 514B, UL 651.

2.1.8.3 PVC Duct Fittings

NEMA TC 9.

2.1.8.4 Outlet Boxes for Steel Conduit

Outlet boxes for use with rigid or flexible steel conduit must be cast-metal cadmium or zinc-coated if of ferrous metal with gasketed closures and must conform to UL 514A.

2.2 LOW VOLTAGE INSULATED CONDUCTORS AND CABLES

Insulated conductors must be rated 600 volts and conform to the requirements of NFPA 70, including listing requirements, or in accordance with NEMA WC 70. Wires and cables manufactured more than 12 months prior to date of delivery to the site are not acceptable. Service entrance conductors must conform to UL 854, type USE.

2.2.1 Conductor Types

Cable and duct sizes indicated are for copper conductors and THHN/THWN unless otherwise noted. Conductors No. 10 AWG and smaller must be solid. Conductors No. 8 AWG and larger must be stranded. All conductors must be copper.

2.2.2 Conductor Material

Unless specified or indicated otherwise or required by NFPA 70, wires in conduit, other than service entrance, must be 600-volt, Type THWN/THHN conforming to UL 83 or RHW conforming to UL 44. Copper conductors must be annealed copper complying with ASTM B3 and ASTM B8.

2.2.3 Jackets

Provide multiconductor cables with an overall PVC outer jacket.

2.2.4 In Duct

Cables must be single-conductor cable.

2.2.5 Cable Marking

Insulated conductors must have the date of manufacture and other identification imprinted on the outer surface of each cable at regular intervals throughout the cable length.

Identify each cable by means of a fiber, laminated plastic, or non-ferrous metal tags in each manhole, handhole, junction box, and each terminal. Each tag must contain the following information; cable type, conductor

size, circuit number, circuit voltage, cable destination and phase identification.

Color code conductors. Provide conductor identification within each enclosure where a tap, splice, or termination is made. Conductor identification must be by color-coded insulated conductors, plastic-coated self-sticking printed markers, colored nylon cable ties and plates, heat shrink type sleeves,or colored electrical tape. Properly identify control circuit terminations. Color must be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutrals may be white with a different colored (not green) stripe for each. Color of ungrounded conductors in different voltage systems are as follows:

a. 208/120 volt, three-phase.

(1) Phase A - black
(2) Phase B - red
(3) Phase C - blue

b. 480/277 volt, three-phase.

(1) Phase A - brown
(2) Phase B - orange
(3) Phase C - yellow

2.3 LOW VOLTAGE WIRE CONNECTORS AND TERMINALS

Provide a uniform compression over the entire conductor contact surface. Use solderless terminal lugs on stranded conductors.

a. For use with copper conductors: UL 486A-486B.

2.4 LOW VOLTAGE SPLICES

Provide splices in conductors with a compression connector on the conductor and by insulating and waterproofing using one of the following methods which are suitable for continuous submersion in water and comply with ANSI C119.1.

2.4.1 Heat Shrinkable Splice

Provide heat shrinkable splice insulation by means of a thermoplastic adhesive sealant material applied in accordance with the manufacturer's written instructions.

2.4.2 Cold Shrink Rubber Splice

Provide a cold-shrink rubber splice which consists of EPDM rubber tube which has been factory stretched onto a spiraled core which is removed during splice installation. The installation must not require heat or flame, or any additional materials such as covering or adhesive. It must be designed for use with inline compression type connectors, or indoor, outdoor, direct-burial or submerged locations.

2.5 MEDIUM VOLTAGE CABLE

Cables provided and installed by CPS Energy.

2.6 MEDIUM VOLTAGE CABLE TERMINATIONS

CPS Energy shall provide all medium voltage cable terminations.**<AM#0002>**~~Final termination to existing CPS Energy overhead primary cabling (noted on drawings) shall be coordinated with CPS Energy. All other site terminations shall be by contractor. Cable terminations provided by CPS Energy.~~**</AM#0002>**

2.7 MEDIUM VOLTAGE CABLE JOINTS

CPS Energy shall provide all medium voltage cable joints.**<AM#0002>**~~Final termination to existing CPS Energy overhead primary cabling (noted on drawings) shall be coordinated with CPS Energy. All other site terminations shall be by contractor. Cable joints provided by CPS Energy.~~ **</AM#0002>**

2.8 TELECOMMUNICATIONS CABLING

Provide telecommunications cabling in accordance with Section 33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP).

2.9 TAPE

2.9.1 Insulating Tape

UL 510, plastic insulating tape, capable of performing in a continuous temperature environment of 80 degrees C.

2.9.2 Buried Warning and Identification Tape

Provide detectable tape in accordance with Section 31 00 00 EARTHWORK.

2.9.3 Fireproofing Tape

Provide tape composed of a flexible, conformable, unsupported intumescent elastomer. Tape must be not less than .030 inch thick, noncorrosive to cable sheath, self-extinguishing, noncombustible, adhesive-free, and must not deteriorate when subjected to oil, water, gases, salt water, sewage, and fungus.

2.10 PULL ROPE

Plastic or flat pull line (bull line) having a minimum tensile strength of 200 pounds.

2.11 GROUNDING AND BONDING

2.11.1 Driven Ground Rods

Provide copper-clad steel ground rods conforming to UL 467 not less than 3/4 inch in diameter by 10 feet in length. Sectional type rods may be used for rods 20 feet or longer.

2.11.2 Grounding Conductors

Stranded-bare copper conductors must conform to ASTM B8, Class B, soft-drawn unless otherwise indicated. Solid-bare copper conductors must conform to ASTM B1 for sizes No. 8 and smaller. Insulated conductors must be of the same material as phase conductors and green color-coded, except

that conductors must be rated no more than 600 volts. Aluminum is not acceptable.

2.12 CAST-IN-PLACE CONCRETE

Provide concrete in accordance with Section 03 30 00 CAST-IN-PLACE CONCRETE. In addition, provide concrete for encasement of underground ducts with 2000 psi minimum 28-day compressive strength. Concrete associated with electrical work for other than encasement of underground ducts must be 2500 psi minimum 28-day compressive strength unless specified otherwise.

2.13 UNDERGROUND STRUCTURES

Provide precast concrete underground structures or standard type cast-in-place manhole types as indicated, conforming to ASTM C857 and ASTM C478. Top, walls, and bottom must consist of reinforced concrete. Walls and bottom must be of monolithic concrete construction. Locate duct entrances and windows near the corners of structures to facilitate cable racking. Covers must fit the frames without undue play. Form steel and iron to shape and size with sharp lines and angles. Castings must be free from warp and blow holes that may impair strength or appearance. Exposed metal must have a smooth finish and sharp lines and arises. Provide necessary lugs, rabbets, and brackets. Set pulling-in irons and other built-in items in place before depositing concrete. Install a pulling-in iron in the wall opposite each duct line entrance. Cable racks, including rack arms and insulators, must be adequate to accommodate the cable.

2.13.1 Cast-In-Place Concrete Structures

Concrete must conform to Section 03 30 00 CAST-IN-PLACE CONCRETE. Construct walls on a footing of cast-in-place concrete except that precast concrete base sections may be used for precast concrete manhole risers. Concrete block must conform to ASTM C139 and Section 04 20 00, MASONRY.

2.13.2 Precast Concrete Structures, Risers and Tops

Precast concrete underground structures may be provided in lieu of cast-in-place subject to the requirements specified below. Precast units must be the product of a manufacturer regularly engaged in the manufacture of precast concrete products, including precast manholes.

2.13.2.1 General

Precast concrete structures must have the same accessories and facilities as required for cast-in-place structures. Likewise, precast structures must have plan area and clear heights not less than those of cast-in-place structures. Concrete materials and methods of construction must be the same as for cast-in-place concrete construction, as modified herein. Slope in floor may be omitted provided precast sections are poured in reinforced steel forms. Concrete for precast work must have a 28-day compressive strength of not less than 4000 psi. Structures may be precast to the design and details indicated for cast-in-place construction, precast monolithically and placed as a unit, or structures may be assembled sections, designed and produced by the manufacturer in accordance with the requirements specified. Structures must be identified with the manufacturer's name embedded in or otherwise permanently attached to an interior wall face.

2.13.2.2 Design for Precast Structures

ACI 318M. In the absence of detailed on-site soil information, design for the following soil parameters/site conditions:

a. Angle of Internal Friction (phi) = 30 degrees.

b. Unit Weight of Soil (Dry) = 110 pcf, (Saturated) = 130 pcf.

c. Coefficient of Lateral Earth Pressure (Ka) = 0.33.

d. Ground Water Level = 3 feet below ground elevation.

e. Vertical design loads must include full dead, superimposed dead, and live loads including a 30 percent magnification factor for impact. Live loads must consider all types and magnitudes of vehicular (automotive, industrial, or aircraft) traffic to be encountered. The minimum design vertical load must be for H20 highway loading per AASHTO HB-17.

f. Horizontal design loads must include full geostatic and hydrostatic pressures for the soil parameters, water table, and depth of installation to be encountered. Also, horizontal loads imposed by adjacent structure foundations, and horizontal load components of vertical design loads, including impact, must be considered, along with a pulling-in iron design load of 6000 pounds.

g. Each structural component must be designed for the load combination and positioning resulting in the maximum shear and moment for that particular component.

h. Design must also consider the live loads induced in the handling, installation, and backfilling of the manholes. Provide lifting devices to ensure structural integrity during handling and installation.

2.13.2.3 Construction

Provide a uniform thickness for structure top, bottom, and wall not less than 6 inches. For power and telecommunications manholes, provide thin-walled knock-out panels for designed or future duct banks entrances. Thin-walled knock-out panels for designed or future duct bank entrances are not permitted. Provide quantity, size, and location of duct bank entrance windows as directed, and cast completely open by the precaster. Size of windows must exceed the nominal duct bank envelope dimensions by at least 12 inches vertically and horizontally to preclude in-field window modifications made necessary by duct bank misalignment. However, the sides of precast windows must be a minimum of 6 inches from the inside surface of adjacent walls, floors, or ceilings. Form the perimeter of precast window openings to have a keyed or inward flared surface to provide a positive interlock with the mating duct bank envelope. Provide welded wire fabric reinforcing through window openings for in-field cutting and flaring into duct bank envelopes. Provide additional reinforcing steel comprised of at least two No. 4 bars around window openings. Provide drain sumps a minimum of 12 inches in diameter and 4 inches deep for precast structures.

2.13.2.4 Joints

Provide tongue-and-groove joints on mating edges of precast components.

Shiplap joints are not allowed. Design joints to firmly interlock adjoining components and to provide waterproof junctions and adequate shear transfer. Seal joints watertight using preformed plastic strip conforming to ASTM C990. Install sealing material in strict accordance with the sealant manufacturer's printed instructions. Provide waterproofing at conduit/duct entrances into structures, and where access frame meets the top slab, provide continuous grout seal.

2.13.3 Manhole Frames and Covers

Provide cast iron frames and covers for manholes conforming to CID A-A-60005. Cast the words<AM#0002> ~~"ELECTRIC" or~~</AM#0002> "TELECOMMUNICATIONS" in the top face of power and telecommunications manhole covers, respectively.

2.13.4 Handhole Frames and Covers

Frames and covers of steel must be welded by qualified welders in accordance with standard commercial practice. Provide rolled-steel floor plate covers having an approved antislip surface. Hinges must be of stainless steel with bronze hinge pin, 5 by 5 inches by approximately 3/16 inch thick, without screw holes, and must be for full surface application by fillet welding. Hinges must have nonremovable pins and five knuckles. The surfaces of plates under hinges must be true after the removal of raised antislip surface, by grinding or other approved method.

2.13.5 Ductile Iron Frames and Covers for Fire Lanes and Roadways

At the Contractor's option, ductile iron covers and frames designed for a minimum proof load of 100,000 pounds may be provided in lieu of the steel frames and covers indicated. Covers must be of the same material as the frames (i.e. ductile iron frame with ductile iron cover, galvanized steel frame with galvanized steel cover). Perform proof loading in accordance with CID A-A-60005 and ASTM A48/A48M. Proof loads must be physically stamped into the cover. Provide the Contracting Officer copies of previous proof load test results performed on the same frames and covers as proposed for this contract. Modify the top of the structure to accept the ductile iron structure in lieu of the steel structure indicated. The finished structure must be level and non-rocking, with the top flush with the surrounding pavement.

2.13.6 Brick for Manhole Collar

Provide sewer and manhole brick conforming to ASTM C32, Grade MS.

2.13.7 Composite/Fiberglass Handholes and Covers

ANSI/SCTE 77. Provide handholes and covers of polymer concrete, reinforced with heavy weave fiberglass with a design load (Tier rating) appropriate for or greater than the intended use. All covers are required to have the Tier level rating embossed on the surface which must not exceed the design load of the box.

2.14 CABLE SUPPORTS (RACKS, ARMS, AND INSULATORS)

Zinc coat the metal portion of racks and arms after fabrication.

2.14.1 Cable Rack Stanchions

The wall bracket or stanchion must be 4 inches by approximately 1-1/2 inch

by 3/16 inch channel steel, or 4 inches by approximately 1 inch glass-reinforced nylon with recessed bolt mounting holes, 48 inches long (minimum) in manholes. Space slots for mounting cable rack arms at 8 inch intervals.

2.14.2 Rack Arms

Cable rack arms must be galvanized steel or malleable iron or glass reinforced nylon and must be of the removable type. Rack arm length must be a minimum of 8 inches and a maximum of 12 inches. Step locks shall be provided for hooks that support splice cases.

2.14.3 Insulators

Insulators for metal rack arms must be dry-process glazed porcelain. Insulators are not required for nylon arms.

2.15 CABLE TAGS IN MANHOLES

Provide**<AM#0002>**~~polyethylene~~**</AM#0002>** tags for each**<AM#0002>**~~power~~**</AM#0002>** cable located in manholes.**<AM#0002>**~~Do not provide handwritten letters. The first position on the power cable tag denotes the voltage. The second through sixth positions on the tag identifies the circuit. The next to last position denotes the phase of the circuit and include the Greek "phi" symbol. The last position denotes the cable size. As an example, a tag could have the following designation: "11.5 NAS 1-8(Phase A)500," denoting that the tagged cable is on the 11.5kV system circuit number NAS 1-8, underground, Phase A, sized at 500 kcmil.~~**</AM#0002>**

2.15.1 Polyethylene Cable Tags

Provide tags of polyethylene having an average tensile strength of 3250 pounds per square inch; and that are 0.08 inch thick (minimum), non-corrosive non-conductive; resistive to acids, alkalis, organic solvents, and salt water; and distortion resistant to 170 degrees F. Provide 0.05 inch (minimum) thick black polyethylene tag holder. Provide a one-piece nylon, self-locking tie at each end of the cable tag, having a minimum loop tensile strength of 175 pounds and black block letters, numbers, and symbols one inch high on a yellow background. Letters, numbers, and symbols must not fall off or change positions regardless of the cable tags' orientation.

<AM#0002>~~2.16 LOW VOLTAGE ABOVE GROUND TERMINATION PEDESTAL~~

~~Provide copolymer polypropylene, low voltage above ground termination pedestal manufactured through an injection molding process. Pedestals must resist fertilizers, salt air environments and ultra violet radiation. Pedestal top must be imprinted with a "WARNING" and "ELECTRIC" identification. Pedestal must contain three lay-in six port connectors, NEMA C119.4, Class "A", dual rated for aluminum or copper, and capable of terminating conductors ranging from 10 AWG to 500 kcmil. Protect each connector with a clear, hard lexan (plastic) cover. Provide pedestal with rust free material and stainless steel hardware that is lockable.~~

~~2.17 PROTECTIVE DEVICES AND COORDINATION~~

~~Provide protective devices and coordination as specified in Section 26 28 01.00 10 COORDINATED POWER SYSTEM PROTECTION.~~

</AM#0002>PART 3 EXECUTION

3.1 INSTALLATION

Install equipment and devices in accordance with the manufacturer's published instructions and with the requirements and recommendations of NFPA 70 and IEEE C2 as applicable. In addition to these requirements, install telecommunications in accordance with TIA-758 and RUS Bull 1751F-644.

3.2 CABLE INSPECTION FOR CABLES <600 VOLTS

Inspect each cable reel for correct storage positions, signs of physical damage, and broken end seals prior to installation. If end seal is broken, remove moisture from cable prior to installation in accordance with the cable manufacturer's recommendations.

3.3 CABLE INSTALLATION PLAN AND PROCEDURE FOR CABLES <600 VOLTS

Obtain from the manufacturer an installation manual or set of instructions which addresses such aspects as cable construction, insulation type, cable diameter, bending radius, cable temperature limits for installation, lubricants, coefficient of friction, conduit cleaning, storage procedures, moisture seals, testing for and purging moisture, maximum allowable pulling tension, and maximum allowable sidewall bearing pressure. Prepare a checklist of significant requirements and perform pulling calculations and prepare a pulling plan and submit along with the manufacturer's instructions in accordance with SUBMITTALS. Install cable strictly in accordance with the cable manufacturer's recommendations and the approved installation plan.

Calculations and pulling plan must include:

a. Site layout drawing with cable pulls identified in numeric order of expected pulling sequence and direction of cable pull.

b. List of cable installation equipment.

c. Lubricant manufacturer's application instructions.

d. Procedure for resealing cable ends to prevent moisture from entering cable.

e. Cable pulling tension calculations of all cable pulls.

f. Cable percentage conduit fill.

g. Cable sidewall bearing pressure.

h. Cable minimum bend radius and minimum diameter of pulling wheels used.

i. Cable jam ratio.

j. Maximum allowable pulling tension on each different type and size of conductor.

k. Maximum allowable pulling tension on pulling device.

3.4 UNDERGROUND FEEDERS SUPPLYING BUILDINGS

Encase the underground portion of the conduit in a concrete envelope and bury as specified for underground duct with concrete encasement.

3.5 UNDERGROUND STRUCTURE CONSTRUCTION

Provide standard type cast-in-place construction as specified herein and as indicated, or precast construction as specified herein. Horizontal concrete surfaces of floors must have a smooth trowel finish. Cure concrete by applying two coats of white pigmented membrane forming-curing compound in strict accordance with the manufacturer's printed instructions, except that precast concrete may be steam cured. Curing compound must conform to ASTM C309. Locate duct entrances and windows in the center of end walls (shorter) and near the corners of sidewalls (longer) to facilitate cable racking and splicing. Covers for underground structures must fit the frames without undue play. Form steel and iron to shape and size with sharp lines and angles. Castings must be free from warp and blow holes that may impair strength or appearance. Exposed metal must have a smooth finish and sharp lines and arises. Provide necessary lugs, rabbets, and brackets. Set pulling-in irons and other built-in items in place before depositing concrete. Manhole locations, as indicated, are approximate. Coordinate exact manhole locations with other utilities and finished grading and paving.

3.5.1 Cast-In-Place Concrete Structures

Construct walls on a footing of cast-in-place concrete except that precast concrete base sections may be used for precast concrete manhole risers. Provide concrete block conforming to ASTM C139 and Section 04 20 00 MASONRY.

3.5.2 Precast Concrete Construction

Set commercial precast structures on 6 inches of level, 90 percent compacted granular fill, 3/4 inch to 1 inch size, extending 12 inches beyond the structure on each side. Compact granular fill by a minimum of four passes with a plate type vibrator. Installation must additionally conform to the manufacturer's instructions.

3.5.3 Pulling-In Irons

Provide steel bars bent as indicated, and cast in the walls and floors. Alternatively, pipe sleeves may be precast into the walls and floors where required to accept U-bolts or other types of pulling-in devices possessing the strengths and clearances stated herein. The final installation of pulling-in devices must be made permanent. Cover and seal exterior projections of thru-wall type pulling-in devices with an appropriate protective coating. In the floor, locate the irons a minimum of 6 inches from the edge of the sump, and in the walls, locate the irons within 6 inches of the projected center of the duct bank pattern or precast window in the opposite wall. However, the pulling-in iron must not be located within 6 inches of an adjacent interior surface, or duct or precast window located within the same wall as the iron. If a pulling-in iron cannot be located directly opposite the corresponding duct bank or precast window due to this clearance limitation, locate the iron directly above or below the projected center of the duct bank pattern or precast window the minimum distance required to preserve the 6 inch clearance previously stated. In the case of directly opposing precast windows, pulling-in irons consisting of a 3 foot length of No. 5 reinforcing bar, formed into a hairpin, may be

cast-in-place within the precast windows simultaneously with the end of the corresponding duct bank envelope. Irons installed in this manner must be positioned directly in line with, or when not possible, directly above or below the projected center of the duct bank pattern entering the opposite wall, while maintaining a minimum clear distance of 3 inches from any edge of the cast-in-place duct bank envelope or any individual duct. Pulling-in irons must have a clear projection into the structure of approximately 4 inches and must be designed to withstand a minimum pulling-in load of 6000 pounds. Hot-dip galvanize irons after fabrication.

3.5.4 Cable Racks, Arms and Insulators

Cable racks, arms and insulators must be sufficient to accommodate the cables. Space racks in power manholes not more than 3 feet apart, and provide each manhole wall with a minimum of two racks. Space racks in signal manholes not more than 16 1/2 inches apart with the end rack being no further than 12 inches from the adjacent wall. Methods of anchoring cable racks are as follows:

a. Provide a 5/8 inch diameter by 5 inch long anchor bolt with 3 inch foot cast in structure wall with 2 inch protrusion of threaded portion of bolt into structure. Provide 5/8 inch steel square head nut on each anchor bolt. Coat threads of anchor bolts with suitable coating immediately prior to installing nuts.

b. Provide concrete channel insert with a minimum load rating of 800 pounds per foot. Insert channel must be steel of the same length as "vertical rack channel;" and cast flush in structure wall. Provide 5/8 inch steel nuts in channel insert to receive 5/8 inch diameter by 3 inch long steel, square head anchor bolts.

c. Provide concrete "spot insert" at each anchor bolt location, cast flush in structure wall. Each insert must have minimum 800 pound load rating. Provide 5/8 inch diameter by 3 inch long steel, square head anchor bolt at each anchor point. Coat threads of anchor bolts with suitable coating immediately prior to installing bolts.

d. All racks shall be galvanized.

e. Step locks shall be provided for hooks that support splice cases.

3.5.5 Field Painting

Clean cast-iron frames and covers not buried in concrete or masonry of mortar, rust, grease, dirt and other deleterious materials, and coat with bituminous paint.

3.6 UNDERGROUND CONDUIT AND DUCT SYSTEMS

3.6.1 Requirements

Run conduit in straight lines except where a change of direction is necessary. Provide numbers and sizes of ducts as indicated. Provide a 4/0 AWG bare copper grounding conductor below medium-voltage distribution duct banks. Bond bare copper grounding conductor to ground rings (loops) in all manholes and to ground rings (loops) at all equipment slabs (pads). Route grounding conductor into manholes with the duct bank (sleeving is not required). Ducts must have a continuous slope downward toward underground structures and away from buildings, laid with a minimum slope of 4 inches

per 100 feet. Depending on the contour of the finished grade, the high-point may be at a terminal, a manhole, a handhole, or between manholes or handholes. Terminate all PVC conduit end points in utility holes, switching cabinets, transform handholes and buildings with end bells. The bell end of the conduits that enter manholes and handholes must be flush with the wall.

Perform changes in ductbank direction as follows:

a. Short-radius manufactured 90-degree duct bends may be used only for pole or equipment risers, unless specifically indicated as acceptable.

b. The minimum manufactured bend radius must be 18 inches for ducts of less than 3 inch diameter, and 36 inches for ducts 3 inches or greater in diameter.

c. As an exception to the bend radius required above, provide field manufactured longsweep bends having a minimum radius of 25 feet for a change of direction of more than 5 degrees, either horizontally or vertically, using a combination of curved and straight sections. Maximum manufactured curved sections allowed for use in field manufactured longsweep bend: 30 degrees.

3.6.2 Treatment

Keep ducts clean of concrete, dirt, or foreign substances during construction. Make field cuts requiring tapers with proper tools and match factory tapers. Use a coupling recommended by the duct manufacturer whenever an existing duct is connected to a duct of different material or shape. Store ducts to avoid warping and deterioration with ends sufficiently plugged to prevent entry of any water or solid substances. Thoroughly clean ducts before being laid. Store plastic ducts on a flat surface and protected from the direct rays of the sun.

3.6.3 Conduit Cleaning

As each conduit run is completed, for conduit sizes 3 inches and larger, draw a flexible testing mandrel approximately 12 inches long with a diameter less than the inside diameter of the conduit through the conduit. After which, draw a stiff bristle brush through until conduit is clear of particles of earth, sand and gravel; then immediately install conduit plugs. For conduit sizes less than 3 inches, draw a stiff bristle brush through until conduit is clear of particles of earth, sand and gravel; then immediately install conduit plugs.

3.6.4 Jacking and Drilling Under Roads and Structures

Conduits to be installed under existing paved areas which are not to be disturbed, and under roads and railroad tracks, must be zinc-coated, rigid steel, jacked into place. Where ducts are jacked under existing pavement, install rigid steel conduit because of its strength. To protect the corrosion-resistant conduit coating, predrilling or installing conduit inside a larger iron pipe sleeve (jack-and-sleeve) is required. For crossings of existing railroads and airfield pavements greater than 50 feet in length, the predrilling method or the jack-and-sleeve method will be used. Separators or spacing blocks must be made of steel, concrete, plastic, or a combination of these materials placed not farther apart than 4 feet on centers.

3.6.5 Galvanized Conduit Concrete Penetrations

Galvanized conduits which penetrate concrete (slabs, pavement, and walls) in wet locations must be PVC coated and extend from at least 2 inches within the concrete to the first coupling or fitting outside the concrete (minimum of 6 inches from penetration).

3.6.6 Multiple Conduits

Separate multiple conduits by a minimum distance of 3 inches, except that light and power conduits must be separated from control, signal, and telephone conduits by a minimum distance of 12 inches. Stagger the joints of the conduits by rows (horizontally) and layers (vertically) to strengthen the conduit assembly. Provide plastic duct spacers that interlock vertically and horizontally. Spacer assembly must consist of base spacers, intermediate spacers, ties, and locking device on top to provide a completely enclosed and locked-in conduit assembly. Install spacers per manufacturer's instructions, but provide a minimum of two spacer assemblies per 10 feet of conduit assembly.

3.6.7 Conduit Plugs and Pull Rope

Provide new conduit indicated as being unused or empty with plugs on each end. Plugs must contain a weephole or screen to allow water drainage. Provide a plastic pull rope having 3 feet of slack at each end of unused or empty conduits.

3.6.8 Conduit and Duct Without Concrete Encasement

Depths to top of the conduit must be not less than 24 inches below finished grade. Provide not less than 3 inches clearance from the conduit to each side of the trench. Grade bottom of trench smooth; where rock, soft spots, or sharp-edged materials are encountered, excavate the bottom for an additional 3 inches, fill and tamp level with original bottom with sand or earth free from particles, that would be retained on a 1/4 inch sieve. The first 6 inch layer of backfill cover must be sand compacted as previously specified. The rest of the excavation must be backfilled and compacted in 3 to 6 inch layers. Provide color, type and depth of warning tape as specified in Section 31 00 00 EARTHWORK.

3.6.8.1 Encasement Under Roads and Structures

Under roads, paved areas, and railroad tracks, install conduits in concrete encasement of rectangular cross-section providing a minimum of 3 inch concrete cover around ducts. Extend concrete encasement at least 5 feet beyond the edges of paved areas and roads, and 12 feet beyond the rails on each side of railroad tracks. Depths to top of the concrete envelope must be not less than 24 inches below finished grade.

3.6.9 Duct Encased in Concrete

Construct underground duct lines of individual conduits encased in concrete. Depths to top of the concrete envelope must be not less than 36 inches below finished grade, except under roads and pavement, concrete envelope must be not less than 24 inches below finished grade for secondary. Do not mix different kinds of conduit in any one duct bank. Concrete encasement surrounding the bank must be rectangular in cross-section and provide at least 3 inches of concrete cover for ducts. Separate conduits by a minimum concrete thickness of 3 inches. Before

pouring concrete, anchor duct bank assemblies, prevent floating during concrete pouring by driving reinforcing rods adjacent to duct spacer assemblies and attaching the rods to the spacer assembly. Provide steel reinforcing in the concrete envelope as indicated. Provide color, type and depth of warning tape as specified in Section 31 00 00 EARTHWORK.

3.6.9.1 Connections to Manholes

Duct bank envelopes connecting to underground structures must be flared to have enlarged cross-section at the manhole entrance to provide additional shear strength. Dimensions of the flared cross-section must be larger than the corresponding manhole opening dimensions by no less than 12 inches in each direction. Perimeter of the duct bank opening in the underground structure must be flared toward the inside or keyed to provide a positive interlock between the duct bank and the wall of the structure. Use vibrators when this portion of the encasement is poured to assure a seal between the envelope and the wall of the structure.

<AM#0002>~~3.6.9.2 Connections to Existing Underground Structures~~

~~For duct bank connections to existing structures, break the structure wall out to the dimensions required and preserve steel in the structure wall. Cut steel and bend out to tie into the reinforcing of the duct bank envelope. Chip the perimeter surface of the duct bank opening to form a key or flared surface, providing a positive connection with the duct bank envelope.~~

~~3.6.9.3 Connections to Existing Concrete Pads~~

~~For duct bank connections to concrete pads, break an opening in the pad out to the dimensions required and preserve steel in pad. Cut the steel and bend out to tie into the reinforcing of the duct bank envelope. Chip out the opening in the pad to form a key for the duct bank envelope.~~

</AM#0002>3.6.9.2 Connections to Existing Ducts

Where connections to existing duct banks are indicated, excavate the banks to the maximum depth necessary. Cut off the banks and remove loose concrete from the conduits before new concrete-encased ducts are installed. Provide a reinforced concrete collar, poured monolithically with the new duct bank, to take the shear at the joint of the duct banks.

3.6.9.3 Partially Completed Duct Banks

During construction wherever a construction joint is necessary in a duct bank, prevent debris such as mud, and, and dirt from entering ducts by providing suitable conduit plugs. Fit concrete envelope of a partially completed duct bank with reinforcing steel extending a minimum of 2 feet back into the envelope and a minimum of 2 feet beyond the end of the envelope. Provide one No. 4 bar in each corner, 3 inches from the edge of the envelope. Secure corner bars with two No. 3 ties, spaced approximately one foot apart. Restrain reinforcing assembly from moving during concrete pouring.

<AM#0002>~~3.6.9.4 Removal of Ducts~~

~~Where duct lines are removed from existing underground structures, close the openings to waterproof the structure. Chip out the wall opening to provide a key for the new section of wall.~~

</AM#0002>3.6.10 Duct Sealing

Seal all electrical penetrations for radon mitigation, maintaining integrity of the vapor barrier, and to prevent infiltration of air, insects, and vermin.

3.7 CABLE PULLING

Test existing duct lines with a mandrel and thoroughly swab out to remove foreign material before pulling cables. Pull cables down grade with the feed-in point at the manhole or buildings of the highest elevation. Use flexible cable feeds to convey cables through manhole opening and into duct runs. Do not exceed the specified cable bending radii when installing cable under any conditions, including turnups into switches, transformers, switchgear, switchboards, and other enclosures. Cable with tape shield must have a bending radius not less than 12 times the overall diameter of the completed cable. If basket-grip type cable-pulling devices are used to pull cable in place, cut off the section of cable under the grip before splicing and terminating.

3.7.1 Cable Lubricants

Use lubricants that are specifically recommended by the cable manufacturer for assisting in pulling jacketed cables.

3.8 CABLES IN UNDERGROUND STRUCTURES

Do not install cables utilizing the shortest path between penetrations, but route along those walls providing the longest route and the maximum spare cable lengths. Form cables to closely parallel walls, not to interfere with duct entrances, and support on brackets and cable insulators. Support cable splices in underground structures by racks on each side of the splice. Locate splices to prevent cyclic bending in the spliced sheath. Install cables at middle and bottom of cable racks, leaving top space open for future cables, except as otherwise indicated for existing installations. Provide one spare three-insulator rack arm for each cable rack in each underground structure.

3.8.1 Cable Tag Installation

Install cable tags in each manhole as specified, including each splice. Tag wire and cable provided by this contract. Install cable tags over the fireproofing, if any, and locate the tags so that they are clearly visible without disturbing any cabling or wiring in the manholes.

3.9 CONDUCTORS INSTALLED IN PARALLEL

Group conductors such that each conduit of a parallel run contains one Phase A conductor, one Phase B conductor, one Phase C conductor, and one neutral conductor.

3.10 LOW VOLTAGE CABLE SPLICING AND TERMINATING

Make terminations and splices with materials and methods as indicated or specified herein and as designated by the written instructions of the manufacturer. Do not allow the cables to be moved until after the splicing material has completely set. Make splices in underground distribution systems only in accessible locations such as manholes, handholes, or

aboveground termination pedestals.

3.11 MEDIUM VOLTAGE CABLE TERMINATIONS

CPS Energy shall provide all medium voltage cable terminations.<AM#0002> ~~Final termination to existing CPS Energy overhead primary cabling (noted on drawings) shall be coordinated with CPS Energy. All other site terminations shall be by contractor. Provided by CPS Energy.~~</AM#0002>

3.12 MEDIUM VOLTAGE CABLE JOINTS

CPS Energy shall provide all medium voltage cable joints.

<AM#0002>~~Provide power cable joints (splices) suitable for continuous immersion in water. Make joints only in accessible locations in manholes or handholes by using materials and methods in accordance with the written instructions of the joint kit manufacturer.~~

</AM#0002>3.13 CABLE END CAPS

Cable ends must be sealed at all times with coated heat shrinkable end caps. Cables ends must be sealed when the cable is delivered to the job site, while the cable is stored and during installation of the cable. The caps must remain in place until the cable is spliced or terminated. Sealing compounds and tape are not acceptable substitutes for heat shrinkable end caps. Cable which is not sealed in the specified manner at all times will be rejected.

3.14 GROUNDING SYSTEMS

NFPA 70 and IEEE C2, except provide grounding systems with a resistance to solid earth ground not exceeding 25 ohms.

3.14.1 Grounding Electrodes

Provide cone pointed driven ground rods driven full depth plus 12 inches, installed to provide an earth ground of the appropriate value for the particular equipment being grounded.

If the specified ground resistance is not met, provide an additional ground rod in accordance with the requirements of NFPA 70 (placed not less than 6 feet from the first rod). Should the resultant (combined) resistance exceed the specified resistance, measured not less than 48 hours after rainfall, notify the Contracting Officer immediately.

3.14.2 Grounding Connections

Make grounding connections which are buried or otherwise normally inaccessible, by exothermic weld or compression connector.

a. Make exothermic welds strictly in accordance with the weld manufacturer's written recommendations. Welds which are "puffed up" or which show convex surfaces indicating improper cleaning are not acceptable. Mechanical connectors are not required at exothermic welds.

b. Make compression connections using a hydraulic compression tool to provide the correct circumferential pressure. Tools and dies must be as recommended by the manufacturer. An embossing die code or other standard method must provide visible indication that a connector has

been adequately compressed on the ground wire.

3.14.3 Grounding Conductors

Provide bare grounding conductors, except where installed in conduit with associated phase conductors. Ground cable sheaths, cable shields, conduit, and equipment with No. 6 AWG. Ground other noncurrent-carrying metal parts and equipment frames of metal-enclosed equipment. Ground metallic frames and covers of handholes and pull boxes with a braided, copper ground strap with equivalent ampacity of No. 6 AWG.

3.14.4 Ground Cable Crossing Expansion Joints

Protect ground cables crossing expansion joints or similar separations in structures and pavements by use of approved devices or methods of installation which provide the necessary slack in the cable across the joint to permit movement. Use stranded or other approved flexible copper cable across such separations.

3.14.5 Manhole Grounding

Loop a 4/0 AWG grounding conductor around the interior perimeter, approximately 12 inches above finished floor. Secure the conductor to the manhole walls at intervals not exceeding 36 inches. Connect the conductor to the manhole grounding electrode with 4/0 AWG conductor. Connect all incoming 4/0 grounding conductors to the ground loop adjacent to the point of entry into the manhole. Bond the ground loop to all cable shields, metal cable racks, and other metal equipment with a minimum 6 AWG conductor.

3.14.6 Fence Grounding

Provide grounding for fences with a ground rod at each fixed gate post and at each corner post. Drive ground rods until the top is 12 inches below grade. Attach a No. 4 AWG copper conductor, by exothermic weld to the ground rods and extend underground to the immediate vicinity of fence post. Lace the conductor vertically into 12 inches of fence mesh and fasten by two approved bronze compression fittings, one to bond wire to post and the other to bond wire to fence. Bond each gate section to its gatepost by a 1/8 by one inch flexible braided copper strap and ground post clamps. Clamps must be of the anti-electrolysis type.

3.15 EXCAVATING, BACKFILLING, AND COMPACTING

Provide in accordance with NFPA 70 and Section 31 00 00 EARTHWORK.

3.15.1 Reconditioning of Surfaces

3.15.1.1 Unpaved Surfaces

Restore to their original elevation and condition unpaved surfaces disturbed during installation of duct. Preserve sod and topsoil removed during excavation and reinstall after backfilling is completed. Replace sod that is damaged by sod of quality equal to that removed. When the surface is disturbed in a newly seeded area, re-seed the restored surface with the same quantity and formula of seed as that used in the original seeding, and provide topsoiling, fertilizing, liming, seeding, sodding, sprigging, or mulching. Provide work in accordance with Section 32 92 23 SODDING and Section 32 93 00 EXTERIOR PLANTS.

3.15.1.2 Paving Repairs

Where trenches, pits, or other excavations are made in existing roadways and other areas of pavement where surface treatment of any kind exists, restore such surface treatment or pavement the same thickness and in the same kind as previously existed, except as otherwise specified, and to match and tie into the adjacent and surrounding existing surfaces.

3.16 CAST-IN-PLACE CONCRETE

Provide concrete in accordance with Section 03 30 00 CAST-IN-PLACE CONCRETE.

3.16.1 Concrete Slabs (Pads) for Equipment

Unless otherwise indicated, the slab must be at least 8 inches thick, reinforced with a 6 by 6 - W2.9 by W2.9 mesh, placed uniformly 4 inches from the top of the slab. Place slab on a 6 inch thick, well-compacted gravel base. Top of concrete slab must be approximately 4 inches above finished grade with gradual slope for drainage. Edges above grade must have 1/2 inch chamfer. Slab must be of adequate size to project at least 8 inches beyond the equipment. Pads shall be per Standard Design Requirements.

Stub up conduits, with bushings, 2 inches into cable wells in the concrete pad. Coordinate dimensions of cable wells with transformer cable training areas.

3.16.2 Sealing

When the installation is complete, seal all conduit and other entries into the equipment enclosure with an approved sealing compound. Seals must be of sufficient strength and durability to protect all energized live parts of the equipment from rodents, insects, or other foreign matter.

3.17 FIELD QUALITY CONTROL

3.17.1 Performance of Field Acceptance Checks and Tests

Perform in accordance with the manufacturer's recommendations, and include the following visual and mechanical inspections and electrical tests, performed in accordance with NETA ATS.

3.17.1.1 Low Voltage Cables, 600-Volt

Perform tests after installation of cable, splices and terminations and before terminating to equipment or splicing to existing circuits.

a. Visual and Mechanical Inspection

(1) Inspect exposed cable sections for physical damage.
(2) Verify that cable is supplied and connected in accordance with contract plans and specifications.
(3) Verify tightness of accessible bolted electrical connections.
(4) Inspect compression-applied connectors for correct cable match and indentation.
(5) Visually inspect jacket and insulation condition.
(6) Inspect for proper phase identification and arrangement.

b. Electrical Tests

(1) Perform insulation resistance tests on wiring No. 6 AWG and larger diameter using instrument which applies voltage of approximately 1000 volts dc for one minute.
(2) Perform continuity tests to insure correct cable connection.

3.17.1.2 Grounding System

a. Visual and mechanical inspection

Inspect ground system for compliance with contract plans and specifications.

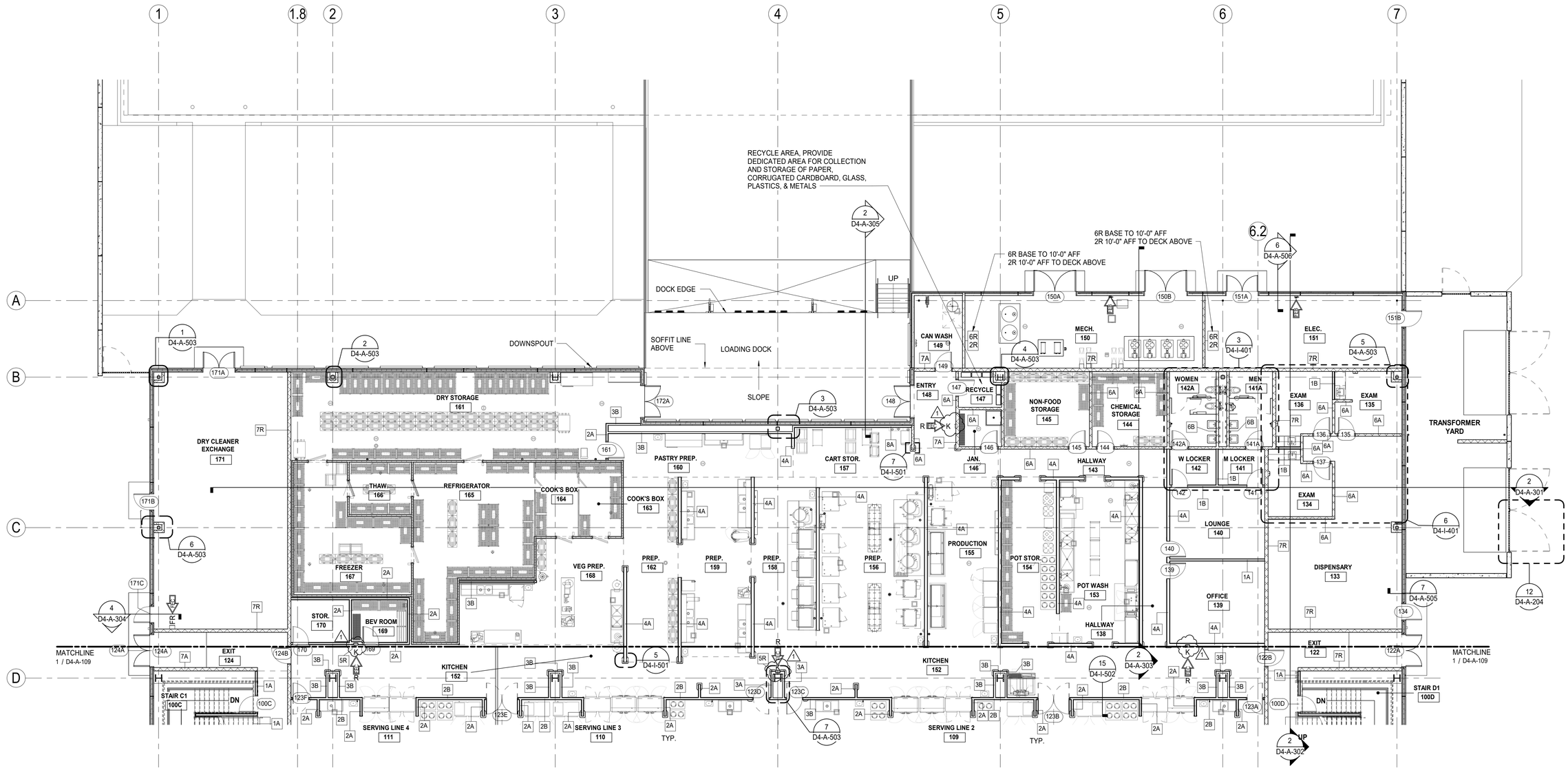
b. Electrical tests

Perform ground-impedance measurements utilizing the fall-of-potential method in accordance with IEEE 81. On systems consisting of interconnected ground rods, perform tests after interconnections are complete. On systems consisting of a single ground rod perform tests before any wire is connected. Take measurements in normally dry weather, not less than 48 hours after rainfall. Use a portable ground resistance tester in accordance with manufacturer's instructions to test each ground or group of grounds. The instrument must be equipped with a meter reading directly in ohms or fractions thereof to indicate the ground value of the ground rod or grounding systems under test. Provide site diagram indicating location of test probes with associated distances, and provide a plot of resistance vs. distance.

3.17.2 Follow-Up Verification

Upon completion of acceptance checks and tests, show by demonstration in service that circuits and devices are in good operating condition and properly performing the intended function. As an exception to requirements stated elsewhere in the contract, the Contracting Officer must be given 5 working days advance notice of the dates and times of checking and testing.

.... -- End of Section --



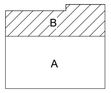
1 FIRST FLOOR INFO PLAN - AREA B
1/8" = 1'-0"

SHEET NOTES

1. REFER TO SHEET D4-A-700 SERIES FOR PANEL PLANS & ELEVATIONS FOR EXTERIOR WALL OPENING DIMENSIONS.
2. COORDINATE FLOOR DRAINS AND FLOOR SINK LOCATIONS WITH PLUMBING DRAWINGS.
3. COORDINATE PAD LOCATIONS WITH MECHANICAL AND STRUCTURAL DRAWINGS.
4. PLAN CONTAINS WALL DIMENSIONS SECTIONS, ENLARGED PLAN CALLOUTS, AND BUILDING ELEVATIONS. REFER TO INFO PLANS FOR ALL ADDITIONAL INFORMATION NOT SHOWN.
5. MECHANICAL, ELECTRICAL, AND PLUMBING EQUIPMENT SHOWN ON OVERALL PLAN IS FOR INFORMATION ONLY, REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING PLANS FOR EXACT LOCATION OF EQUIPMENT.
6. KITCHEN AND SERVING EQUIPMENT SHOWN FOR INFORMATION ONLY. REFER TO KITCHEN DRAWINGS FOR LOCATION AND EQUIPMENT REQUIREMENTS.
7. REFER TO SHEETS D4-A-501 & D4-A-502 FOR PARTITION TYPES.
8. SLOPE STRUCTURAL STOOPS TO PROVIDE WATER DRAINAGE AWAY FROM THE FACILITY.
9. REFER TO D4-A-403 FOR CANOPY DIMENSIONS.
10. INSTALL TYPICAL GYPSUM BOARD WALL JOINTS PER SPECIFICATION 09 29 00.
11. DIMENSIONS ARE FROM CENTER OF PARTITION WALL.
12. THIRD FLOOR: CLASSROOM TOP OF WALLS TO STRUCTURAL STEEL FRAMING PER S-115.
13. MECH EQUIPMENT - RE: MECH
14. TRANSFORMER GATE - REFER TO SHEET 11 / D4-A-204 & 12 / D4-A-204

LEGEND

- XX — PARTITION TYPE - REFER TO SHEET D4-A-501
- X — WINDOW TYPE - REFER TO SHEET D4-A-604
- 000 — DOOR TYPE - REFER TO SHEET D4-A-600
- DIRECTION OF SLOPE
- FIRE EXTINGUISHER CABINET
- FR — FIRE-RATED FIRE EXTINGUISHER CABINET
- FIRE EXTINGUISHER BRACKET
- K — FIRE EXTINGUISHER - CLASS K - SEMI-RECESSED CABINET
- R — FIRE EXTINGUISHER FULLY-RECESS CABINET
- CORNER GUARD, REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY
- WALL GUARD, REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY



KEY PLAN

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT
ALAN RIVARD
23038
STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2026
Rev.
Dwn by: F. DE LUNA
Solicitation No.: W912GG26R0025
Reviewed by: J. LANGE
Contract No.
Submitted by: C. LANGUM
File name:
Plot date: revision date
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IRSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

FIRST FLOOR INFO PLAN - AREA B

Sheet reference number
D4-A-110
Sheet of

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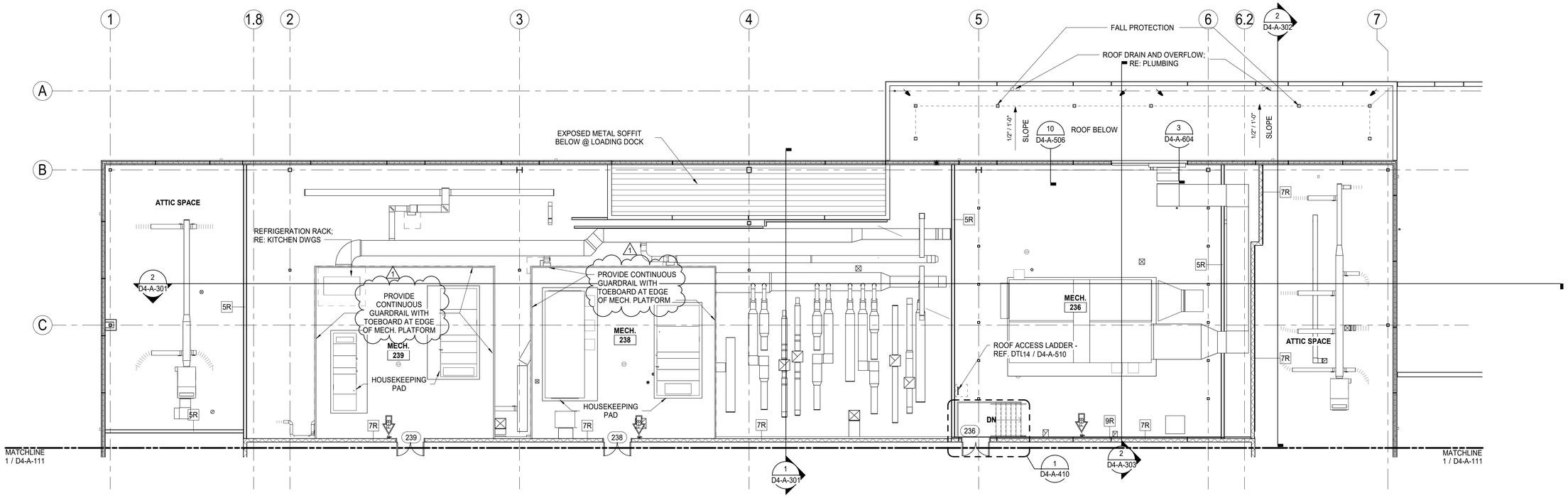
US Army Corps of Engineers
Fort Worth District



1 SECOND FLOOR INFO PLAN - AREA B

1/8" = 1'-0"

PLAN NORTH

LEGEND

- STANDING SEAM METAL ROOF
- MEMBRANE ROOF
- LIGHTNING PROTECTION - RE: ELECTRICAL
- FALL PROTECTION; RE: 13/D4-S-531

SHEET NOTES

1. REFER TO SHEET D4-A-700 SERIES FOR PANEL PLANS & ELEVATIONS FOR EXTERIOR WALL OPENING DIMENSIONS.
2. COORDINATE FLOOR DRAINS AND FLOOR SINK LOCATIONS WITH PLUMBING DRAWINGS.
3. COORDINATE PAD LOCATIONS WITH MECHANICAL AND STRUCTURAL DRAWINGS.
4. PLAN CONTAINS WALL DIMENSIONS SECTIONS, ENLARGED PLAN CALLOUTS, AND BUILDING ELEVATIONS. REFER TO INFO PLANS FOR ALL ADDITIONAL INFORMATION NOT SHOWN.
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7. REFER TO SHEETS D4-A-501 & D4-A-502 FOR PARTITION TYPES.
8. SLOPE STRUCTURAL STOOPS TO PROVIDE WATER DRAINAGE AWAY FROM THE FACILITY.
9. REFER TO D4-A-403 FOR CANOPY DIMENSIONS.
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11. DIMENSIONS ARE FROM CENTER OF PARTITION WALL.
12. THIRD FLOOR: CLASSROOM TOP OF WALLS TO STRUCTURAL STEEL FRAMING PER S-115.
13. MECH EQUIPMENT - RE: MECH
14. TRANSFORMER GATE - REFER TO SHEET 11 / D4-A-204 & 12 / D4-A-204

LEGEND

- XX — PARTITION TYPE - REFER TO SHEET D4-A-501
- X — WINDOW TYPE - REFER TO SHEET D4-A-604
- 000 — DOOR TYPE - REFER TO SHEET D4-A-600
- DIRECTION OF SLOPE
- FIRE EXTINGUISHER CABINET
- FR — FIRE-RATED FIRE EXTINGUISHER CABINET
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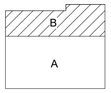
- WALL GUARD, REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY



KEY PLAN

REGISTERED ARCHITECT ALAN RIVARD 23038 STATE OF TEXAS
20 JULY 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Drawn by: F. DE LUNA
Solicitation No.: W9126G25RA020
Contract No.:
Reviewed by: J. DAVIES
Submitted by: C. LANGUM
File name:
Plot date: Added to the mix
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CONTRACT NUMBER:
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPS.L200527

SECOND FLOOR INFO PLAN - AREA B

Sheet reference number
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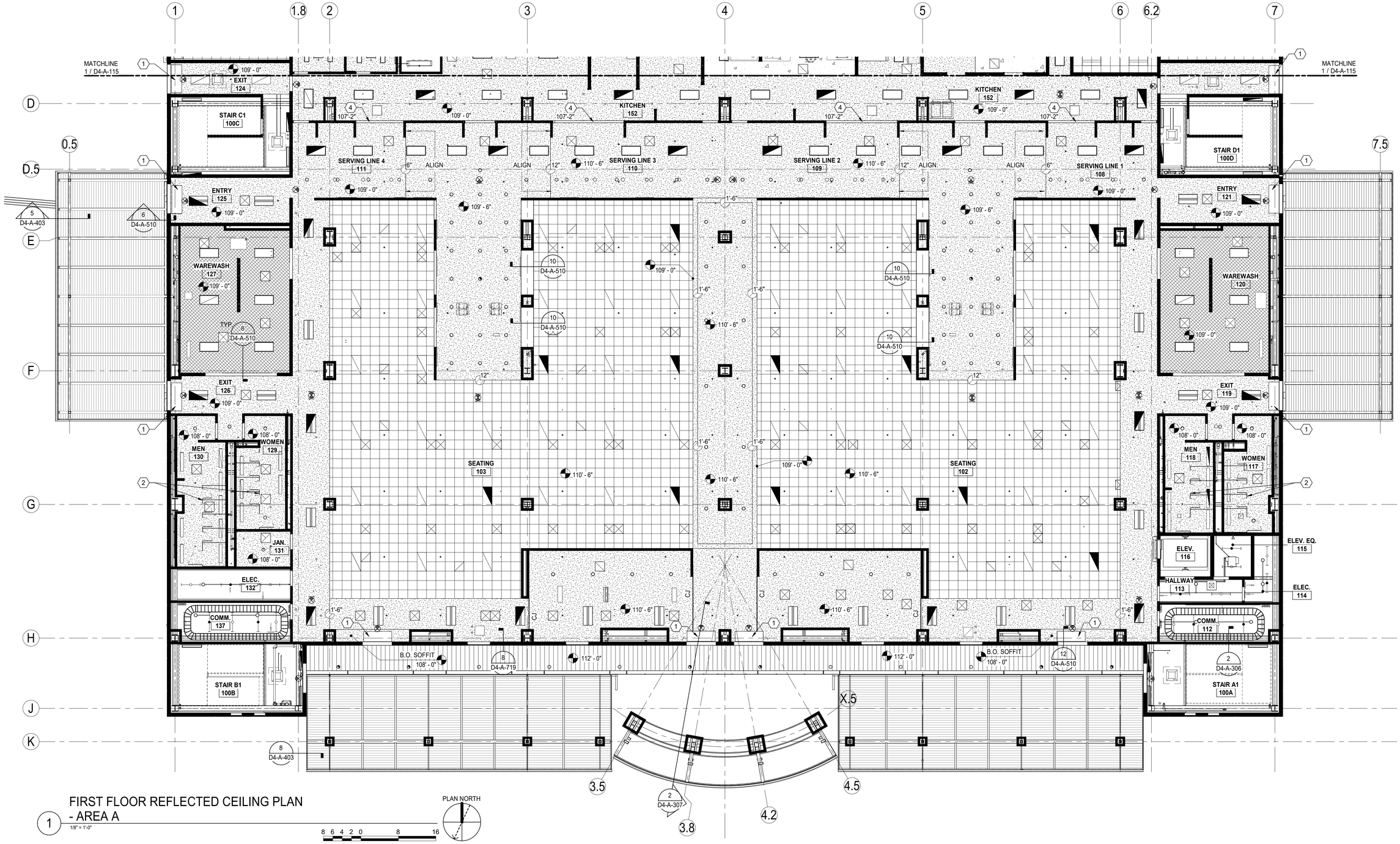


FIRST FLOOR REFLECTED CEILING PLAN - AREA A

1 1/8" = 1'-0"

PLAN NORTH

8 6 4 2 0 8 16

SHEET NOTES

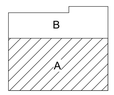
1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL DOWNLIGHTS, SPEAKERS, SPRINKLER HEADS, ETC. SHALL BE CENTERED IN CEILING TILE.
2. CLIP IN PLACE CEILING TILES WITHIN A 6'-0" RADIUS IMMEDIATELY IN FRONT OF EACH EXTERIOR DOOR.
3. ENTER CORRIDOR LIGHTING EQUALLY FROM EACH SIDE IN WIDTH OF CORRIDOR SPACE. AT JOGS IN CORRIDOR WALL ALIGN FIXTURES THROUGH ENTIRE LENGTH OF CORRIDOR. SPACE FIXTURES ALONG CORRIDOR LENGTH AT UNIFORM DISTANCES. PROVIDE EQUAL DISTANCE FROM EACH END FIXTURE TO END OF CORRIDOR.
4. ARCHITECTURAL CEILING PLANS ARE FOR LOCATING FIXTURES UNLESS NOTED OTHERWISE. FOR ADDITIONAL INFORMATION AND RELATED WORK REFER TO ELECTRICAL LIGHTING, MECHANICAL, AND PLUMBING PLANS.
5. COORDINATE LOCATION OF ALL ACCESS PANELS IN FIELD AND CONSOLIDATE IF POSSIBLE.
6. A.F.F. CEILING ELEVATIONS ARE MEASURED FROM THE FINISHED FLOOR OF EACH FLOOR.
7. PAINT ALL EXPOSED STEEL COMPONENTS. DO NOT OVERPAINT MEMBERS WITH INTUMESCENT PAINT TYP, UNO.
8. FOR TYPICAL SUSPENDED GYP BOARD ACCESS PANEL DETAIL, SEE14 / D4-A-510
9. TYPICAL CONTROL JOINT REFER TO 11 / D4-A-510
10. ~~ALL CEILINGS ARE 9'-0" UNO.~~
11. FOR VIDEO WALL IN CLASSROOMS, RE: TELECOMMUNICATIONS

KEYNOTES : DOES NOT APPLY ON ALL SHEETS

1. AIR CURTAIN
2. PROVIDE STRUCTURAL SUPPORT FOR CEILING HUNG TOILET PARTITION, TYP. COORDINATE MOUNTING HEIGHT WITH PARTITION MANUFACTURER. REFERENCE DETAIL 9 / D4-A-510 AND 16 / D4-A-510
3. ROOF ACCESS HATCH AND LADDER
4. PROVIDE GWB SOFFIT AROUND CEILING OPENING
5. PROVIDE 1-HOUR SPRAY APPLIED FIRE PROOFING WITH THERMAL BARRIER AT ROOF ASSEMBLY
6. REFER TO KITCHEN DRAWINGS FOR CEILING FINISH
7. HOOD AND FIRE SUPPRESSION; RE: KITCHEN DRAWINGS
8. GYPSUM BOARD SOFFIT AROUND BEAM

LEGEND

- ACOUSTICAL TILE CEILING
- ACOUSTICAL TILE CEILING - SOUND RATED
- EXPOSED CEILING OPEN TO STRUCTURE
- GYPSUM WALLBOARD
- CEMENT BOARD WITH APPLIED FINISH - SEE FINISH SCHEDULE
- 2' x 4' FIBERGLASS REINFORCED PLASTIC PANEL ON CEMENT BOARD
- METAL SOFFIT PANEL
- EXPOSED METAL DECKING COLOR: DARK BRONZE
- RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
- EMERGENCY - RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
- RECESSED MOUNTED FLUORESCENT LIGHT FIXTURE
- EMERGENCY - RECESSED MOUNTED FLUORESCENT LIGHT FIXTURE
- STRIP FLUORESCENT LIGHT FIXTURE
- RECESSED COMPACT FLUORESCENT OR WALL WASHED LIGHT FIXTURE
- SQUARE DOWNLIGHT FIXTURE
- BUILDING EXTERIOR LIGHTING FIXTURE
- RECESSED FLUORESCENT LIGHT FIXTURE
- ATRIUM LIGHTING FIXTURE
- EXHAUST
- SUPPLY AIR DIFFUSER
- RETURN AIR DIFFUSER
- LINEAR DIFFUSERS
- JUNCTION BOX
- CEILING ACCESS PANEL
- CJ — CONTROL JOINT - RE: I-601 FINISH SELECTION AND I-103 FINISH PLAN
- EXIT LIGHT
- SPOT ELEVATION - HEIGHT A.F.F. UNO.
- FIRE SPRINKLER



KEY PLAN

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT ALBERTO RIVARD 23035 STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Date: MAY 2025
Solicitation No.: W9126G26RA030
Contract No.:
Rev.:
Designed by: A. RIVARD
Dwn by: F. DE LUNA
Reviewed by: A. DOVER
Submitted by: C. LANGUM
File name:
Plot date: Friday, July 17, 2026
Plot scale: 1:1
U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
MERRICK®
DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

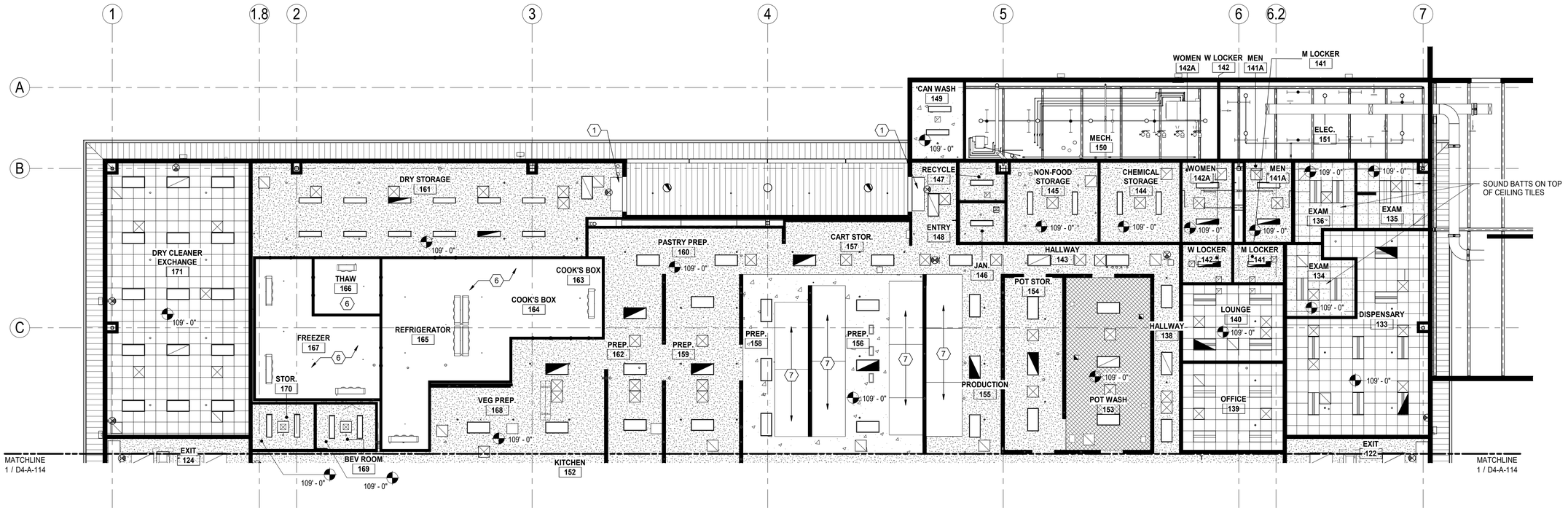
FIRST FLOOR REFLECTED CEILING PLAN - AREA A

Sheet reference number
D4-A-114
Sheet of

Cont No.:

7/20/2026 2:41:15 PM

US Army Corps of Engineers
Fort Worth District



FIRST FLOOR REFLECTED CEILING PLAN - AREA B

1 — 1/8" = 1'-0"

PLAN NORTH

8 6 4 2 0 8 16

SHEET NOTES

1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL DOWNLIGHTS, SPEAKERS, SPRINKLER HEADS, ETC. SHALL BE CENTERED IN CEILING TILE.
2. CLIP IN PLACE CEILING TILES WITHIN A 6'-0" RADIUS IMMEDIATELY IN FRONT OF EACH EXTERIOR DOOR.
3. ENTER CORRIDOR LIGHTING EQUALLY FROM EACH SIDE IN WIDTH OF CORRIDOR SPACE. AT JOGS IN CORRIDOR WALL ALIGN FIXTURES THROUGH ENTIRE LENGTH OF CORRIDOR. SPACE FIXTURES ALONG CORRIDOR LENGTH AT UNIFORM DISTANCES. PROVIDE EQUAL DISTANCE FROM EACH END FIXTURE TO END OF CORRIDOR.
4. ARCHITECTURAL CEILING PLANS ARE FOR LOCATING FIXTURES UNLESS NOTED OTHERWISE. FOR ADDITIONAL INFORMATION AND RELATED WORK REFER TO ELECTRICAL LIGHTING, MECHANICAL, AND PLUMBING PLANS.
5. COORDINATE LOCATION OF ALL ACCESS PANELS IN FIELD AND CONSOLIDATE IF POSSIBLE.
6. A.F.F. CEILING ELEVATIONS ARE MEASURED FROM THE FINISHED FLOOR OF EACH FLOOR.
7. PAINT ALL EXPOSED STEEL COMPONENTS. DO NOT OVERPAINT MEMBERS WITH INTUMESCENT PAINT TYP, UNO.
8. FOR TYPICAL SUSPENDED GYP BOARD ACCESS PANEL DETAIL, SEE14 / D4-A-510
9. TYPICAL CONTROL JOINT REFER TO 11 / D4-A-510
10. ALL CEILINGS ARE 9'-0" UNO.
11. FOR VIDEO WALL IN CLASSROOMS, RE: TELECOMMUNICATIONS

KEYNOTES : DOES NOT APPLY ON ALL SHEETS

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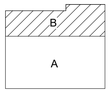
2. PROVIDE STRUCTURAL SUPPORT FOR CEILING HUNG TOILET PARTITION, TYP. COORDINATE MOUNTING HEIGHT WITH PARTITION MANUFACTURER. REFERENCE DETAIL 9 / D4-A-510 AND 16 / D4-A-510
3. ROOF ACCESS HATCH AND LADDER
4. PROVIDE GWB SOFFIT AROUND CEILING OPENING
5. PROVIDE 1-HOUR SPRAY APPLIED FIRE PROOFING WITH THERMAL BARRIER AT ROOF ASSEMBLY
6. REFER TO KITCHEN DRAWINGS FOR CEILING FINISH
7. HOOD AND FIRE SUPPRESSION; RE: KITCHEN DRAWINGS
8. GYPSUM BOARD SOFFIT AROUND BEAM

LEGEND

- ACOUSTICAL TILE CEILING
- ACOUSTICAL TILE CEILING - SOUND RATED
- EXPOSED CEILING OPEN TO STRUCTURE
- GYPSUM WALLBOARD
- CEMENT BOARD WITH APPLIED FINISH - SEE FINISH SCHEDULE
- 2' x 4' FIBERGLASS REINFORCED PLASTIC PANEL ON CEMENT BOARD
- METAL SOFFIT PANEL
- EXPOSED METAL DECKING COLOR: DARK BRONZE
- RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
- EMERGENCY - RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
- RECESSED MOUNTED FLUORESCENT LIGHT FIXTURE
- EMERGENCY - RECESSED MOUNTED FLUORESCENT LIGHT FIXTURE
- STRIP FLUORESCENT LIGHT FIXTURE
- RECESSED COMPACT FLUORESCENT OR WALL WASHED LIGHT FIXTURE
- SQUARE DOWNLIGHT FIXTURE
- BUILDING EXTERIOR LIGHTING FIXTURE
- RECESSED FLUORESCENT LIGHT FIXTURE
- ATRIUM LIGHTING FIXTURE
- EXHAUST
- SUPPLY AIR DIFFUSER
- RETURN AIR DIFFUSER
- LINEAR DIFFUSERS
- JUNCTION BOX
- CEILING ACCESS PANEL
- CJ — CONTROL JOINT - RE: I-601 FINISH SELECTION AND I-103 FINISH PLAN
- EXIT LIGHT
- SPOT ELEVATION - HEIGHT A.F.F. UNO.
- FIRE SPRINKLER



KEY PLAN

REGISTERED ARCHITECT MARIN RIVARD 23035 STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW A0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Dwn by: F. DE LUNA
Solicitation No.: W9126G26RA030
Contract No.
Reviewed by: J. DUNCE
Submitted by: C. LANGUM
File name:
Plot date: 7/20/26 2:44 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

FIRST FLOOR REFLECTED CEILING PLAN - AREA B

Sheet reference number
D4-A-115
Sheet of

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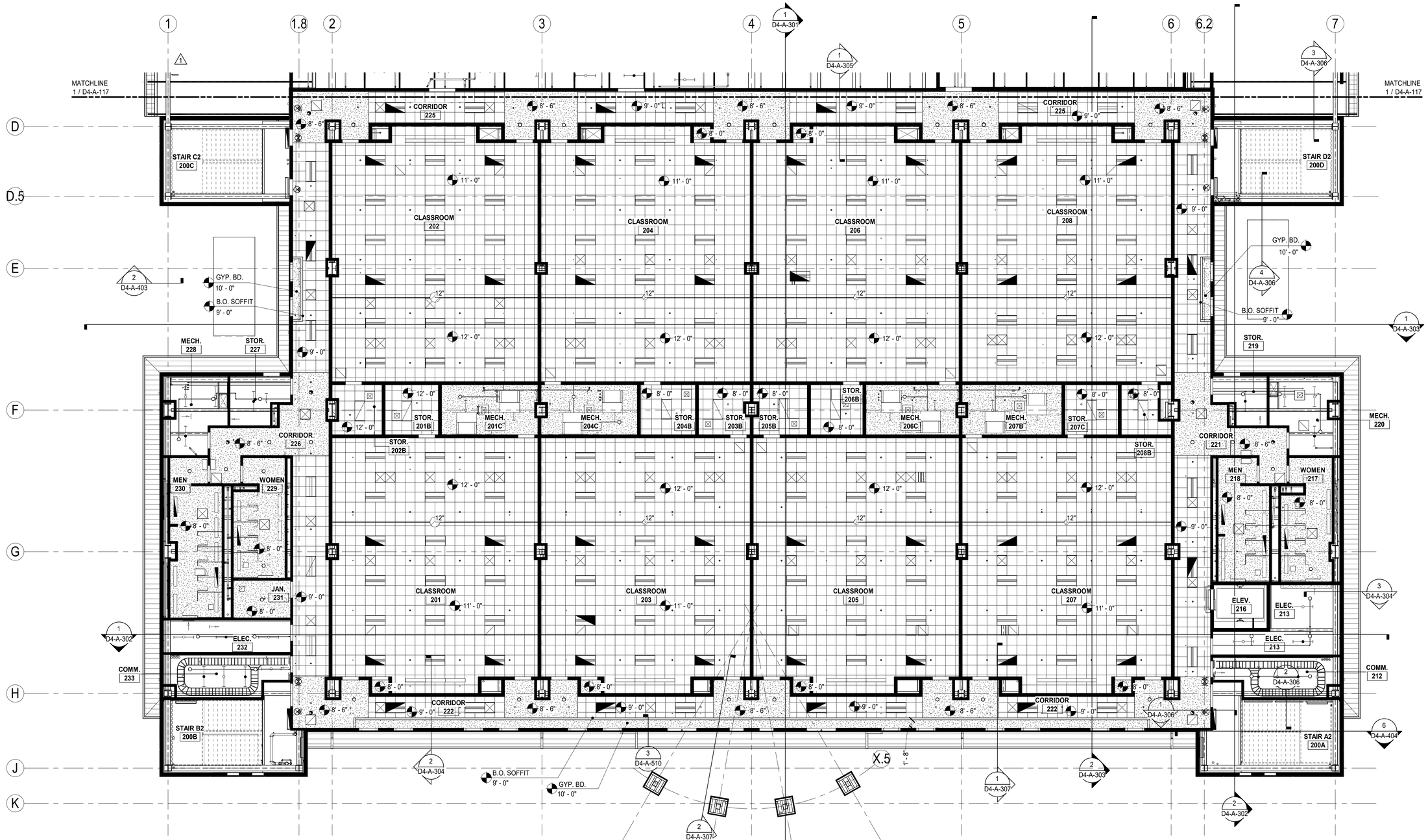

SECOND FLOOR REFLECTED CEILING PLAN - AREA A

1 — 1/8" = 1'-0"

PLAN NORTH

8 6 4 2 0 8 16

SHEET NOTES

1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL DOWNLIGHTS, SPEAKERS, SPRINKLER HEADS, ETC. SHALL BE CENTERED IN CEILING TILE.
2. CLIP IN PLACE CEILING TILES WITHIN A 6'-0" RADIUS IMMEDIATELY IN FRONT OF EACH EXTERIOR DOOR.
3. ENTER CORRIDOR LIGHTING EQUALLY FROM EACH SIDE IN WIDTH OF CORRIDOR SPACE. AT JOGS IN CORRIDOR WALL ALIGN FIXTURES THROUGH ENTIRE LENGTH OF CORRIDOR. SPACE FIXTURES ALONG CORRIDOR LENGTH AT UNIFORM DISTANCES. PROVIDE EQUAL DISTANCE FROM EACH END FIXTURE TO END OF CORRIDOR.
4. ARCHITECTURAL CEILING PLANS ARE FOR LOCATING FIXTURES UNLESS NOTED OTHERWISE. FOR ADDITIONAL INFORMATION AND RELATED WORK REFER TO ELECTRICAL LIGHTING, MECHANICAL, AND PLUMBING PLANS.
5. COORDINATE LOCATION OF ALL ACCESS PANELS IN FIELD AND CONSOLIDATE IF POSSIBLE.
6. A.F.F. CEILING ELEVATIONS ARE MEASURED FROM THE FINISHED FLOOR OF EACH FLOOR.
7. PAINT ALL EXPOSED STEEL COMPONENTS. DO NOT OVERPAINT MEMBERS WITH INTUMESCENT PAINT TYP, UNO.
8. FOR TYPICAL SUSPENDED GYP BOARD ACCESS PANEL DETAIL, SEE14 / D4-A-510
9. TYPICAL CONTROL JOINT REFER TO 11 / D4-A-510
10. ALL CEILINGS ARE 9'-0" UNO.
11. FOR VIDEO WALL IN CLASSROOMS, RE: TELECOMMUNICATIONS

KEYNOTES : DOES NOT APPLY ON ALL SHEETS

1. AIR CURTAIN
2. PROVIDE STRUCTURAL SUPPORT FOR CEILING HUNG TOILET PARTITION, TYP. COORDINATE MOUNTING HEIGHT WITH PARTITION MANUFACTURER. REFERENCE DETAIL 9 / D4-A-510 AND 16 / D4-A-510
3. ROOF ACCESS HATCH AND LADDER
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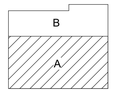
6. REFER TO KITCHEN DRAWINGS FOR CEILING FINISH
7. HOOD AND FIRE SUPPRESSION; RE: KITCHEN DRAWINGS
8. GYPSUM BOARD SOFFIT AROUND BEAM

LEGEND

- ACOUSTICAL TILE CEILING
- ACOUSTICAL TILE CEILING - SOUND RATED
- EXPOSED CEILING OPEN TO STRUCTURE
- GYPSUM WALLBOARD
- CEMENT BOARD WITH APPLIED FINISH - SEE FINISH SCHEDULE
- 2' x 4' FIBERGLASS REINFORCED PLASTIC PANEL ON CEMENT BOARD
- METAL SOFFIT PANEL
- EXPOSED METAL DECKING COLOR: DARK BRONZE
- RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
- EMERGENCY - RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
- RECESSED MOUNTED FLUORESCENT LIGHT FIXTURE
- EMERGENCY - RECESSED MOUNTED FLUORESCENT LIGHT FIXTURE
- STRIP FLUORESCENT LIGHT FIXTURE
- RECESSED COMPACT FLUORESCENT OR WALL WASHED LIGHT FIXTURE
- SQUARE DOWNLIGHT FIXTURE
- BUILDING EXTERIOR LIGHTING FIXTURE
- RECESSED FLUORESCENT LIGHT FIXTURE
- ATRIUM LIGHTING FIXTURE
- EXHAUST
- SUPPLY AIR DIFFUSER
- RETURN AIR DIFFUSER
- LINEAR DIFFUSERS
- J — JUNCTION BOX
- CEILING ACCESS PANEL
- CJ — CONTROL JOINT - RE: I-601 FINISH SELECTION AND I-103 FINISH PLAN
- EXIT LIGHT
- SPOT ELEVATION - HEIGHT A.F.F. UNO.
- FIRE SPRINKLER



KEY PLAN

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT — ALBERT MARIN RIVARD — 23035 — STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Drawn by: F. DE LUNA
Solicitation No.: W9126G25RA020
Reviewed by: D. DUKES
Contract No.:
Submitted by: C. LANGAM
File name:
File date: 7/20/2026 2:47:59 PM
Print scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPS:220527

SECOND FLOOR REFLECTED CEILING PLAN - AREA A

Sheet reference number
D4-A-116
Sheet of

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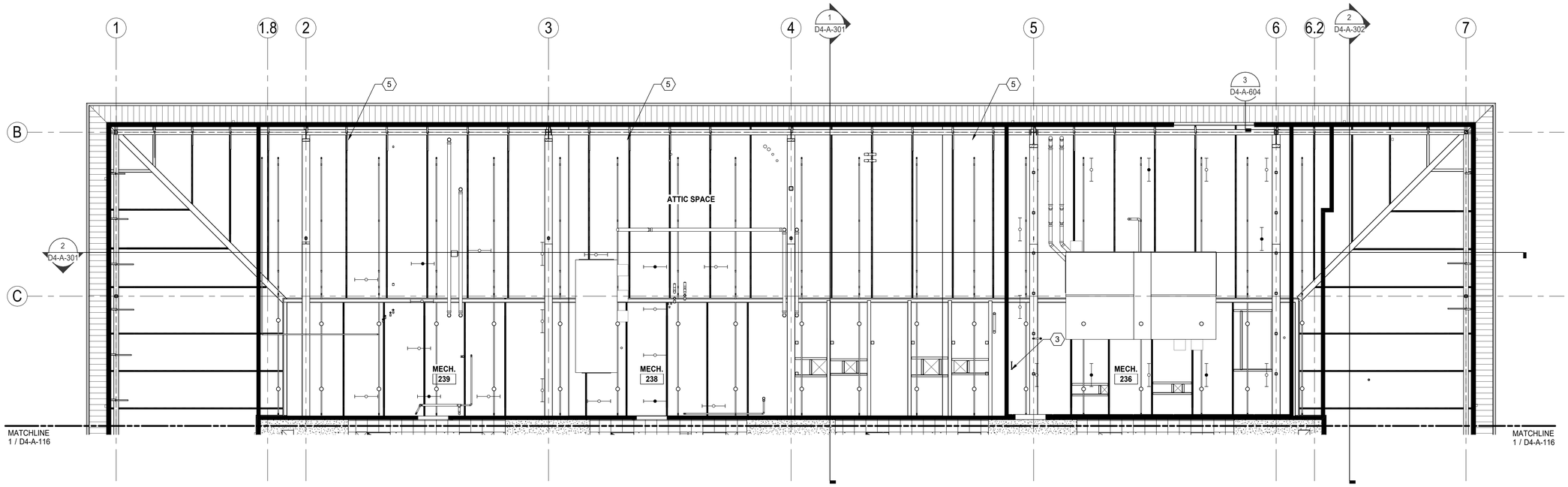
US Army Corps of Engineers
Fort Worth District



1 SECOND FLOOR REFLECTED CEILING PLAN - AREA B

1/8" = 1'-0"

PLAN NORTH

8 6 4 2 0 8 16

SHEET NOTES

1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL DOWNLIGHTS, SPEAKERS, SPRINKLER HEADS, ETC. SHALL BE CENTERED IN CEILING TILE.
2. CLIP IN PLACE CEILING TILES WITHIN A 6'-0" RADIUS IMMEDIATELY IN FRONT OF EACH EXTERIOR DOOR.
3. ENTER CORRIDOR LIGHTING EQUALLY FROM EACH SIDE IN WIDTH OF CORRIDOR SPACE. AT JOGS IN CORRIDOR WALL ALIGN FIXTURES THROUGH ENTIRE LENGTH OF CORRIDOR. SPACE FIXTURES ALONG CORRIDOR LENGTH AT UNIFORM DISTANCES. PROVIDE EQUAL DISTANCE FROM EACH END FIXTURE TO END OF CORRIDOR.
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6. A.F.F. CEILING ELEVATIONS ARE MEASURED FROM THE FINISHED FLOOR OF EACH FLOOR.
7. PAINT ALL EXPOSED STEEL COMPONENTS. DO NOT OVERPAINT MEMBERS WITH INTUMESCENT PAINT TYP, UNO.
8. FOR TYPICAL SUSPENDED GYP BOARD ACCESS PANEL DETAIL, SEE 14 / D4-A-510
9. TYPICAL CONTROL JOINT REFER TO 11 / D4-A-510
10. ALL CEILINGS ARE 9'-0" UNO
11. FOR VIDEO WALL IN CLASSROOMS, RE: TELECOMMUNICATIONS

KEYNOTES : DOES NOT APPLY ON ALL SHEETS

1. AIR CURTAIN
2. PROVIDE STRUCTURAL SUPPORT FOR CEILING HUNG TOILET PARTITION, TYP. COORDINATE MOUNTING HEIGHT WITH PARTITION MANUFACTURER. REFERENCE DETAIL 9 / D4-A-510 AND 16 / D4-A-510
3. ROOF ACCESS HATCH AND LADDER
4. PROVIDE GWB SOFFIT AROUND CEILING OPENING
5. PROVIDE 1-HOUR SPRAY APPLIED FIRE PROOFING WITH THERMAL BARRIER AT ROOF ASSEMBLY
6. REFER TO KITCHEN DRAWINGS FOR CEILING FINISH
7. HOOD AND FIRE SUPPRESSION; RE: KITCHEN DRAWINGS
8. GYPSUM BOARD SOFFIT AROUND BEAM

LEGEND

- ACOUSTICAL TILE CEILING
- ACOUSTICAL TILE CEILING - SOUND RATED
- EXPOSED CEILING OPEN TO STRUCTURE
- GYPSUM WALLBOARD
- CEMENT BOARD WITH APPLIED FINISH - SEE FINISH SCHEDULE
- 2' x 4' FIBERGLASS REINFORCED PLASTIC PANEL ON CEMENT BOARD
- METAL SOFFIT PANEL
- EXPOSED METAL DECKING COLOR: DARK BRONZE
- RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
- EMERGENCY - RECESSED MOUNTED FLUORESCENT DIRECT/INDIRECT LIGHT FIXTURE
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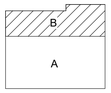
- RECESSED FLUORESCENT LIGHT FIXTURE
- ATRIUM LIGHTING FIXTURE
- EXHAUST
- SUPPLY AIR DIFFUSER
- RETURN AIR DIFFUSER
- LINEAR DIFFUSERS
- JUNCTION BOX
- CEILING ACCESS PANEL
- CJ — CONTROL JOINT - RE: I-601 FINISH SELECTION AND I-103 FINISH PLAN
- EXIT LIGHT
- SPOT ELEVATION - HEIGHT A.F.F. UNO.
- FIRE SPRINKLER



KEY PLAN

REGISTERED ARCHITECT
ALVIN RIVARD JR.
23038
STATE OF TEXAS

20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Dwn by: F. DE LUNA
Solicitation No.: W9126G25RA020
Contract No.
Reviewed by: J. LAYDEE
Submitted by: C. LANGUM
Approved by: C. LANGUM
File name:
Plot date: 7/21/2026 8:26:34 AM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, CONTRACTING DIVISION FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

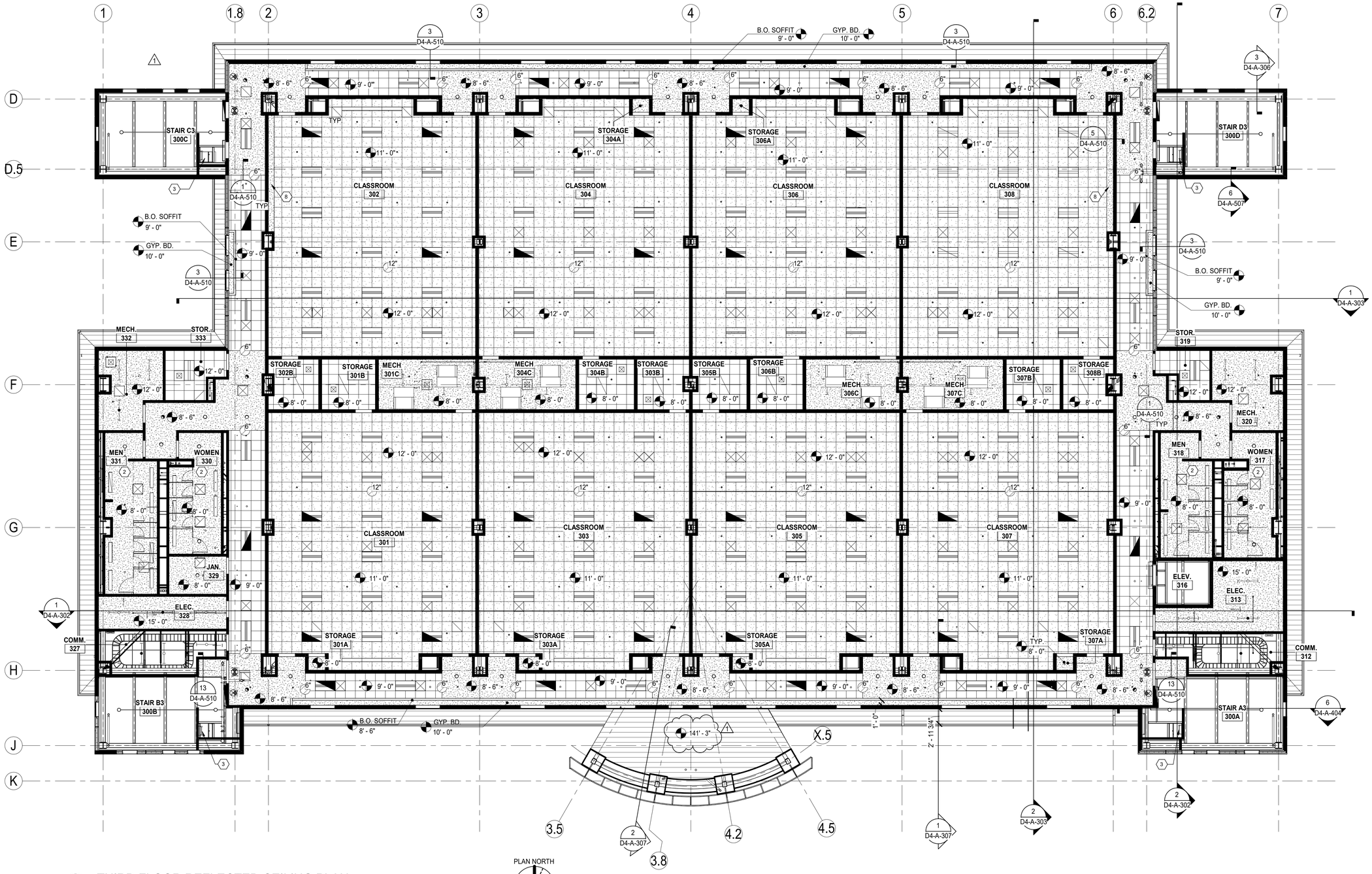
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

SECOND FLOOR REFLECTED CEILING PLAN - AREA B

Sheet reference number
D4-A-117
Sheet of

Contr No.

7/21/2026 8:26:34 AM



1 THIRD FLOOR REFLECTED CEILING PLAN
1/8" = 1'-0"

SHEET NOTES

1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL DOWNLIGHTS, SPEAKERS, SPRINKLER HEADS, ETC. SHALL BE CENTERED IN CEILING TILE.
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7. HOOD AND FIRE SUPPRESSION; RE: KITCHEN DRAWINGS
8. GYPSUM BOARD SOFFIT AROUND BEAM

LEGEND

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- BUILDING EXTERIOR LIGHTING FIXTURE
- RECESSED FLUORESCENT LIGHT FIXTURE
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- CJ — CONTROL JOINT - RE: I-601 FINISH SELECTION AND I-103 FINISH PLAN
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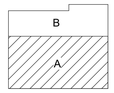
- SPOT ELEVATION - HEIGHT A.F.F. UNO.
- FIRE SPRINKLER



KEY PLAN

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT A. RIVARD 23035 STATE OF TEXAS
20 JULY 2026

No.	Description	Date	Action	O.O. No.
1	REVISED JAV AM0002	JULY 2026		

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Dwn by: F. DE LUNA
Solicitation No. W9126G26RA020
Contract No.
Reviewed by: S. LAPOSTE
Submitted by: C. LANGUM
Approved by: C. LANGUM
File name:
Plot date: Version name
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

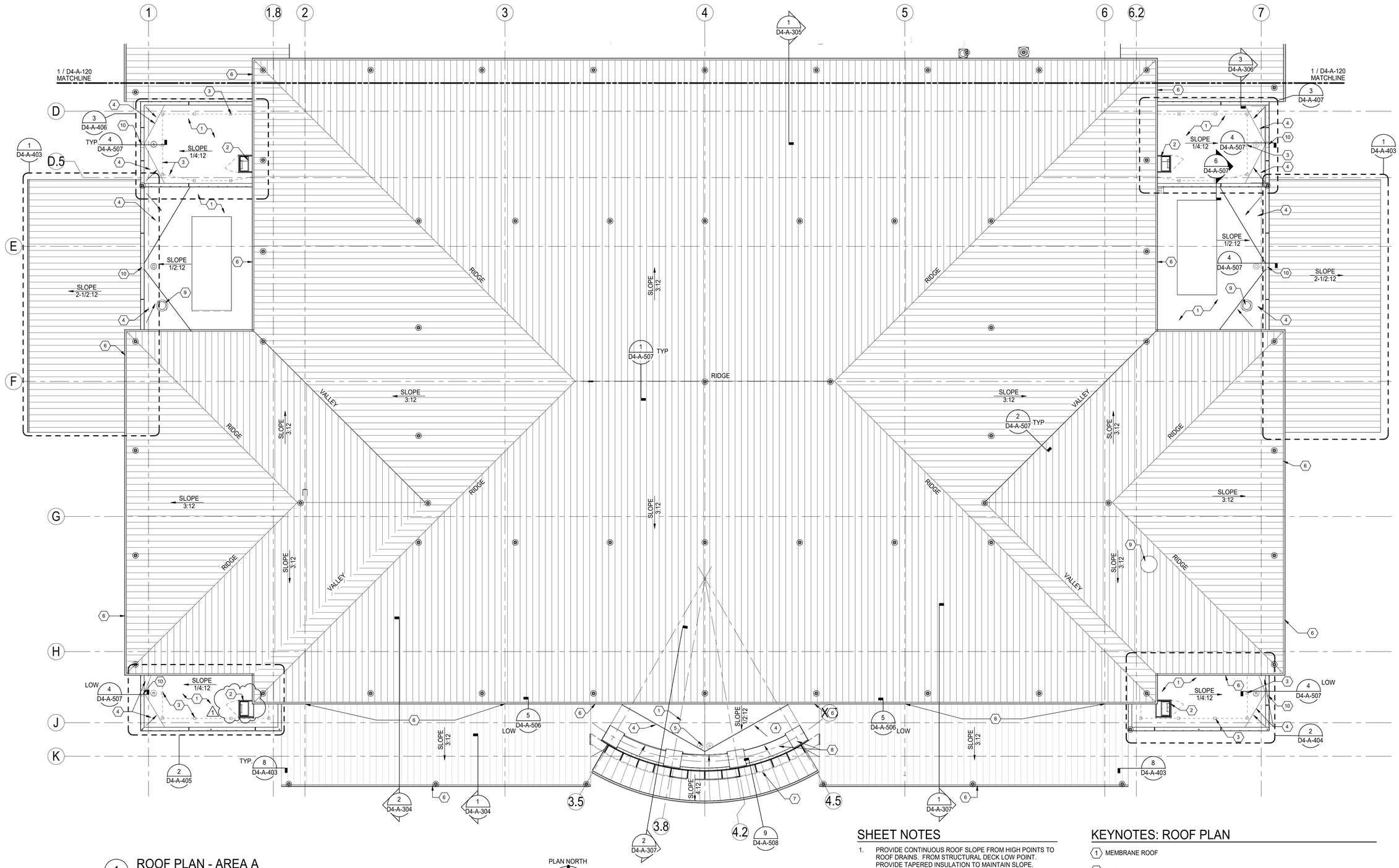
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220927

THIRD FLOOR REFLECTED CEILING PLAN

Sheet reference number
D4-A-118
Sheet of

Contr No.

7/20/2026 2:48:08 PM



1 ROOF PLAN - AREA A

1/8" = 1'-0"

8 6 4 2 0 8 16

PLAN NORTH

SHEET NOTES

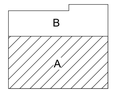
1. PROVIDE CONTINUOUS ROOF SLOPE FROM HIGH POINTS TO ROOF DRAINS. FROM STRUCTURAL DECK LOW POINT. PROVIDE TAPERED INSULATION TO MAINTAIN SLOPE. ARROWS INDICATE SLOPE DIRECTIONS.
2. PROVIDE FLASHING AT ALL SSMR PENETRATIONS: REFERENCE DTL 5/D4-A507.

LEGEND

- STANDING SEAM METAL ROOF
- MEMBRANE ROOF
- LIGHTNING PROTECTION - RE: ELECTRICAL
- FALL PROTECTION; RE: 13/D4-S-531

KEYNOTES: ROOF PLAN

1. MEMBRANE ROOF
2. ROOF ACCESS HATCH & GUARDRAIL RE:D4-A508
3. ROOF FALL PROTECTION. RE: DTL 10/D4-A-507 & DTL 10/D4-S-531
4. MEMBRANE ROOFING OVER TAPERED CRICKET -SLOPE TO DRAIN
5. OVERFLOW ROOF DRAIN - RE: DTL 7/D4-A507
6. PREFINISHED METAL GUTTER & DOWNSPOUT. PROVIDE LOCK AT LOCATIONS ON FLAT ROOF WHERE DOWNSPOUTS DAYLIGHT. MIN. GUTTER SIZE REQUIREMENT 6" X 6". MIN. DOWNSPOUT REQUIREMENT 3.75" X 4.75"
7. STEEL ARCHITECTURAL FEATURE, PAINT TO MATCH COMPOSITE METAL PANELS
8. FLAT SEAM METAL PANELS TO MATCH COMPOSITE METAL WALL. SLOPE TO DRAIN
9. MECH EQUIPMENT - RE: MECH
10. SCUPPER AND ROOF DRAIN - RE: DTL 4/D4-A507
11. SCREEN WALL -RE: DTL 4/D4-A508, 5/D4-A508& 6/D4-A508
12. ROOFTOP WALKWAY PADS



KEY PLAN

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT
ALAN RIVARD
23038
STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev:
Own by: F. DE LUNA
Solicitation No.: W912GG25RA030
Reviewed by: D.JONES
Contract No.
Submitted by: C. LANGUM
File name:
Plot date: Version 24.0 on PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CONTRACT DOCUMENTS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - JACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

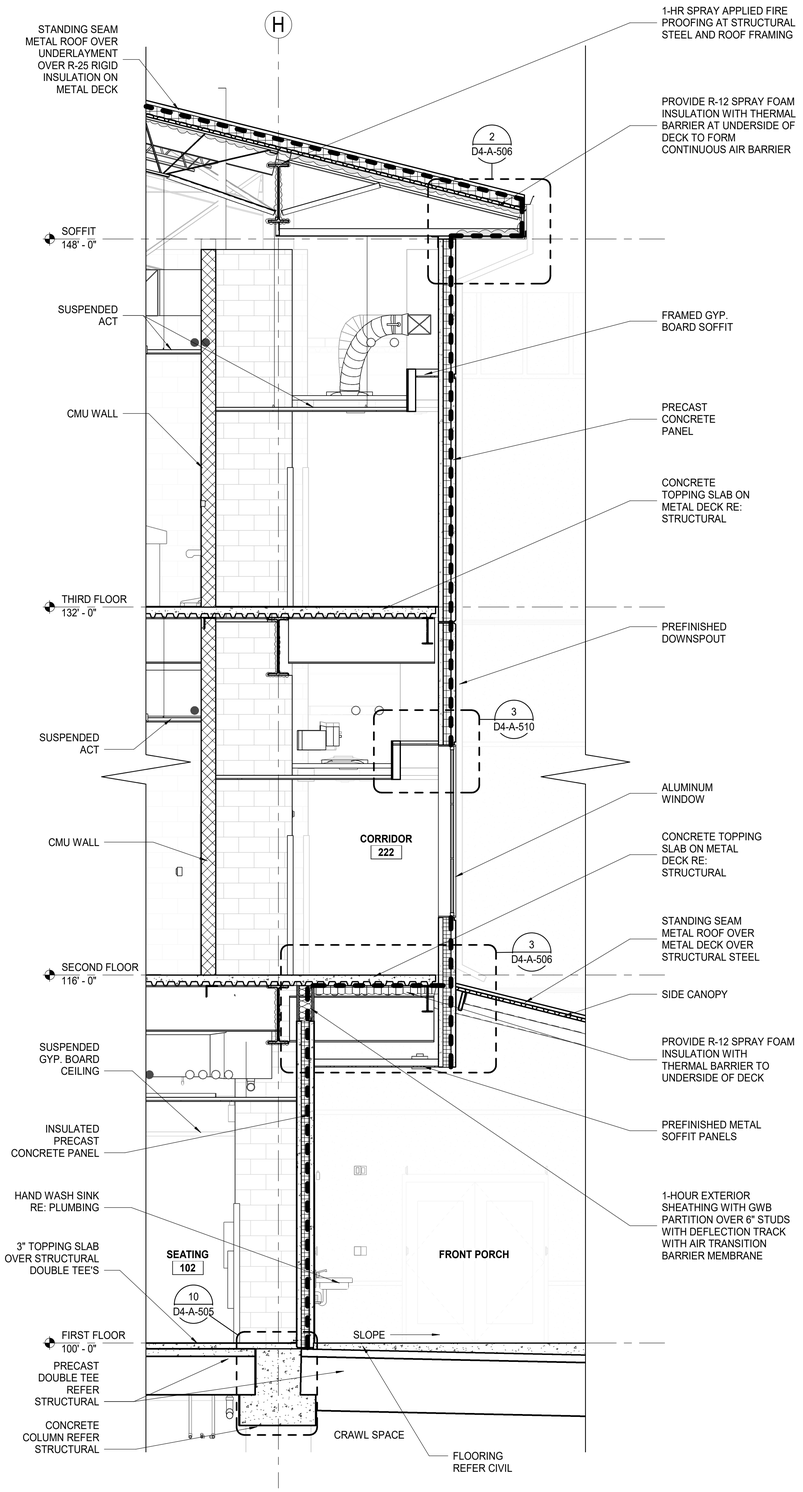
ROOF PLAN - AREA A

Sheet reference number
D4-A-119

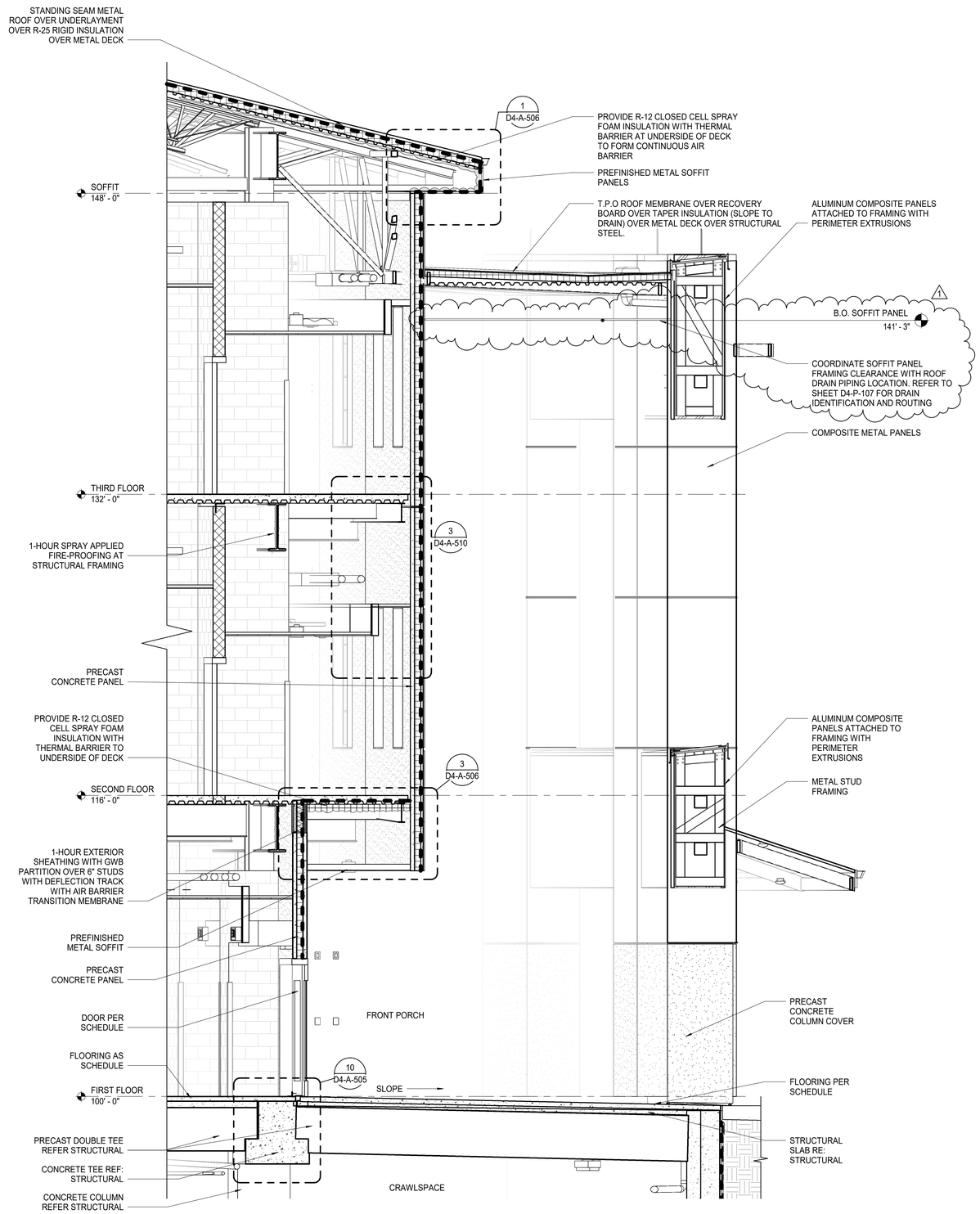
Sheet of

Cover No.

7/8/2026 2:24:41 PM



1 SECTION AT FRONT OVERHANG
3/8" = 1'-0"



2 SECTION AT FRONT CURVED PORCH
3/8" = 1'-0"

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT ALAN RIVARD 23038 STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev:
Dwn by: F. DE LUNA
Solicitation No.: W912G26RA030
Contract No.
Reviewed by: A. DUNCE, C. LANGUM
Submitted by: C. LANGUM
File name:
Plot date: 7/20/26 2:27 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH ATTN: CESWF-PDD-DES FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPS:220527

CURVED PORCH WALL SECTIONS

Sheet reference number
D4-A-307
Sheet of

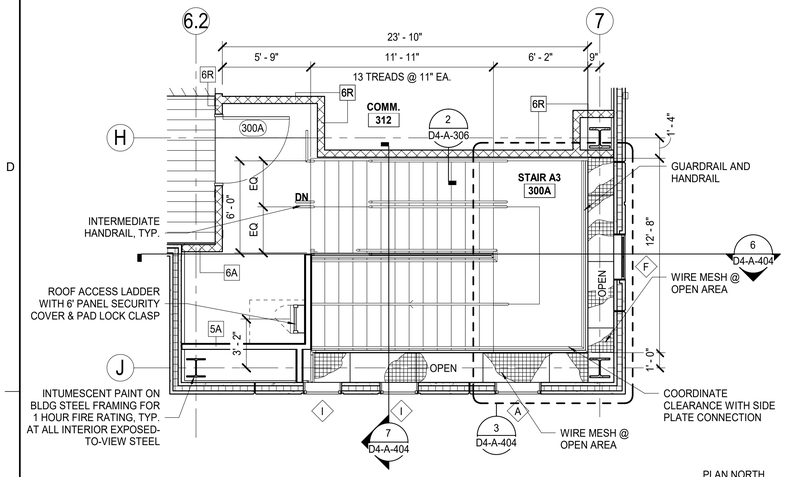
Cont No:

7/8/2026 2:27:57 PM

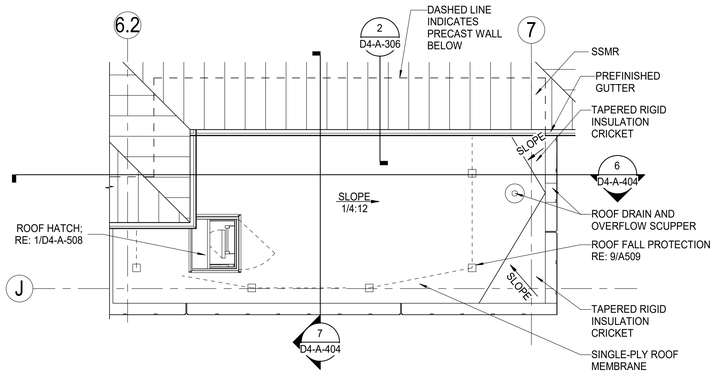
SHEET NOTES

1. REFER TO SHEET D4-A510 FOR HANDRAIL AND STAIR DETAILS.

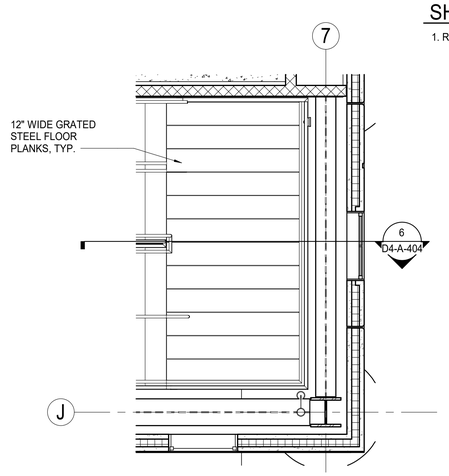
US Army Corps of Engineers
Fort Worth District



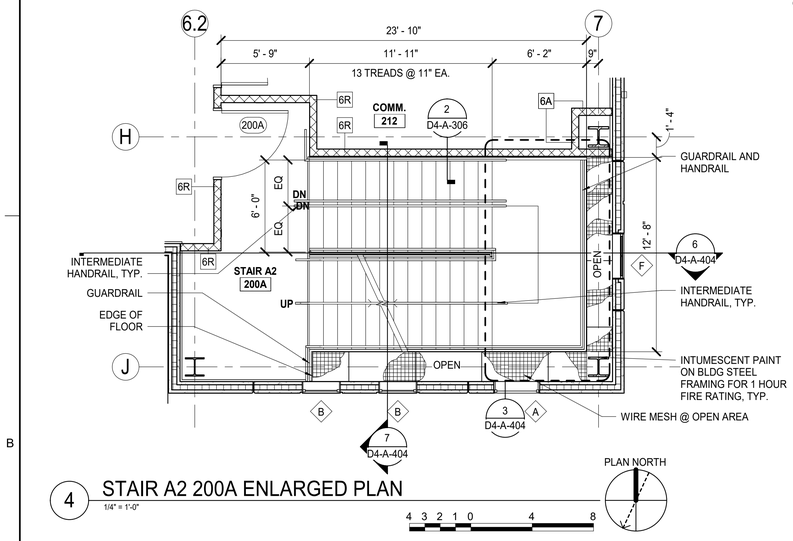
1 STAIR A3 300A ENLARGED PLAN
1/4" = 1'-0"



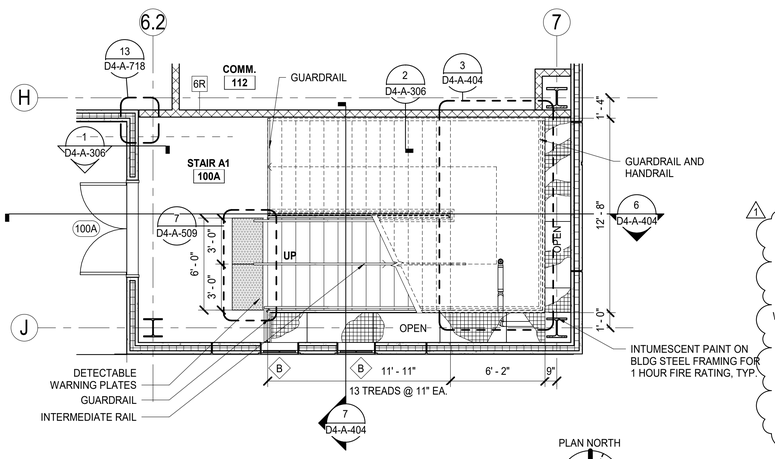
2 ROOF PLAN OVER STAIR A
1/4" = 1'-0"



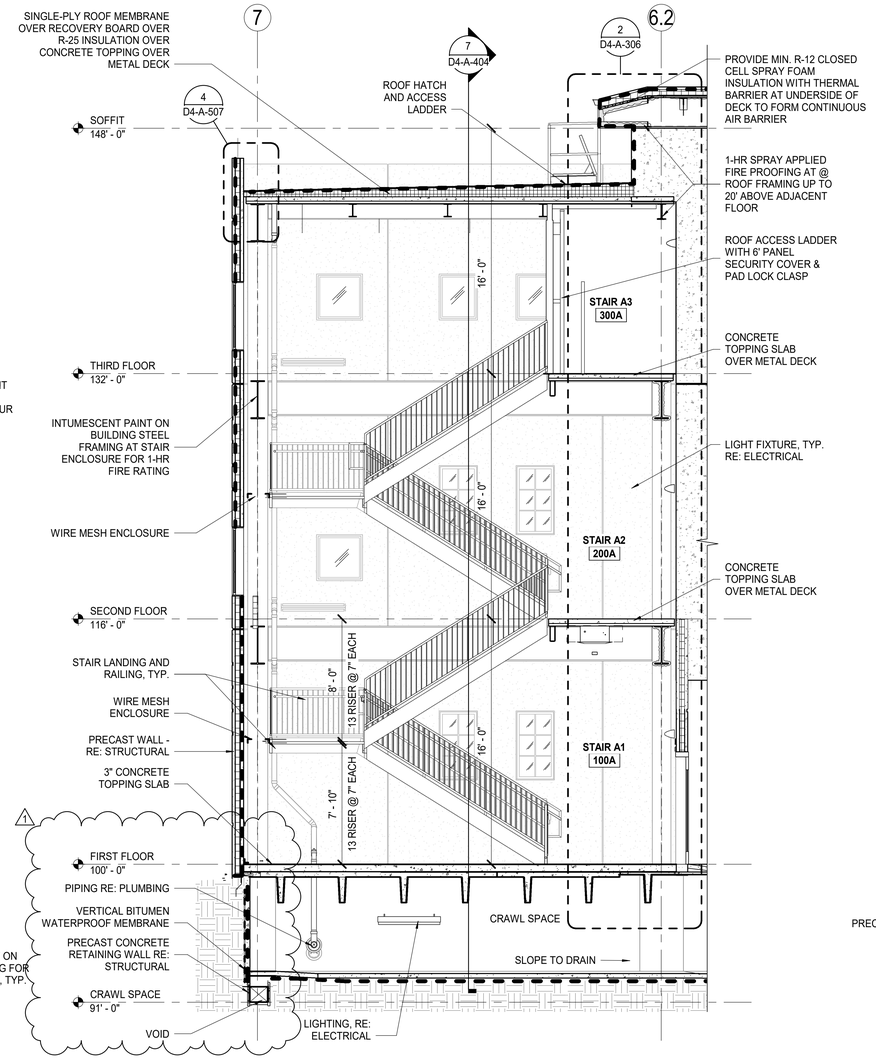
3 ENLARGED TYPICAL STAIR LANDING
3/8" = 1'-0"



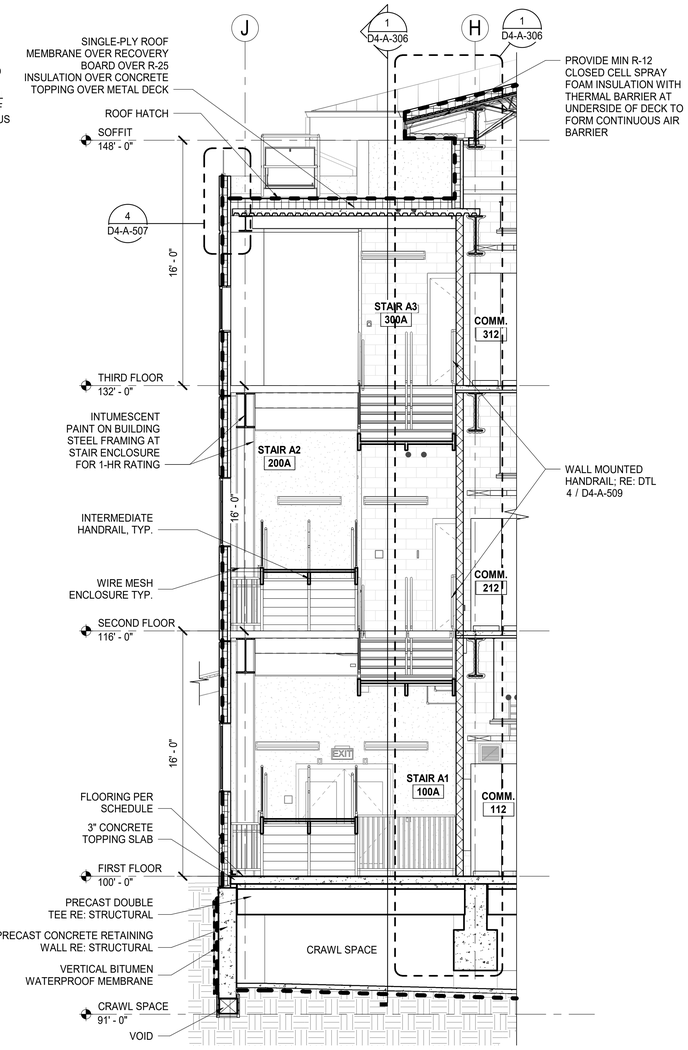
4 STAIR A2 200A ENLARGED PLAN
1/4" = 1'-0"



5 STAIR A1 100A ENLARGED PLAN
1/4" = 1'-0"



6 STAIR A SECTION
1/4" = 1'-0"



7 STAIR A SECTION
1/4" = 1'-0"

REGISTERED ARCHITECT ALBERTO RIVARD JR. 23038 STATE OF TEXAS
20 JULY 2026

No.	Description	Date
1	REVISED IAW AN0002	JULY 2026

Designed by: A. RIVARD	Date: MAY 2025
Dwn by: F. DE LUNA	Solicitation No.: W912R026RA020
Reviewed by: L. DUNEE, A. RIVARD, C. LANDUM	Contract No.:
	File name:
	Plot date: Issue in Line
	Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CONTRACTING DIVISION
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

STAIR A ENLARGED PLANS AND SECTIONS

Sheet reference number
D4-A-404
Sheet of

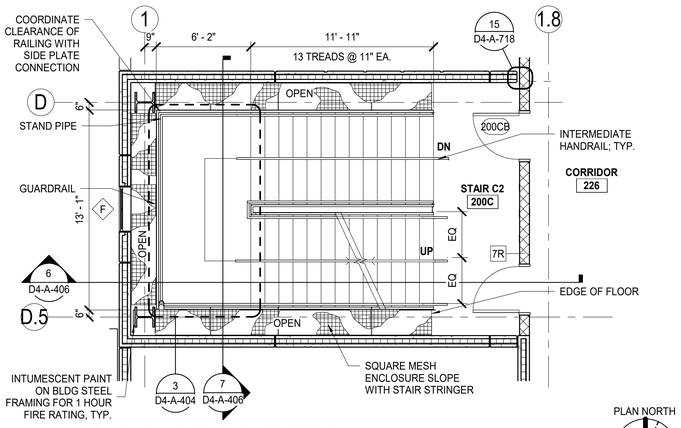
Cont No.

7/20/2026 2:17:30 PM

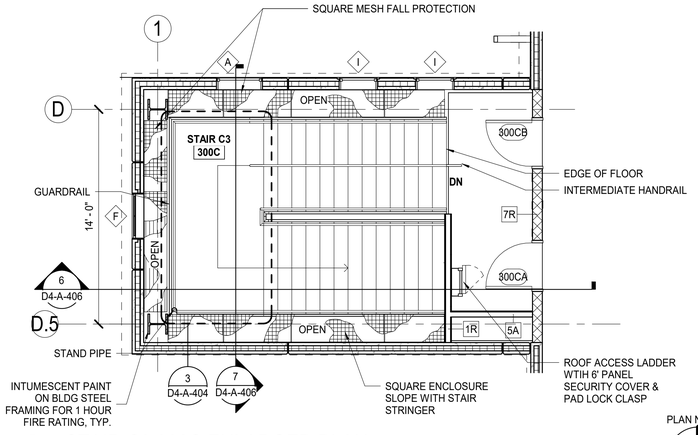
SHEET NOTES

1. REFER TO SHEET D4-A510 FOR HANDRAIL AND STAIR DETAILS.

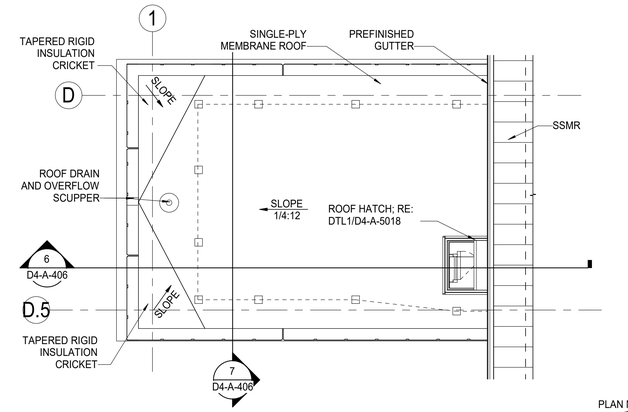
US Army Corps of Engineers
Fort Worth District



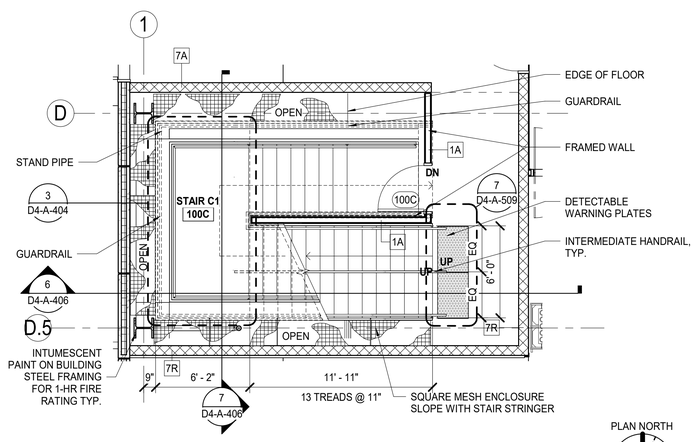
1 STAIR C2 200C ENLARGED PLAN
1/4" = 1'-0"



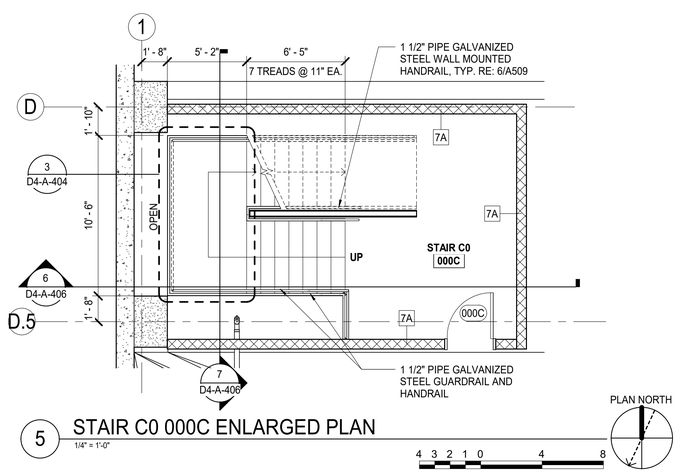
2 STAIR C3 300C ENLARGED PLAN
1/4" = 1'-0"



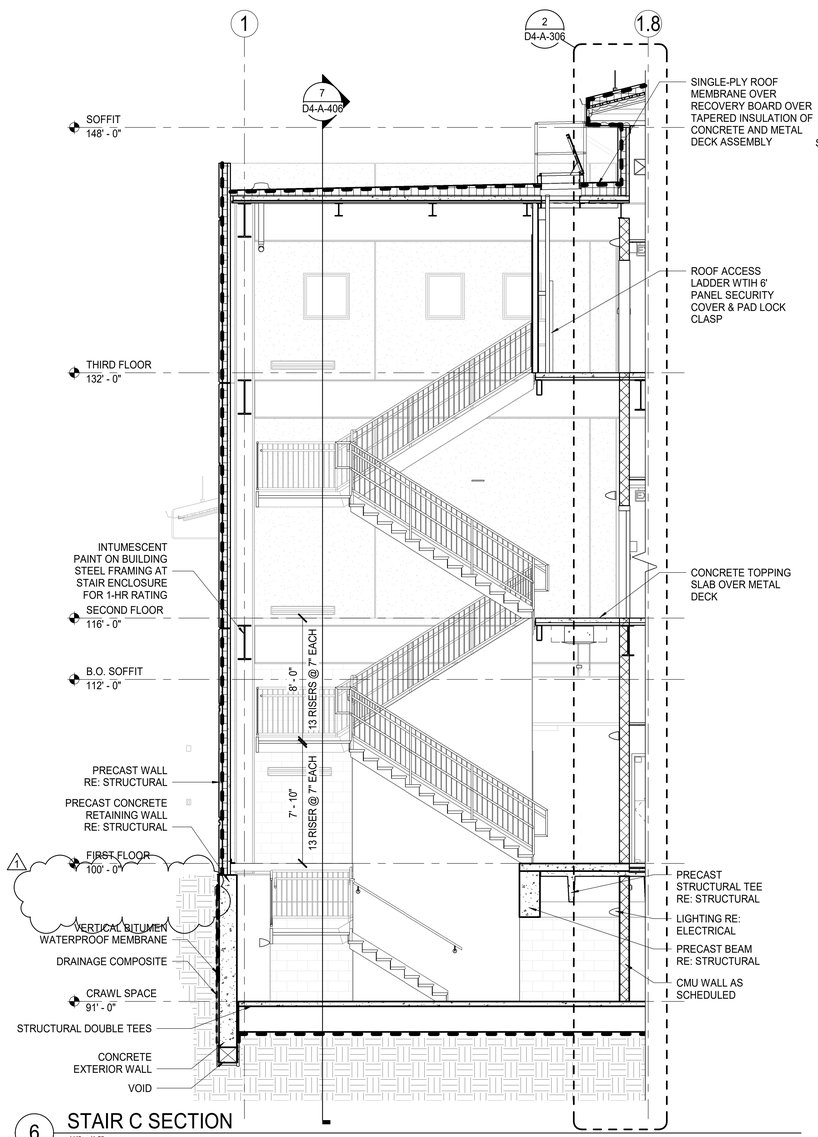
3 ROOF PLAN OVER STAIR C
1/4" = 1'-0"



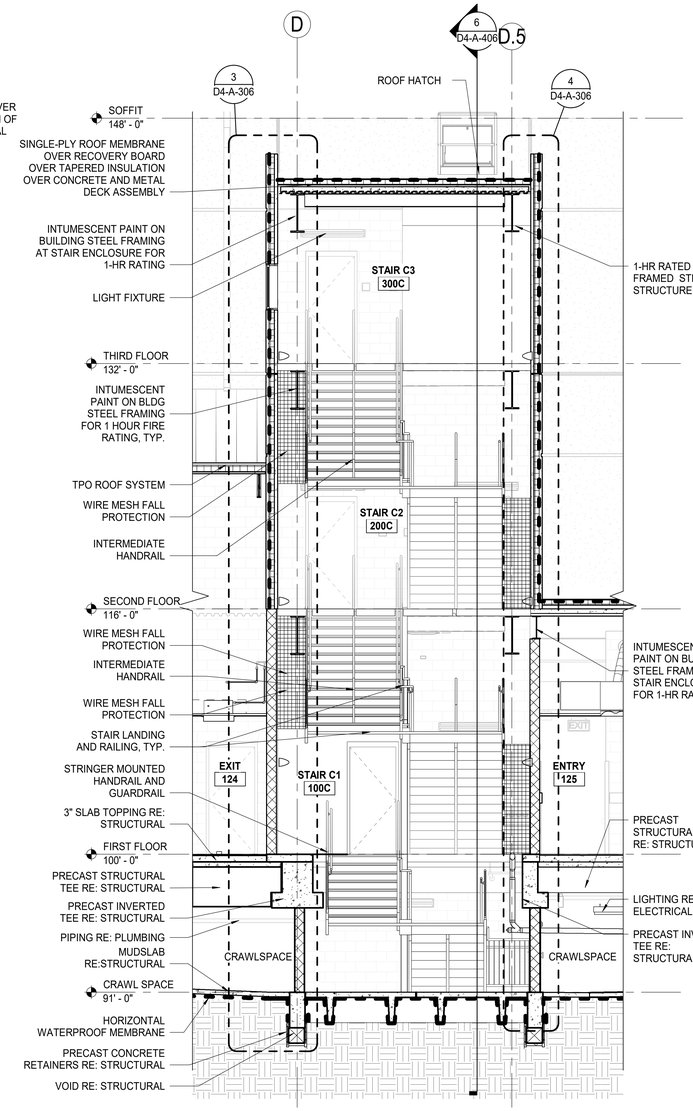
4 STAIR C1 100C ENLARGED PLAN
1/4" = 1'-0"



5 STAIR C0 000C ENLARGED PLAN
1/4" = 1'-0"



6 STAIR C SECTION
1/4" = 1'-0"



7 STAIR C SECTION
1/4" = 1'-0"

REGISTERED ARCHITECT ALAN RIVARD 23038 STATE OF TEXAS
20 JULY 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: A. RIVARD
Date: MAY 2025
Solicitation No.: W9126G26RA020
Rev.
Drawn by: F. DE LUNA
Contract No.:
Reviewed by: A. LOVATO
Approved by: C. LANGUM
File name:
Plot date: 7/20/2026 2:19:38 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CONTRACT SPECIFICATIONS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

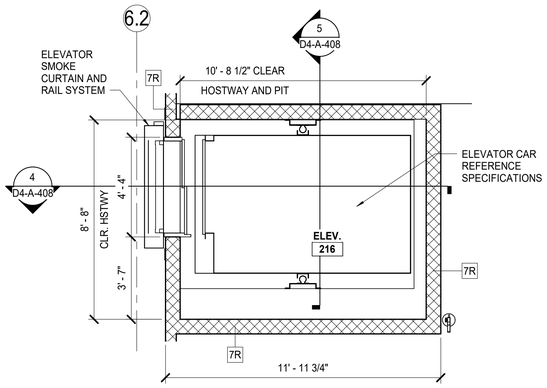
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

STAIR C ENLARGED PLANS AND SECTIONS

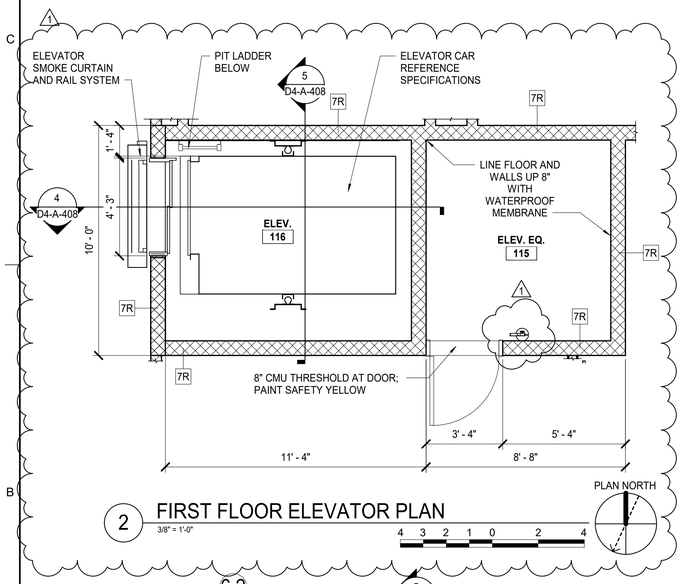
Sheet reference number
D4-A-406
Sheet of

Code No.

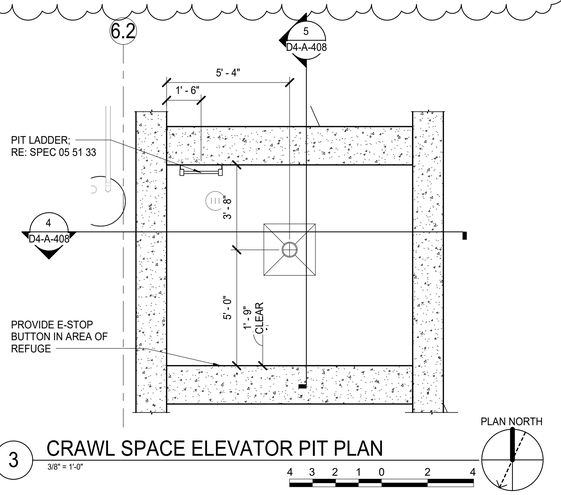
7/20/2026 2:19:38 PM



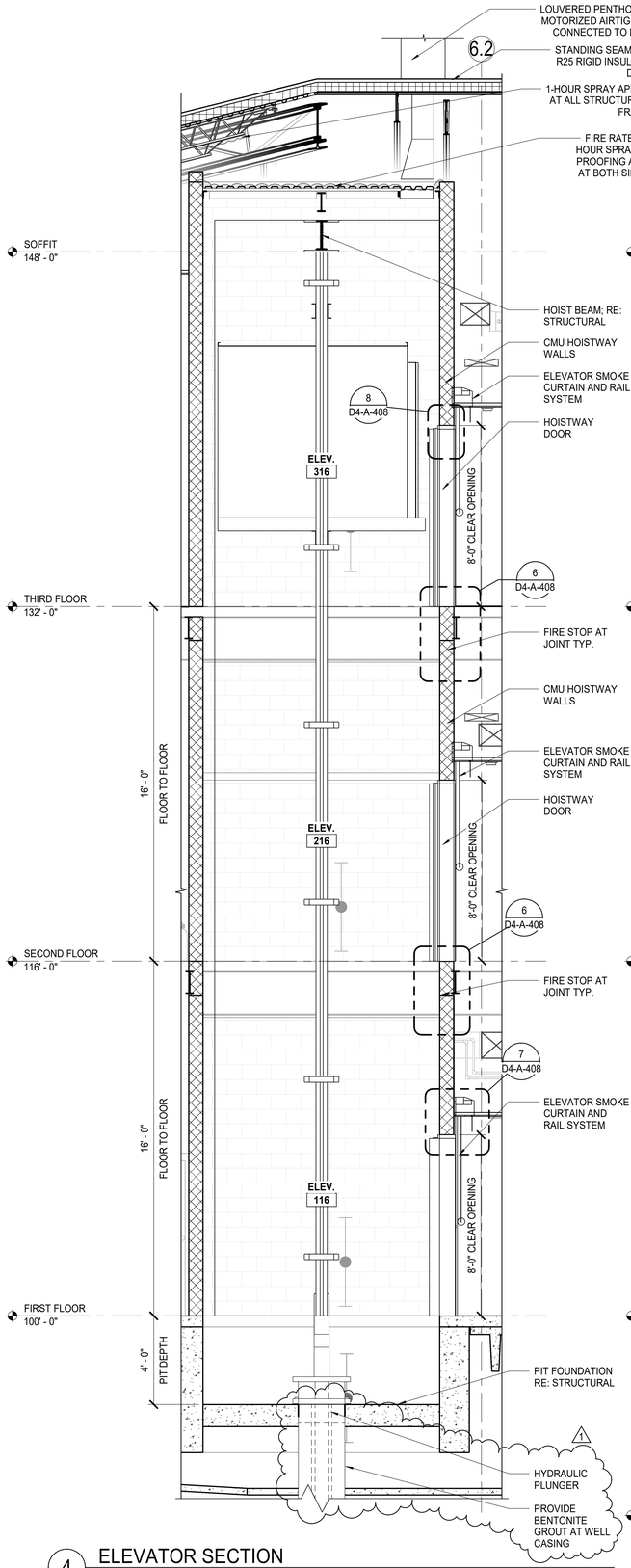
1 SECOND & THIRD FLOOR ELEVATOR PLAN
3/8" = 1'-0"



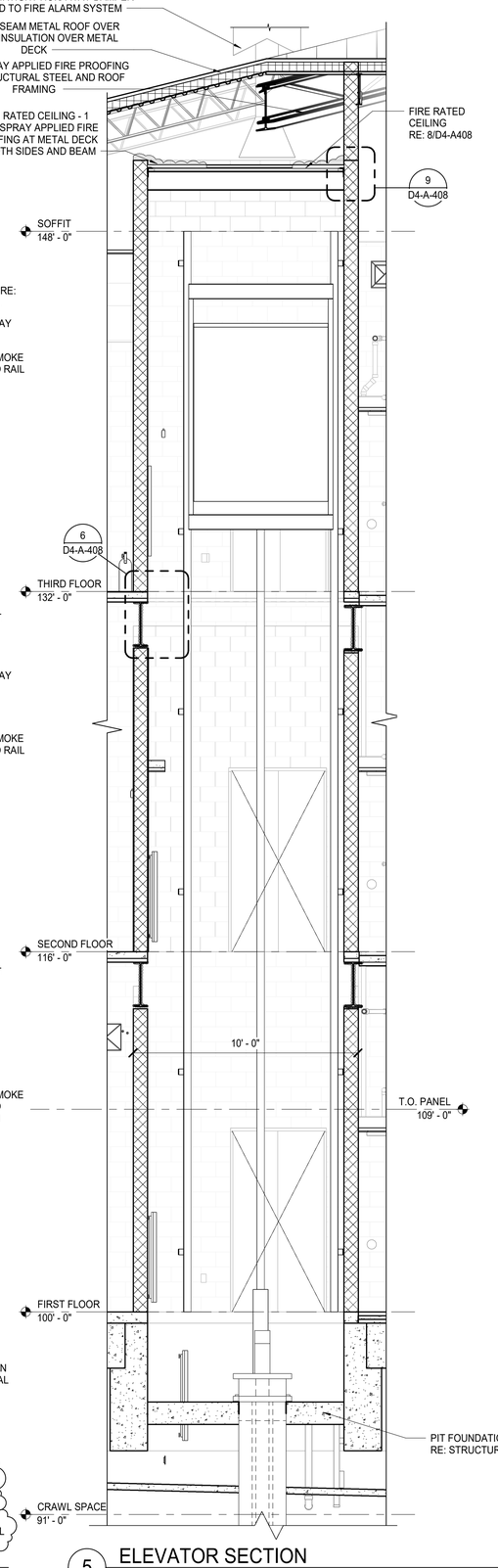
2 FIRST FLOOR ELEVATOR PLAN
3/8" = 1'-0"



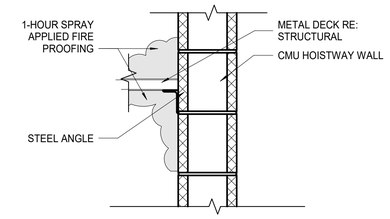
3 CRAWL SPACE ELEVATOR PIT PLAN
3/8" = 1'-0"



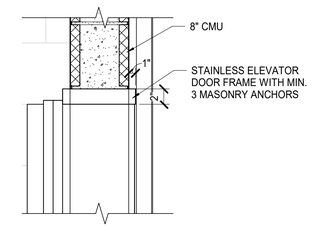
4 ELEVATOR SECTION
3/8" = 1'-0"



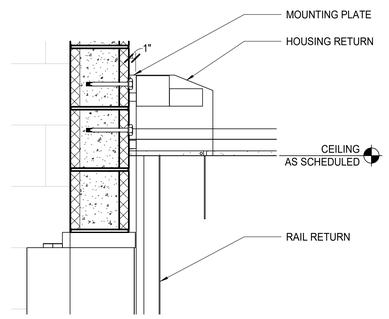
5 ELEVATOR SECTION
3/8" = 1'-0"



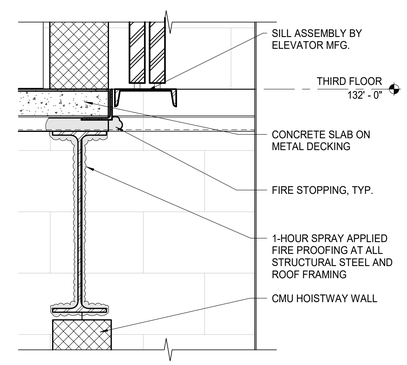
9 DETAIL AT ELEVATOR HOISTWAY
1 1/2" = 1'-0"



8 ELEVATOR DOOR JAMB DETAIL
1 1/2" = 1'-0"



7 ELEVATOR SMOKE CURTAIN DETAIL
1 1/2" = 1'-0"



6 ELEVATOR SILL DETAIL
1 1/2" = 1'-0"

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT
ALBERTO ALVARO RIVARD
23035
STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Solicitation No.: W9126G26RA030
Rev.:
Dwn by: F. DE LUNA
Contract No.:
Reviewed by: J. LAVOIE
File name:
Plot date: Plot scale: 1:1
Submitted by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH DESIGN CENTER, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS DINING CLASSROOM FACILITY (DCF4)
MPSL220527

ELEVATOR PLANS AND SECTIONS

Sheet reference number
D4-A-408
Sheet of

Contr No.:

7/20/2026 11:06:07 AM

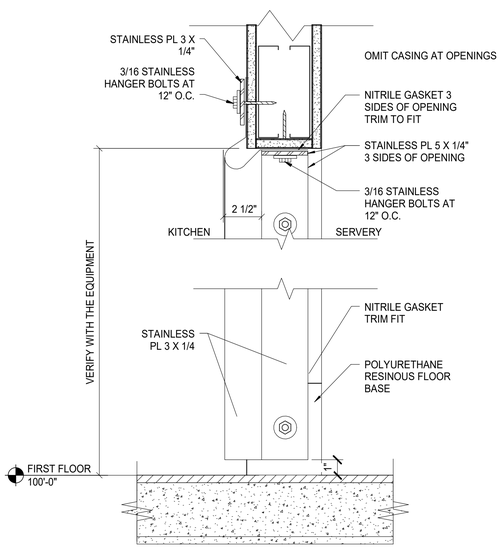
US Army Corps of Engineers
Fort Worth District

SHEET NOTES: PARTITION TYPES

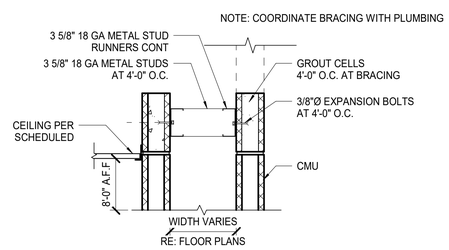
1. PARTITION THICKNESS SHOWN ON THE FLOOR PLANS ARE NOMINAL (NOM.) DIMENSIONS.
2. PARTITION TYPES ARE TYPICAL. NOT ALL PARTITION TYPES ARE USED.
3. ALL PARTITION TYPES WITH A "R" AS PART OF THE IDENTIFIER SHALL BE FIRE RATED.
4. PARTITION TYPES WITH STC RATINGS SHOW THE MINIMUM ACCEPTABLE CONSTRUCTION.
5. PARTITION TYPES WITH UL DESIGN NO. SHALL BE CONSTRUCTED AS INDICATED IN UL FIRE RESISTANCE DIRECTORY.
6. INTERIOR PARTITION STUD SPACING SHALL NOT EXCEED 16" O.C.
7. FIRE RATED PARTITIONS SHALL EXTEND TO THE UNDERSIDE OF FLOOR OR ROOF DECK.
8. FOR ALL KITCHEN STUD PARTITIONS SEE D4-A110 & D4-A501. OMIT CURB AT COLUMN ENCLOSURES.

SHEET NOTES: MASONRY PARTITION CONSTRUCTION

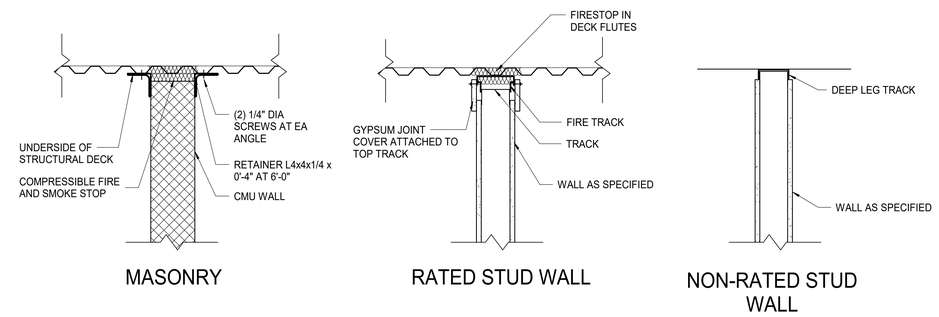
1. HORIZONTAL REINFORCING AT 16 INCHES O.C.
2. 6 INCH MASONRY WALLS
   - A. SOLID GROUT AND REINFORCE WITH # 4 VERTICAL AT 32" O.C.
   - B. REINFORCE WALL ENDS, OPENING HEADS AND JAMBS PER STRUCTURAL.
   - C. BRACE 6 INCH MASONRY WALLS WITH UNBRACED LENGTH GREATER THAN 10'-0" AT 10'-0" HEIGHT. BRACE FULL HEIGHT WALLS AS SHOWN IN DETAIL 3/A502. BRACE PARTIAL HEIGHT WALLS AS SHOWN IN DETAIL 13/S511.
3. 8 INCH MASONRY WALLS
   - A. SOLID GROUT AND REINFORCE VERTICAL WITH VERTICAL # 4 AT 48" O.C.
   - B. REINFORCE WALL ENDS, OPENING HEADS AND JAMBS PER STRUCTURAL/



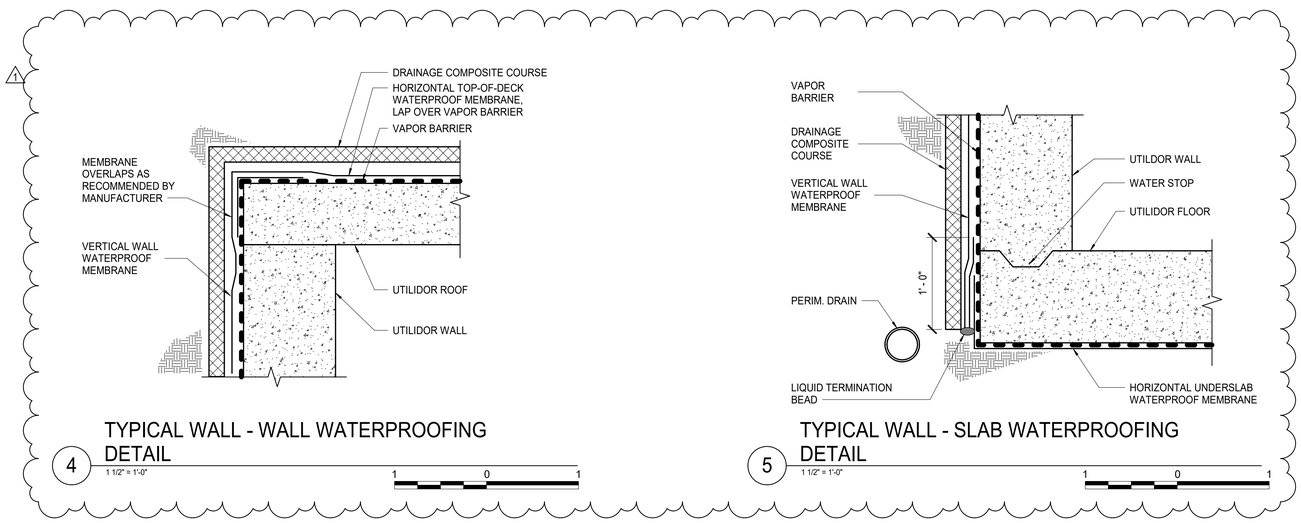
1 SERVERY WALL OPENING DETAILS
3" = 1'-0"



2 BRACING DETAIL AT CHASE TYPE "B"
1 1/2" = 1'-0"



3 WALL HEAD / SLIP JOINT DETAILS
1 1/2" = 1'-0"



4 TYPICAL WALL - WALL WATERPROOFING DETAIL
1 1/2" = 1'-0"

5 TYPICAL WALL - SLAB WATERPROOFING DETAIL
1 1/2" = 1'-0"

REGISTERED ARCHITECT ALAN RIVARD 23038 STATE OF TEXAS
20 JULY 2026

No.	Description	Date	Action	O.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Drawn by: F. DE LUNA
Solicitation No.: W9126G26RA020
Contract No.:
Reviewed by: A. DORSEY
Approved by: C. LANGUM
File name:
Plot date: 7/20/2026 2:51:28 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
MERRICK
DRAWING NUMBER: LA 20-0003

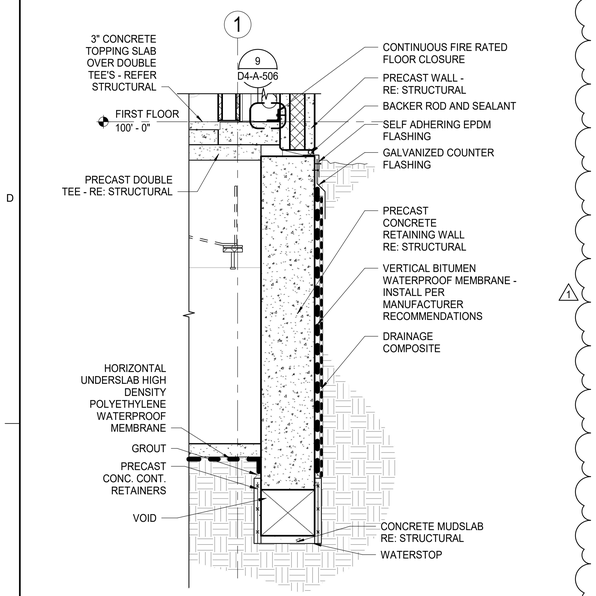
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

PARTITION TYPES AND DETAILS

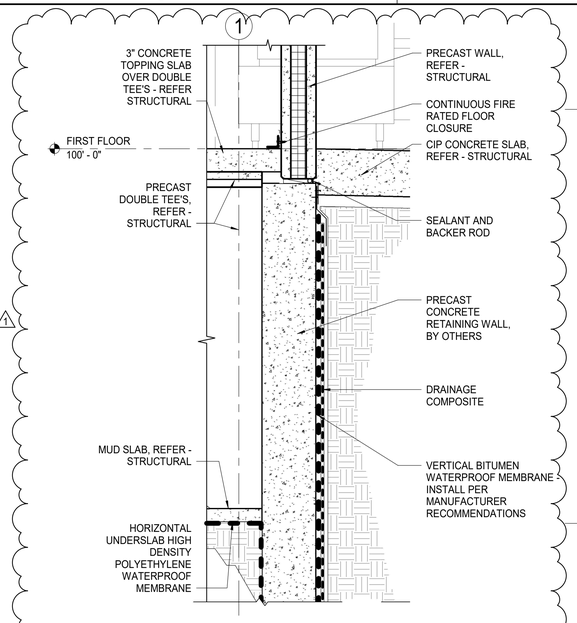
Sheet reference number
D4-A-502
Sheet of

Cover No.

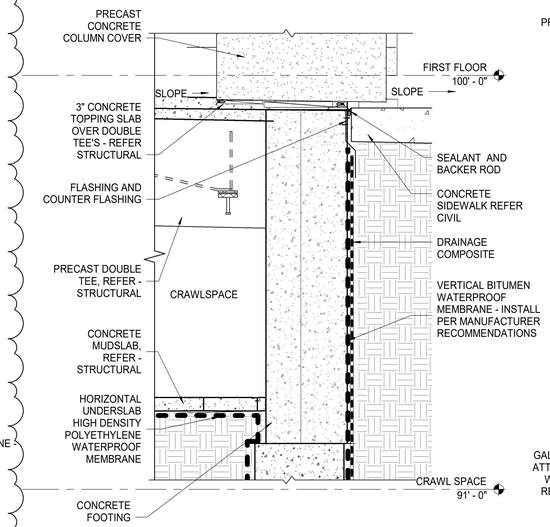
7/8/2026 2:51:28 PM



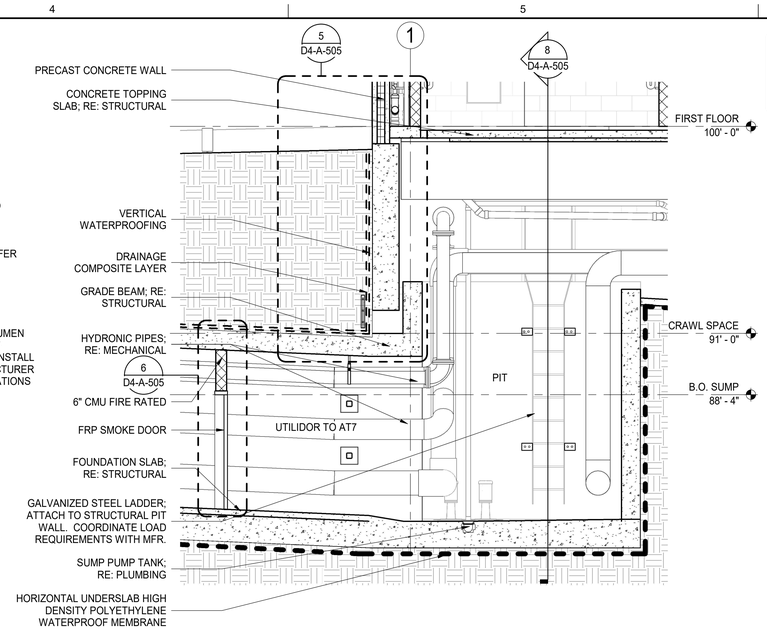
1 CONCRETE DETAIL
3/4" = 1'-0"



2 FOUNDATION WALL DETAIL
3/4" = 1'-0"



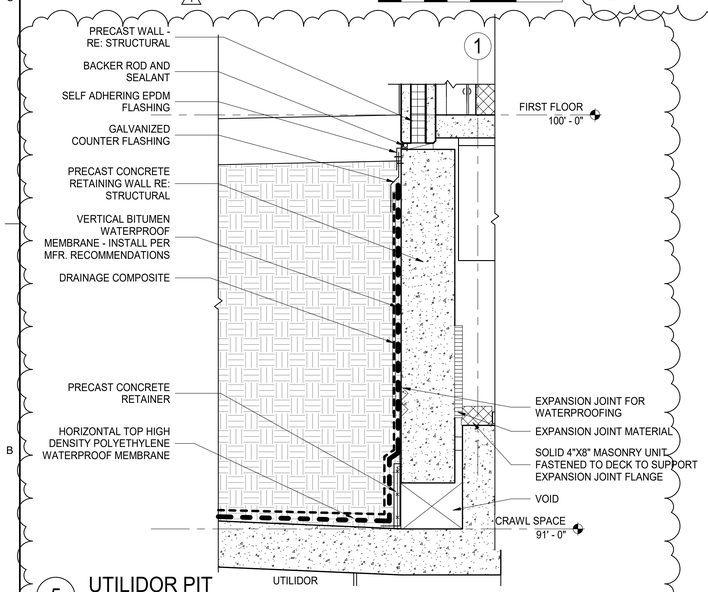
3 FOUNDATION WALL @ CURVED ENTRY DETAIL
3/4" = 1'-0"



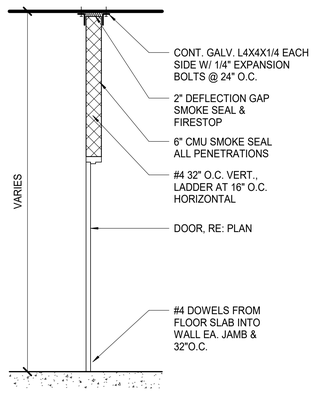
4 UTILIDOR TO PIT SECTION
3/8" = 1'-0"

US Army Corps of Engineers
Fort Worth District

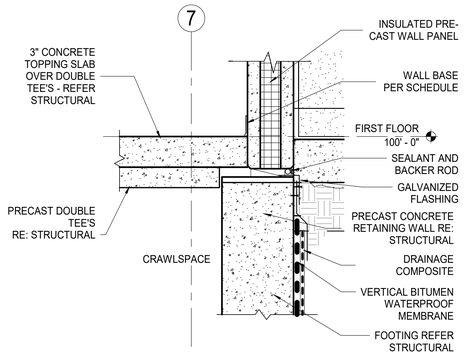
REGISTERED ARCHITECT ALBERTO RIVARD 23035 STATE OF TEXAS
20 JULY 2026



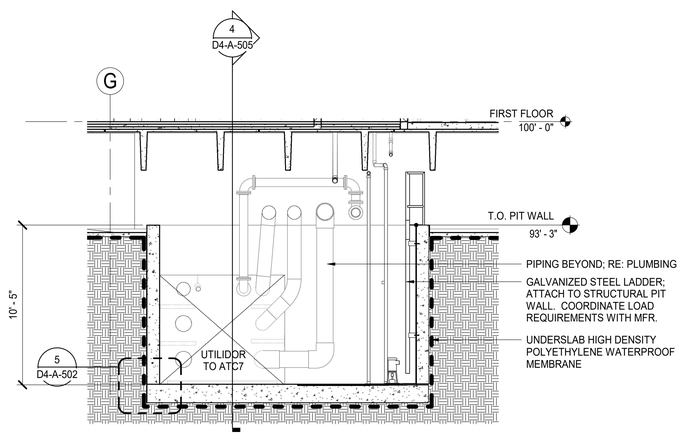
5 UTILIDOR PIT
3/4" = 1'-0"



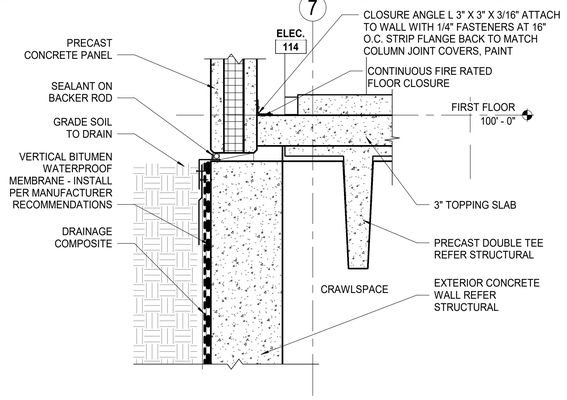
6 UTILIDOR SMOKE DOOR
1/2" = 1'-0"



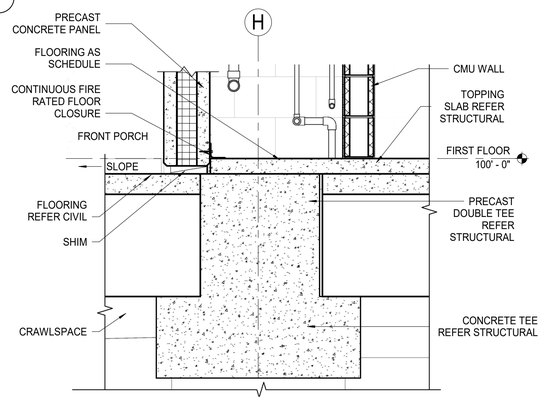
7 FOUNDATION WALL DETAIL
1" = 1'-0"



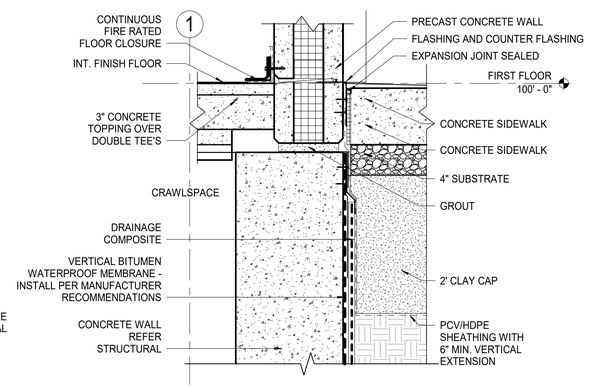
8 PIT SECTION
1/4" = 1'-0"



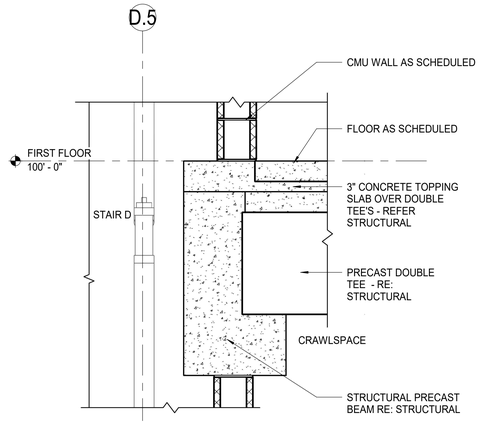
9 PRECAST PANEL AT FOUNDATION
1" = 1'-0"



10 PRECAST PANEL TO FOUNDATION AT STOOP
1" = 1'-0"



11 DETAIL AT CRAWL SPACE
1 1/2" = 1'-0"



12 FLOOR TO STAIR AT CRAWL SPACE
1" = 1'-0"

No.	Description	D.O. No.	Action	Date
1	REVISED IAW A00002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev:
Dwn by: F. DE LUNA
Solicitation No.: W9126G25RA020
Reviewed by: J. DUREE
Contract No.:
Reviewed by: C. LANGUM
File date: 11/12/25 10:30:17 AM
Plot date: 11/12/25 10:30:17 AM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

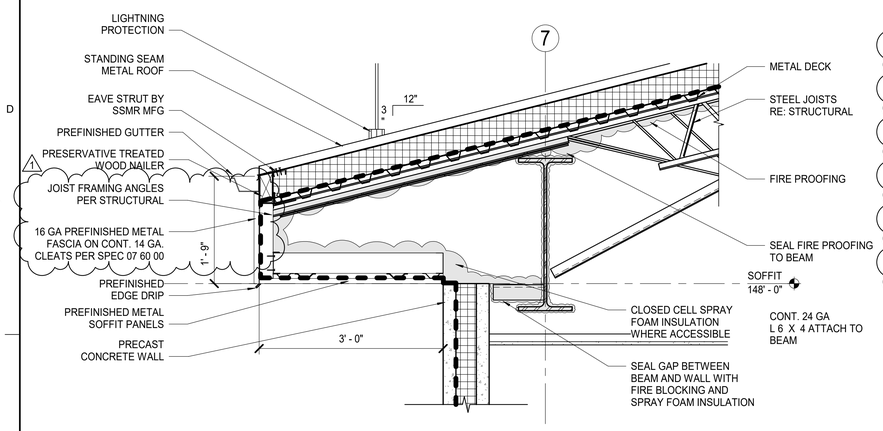
IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

SECTION DETAILS

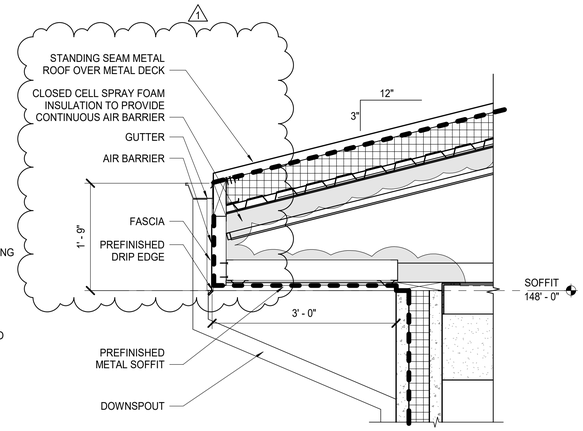
Sheet reference number
D4-A-505
Sheet of

Cont No.:

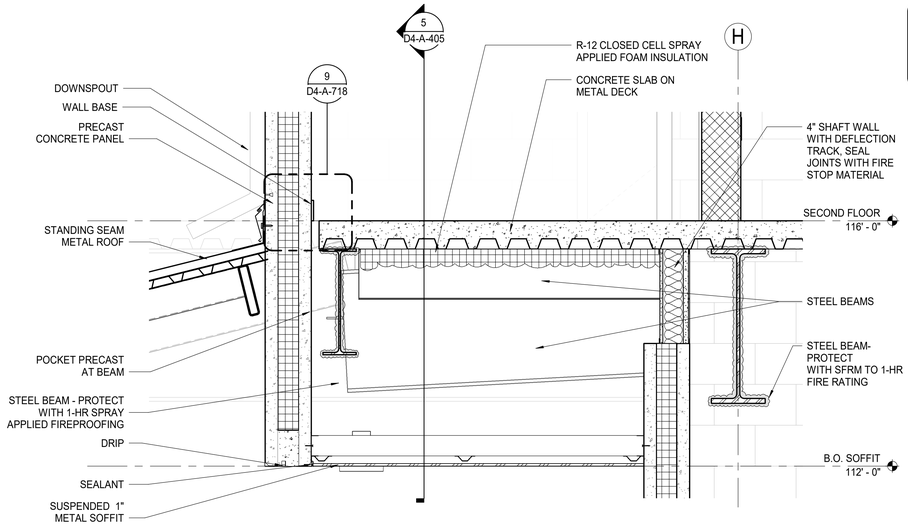
7/16/2026 10:36:07 AM



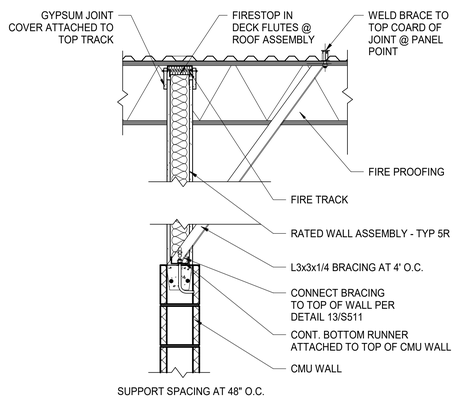
1 ROOF EAVE DETAIL
1" = 1'-0"



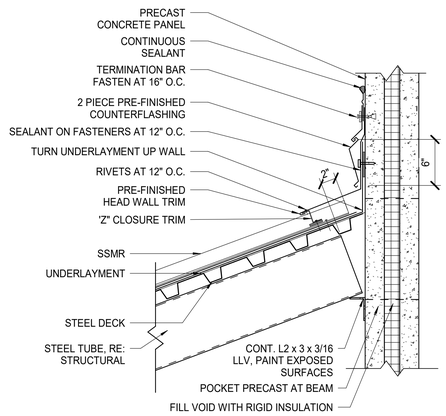
2 ROOF EAVE WITH GUTTER DETAIL
1" = 1'-0"



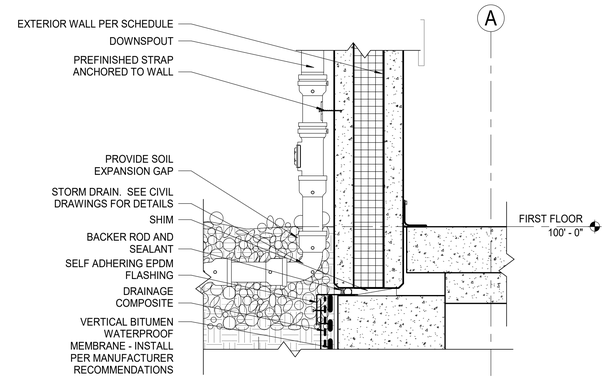
3 OVERHANG DETAIL
1" = 1'-0"



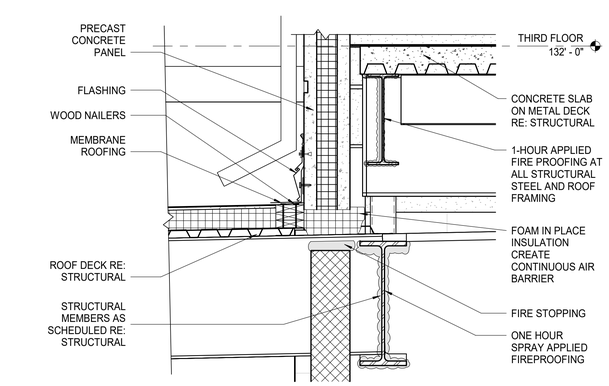
4 RATED ATTIC WALL DETAIL
1" = 1'-0"



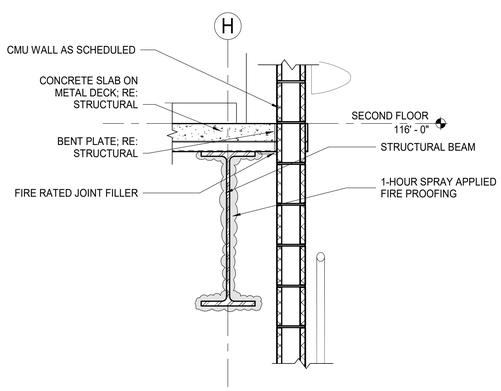
5 ROOF OVERHANG DETAIL
1 1/2" = 1'-0"



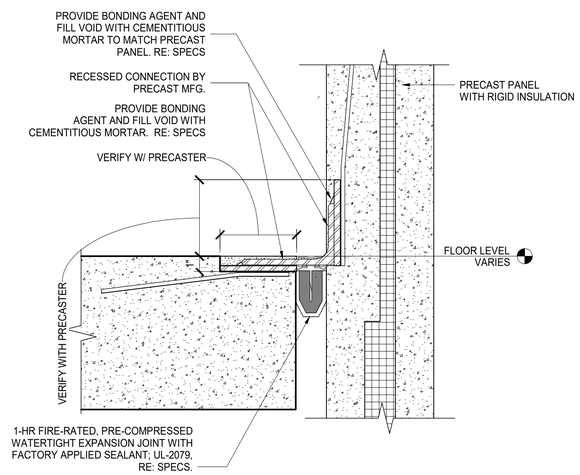
6 DOWNSPOUT TERMINATION
1 1/2" = 1'-0"



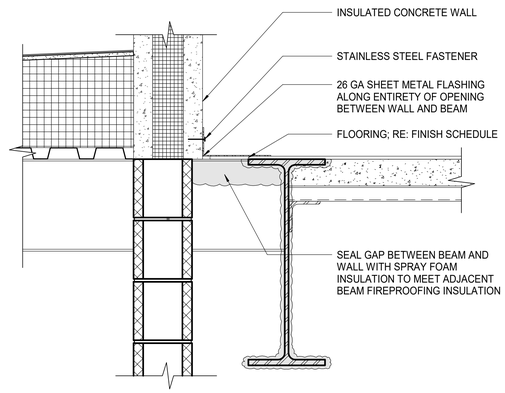
7 ROOF TO PANEL WALL DETAIL
1" = 1'-0"



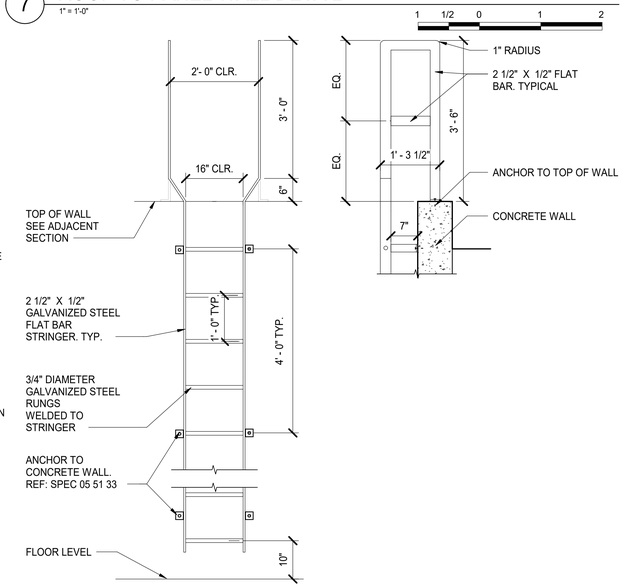
8 CMU TO FLOOR CLOSURE AT STAIR DETAIL
1" = 1'-0"



9 PRECAST CONNECTION TO FLOOR
3" = 1'-0"



10 FIRESTOPPING GAP DETAIL
1 1/2" = 1'-0"



11 CRAWL SPACE PIT LADDER DETAIL
3/4" = 1'-0"

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT ALBERTO RIVARD 23035 STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Fmn:
Dwn by: F. DE LUNA
Solicitation No.: W912G025A020
Contract No.:
Reviewed by: J. DUREE, S. LANGUM, C. LANGUM
File date: 7/16/2026 11:17:53 AM
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPS.220527

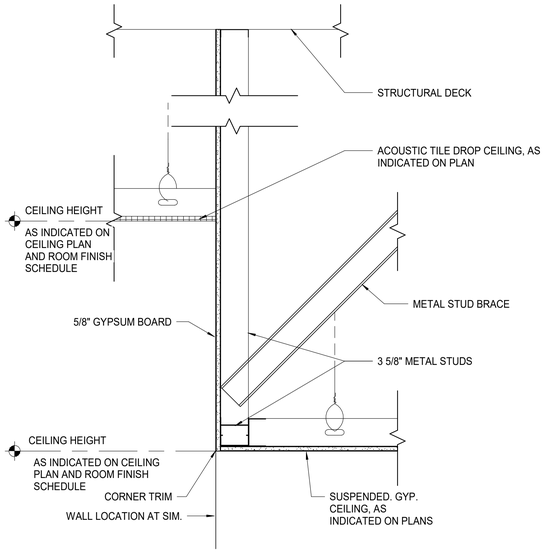
SECTION DETAILS

Sheet reference number
D4-A-506
Sheet of

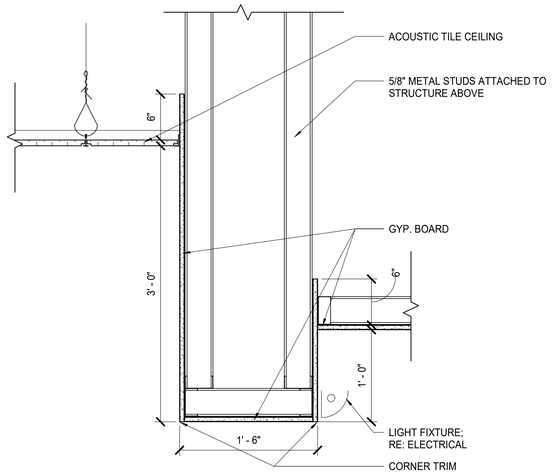
Cont No:

7/16/2026 11:17:53 AM

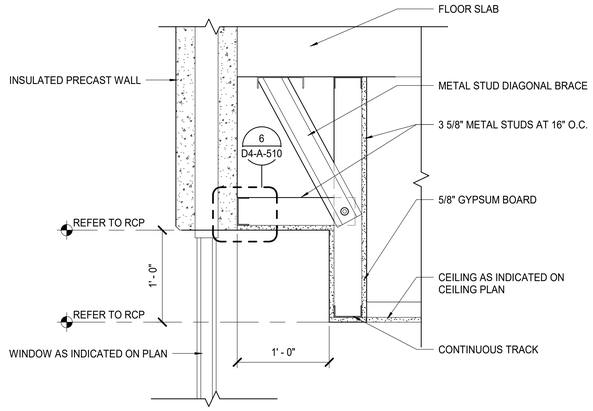
US Army Corps of Engineers
Fort Worth District



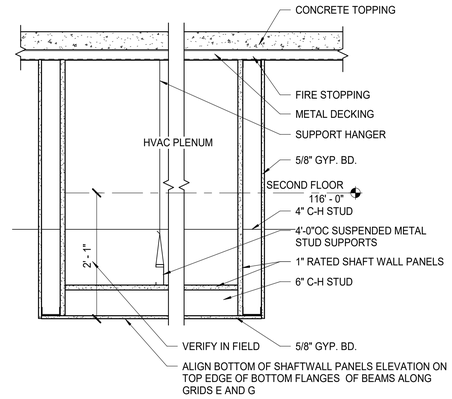
1 CEILING DETAIL
1 1/2" = 1'-0"



2 CEILING DETAIL AT DINING SEATING AREA
1 1/2" = 1'-0"

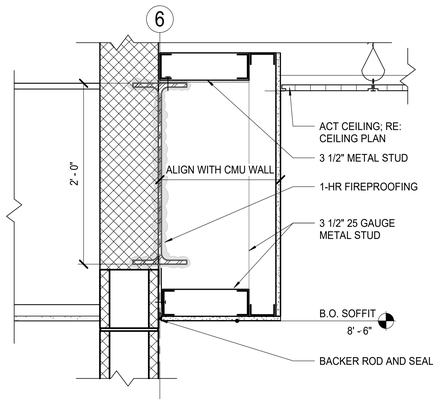


3 DETAIL AT WINDOW POCKET
1 1/2" = 1'-0"

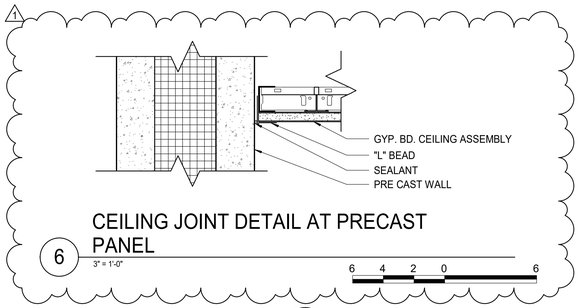


1 HR RATED SHAFT WALL CONSTRUCTION PER UL ASSEMBLY U415 -SYSTEM A

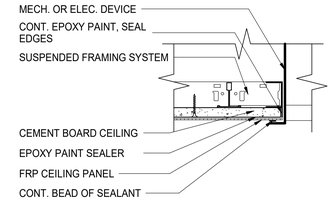
4 HVAC PLENUM @ BELOW CLASSROOMS
1" = 1'-0"



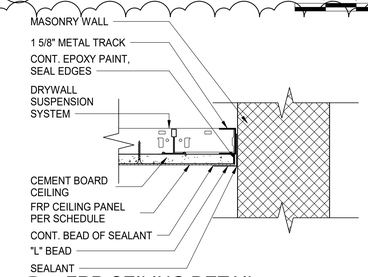
5 SOFFIT DETAIL
1 1/2" = 1'-0"



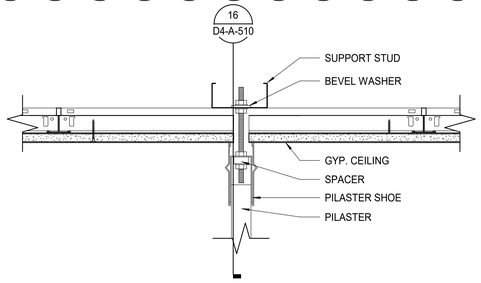
6 CEILING JOINT DETAIL AT PRECAST PANEL
3" = 1'-0"



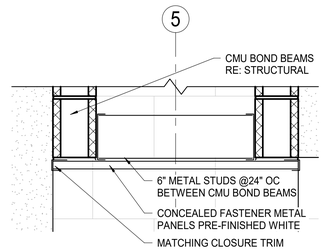
7 FRP PENETRATION CEILING DETAIL
3" = 1'-0"



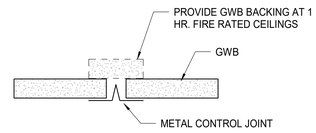
8 FRP CEILING DETAIL
3" = 1'-0"



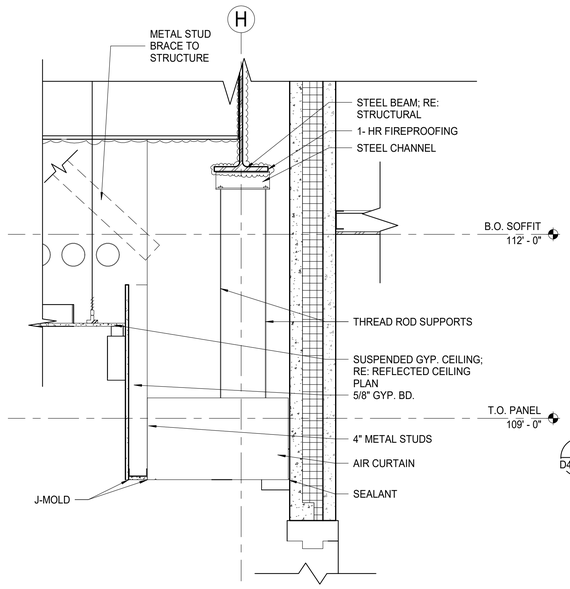
9 CEILING MOUNTED TOILET PARTITION DETAIL
3" = 1'-0"



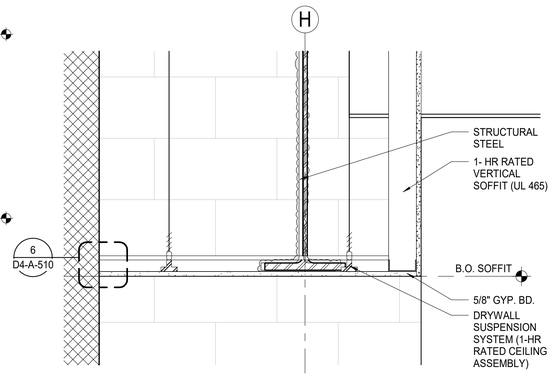
10 TOP OF OPENING AT SERVICE LINE/SEATING
1 1/2" = 1'-0"



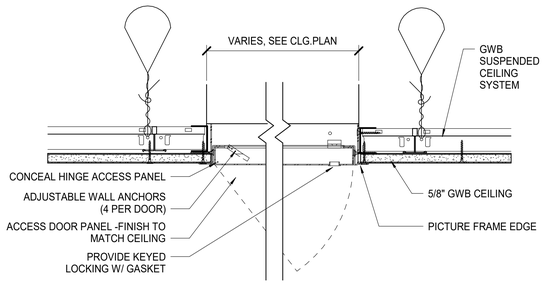
11 CONTROL JOINT DETAIL
6" = 1'-0"



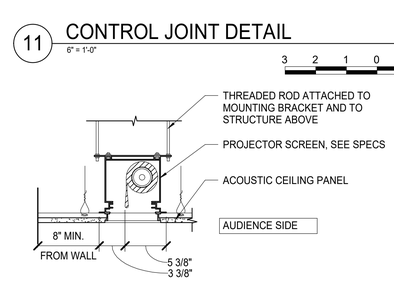
12 SOFFIT DETAIL AT AIR CURTAIN
1" = 1'-0"



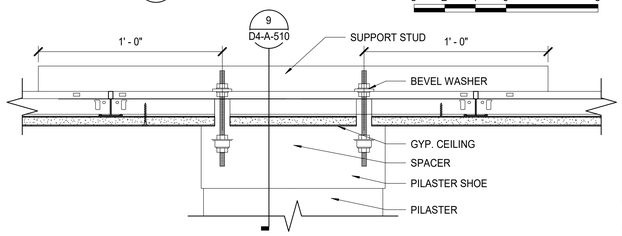
13 STAIR SOFFIT DETAIL
1 1/2" = 1'-0"



14 SUSPD. GWB SYSTEM AND RECESSED ACCESS PANEL
3" = 1'-0"



15 PROJECTOR SCREEN DETAIL
1 1/2" = 1'-0"



16 CEILING MOUNTED TOILET PARTITION DETAIL
3" = 1'-0"

REGISTERED ARCHITECT ALBERTO RIVARD 23035 STATE OF TEXAS
20 JULY 2026

No.	Description	Date	Action	O.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: A. RIVARD
Date: MAY 2025
Rev:
Dwn by: F. DE LUNA
Solicitation No.: W9126G25RA030
Reviewed by: J. DOYLE
Contract No.:
Submitted by: C. LANGUM
File name:
Plot date: 7/20/2026 11:56:43 AM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH (CESWF-PDE-MS) FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPS1220527

CEILING DETAILS

Sheet reference number
D4-A-510
Sheet of

Cover No.

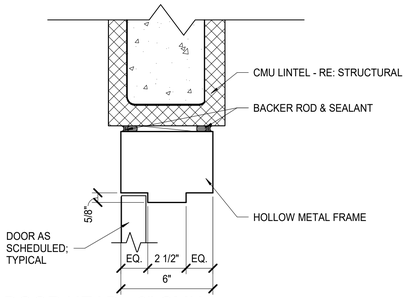
7/20/2026 11:56:43 AM

DOOR SCHEDULE

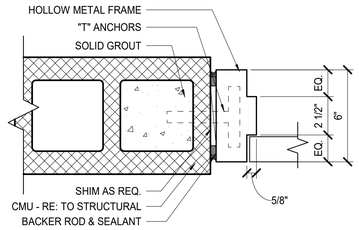
DOOR NO.	DOOR SIZE HEIGHT	DOOR SIZE WIDTH	DOOR SIZE THICKNESS	MATERIAL DOOR MATERIAL	MATERIAL DOOR TYPE	FRAME TYPE	HARDWARE SET	FIRE RATING	DETAILS HEAD DETAIL	DETAILS JAMB DETAIL	REMARKS	SIGNAGE SIGN TYPE	SIGNAGE ROOM NUMBER	SIGNAGE MESSAGE	SIGNAGE SIGN NOTES
000C	5' - 10"	3' - 0"	1' - 0 3/4"	FRP	B	3	21	1 HR	1 / D4-A602	2 / D4-A602	INSULATED	4	-	STAIR C	SIGN NOTE 5
000D	5' - 10"	3' - 0"	1' - 0 3/4"	FRP	B	3	21	1 HR	1 / D4-A602	2 / D4-A602	INSULATED	4	-	STAIR C	SIGN NOTE 5
000E	5' - 0"	2' - 4"	1' - 0 3/4"	FRP	B	3	16	-	5 / D4-A602	6 / D4-A602	UTILITY SMOKE DOOR				
001F	5' - 0"	2' - 4"	1' - 0 3/4"	FRP	B	3	16	-	5 / D4-A602	6 / D4-A602	UTILITY SMOKE DOOR				
100A	7' - 0"	6' - 0"	1' - 0 3/4"	FRP	F	9	2	-	3 / D4-A603	4 / D4-A603	-	4	-	STAIR A	-
100B	7' - 0"	6' - 0"	1' - 0 3/4"	FRP	F	9	2	-	3 / D4-A603	4 / D4-A603	-	4	-	STAIR B	-
100C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	16	-	9 / D4-A602	10/ D4-A602	-	4,5	-	CRAWL SPACE	SIGN NOTE 5
100D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	16	-	9 / D4-A602	10/ D4-A602	-	4,5	-	CRAWL SPACE	SIGN NOTE 5
101A	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-		-	-	-
101B	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
101C	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
101D	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
112	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-A602	6 / D4-A602	-	1	112	COMMUNICATIONS	-
113	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	16	45 MIN	5 / D4-A602	6 / D4-A602	-	1	113	UTILITIES	-
114	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	15	-	9 / D4-A602	10 / D4-A602	-	1	114	ELECTRICAL	-
115	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	18	45 MIN	1 / D4-A602	2 / D4-A602	SILL DETAIL: 13 / D4-A603	1	115	ELEVATOR EQUIPMENT	-
117	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	9 / D4-A603	10 / D4-A602	-	3	-	WOMEN	-
118	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	9 / D4-A603	10 / D4-A603	-	3	-	MEN	-
119	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
120	7' - 3 3/4"	6' - 4"	1"	PL	J	9	23	-	11/ D4-A603	12/ D4-A602	TRAFFIC DOOR	1	120	WAREWASH	-
121	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
122A	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
122B	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	9	9	1 HR	1 / D4-A602	2 / D4-A602	-	4	-	STAIR D	SIGN NOTE 5
123A	7' - 0"	3' - 0"	1"	PL	D	6	23	-	15/ D4-A602	16/ D4-A602	TRAFFIC DOOR	1	123	KITCHEN	-
123B	7' - 0"	6' - 0"	1"	PL	J	7	23	-	15/ D4-A602	16/ D4-A602	TRAFFIC DOOR	1	123	KITCHEN	-
123C	7' - 0"	3' - 0"	1"	PL	D	6	23	-	15/ D4-A602	16/ D4-A602	TRAFFIC DOOR	1	123	KITCHEN	-
123D	7' - 0"	3' - 0"	1"	PL	D	6	23	-	15/ D4-A602	16/ D4-A602	TRAFFIC DOOR	1	123	KITCHEN	-
123E	7' - 0"	6' - 0"	1"	PL	J	7	23	-	15/ D4-A602	16/ D4-A602	TRAFFIC DOOR	1	123	KITCHEN	-
123F	7' - 0"	3' - 0"	1"	PL	D	6	23	-	15/ D4-A602	16/ D4-A602	TRAFFIC DOOR	1	123	KITCHEN	-
124A	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
124B	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	9	9	1 HR	1 / D4-A602	2 / D4-A602	-	4	-	STAIR C	SIGN NOTE 5
125	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	ENTRY	-
126	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	-	-	-	-
127	7' - 3 3/4"	6' - 4"	1"	PL	J	9	23	-	11/ D4-A603	12/ D4-A603	TRAFFIC DOOR	1	127	WAREWASH	-
129	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	129	WOMEN	-
130	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	130	MEN	-
131	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	5 / D4-602	6 / D4-602	-	1	131	JANITOR	-
132	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-602	6 / D4-602	-	1	132	ELECTRICAL	-
133	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-602	6 / D4-602	-	1	133	COMMUNICATIONS	-
134	7' - 0"	3' - 0"	1' - 0 3/4"	ALUM	A	1	3		1 / D4-A603	3 / D4-A603	-	2	134	DISPENSARY	-
135	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	20	-	5 / D4-A602	6 / D4-A602	-	1	135	EXAM	-
136	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	20	-	5 / D4-A602	6 / D4-A602	-	1	136	EXAM	-
137	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	20	-	5 / D4-A602	6 / D4-A602	-	1	137	EXAM	-
139	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	19	-	9 / D4-A602	10/ D4-A602	-	1	139	OFFICE	-
140	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	19	-	9 / D4-A602	10/ D4-A602	-	1	140	LOUNGE	-
141	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	9 / D4-A602	10/ D4-A602	-	3	-	MEN LOCKER	-
141A	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	-	MEN	-
142	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	9 / D4-A602	10/ D4-A602	-	3	142	WOMENS LOCKER	-
142A	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	-	WOMEN	-
144	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	17	-	5 / D4-A602	6 / D4-A602	-	1	144	CHEMICAL STORAGE	-
145	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	12	-	5 / D4-A602	6 / D4-A602	-	1	145	NON-FOOD STORAGE	-
146	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	17	-	5 / D4-A602	6 / D4-A602	-	1	146	JANITOR	-
147	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	12	-	5 / D4-A602	6 / D4-A602	-	1	147	RECYCLE	-
148	8' - 0"	6' - 0"	1' - 0 3/4"	FRP	I	9	5	-	7 / D4-A602	8 / D4-A602*	-	2	148	KITCHEN DELIVERY	-
149	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	12	-	1 / D4-A602	2 / D4-A602	-	1	149	CAN WASH	-
150A	7' - 0"	8' - 0"	1' - 0 3/4"	HM	G	11	7	-	7 / D4-A602	8 / D4-A602	-	2	150	MECHANICAL	-
150B	7' - 0"	8' - 0"	1' - 0 3/4"	HM	G	11	7	-	7 / D4-A602	8 / D4-A602	-	2	150	MECHANICAL	-
151A	7' - 0"	6' - 0"	1' - 0 3/4"	HM	G	11	4	-	7 / D4-A602	8 / D4-A602	-	2	151	ELECTRICAL	-
151B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	6	-	7 / D4-A602	8 / D4-A602	-	2	151	ELECTRICAL	-
161	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	13	-	9 / D4-A602	10 / D4-A602	-	2	161	DRY STORAGE	-
169	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	13	-	9 / D4-A602	10/ D4-A602	-	1	169	BEVERAGE ROOM	-
170	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	2	12	-	9 / D4-A602	10/ D4-A602	-	1	170	STORAGE	-
171A	7' - 0"	6' - 0"	1' - 0 3/4"	ALUM	F	4	1	-	1 / D4-A603	2 / D4-A603	-	2	171	DRY CLEANER EXCHANGE	-
171B	7' - 0"	3' - 0"	1' - 0 3/4"	ALUM	A	1	3	-	1 / D4-A603	3 / D4-A603	-	2	173	DRY CLEANER EXCHANGE	-
171C	7' - 0"	3' - 0"	1' - 0 3/4"	ALUM	A	1	3		1 / D4-A603	3 / D4-A603	-	2	171	DRY CLEANER EXCHANGE	-
172A	8' - 0"	6' - 0"	1' - 0 3/4"	FRP	I	9	5	-	7 / D4-A602	8 / D4-A602*	-	2	172	KITCHEN DELIVERY	-
200A	7' - 0"	4' - 4"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR A	SIGN NOTE 5
200B	7' - 0"	4' - 4"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR B	SIGN NOTE 5
200CA	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR C	SIGN NOTE 5
200CB	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR C	SIGN NOTE 5
200DA	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR D	SIGN NOTE 5
200DB	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR D	SIGN NOTE 5
201A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	201A	STORAGE	-
201B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	201B	STORAGE	UNDERCUT DOOR 3/4"
201C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	201C	MECHANICAL	-
201D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	201	CLASSROOM	-
201E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	201	CLASSROOM	-
202B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	202B	STORAGE	UNDERCUT DOOR 3/4"
202C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	202	CLASSROOM	-
202D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	202	CLASSROOM	-
203A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	203A	STORAGE	-
203B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	203B	STORAGE	UNDERCUT DOOR 3/4"
203C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	203	CLASSROOM	-
203D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	203	CLASSROOM	-
204A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	14	-	1 / D4-A602	2 / D4-A602	-	1	204A	STORAGE	-
204B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	204B	STORAGE	UNDERCUT DOOR 3/4"
204C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	204C	MECHANICAL	-
204D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	204	CLASSROOM	-
204E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	204	CLASSROOM	-
205A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	205A	STORAGE	-
205B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	205B	STORAGE	UNDERCUT DOOR 3/4"
205C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	205	CLASSROOM	-
205D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	205	CLASSROOM	-
206A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	206A	STORAGE	-
206B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	206B	STORAGE	UNDERCUT DOOR 3/4"
206C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	206C	MECHANICAL	-
206D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	206	CLASSROOM	-
206E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	206	CLASSROOM	-
207A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	207A	STORAGE	-
207B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	207B	MECHANICAL	-
207C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	207C	STORAGE	UNDERCUT DOOR 3/4"
207D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	207	CLASSROOM	-
207E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	207	CLASSROOM	-
208B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	208B	STORAGE	UNDERCUT DOOR 3/4"
208C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	208	CLASSROOM	-
208D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	208	CLASSROOM	-
212	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-A602	6 / D4-A602	-	1	212	COMMUNICATIONS	-
213	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-A602	6 / D4-A602	-	1	213	ELECTRICAL	-
217	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	-	WOMEN	-
218	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	-	MEN	-
219A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	5 / D4-A602	6 / D4-A602	-	1	219	STORAGE	-
219B	6' - 8"	3' - 0"	1' - 0 3/4"	HM	B	2	8	-	7 / D3-A602	8 / D4-A602	INSULATED	-	-	-	-

DOOR SCHEDULE

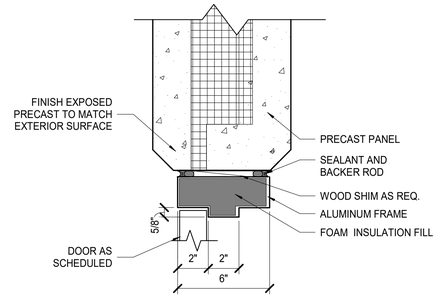
DOOR NO.	DOOR SIZE HEIGHT	DOOR SIZE WIDTH	DOOR SIZE THICKNESS	MATERIAL DOOR MATERIAL	MATERIAL DOOR TYPE	FRAME TYPE	HARDWARE SET	FIRE RATING	DETAILS HEAD DETAIL	DETAILS JAMB DETAIL	REMARKS	SIGNAGE SIGN TYPE	SIGNAGE ROOM NUMBER	SIGNAGE MESSAGE	SIGNAGE SIGN NOTES
220	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	5 / D4-A602	6 / D4-A602	-	1	220	MECHANICAL	-
227A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	5 / D4-A602	6 / D4-A602	-	1	227	STORAGE	-
227B	6' - 8"	3' - 0"	1' - 0 3/4"	HM	B	2	8	-	7 / D4-A602	8 / D4-A602	INSULATED	-	-	-	-
228	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	5 / D4-A602	6 / D4-A602	-	1	228	MECHANICAL	-
229	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	-	WOMEN	-
230	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	B	3	22	-	5 / D4-A602	6 / D4-A602	-	3	-	MEN	-
231	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	5 / D4-A602	6 / D4-A602	-	1	231	JANITOR	-
232	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-A602	6 / D4-A602	-	1	232	ELECTRICAL	-
233	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-A602	6 / D4-A602	-	1	233	COMMUNICATIONS	-
236	7' - 0"	5' - 0"	1' - 0 3/4"	HM	G	10	7.1	45 MIN	1 / D4-A602	2 / D4-A602	INSULATED	1	236	MECHANICAL	-
238	7' - 0"	5' - 0"	1' - 0 3/4"	HM	G	10	7.1	-	1 / D4-A602	2 / D4-A602	-	1	238	MECHANICAL	-
239	7' - 0"	5' - 0"	1' - 0 3/4"	HM	G	10	7.1	-	1 / D4-A602	2 / D4-A602	-	1	239	MECHANICAL	-
300A	7' - 0"	4' - 4"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR A	SIGN NOTE 5
300B	7' - 0"	4' - 4"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR B	SIGN NOTE 5
300CA	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR C	SIGN NOTE 5
300CB	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR C	SIGN NOTE 5
300DA	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D3-A602	-	4,5	-	STAIR D	SIGN NOTE 5
300DB	7' - 0"	3' - 0"	1' - 0 3/4"	FRP	C	3	9	1 HR	5 / D4-A602	6 / D4-A602	-	4,5	-	STAIR D	SIGN NOTE 5
301A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	301A	STORAGE	-
301B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	301B	STORAGE	UNDERCUT DOOR 3/4"
301C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	301C	MECHANICAL	-
301D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	301	CLASSROOM	-
301E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	301	CLASSROOM	-
302B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	302B	STORAGE	UNDERCUT DOOR 3/4"
302C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	302	CLASSROOM	-
302D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	302	CLASSROOM	-
303A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	303A	STORAGE	-
303B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	303B	STORAGE	UNDERCUT DOOR 3/4"
303C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	303	CLASSROOM	-
303D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	303	CLASSROOM	-
304A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	14	-	1 / D4-A602	2 / D4-A602	-	1	304A	STORAGE	-
304B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	304B	STORAGE	UNDERCUT DOOR 3/4"
304C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	304C	MECHANICAL	-
304D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	304	CLASSROOM	-
304E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	304	CLASSROOM	-
305A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	305E	STORAGE	-
305B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	305B	STORAGE	UNDERCUT DOOR 3/4"
305C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	305	CLASSROOM	-
305D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	305	CLASSROOM	-
306A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	306A	STORAGE	-
306B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	306B	STORAGE	UNDERCUT DOOR 3/4"
306C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	306C	MECHANICAL	-
306D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	306	CLASSROOM	-
306E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	306	CLASSROOM	-
307A	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	14	-	1 / D4-A602	2 / D4-A602	-	1	307A	STORAGE	-
307B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	307B	STORAGE	UNDERCUT DOOR 3/4"
307C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	-	1 / D4-A602	2 / D4-A602	-	1	307C	MECHANICAL	-
307D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	307	CLASSROOM	-
307E	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	307	CLASSROOM	-
308B	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	11	-	1 / D4-A602	2 / D4-A602	-	1	308B	STORAGE	UNDERCUT DOOR 3/4"
308C	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	308	CLASSROOM	-
308D	7' - 0"	3' - 0"	1' - 0 3/4"	HM	C	10	10	-	1 / D4-A602	2 / D4-A602	-	1	308	CLASSROOM	-
312	7' - 0"	3' - 0"	1' - 0 3/4"	HM	B	10	16	45 MIN	5 / D4-A602	6 / D4-A602		1



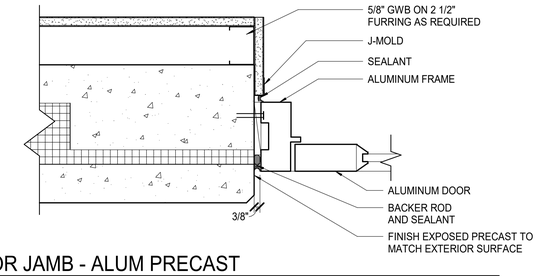
1 DOOR HEAD - 8" CMU
3" = 1'-0"



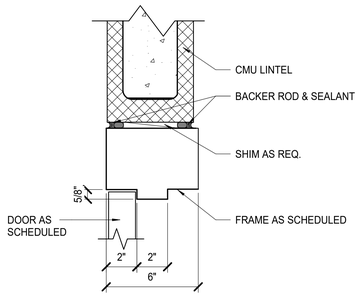
2 DOOR JAMB - 8" CMU
3" = 1'-0"



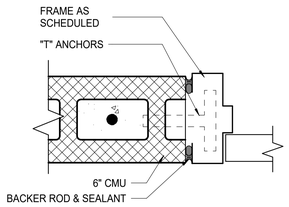
3 DOOR HEAD - ALUM PRECAST
3" = 1'-0"



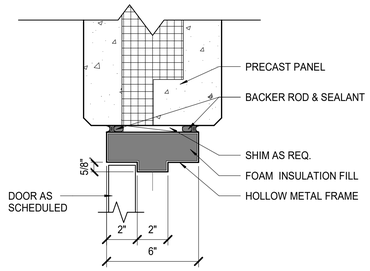
4 DOOR JAMB - ALUM PRECAST
3" = 1'-0"



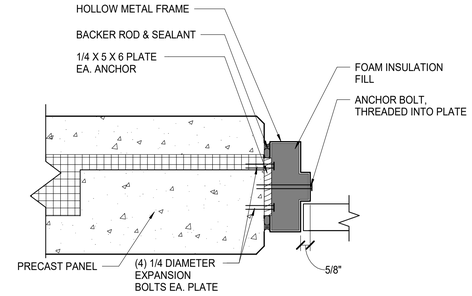
5 HM DOOR HEAD - 6" CMU
3" = 1'-0"



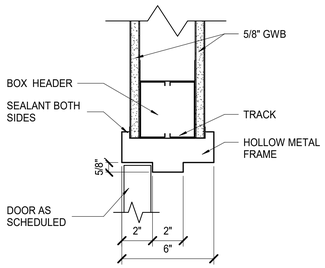
6 HM DOOR JAMB - 6" CMU
3" = 1'-0"



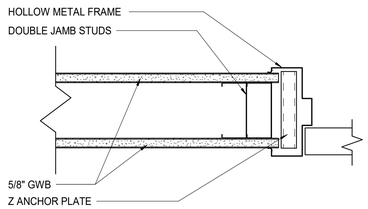
7 HM DOOR HEAD - PRECAST
3" = 1'-0"



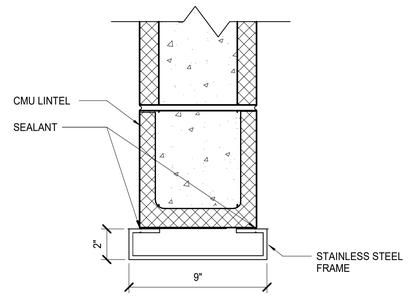
8 HM DOOR JAMB - PRECAST
3" = 1'-0"



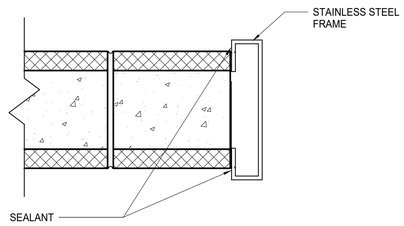
9 DOOR HEAD - GYP BD
3" = 1'-0"



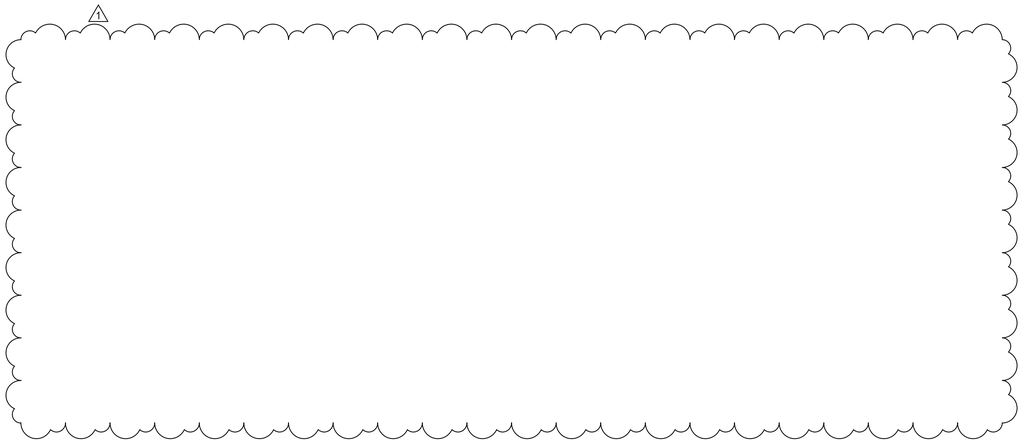
10 DOOR JAMB - GYP BD
3" = 1'-0"

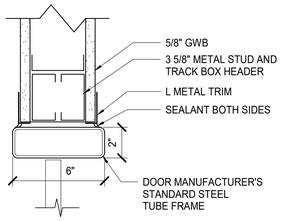


11 DOOR HEAD - ELEVATOR
3" = 1'-0"

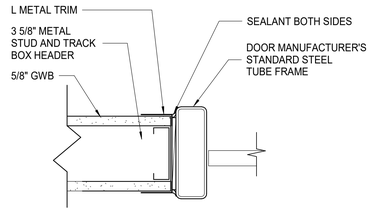


12 DOOR JAMB - ELEVATOR
3" = 1'-0"





13 KITCHEN STEEL TUBE FRAME HEAD
3" = 1'-0"



14 KITCHEN DOOR STEEL TUBE FRAME JAMB
3" = 1'-0"

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT
ALBERTO RIVARD
23035
STATE OF TEXAS
20 JULY 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Solicitation No.: W9126G26RA020
Contract No.:
Rev.:
Dwn by: F. DE LUNA
Reviewed by: J.P. DUARTE
Approved by: C. LANGM
File Name: 7-16-2026 11:44:00 AM
Plot Date: 7/16/2026 11:44:00 AM
Plot Scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

DOOR DETAILS

Sheet reference number
D4-A-602
Sheet of

Cont'd to:

7/16/2026 11:44:00 AM

LEGEND

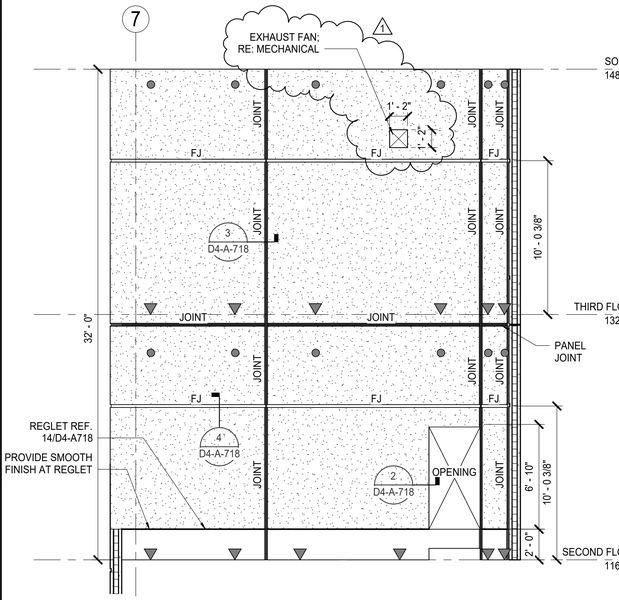
- ▼ INDICATES PRECAST DEAD LOAD / LATERAL LOAD CONNECTION LOCATIONS. COORDINATE LOCATIONS WITH ASSOCIATED CONNECTION DETAILS
- ● INDICATES LATERAL LOAD ONLY DETAIL LOCATIONS. COORDINATE WITH ASSOCIATED CONNECTION DETAILS

EXTERIOR COLOR AND FINISH LEGEND

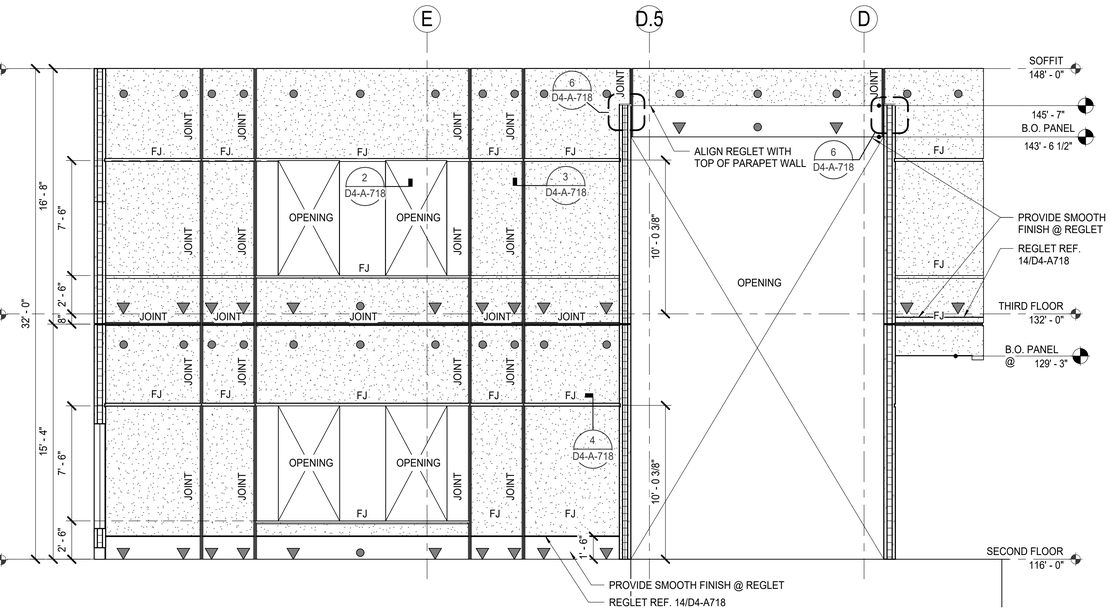
- PRECAST CONCRETE, SMOOTH FINISH
- PRECAST CONCRETE, SAND BLAST FINISH
- PRECAST CONCRETE, PRESSURE WASH, LIGHT AGGREGATE FINISH
- FJ FALSE JOINT

SHEET NOTES

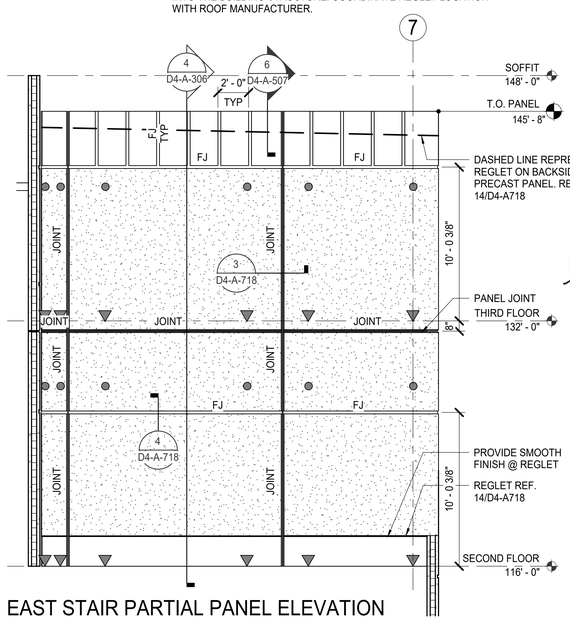
1. INSULATE PRECAST PANELS ASSEMBLY CONSISTS OF 2 1/2" CONCRETE, 4" RIGID INSULATION AND 2 1/2" CONCRETE.
2. INTERIOR FINISH SHALL BE SMOOTH.
3. COORDINATE PANELS WITH ELECTRICAL DRAWINGS FOR CONDUITS, OUTLETS, SWITCH BOXES, ETC. TO BE CAST IN THE PANEL SYSTEM.
4. CONFIRM ACTUAL OPENING SIZES WITH DOORS AND WINDOWS MANUFACTURER.
5. COORDINATE LOUVER OPENINGS AND LOCATIONS.
6. FALSE JOINT MEASUREMENTS ARE FROM CENTER OF JOINT.
7. COORDINATE PANEL ELEVATIONS WITH STRUCTURAL DRAWINGS. REFERENCE SHEET D4-S002 FOR PRECAST SHEET NOTES.
8. SHEET D4-S601 FOR WIND AND BLAST LOADING CRITERIA. PANELS SHALL BE DESIGNED BY THE PANEL SUPPLIER FOR AT/FP BLAST LOADS PER SPECIFICATIONS AND UFC 4-010-01.
9. REFERENCE D4-A719 FOR STRUCTURAL CONNECTION REQUIREMENTS AND LOCATION LIMITATIONS.
10. THESE CONNECTIONS ARE FOR REFERENCE ONLY. IT IS THE CONTRACTORS RESPONSIBILITY TO DESIGN ALL CONNECTION FOR THE PRECAST PANELS, THIS INCLUDES ANY ATTACHMENT EMBEDS INTO THE BUILDING STRUCTURE. COORDINATE REGLET LOCATION WITH ROOF MANUFACTURER.



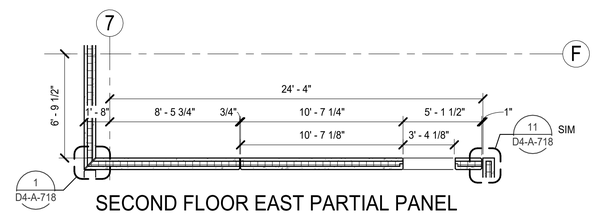
1 EAST PARTIAL PANEL ELEVATION B
1/4" = 1'-0"



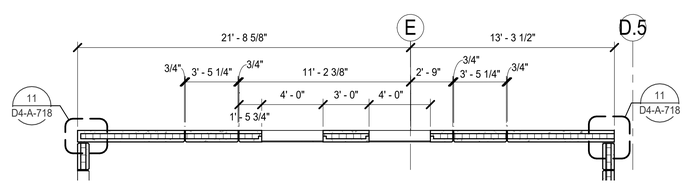
2 EAST PARTIAL PANEL ELEVATION
1/4" = 1'-0"



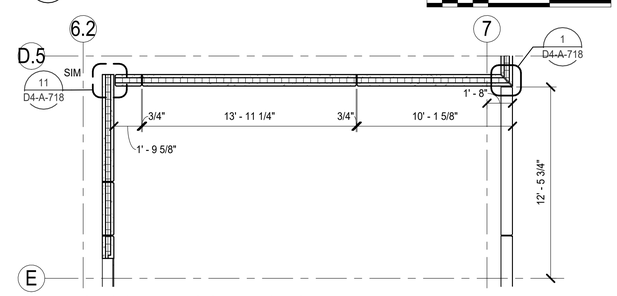
3 EAST STAIR PARTIAL PANEL ELEVATION A
1/4" = 1'-0"



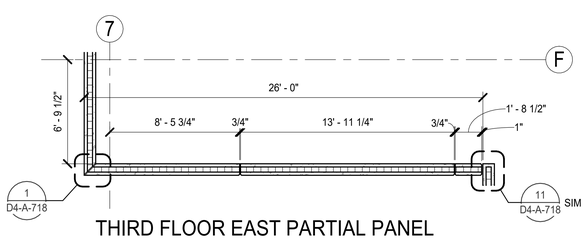
4 SECOND FLOOR EAST PARTIAL PANEL PLAN B
1/4" = 1'-0"



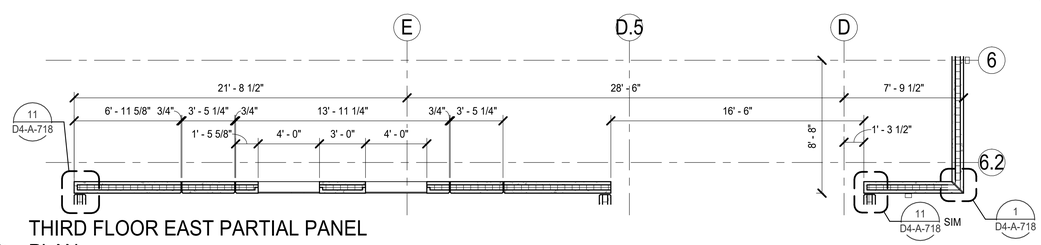
5 SECOND FLOOR EAST PARTIAL PANEL PLAN
1/4" = 1'-0"



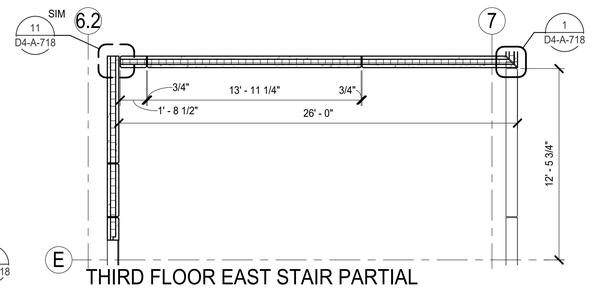
6 SECOND FLOOR EAST STAIR PARTIAL PANEL PLAN
1/4" = 1'-0"



7 THIRD FLOOR EAST PARTIAL PANEL PLAN B
1/4" = 1'-0"



8 THIRD FLOOR EAST PARTIAL PANEL PLAN
1/4" = 1'-0"



9 THIRD FLOOR EAST STAIR PARTIAL PANEL
1/4" = 1'-0"

US Army Corps of Engineers
Fort Worth District

REGISTERED ARCHITECT ALVIN RIVARD JR. 23036 STATE OF TEXAS
20 JULY 2026

No.	Description	Date	Action	D.O. No.
1	REV/SED IAW AM0002	JULY 2026		

Rev.
Date: MAY 2025
Solicitation No.: W9126G25RA020
Contract No.:
File name:
Plot date: Fri Jul 24 8:26:36 AM
Plot scale: 1:1
Designed by: A. RIVARD
Dwn by: F. DE LUNA
Reviewed by: J. CURTIS
Approved by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

EAST PANEL PARTIAL ELEVATION

Sheet reference number
D4-A-709
Sheet of

Cont No.

7/21/2026 8:26:36 AM

GENERAL NOTES

1. VERIFY CONDITIONS AND DIMENSIONS RELATING TO THE PROJECT BEFORE COMMENCING WITH THE WORK.
2. PROMPTLY NOTIFY THE CONTRACTING OFFICER OF ANY DISCREPANCIES AND/OR CONDITIONS WHICH PREVENT FULFILLING THE TERMS OF THE CONTRACT.
3. ITEMS AND MATERIALS TO BE REMOVED SHALL BE DONE IN SUCH A MANNER AS TO PREVENT DAMAGES TO ITEMS AND MATERIALS THAT REMAIN. SUCH DAMAGES SHALL BE REPAIRED TO THE SATISFACTION OF THE CONTRACTING OFFICER AND AT NO ADDITIONAL COST TO THE GOVERNMENT.
4. WASTE MATERIALS SHALL BE PROMPTLY REMOVED AND DISPOSED OF OUTSIDE THE LIMITS OF GOVERNMENT PROPERTY.
5. THE WORD "REPLACE" MEANS TO REMOVE EXISTING WORK AND PROVIDE NEW WORK AS DETAILED OR NOTED ON THE DRAWINGS.
6. WORK INDICATED SHALL BE "NEW" WORK UNLESS OTHERWISE INDICATED "EXISTING" OR "EXIST".
7. COORDINATE ACTIVITIES WITH THE CONTRACTING OFFICER DURING CONSTRUCTION. PROVIDE A MINIMUM 14-DAY WRITTEN NOTICE TO THE CONTRACTING OFFICER'S REPRESENTATIVE PRIOR TO COMMENCING WORK.
8. NOTIFY THE CONTRACTING OFFICER AND THE PROJECT ENGINEER IN WRITING AT LEAST 14 DAYS BEFORE ANY UTILITY OUTAGE OR ROAD CLOSURE.
9. STOW ALL FLAMMABLE MATERIALS IN ACCORDANCE WITH EM 385-1-1, 30 NOVEMBER 2014, SECTION 9 OF THE U.S. ARMY CORPS OF ENGINEERS SAFETY AND HEALTH REQUIREMENTS MANUAL, EXCEPT FLAMMABLE LIQUIDS SHALL NOT BE STORED ON SITE UNLESS IN AN APPROVED FLAMMABLE STORAGE LOCKER PER NFPA AND 29 CFR 1910.
10. HAVE ON HAND ALL SAFETY DATA SHEETS (SDS) BEFORE THE MATERIALS ARE BROUGHT ON TO THE PROJECT SITE. AT LEAST TWO COPIES OF EACH SDS SHALL BE FURNISHED TO THE CONTRACTING OFFICER'S REPRESENTATIVE.
11. OBTAIN ALL REQUIRED FEDERAL, STATE & LOCAL PERMITS REQUIRED FOR THIS PROJECT AT NO ADDITIONAL COST TO GOVERNMENT. PROVIDE EROSION CONTROL BEST MANAGEMENT PRACTICES (BMPs).
12. VISITORS AND STAFF SHALL BE PROTECTED FROM VAPORS AND HEALTH EFFECTS OF PRODUCTS BEING USED AND/OR REMOVED.
13. COMPLY WITH THE REQUIREMENTS OF NFPA 241 FOR FIRE PREVENTION DURING CONSTRUCTION.
14. DRAINAGE AND DEWATERING: ALL EXCAVATIONS SHALL BE PERFORMED SO THAT THE SITE AND THE AREA IMMEDIATELY SURROUNDING THE SITE WHICH AFFECTS CONSTRUCTION OPERATIONS WILL BE CONTINUALLY AND EFFECTIVELY DRAINED. CONTRACTOR SHALL PROVIDE DRAINAGE AND DEWATERING AS REQUIRED TO ENSURE THAT ALL FOOTING EXCAVATIONS ARE ACCOMPLISHED WITH THE SUBGRADE SOILS REMAINING DRY AND FIRM UNTIL AFTER FOOTINGS ARE PLACED AND BACKFILLED. REMOVAL OF SURFACE WATER, GROUNDWATER AND ANY PERCHED WATER CONDITIONS, WHICH MIGHT BE ENCOUNTERED DURING EXCAVATIONS SHALL BE ACCOMPLISHED BY APPROVED MEANS. REFER TO SPECIFICATION 31 00 00 EARTHWORK FOR ADDITIONAL REQUIREMENTS.
15. REFER TO MUTCD FIGURE 2A-1 FOR TYPICAL INSTALLATION OF SIGNS, LATERAL LOCATIONS AND TYPICAL HEIGHTS. ENSURE A MINIMUM OF 6'-0" FROM ANY ROADSIDE OBSTRUCTIONS.
16. CONDITIONS DEPICTED ON THE PLANS ARE WHAT WAS PRESENT AT THE TIME OF SURVEY. OTHER FEATURES MAY HAVE EXISTED IN THE PAST. IF CONCRETE FOUNDATIONS NOT INDICATED TO BE REMOVED IN THE DEMO PLANS ARE ENCOUNTERED STOP WORK AND NOTIFY THE CONTRACTING OFFICER.
17. COORDINATE TEMPORARY POWER FROM CIRCUIT 6 WITH CPS ENERGY.

CONSTRUCTION SEQUENCING

THESE NOTES ARE PROVIDED AS GENERAL GUIDANCE ON THE SEQUENCING OF DEMOLITION AND CONSTRUCTION ACTIVITIES RELATED TO THE LACKLAND DCF4 PROJECT. THE CONTRACTOR(S) IS (ARE) RESPONSIBLE FOR THE FINAL SEQUENCING AND SCHEDULING OF THE PROJECT. WORK INCLUDES MULTIPLE CONTRACTORS WORKING ON MULTIPLE CONTRACTS SIMULTANEOUSLY ON ADJACENT AND OVERLAPPING GROUND. COORDINATION BETWEEN CONTRACTORS ON THE ATC5, ATC6 AND ATC8 PROJECT AS WELL AS THE CONCURRENT DCF3 PROJECT IS ESSENTIAL. SEQUENCE LISTS FOR BOTH THE SMALL BUSINESS AND LARGE BUSINESS PORTION OF THE PROJECT ARE PROVIDED FOR CROSS REFERENCING BETWEEN THE ASPECTS OF THE PROJECT.

LARGE BUSINESS

1. INSTALL CONSTRUCTION WORK ZONE FENCING FOR WORK OF DCF4 AREA.
2. INSTALL EROSION CONTROL BEST MANAGEMENT PRACTICE (BMP) MEASURE.
3. REMOVE WATER, GAS, SANITARY SEWER, ELECTRICAL, AND COMMUNICATION LINES THROUGHOUT THE SITE. ENSURING THAT CONNECTIVITY OF SYSTEMS IS MAINTAINED WHERE REQUIRED.
4. PERFORM OVERLOT GRADING.
5. CONSTRUCT SANITARY SEWER COLLECTION SYSTEM.
6. CONSTRUCT STORM SEWER COLLECTION SYSTEM.
7. CONSTRUCT DINING CLASSROOM FACILITY (DCF4).
8. INSTALL LOW SECURITY WALL, PIPE GUARDS, REMOVABLE BOLLARDS, AND BOLLARD STORAGE PADS.
9. CONSTRUCT LOADING DOCK RAMP AND SERVICE YARD PAVEMENT, SITE WALLS INCLUDING TRASH ENCLOSURE.
10. PERFORM FINISH GRADING.
11. INSTALL LANDSCAPING.
12. REMOVE NON-PERMANENT EROSION CONTROL MEASURES.

ABBREVIATIONS

NOTE: ABBREVIATIONS MAY OR MAY NOT HAVE PERIOD (.) SEPARATORS.

ABBREV	ABBREVIATIONS
(AIP)	ABANDONED IN PLACE
ATC5, A5	AIRMEN TRAINING COMPLEX 5
ATC6. A6	AIRMEN TRAINING COMPLEX 6
ATC8, A8	AIRMEN TRAINING COMPLEX 8
ASTM	AMERICAN SOCIETY OF TESTING AND MATERIALS
ATFP	ANTI-TERRORISM FORCE PROTECTION
B###	BUILDING NUMBER
BLVD	BOULEVARD
C-C	CENTER TO CENTER
CO	CLEANOUT
CONST	CONSTRUCTION
CPAD CNR	CONCRETE PAD CORNER
DCF3, D3	DINING CLASSROOM FACILITY 3
DCF4, D4	DINING CLASSROOM FACILITY 4
DEMO	DEMOLITION
DIA	DIAMETER
DR	DRIVE
TWC	TWO-WAY CLEANOUT
EB1	EQUIPMENT BUILDING 1
EB2	EQUIPMENT BUILDING 2
ELEC	ELECTRICAL
ELEV.	ELEVATION
EDG PAVE	EDGE OF PAVEMENT
EDG SDWK	EDGE OF SIDEWALK
EISA	ENERGY INDEPENDENCE AND SECURITY ACT
EOCT	END OF CURB TERMINAL
FACP	FIRE ALARM CONTROL PANEL
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISH FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
(GIS)	GEOGRAPHIC INFORMATION SYSTEM
LB	LARGE BUSINESS
LE/FE	LOW EMITTING FUEL EFFICIENT
ID	INSIDE DIAMETER
INV.	INVERT
MAX.	MAXIMUM
MIN	MINIMUM
MUTCD	MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES
N/A	NOT APPLICABLE
(NIC)	NOT IN CONTRACT
NO. OR #	NUMBER
OD	OUTSIDE DIAMETER
OC	ON CENTER
OCEW	ON CENTER EACH WAY
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PC	POINT OF CURVATURE
PCC	PORTLAND CEMENT CONCRETE
POV	PRIVATELY OWNED VEHICLES
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVMT MRKG	PAVEMENT MARKING
RE:	REFERENCE
SB	SMALL BUSINESS
SDWLK	SIDEWALK
SQ	SQUARE
TBC	TOP BACK OF CURB
TOG	TOP OF GRADE
TV	TOP OF VALVE
TW	TOP OF WALL
TYP	TYPICAL
VC	VALVE COVER
WCP5	WEAPONS CLEANING PAVILION 5
WCP6	WEAPONS CLEANING PAVILION 6
WCP8	WEAPONS CLEANING PAVILION 8
YCO	YARD CLEANOUT

LEGEND

SS x	EXISTING SANITARY SEWER LINE
SS 8"	NEW SANITARY SEWER LINE
SD x	EXISTING STORM DRAIN LINE
SD 30"	NEW STORM DRAIN LINE
DL 6"	NEW DRAIN LINE
RD 8"	NEW ROOF DRAIN LINE
W x	EXISTING WATER LINE
W 12"	NEW WATER LINE
FDC 6"	FIRE DEPARTMENT LINE
FP 6"	FIRE PROTECTION LINE
G x	EXISTING NATURAL GAS LINE
G 4"	NEW NATURAL GAS LINE
	EXISTING STORM DRAIN MANHOLE
	EXISTING CURB INLET
	NEW CURB INLET
	EXISTING SURFACE INLET
	NEW SURFACE INLET
	EXISTING STORM DRAIN MANHOLE
	NEW STORM DRAIN MANHOLE
	EXISTING SANITARY SEWER MANHOLE
	NEW SANITARY SEWER MANHOLE
	EXISTING CLEANOUT
YCO	YARD CLEANOUT
TWC	TWO WAY CLEANOUT
	EXISTING GAS VALVE
	EXISTING GAS METER
	EXISTING WATER VALVE
	EXISTING WATER METER
	EXISTING WATER FAUCET
SC	EXISTING SPRINKLER CONTROL VALVE
	EXISTING SPRINKLER HEADS
	EXISTING VALVE AND BOX
	NEW VALVE AND BOX
	THRUST BLOCK
	REDUSER
FH	EXISTING FIRE HYDRANT
FH	NEW FIRE HYDRANT
FDC	NEW FIRE DEPARTMENT CONNECTION
	NEW POST INDICATOR VALVE
M	WATER METER WITH VALVE BOX AND LID
R	GAS REGULATOR/METER
780	EXISTING CONTOUR
780	NEW CONTOUR
46	SPOT ELEVATION WITH SURVEY CONTROL DATA
X	EXISTING CHAIN LINK FENCE
X X	NEW CHAIN LINK FENCE
CU x	EXISTING UNDERGROUND COMMUNICATION
CU CU	NEW COMMUNICATIONS LINE
E x	EXISTING OVERHEAD ELECTRICAL
EU EU	NEW UNDERGROUND ELECTRIC LINE
	TRAFFIC SIGN
	EXISTING GUARD POST
	EXISTING TREE
	EXISTING SHRUB
	EXISTING SIGN
6	SURVEY CONTROL DATA NUMBER
	SURVEY CONTROL DATA
	SILT FENCE
	INLET ROCK BERM
	CURB INLET POCK BERM
	ROCK BERM
	STABILIZED ENTRANCE
	DIRECTION OF FLOW
X	DEMOLISH CHAIN-LINK FENCE
(o)	DEMOLISH SPRINKLER HEADS
	DEMOLISH CONCRETE HEADWALL
	DEMOLISH SIGN AND POST
	DEMOLISH UTILITY LINE (TYPE AS NOTED)
	DEMOLISH MANHOLE (TYPE AS NOTED)
	BUILDING OUTLINE
	ASPHALT PAVEMENT FOR SERVICE YARD
	CONCRETE PAVEMENT
	CONCRETE SIDEWALK
	CONCRETE CURB AND GUTTER
	CONSTRUCTION LIMITS

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM # F-001
07/20/2026

No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: G. LEAF
Date: MAY 2025
Rev.
Dwn by: E. CHAVEZ
Solicitation No.: W9126G25RA0020
Ckd by: M. HOLMAN
Contract No.:
Submitted by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPLS220527

CIVIL GENERAL NOTES, ABBREVIATIONS AND LEGEND

Sheet reference number
D4-C-100
Sheet of

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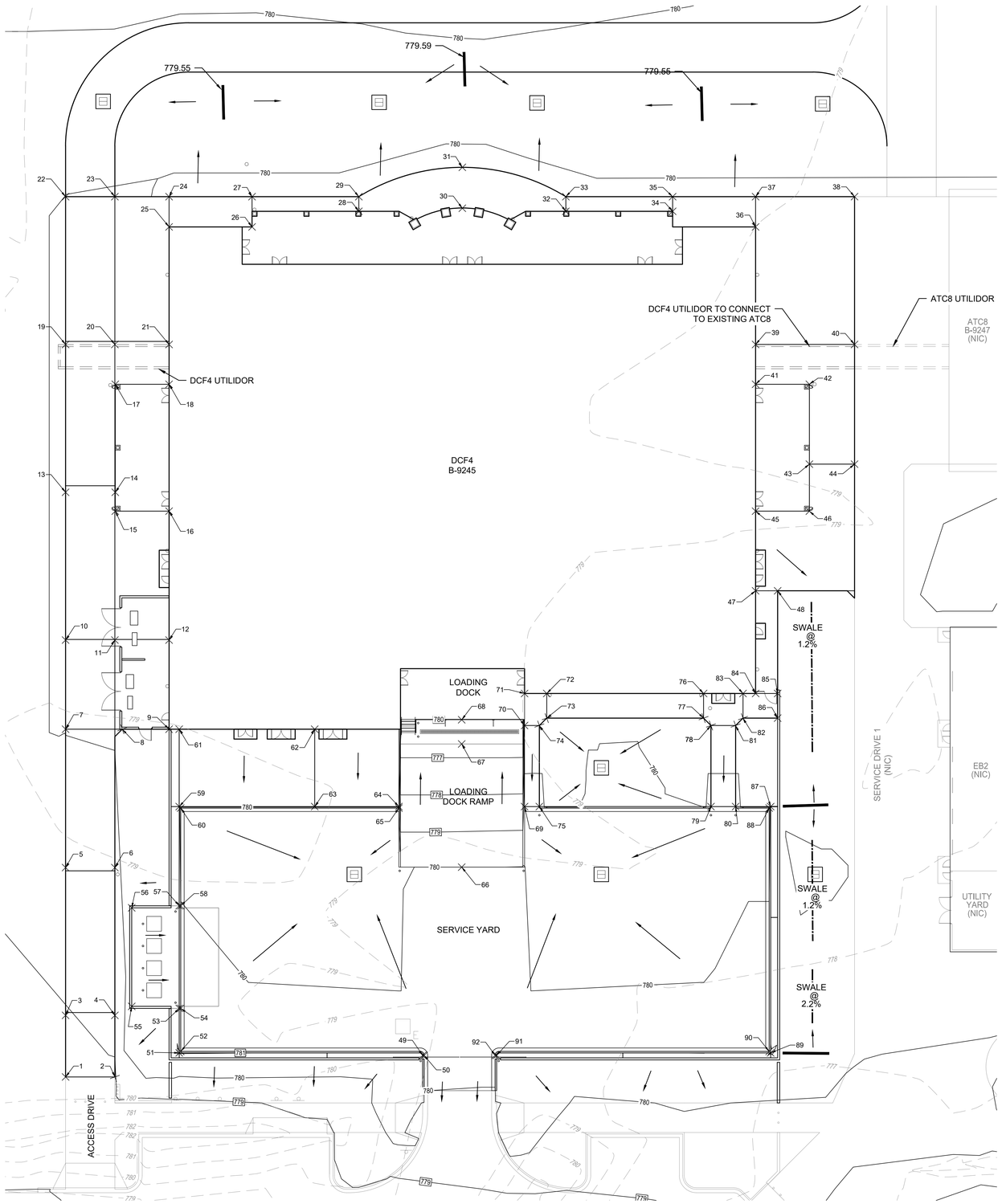


1 SPOT ELEVATION PLAN

SCALE: 1" = 20'

0 20' 40'

TRUE NORTH

SPOT ELEVATION CONTROL DATA

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	13689823.35	2085725.74	778.73	CORNER OF PVMT AT JOINT
2	13689831.92	2085743.81	778.93	CORNER OF PVMT AT JOINT
3	13689845.94	2085715.03	778.96	CORNER OF PVMT AT JOINT
4	13689854.51	2085733.10	779.14	CORNER OF PVMT AT JOINT
5	13689900.15	2085689.31	779.51	CORNER OF PVMT AT JOINT
6	13689908.72	2085707.38	779.62	CORNER OF PVMT AT JOINT
7	13689950.91	2085665.23	780.02	CORNER OF PVMT AT JOINT
8	13689960.76	2085686.01	780.15	CORNER OF PVMT AT JOINT
9	13689968.91	2085703.18	780.62	CORNER OF PVMT AT BLDG FOUNDATION
10	13689983.60	2085649.72	780.02	CORNER OF PVMT AT JOINT
11	13689992.18	2085667.80	780.17	CORNER OF PVMT AT JOINT
12	13690001.60	2085687.67	780.62	CORNER OF PVMT AT BLDG FOUNDATION
13	13690037.81	2085624.01	780.02	CORNER OF PVMT AT JOINT
14	13690046.45	2085642.23	780.31	CORNER OF PVMT AT BLDG FOUNDATION
15	13690039.53	2085645.51	780.31	CORNER OF PVMT AT BLDG FOUNDATION
16	13690048.89	2085665.24	780.62	CORNER OF PVMT AT BLDG FOUNDATION
17	13690086.06	2085623.44	780.31	CORNER OF PVMT AT BLDG FOUNDATION
18	13690095.42	2085643.17	780.62	CORNER OF PVMT AT BLDG FOUNDATION
19	13690092.02	2085598.29	780.02	CORNER OF PVMT AT JOINT
20	13690100.59	2085616.36	780.31	CORNER OF PVMT AT JOINT
21	13690110.02	2085636.24	780.63	CORNER OF PVMT AT BLDG FOUNDATION
22	13690146.23	2085572.57	780.02	CORNER OF PVMT
23	13690154.80	2085590.64	780.01	CORNER OF PVMT AT JOINT
24	13690164.23	2085610.52	780.25	CORNER OF PVMT AT JOINT
25	13690153.14	2085615.78	780.63	CORNER OF PVMT AT BLDG FOUNDATION
26	13690167.57	2085646.20	780.63	CORNER OF PVMT AT BLDG FOUNDATION
27	13690178.66	2085640.94	780.39	CORNER OF PVMT AT JOINT
28	13690191.87	2085682.64	780.63	CORNER OF PVMT AT BLDG FOUNDATION
29	13690197.23	2085680.09	780.63	CORNER OF PVMT AT JOINT
30	13690211.00	2085720.05	780.63	CORNER OF PVMT AT BLDG FOUNDATION
31	13690226.00	2085712.93	780.08	CORNER OF PVMT AT JOINT
32	13690227.87	2085758.53	780.63	CORNER OF PVMT AT BLDG FOUNDATION
33	13690233.24	2085755.98	780.41	CORNER OF PVMT AT JOINT
34	13690246.44	2085797.68	780.63	CORNER OF PVMT AT BLDG FOUNDATION
35	13690251.81	2085795.14	780.53	CORNER OF PVMT AT JOINT
36	13690255.15	2085830.81	780.63	CORNER OF PVMT AT BLDG FOUNDATION
37	13690266.24	2085825.55	780.23	CORNER OF PVMT AT JOINT
38	13690283.46	2085861.83	780.33	CORNER OF PVMT
39	13690212.04	2085851.26	780.63	CORNER OF PVMT AT BLDG FOUNDATION
40	13690229.25	2085887.55	1 780.46	CORNER OF PVMT
41	13690197.43	2085858.19	780.63	CORNER OF PVMT AT BLDG FOUNDATION
42	13690206.79	2085877.92	780.41	CORNER OF PVMT AT BLDG FOUNDATION
43	13690177.49	2085891.82	780.53	CORNER OF PVMT AT BLDG FOUNDATION
44	13690185.35	2085908.38	780.53	CORNER OF PVMT AT BLDG FOUNDATION
45	13690150.89	2085880.27	780.63	CORNER OF SIDEWALK AT BLDG
46	13690160.25	2085900.00	780.41	CORNER OF PVMT AT BLDG FOUNDATION

SPOT ELEVATION CONTROL DATA

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
47	13690121.68	2085894.13	780.63	CORNER OF SIDEWALK AT BLDG
48	13690125.51	2085902.21	780.51	CORNER OF SIDEWALK
49	13689893.38	2085852.92	780.93	TOP OF CURB
50	13689893.64	2085853.46	780.39	GUTTER LINE
51	13689851.94	2085763.22	781.03	TOP OF CURB
52	13689852.74	2085763.51	780.53	GUTTER LINE
53	13689868.26	2085755.48	780.87	TOP OF CURB
54	13689868.52	2085756.03	780.38	GUTTER LINE
55	13689860.74	2085737.70	780.97	SLAB CORNER
56	13689896.88	2085720.56	780.63	SLAB CORNER
57	13689905.90	2085737.63	780.51	TOP OF CURB
58	13689906.15	2085738.17	780.02	GUTTER LINE
59	13689942.29	2085720.36	780.17	TOP OF CURB AND SIDEWALK
60	13689942.00	2085721.17	779.67	GUTTER LINE
61	13689970.66	2085706.88	780.62	CORNER OF SIDEWALK AT BLDG
62	13689994.24	2085756.57	780.62	CORNER OF SIDEWALK AT BLDG
63	13689965.85	2085770.04	780.17	TOP OF CURB AND SIDEWALK
64	13689980.49	2085800.89	780.17	TOP OF CURB AND SIDEWALK
65	13689979.95	2085801.15	779.67	GUTTER LINE
66	13689969.21	2085834.47	780.20	TOP OF DOCK RAMP
67	13690014.38	2085813.04	776.63	BOTTOM OF DOCK RAMP
68	13690023.26	2085808.83	776.63	BOTTOM OF DOCK RAMP
69	13690002.35	2085846.97	779.68	TOP OF SIDEWALK/GUTTER
70	13690032.09	2085832.87	780.47	CORNER OF SIDEWALK
71	13690043.83	2085827.29	780.63	CORNER OF SIDEWALK AT BLDG
72	13690047.69	2085835.43	780.63	CORNER OF SIDEWALK AT BLDG
73	13690038.66	2085839.71	780.53	CORNER OF SIDEWALK
74	13690034.66	2085838.29	780.46	CORNER OF SIDEWALK
75	13690004.92	2085852.40	779.68	TOP OF SIDEWALK/GUTTER
76	13690074.97	2085892.93	780.63	CORNER OF SIDEWALK AT BLDG
77	13690065.93	2085897.22	780.53	CORNER OF SIDEWALK
78	13690064.51	2085901.21	780.46	CORNER OF SIDEWALK
79	13690034.77	2085915.32	779.68	TOP OF SIDEWALK/GUTTER
80	13690039.06	2085924.35	779.68	TOP OF SIDEWALK/GUTTER
81	13690068.80	2085910.25	780.46	CORNER OF SIDEWALK
82	13690072.79	2085911.67	780.53	CORNER OF SIDEWALK
83	13690081.83	2085907.39	780.63	CORNER OF SIDEWALK AT BLDG
84	13690084.03	2085912.03	780.63	CORNER OF SIDEWALK AT BLDG
85	13690087.85	2085920.08	780.47	CORNER OF SIDEWALK
86	13690078.81	2085924.37	780.39	CORNER OF SIDEWALK
87	13690045.15	2085937.20	780.17	TOP OF CURB AND SIDEWALK
88	13690044.35	2085936.92	779.67	GUTTER LINE
89	13689954.80	2085980.06	781.03	TOP OF CURB
90	13689955.09	2085979.26	780.53	GUTTER LINE
91	13689906.24	2085880.02	780.93	TOP OF CURB
92	13689905.98	2085879.48	780.38	GUTTER LINE

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
07/20/2026

No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM002			JULY 2026

Date: MAY 2025
Rev.
Solicitation No.: W912GG26RA030
Contract No.
File name:
Plot date:
Plot scale: 1:1
Designed by: G. LEAF
Dwn by: E. CHAVEZ
Reviewed by: J. HOLLAWAY
Submitted by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMP EX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL S22/0527

SPOT ELEVATION PLAN

Sheet reference number
D4-CG401

Sheet of

DESIGN FILE

Cover No.

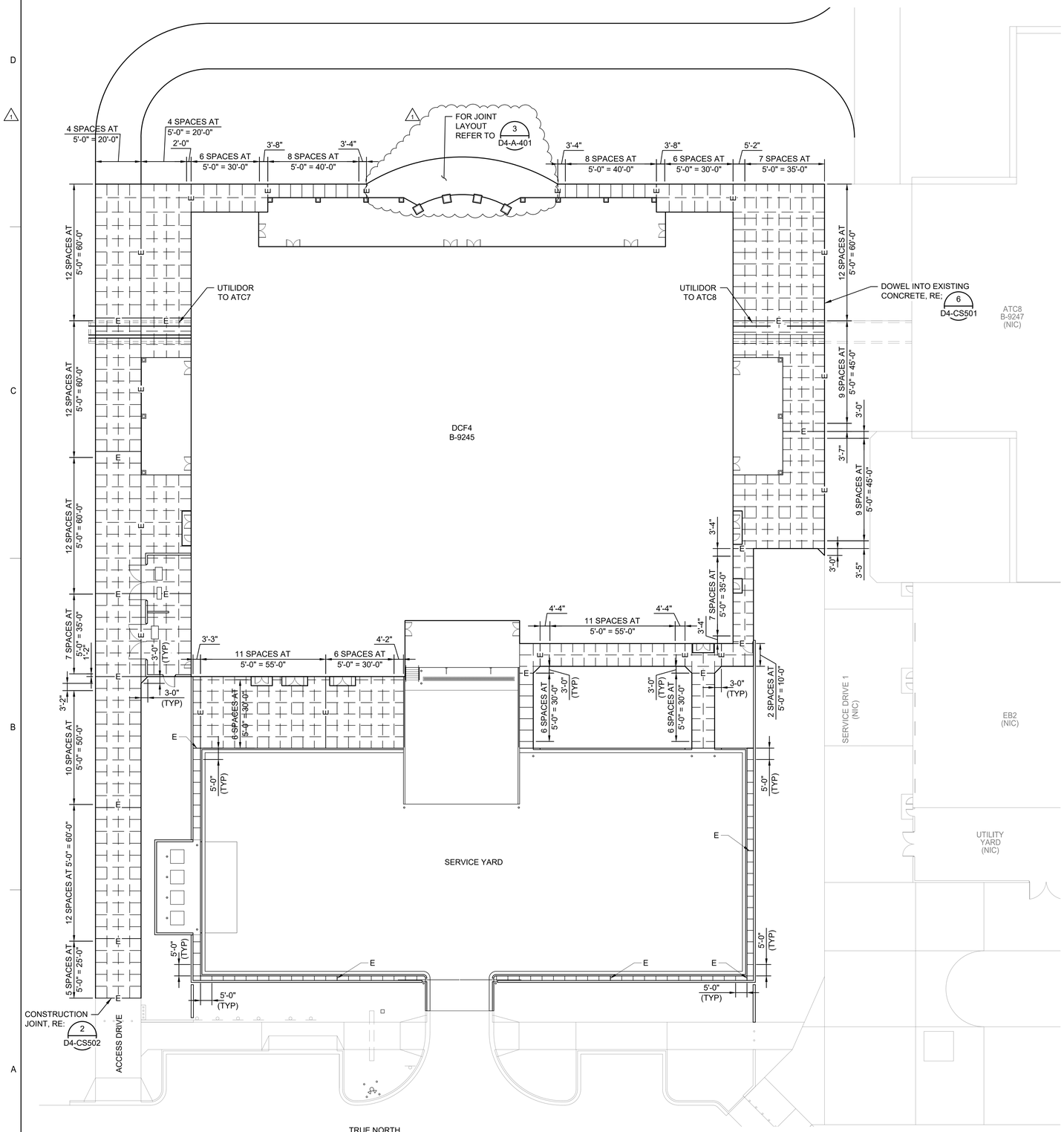
LEGEND

— — — CONTRACTION JOINT, RE: DETAIL 3 / D4-CS502 AND 7 / D4CS502

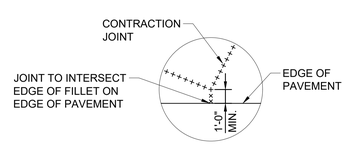
—E— EXPANSION JOINT, RE: DETAIL 10 / D4-CS502

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM # 3911
07/20/2026



1 SIDEWALK JOINT LAYOUT PLAN
SCALE: 1" = 20'
0 20' 40'



2 TYPICAL FILLET
N.T.S.

No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: G. LEAF
Date: MAY 2025
Rev.
Drawn by: E. CHAVEZ
Solicitation No.: W9126G25RA020
Contract No.:
Reviewed by: J. VAN HOOK
Submitted by: C. LANGAM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CONTRACT DRAWINGS
FORT WORTH, TEXAS

MERRICK®

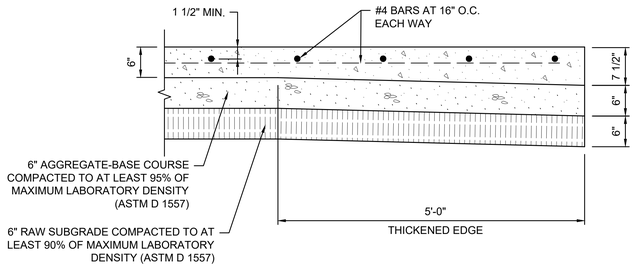
DRAWING NUMBER: LA 20-0003

JBSA- LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220527

SIDEWALK JOINT LAYOUT PLAN

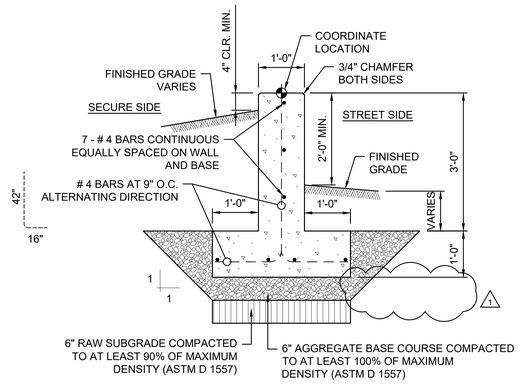
Sheet reference number
D4-CS401
Sheet of

DESIGN FILE:
Cont No.



1 THICKENED EDGE (LOADING DOCK)

1" = 1'-0"



5 TYPICAL LOW SECURITY WALL SECTION

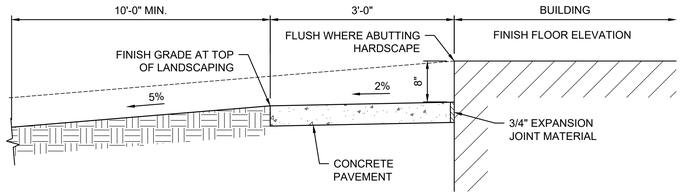
3/4" = 1'-0"

SHEET NOTES

1. THE MOISTURE CONTENT SHALL BE AT LEAST 1 PERCENT ABOVE OPTIMUM DURING COMPACTION OF THE RAW SUBGRADE.

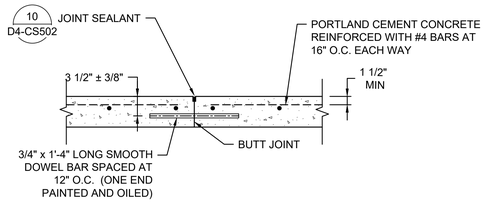
US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM # 3911
07/20/2026



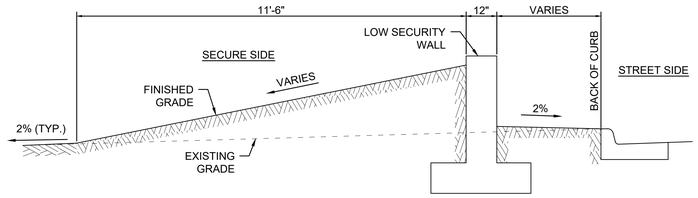
9 TYPICAL GRADING AT BUILDING

N.T.S.



2 CONSTRUCTION JOINT

1" = 1'-0"

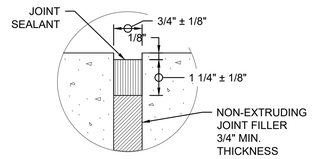


NOTES

1. EXPANSION JOINTS SHALL BE SPACED 60' O.C. MAXIMUM. REBAR SHALL NOT PASS THRU JOINTS. STOP REBARS 3" FROM EDGE OF CONCRETE.
2. CONTRACTION JOINT SHALL BE ON ALL THREE SIDES OF WALL AND SPACED 20' O.C.
3. WALL FINISH SHALL BE CLASS "A" FINISH.

6 TYPICAL SECTION AT LOW SECURITY WALL

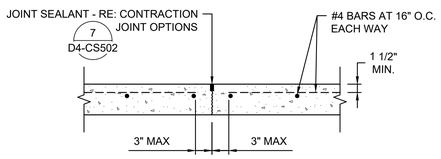
1/2" = 1'-0"



EXPANSION JOINTS

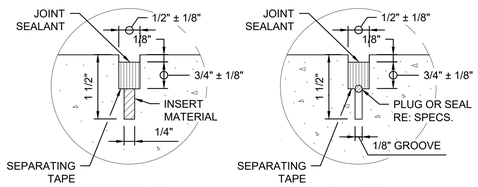
10 JOINT SEALANT DETAIL

N.T.S.



3 CONTRACTION JOINT

1" = 1'-0"



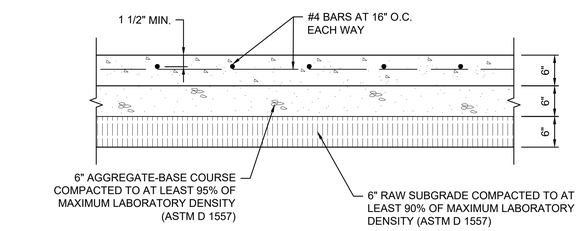
INSERT TYPE SAWED

CONTRACTION JOINT NOTES

1. TRANSVERSE CONSTRUCTION JOINT SHALL BE INSTALLED AT THE END OF EACH DAY'S PAVING OPERATION AND OTHER POINTS WITHIN A PAVING LANE WHERE THE PLACING OF CONCRETE IS DISCONTINUED A SUFFICIENT LENGTH OF TIME FOR THE CONCRETE TO START TO SET.
2. FOR DETAILED TREATMENT OF DOWELS, RE: SPECIFICATIONS.
3. MAXIMUM DENSITY IS TO BE DETERMINED IN ACCORDANCE TO ASTM D 1557.
4. FOR A TRANSVERSE CONSTRUCTION JOINT AT A LOCATION OTHER THAN A REGULARLY SCHEDULED CONTRACTION JOINT:
   A. THE REINFORCEMENT SHALL BE CARRIED THROUGH THE JOINT.
   B. DOWELS SHALL NOT BE PAINTED OR OILED.
   C. NO GROOVE OR JOINT SEAL NEEDS TO BE PROVIDED.

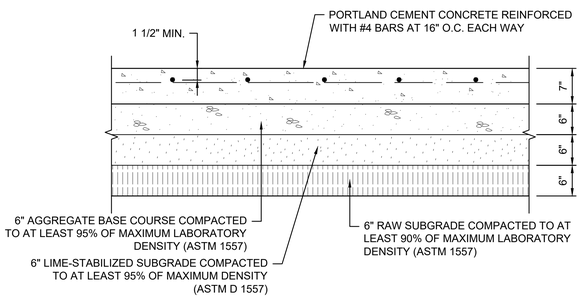
7 CONTRACTION JOINT OPTIONS

N.T.S.



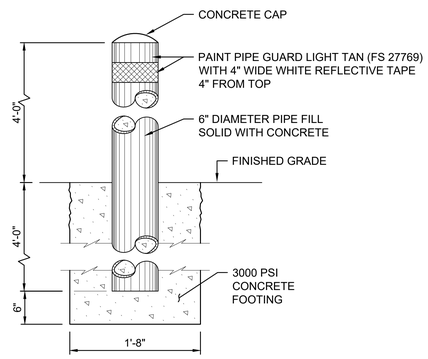
11 CONCRETE PAVEMENT SECTION (LOADING DOCK)

1" = 1'-0"



4 CONCRETE PAVEMENT SECTION (ACCESS DRIVE)

1" = 1'-0"



NOTE

PIPE GUARD SPACING SHALL BE 4'-0" MAX.

8 PIPE GUARD DETAILS

N.T.S.

No.	Description	Date
1	REVISED IAW AN0002	JULY 2026

Designed by: G. LEAF	Date: MAY 2025
Dwn by: E. CHAVEZ	Solicitation No.: W912GG25RA020
Reviewed by: J. PITCHFORD	Contract No.:
Submitted by: C. LANGUM	File name: Plot date: Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

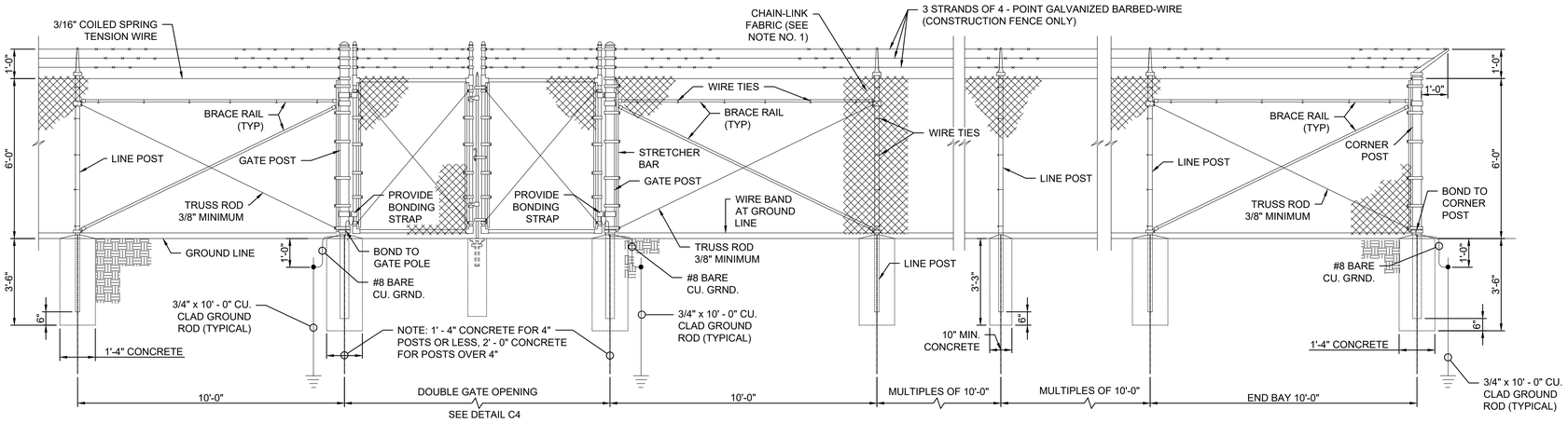
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL S220527

PAVING DETAILS II

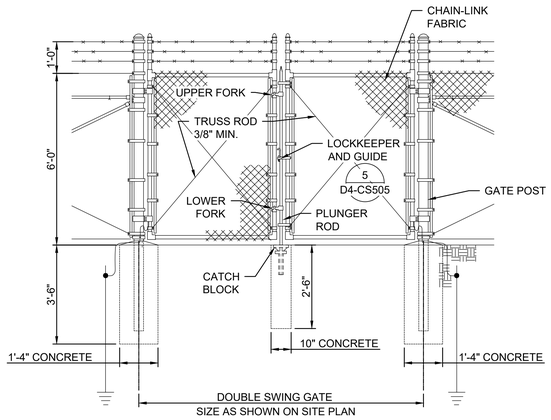
Sheet reference number
D4-CS502
Sheet of

DESIGN FILE:

Cont No.:



1 CHAIN-LINK FABRIC FENCE
N.T.S.



4 DOUBLE SWING GATE
N.T.S.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM # 3901
07/20/2026

SHEET NOTES

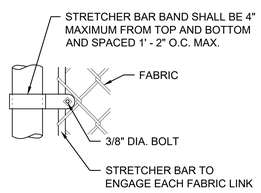
1. ALL FABRIC SHALL BE GALVANIZED NO. 9 GAUGE WIRE, WOVEN IN A 2" MESH. TOP AND BOTTOM EDGES SHALL BE TWISTED AND BARBED.
2. ALL PIPE SHALL BE STANDARD WEIGHT PIPE.
3. ALL FITTINGS SHALL BE GALVANIZED TO MATCH CHAIN-LINK FABRIC.
4. UPON COMPLETION AND ACCEPTANCE OF THE PROJECT, THE FENCE SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
5. UPON REMOVAL OF THE FENCE, THE AREA SHALL BE RESTORED TO ITS ORIGINAL OR BETTER CONDITION.
6. PROVIDE AND INSTALL BROWN FABRIC TEMPORARY CONSTRUCTION PRIVACY SCREENING INSIDE OF ALL CONSTRUCTION FENCES.
7. BARBED-WIRE EXTENSION ARM SHALL EXTEND INTO CONSTRUCTION AREA, PROVIDING SECURITY TO LACKLAND AFB.
8. THERE SHALL BE NO GAP BETWEEN THE BOTTOM OF THE FENCE AND THE GROUND LINE.
9. SWING GATES SHALL BE CONSTRUCTED WITH DROP RODS, PADLOCKS, LATCH ASSEMBLY AND GATE KEEPERS EXCEPT AS NOTED.
10. ALL GATE FRAMES SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM F900 1.90" NOMINAL (ROUND) OR 2.00" NOMINAL (SQUARE). GATE FRAMES SHALL BE OF WELDED CONSTRUCTION OR SHALL BE ASSEMBLED USING HEAVY FITTINGS. AT CONTRACTOR'S OPTION A WELDED HORIZONTAL BRACE MAY BE USED IN LIEU OF TRUSS RODS TO BRACE ALL-WELDED GATE FRAMES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER RIGID CONSTRUCTION OF ALL GATES SUPPLIED.

GATE POST SCHEDULE

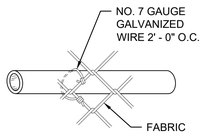
GATE LEAF WIDTH (NOMINAL)	OUTSIDE DIMENSION (NOMINAL)
6' OR LESS	2.875" OD 2.5" SQ
GREATER THAN 6' TO 12'	4.0" OD
GREATER THAN 12' TO 18'	6.625" OD
MORE THAN 18'	8.625" OD

STEEL POST SCHEDULE

USE AND SECTION	MINIMUM OUTSIDE DIMENSIONS (NOMINAL)		
	FABRIC WIDTH 72" OR LESS	FABRIC WIDTH 84" TO 96"	FABRIC WIDTH 108" AND OVER
CORNER, END & PULL POSTS			
TUBULAR - ROUND	2.375" O.D.	2.875" O.D.	4.00" O.D.
TUBULAR - SQUARE	2.00" SQ.	2.50" SQ.	3.00" SQ.
C-SECTION (ROLL-FORMED)	3.50" x 3.50"	3.50" x 3.50"	———
LINE POST			
TUBULAR - ROUND	1.90" O.D.	2.375" O.D.	2.875" O.D.
H - SQUARE	2.25" x 1.70"	2.25" x 1.70"	2.25" x 1.70"
C-SECTION (ROLL-FORMED)	1.875" x 1.625"	2.25" x 1.70"	———
TOP, BOTTOM & BRACE RAILS			
TUBULAR - ROUND	1.66" O.D.		
TUBULAR - SQUARE	1.50" SQ.		
H - SQUARE	1.625" x 1.50"		
C-SECTION (ROLL-FORMED)	1.625" x 1.25"		



BAND FOR WIRE STRETCHING

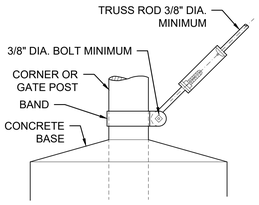


WIRE TIES FOR TOP OR BRACE RAIL

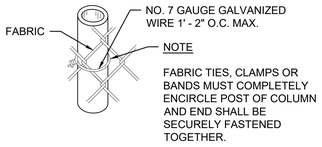
ELEVATION

TOP VIEW

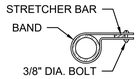
DETAIL OF BONDING TO GATE FRAMES OR SUPPORTING POST



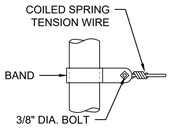
TRUSS ROD AND BAND



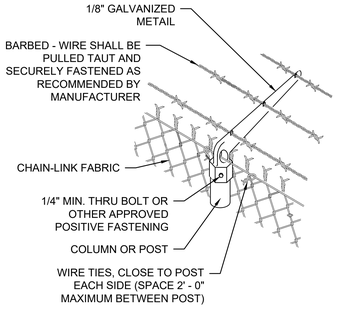
POST WIRE TIES



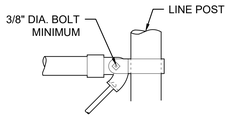
PLAN AT BANDS



END OR GATE POST

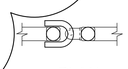


BARBED - WIRE EXTENSION ARM

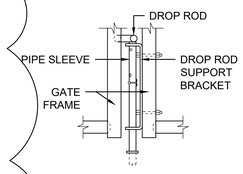


CLAMP FOR TOP OR BRACE RAIL

2 FASTENING DETAILS - SIMILAR FOR TUBULAR POST OR "H" COLUMNS
N.T.S.



PLAN



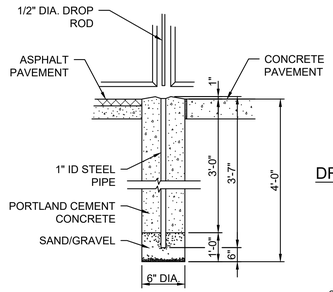
DETAIL

DROP ROD ASSEMBLY

PLAN

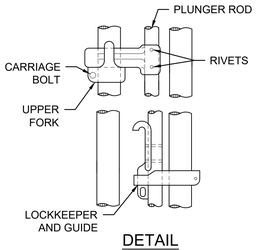
DETAIL

LATCH ASSEMBLY

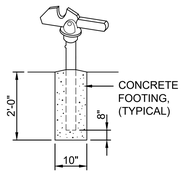


DROP ROD FOUNDATION

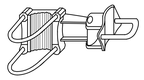
DROP ROD PLAN



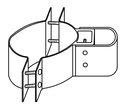
DETAIL



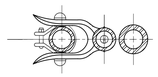
GATEKEEPER (TO HOLD GATE OPEN)



OFFSET HINGE



STANDARD HINGE



PLAN AT FORK

DOUBLE SWING GATE DETAILS

5 DOUBLE SWING GATE DETAILS
N.T.S.

No.	Description	Date
1	REVISED RW AM0002	JULY 2026

D.O.No. Action

Designed by: G. LEAF
Date: MAY 2025
Rev.
Dwn by: E. CHAVEZ
Solicitation No. W912GG25RA030
Reviewed by: J. VELLANOWETH
Contract No.
Submitted by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

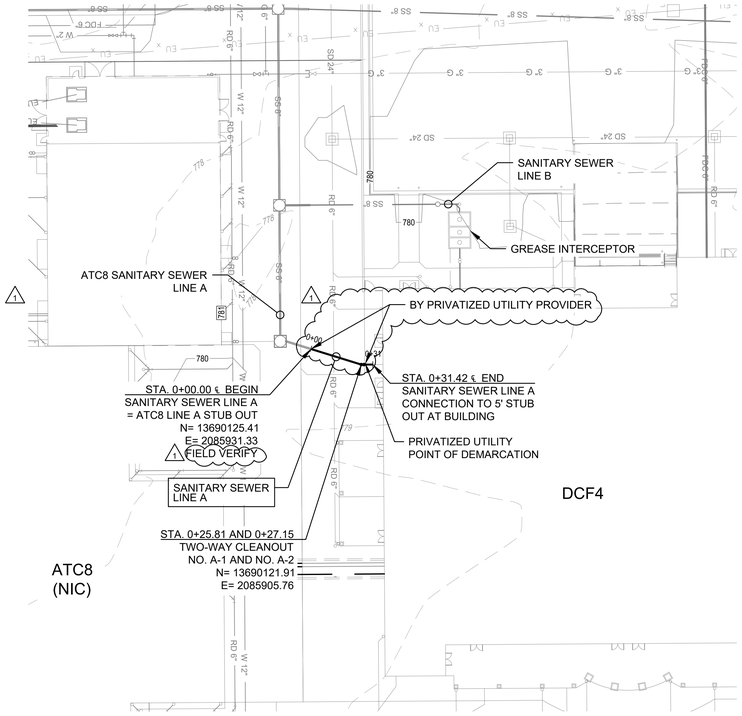
DRAWING NUMBER: LA 20-0003

BSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING CORPS EX - WEST CAMPUS DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220/5527

CONSTRUCTION FENCE DETAILS

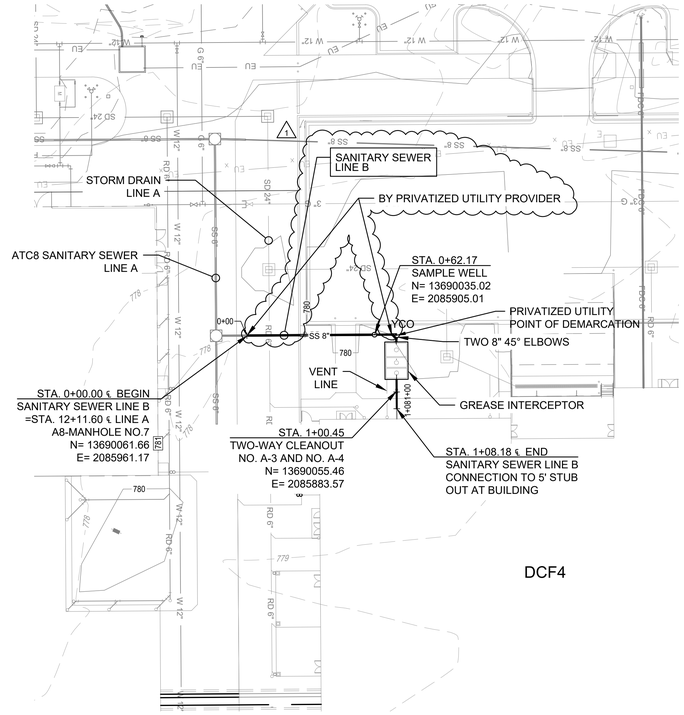
Sheet reference number
D4-CS505
Sheet of

DESIGN FILE:
Cont No.



1 PLAN SANITARY SEWER LINE A
SCALE: 1" = 30'

TRUE NORTH



2 PLAN SANITARY SEWER LINE B
SCALE: 1" = 30'

TRUE NORTH

SHEET NOTES

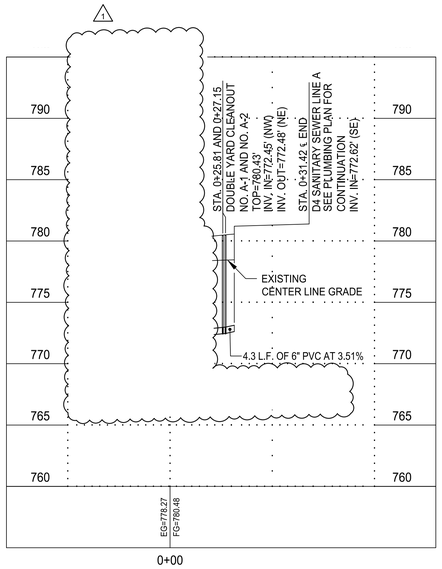
1. EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL VERIFY EXACT LOCATIONS IN FIELD PRIOR TO EXCAVATING OR TRENCHING OPERATIONS.

US Army Corps of Engineers
Fort Worth District

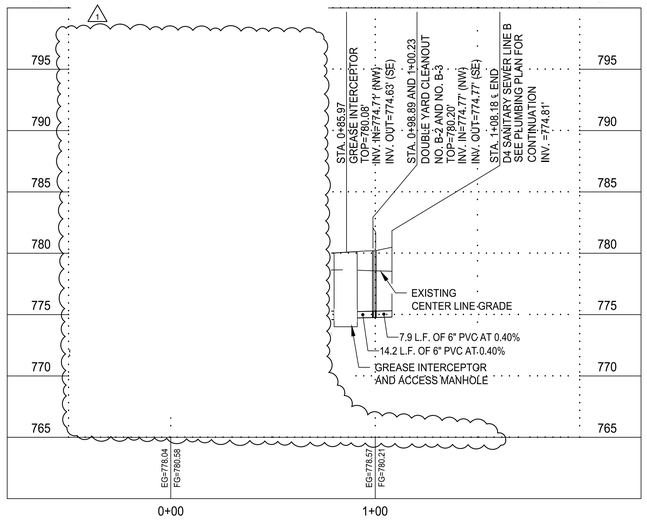
STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED PROFESSIONAL ENGINEER
TBPELS FIRM F-8813
07/20/2026

0 5' 10'
VERT. SCALE OF FEET

0 30' 60'
HORIZ. SCALE OF FEET



3 PROFILE SANITARY SEWER LINE A
SCALE: HORIZ. 1" = 30'
VERT. 1" = 5'



4 PROFILE SANITARY SEWER LINE B
SCALE: HORIZ. 1" = 30'
VERT. 1" = 5'

No.	Description	D.O.No.	Action	Date
1	REVISED MAY AM0002			JULY 2026

Designed by: G. LEAF
Date: MAY 2025
Rev.
Dwn by: D. YAPA
Solicitation No.: W9126G26RA0020
Reviewed by: A. HOLLAND
Contract No.:
Submitted by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

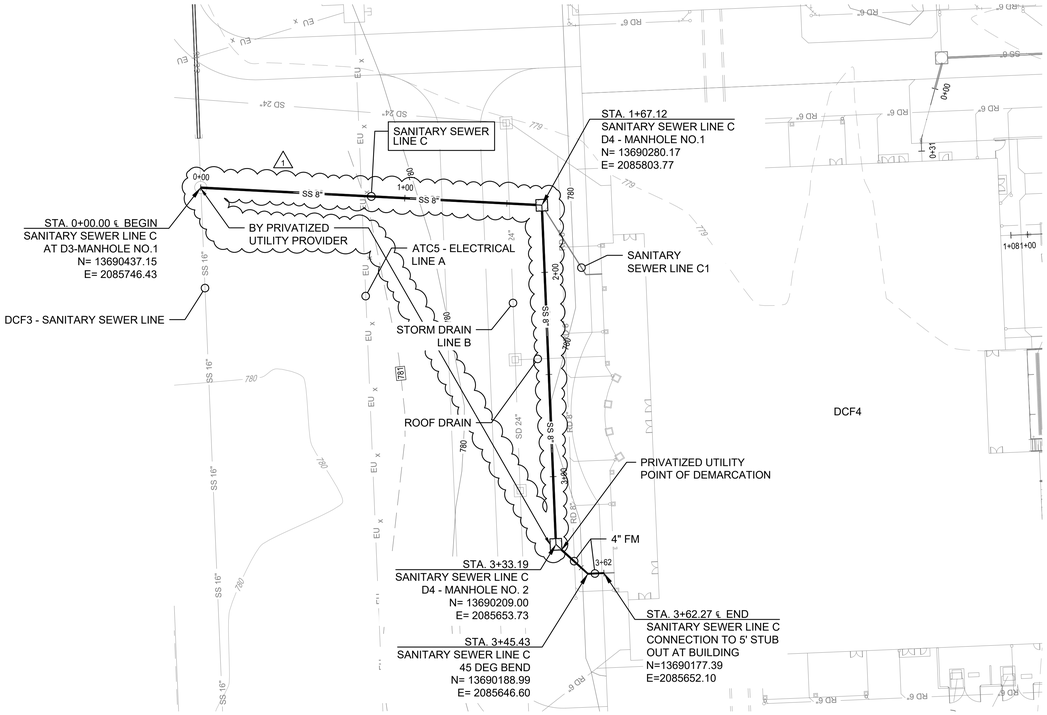
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPLS220527

SANITARY SEWER LINE A AND B
PLAN AND PROFILE

Sheet reference number
D4-CU220
Sheet of

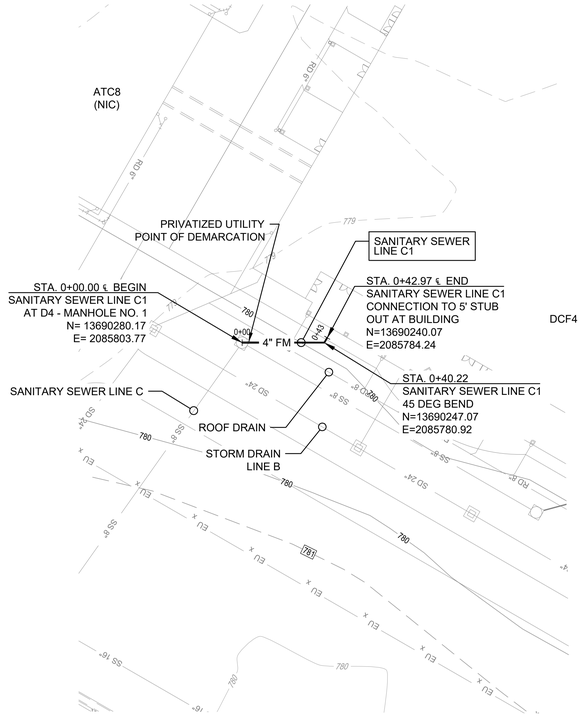
DESIGN FILE:

Contr No.



1 PLAN SANITARY SEWER LINE C
SCALE: 1" = 30'

TRUE NORTH



2 PLAN SANITARY SEWER LINE C1
SCALE: 1" = 30'

TRUE NORTH

SHEET NOTES

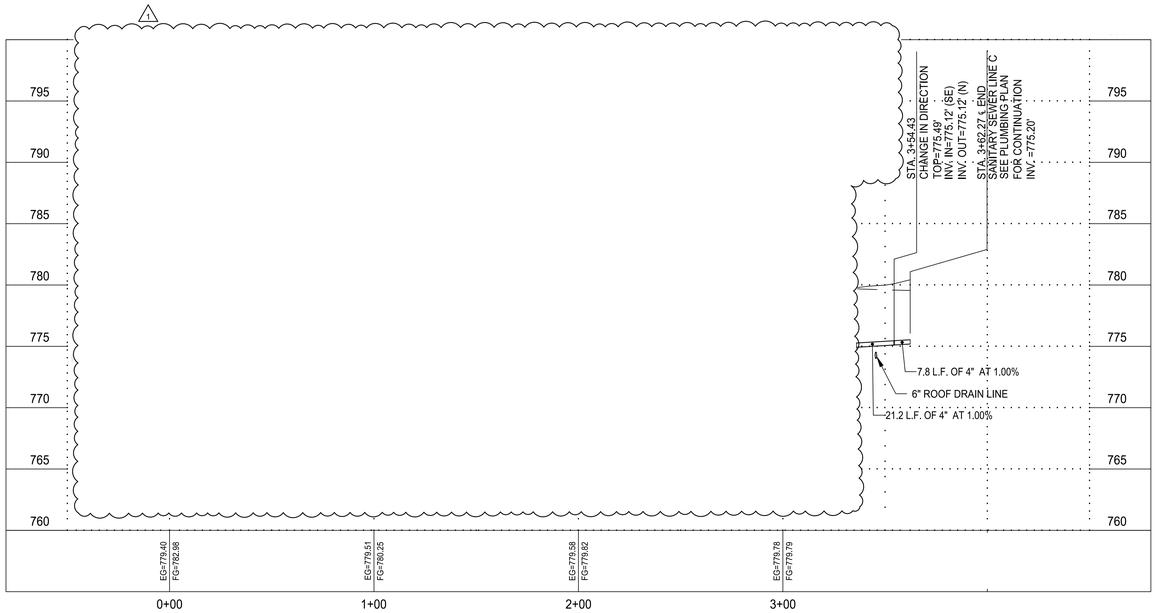
1. EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL VERIFY EXACT LOCATIONS IN FIELD PRIOR TO EXCAVATING OR TRENCHING OPERATIONS.

US Army Corps of Engineers
Fort Worth District

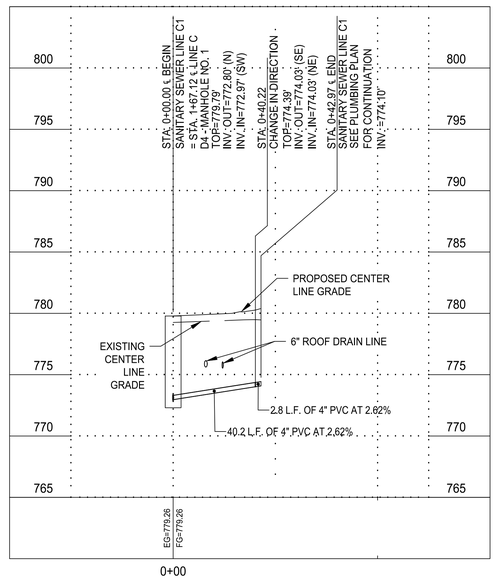
STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
07/20/2026

0 5' 10'
VERT. SCALE OF FEET

0 30' 60'
HORIZ. SCALE OF FEET



3 PROFILE SANITARY SEWER LINE C
SCALE: HORIZ. 1" = 30'
VERT. 1" = 5'



4 PROFILE SANITARY SEWER LINE C1
SCALE: HORIZ. 1" = 30'
VERT. 1" = 5'

No.	Description	D.O.No.	Action	Date
1	REVISED MAY A00002			JULY 2026

Designed by: G. LEAF
Date: MAY 2025
Rev.
Drawn by: D. TAPIA
Solicitation No.: W9126G26RA020
Reviewed by: A. HOLLAND
Contract No.:
Submitted by: C. LANGAM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220527

SANITARY SEWER LINE C AND C1
PLAN AND PROFILE

Sheet reference number
D4-CU221

Sheet of

DESIGN FILE:

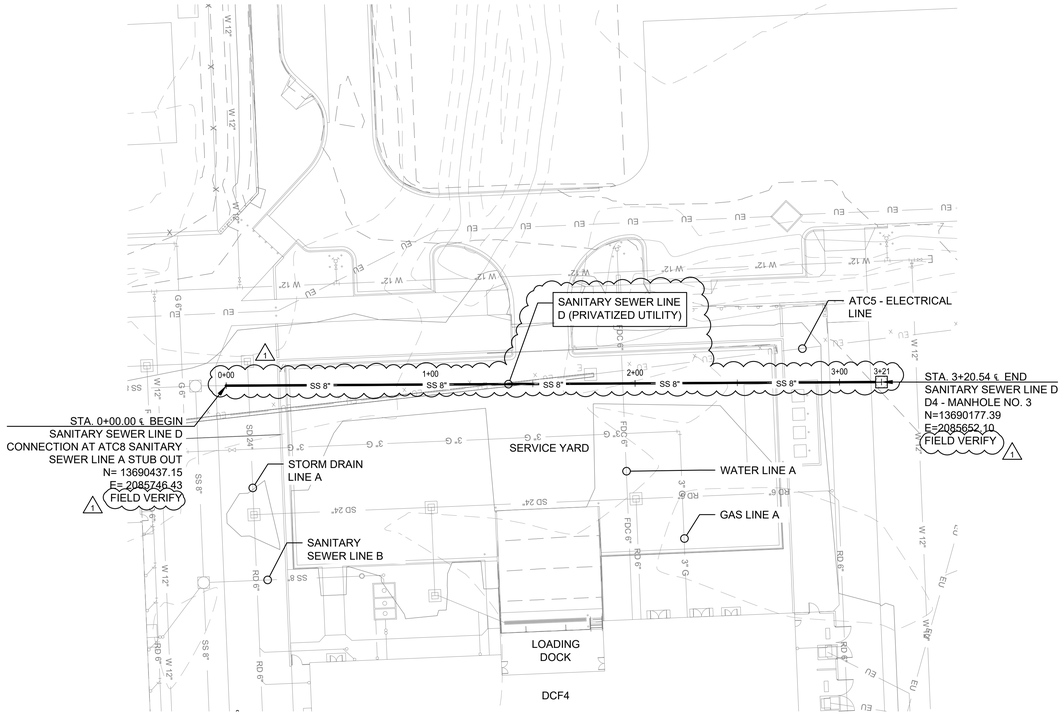
Contr No.

SHEET NOTES

1. EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL VERIFY EXACT LOCATIONS IN FIELD PRIOR TO EXCAVATING OR TRENCHING OPERATIONS.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM # 8943
07/20/2026



1 PLAN SANITARY SEWER LINE D
SCALE: 1" = 30'

TRUE NORTH

0 5' 10'
VERT. SCALE OF FEET

0 30' 60'
HORIZ. SCALE OF FEET

No.	Description	Date	Action	D.O.No.
1	REVISED MAY A00022	JULY 2026		

Designed by: G. LEAF
Date: MAY 2025
Rev.
Drawn by: D. TAPIA
Solicitation No. W9126G25RA020
Reviewed by: J. HYLAND
Contract No.
Submitted by: C. LANGIM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CONPOSITE BUSINESS FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA- LACKLAND AFB , TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220527

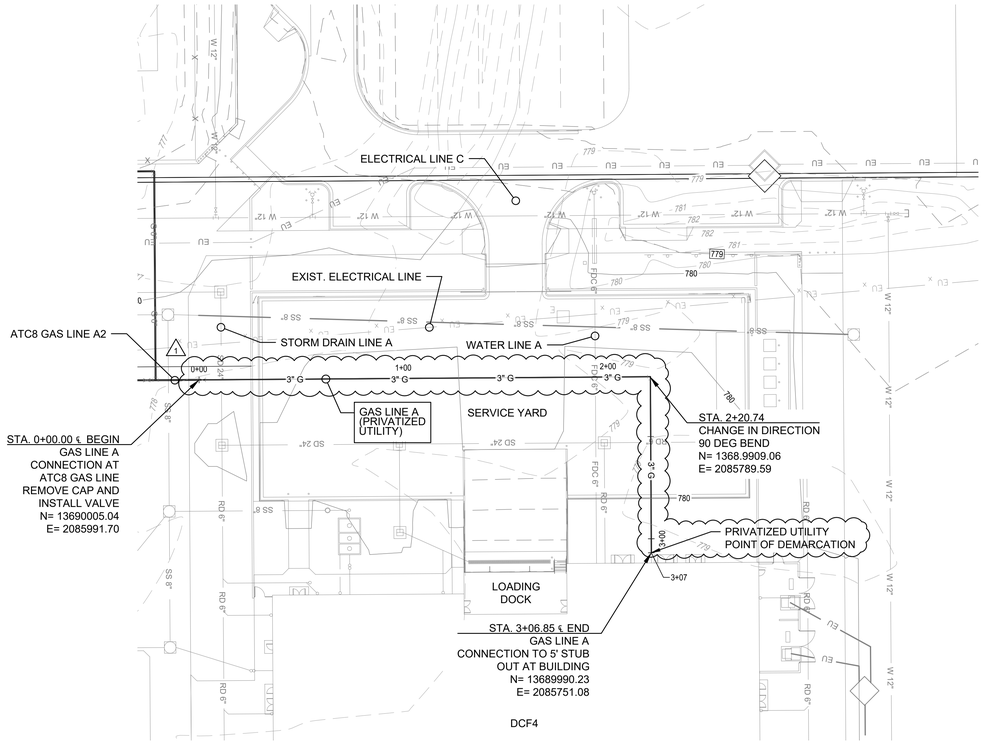
SANITARY SEWER LINE D
PLAN AND PROFILE

Sheet reference number
D4-CU222
Sheet of

DESIGN FILE:
Cont No.

SHEET NOTES

1. EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL VERIFY EXACT LOCATIONS IN FIELD PRIOR TO EXCAVATING OR TRENCHING OPERATIONS.



1 PLAN GAS LINE A
SCALE: 1" = 30'

TRUE NORTH

0 5' 10'
VERT. SCALE OF FEET

0 30' 60'
HORIZ. SCALE OF FEET

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM # 9951
07/20/2026

No.	Description	Date	Action	D.O.No.
1	REVISED MAY AM0002	JULY 2026		

Designed by: G. LEAF
Drawn by: D. TAPIA
Reviewed by: A. VOYLAND
Submitted by: C. LANGUM
Date: MAY 2025
Solicitation No.: W9126G25RA020
Contract No.:
File name:
Plot date:
Plot scale: 1:1
Rev.

U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

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DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPI-S220527

GAS LINE A PLAN AND PROFILE

Sheet reference number
D4-CU240

Sheet of

Core No.

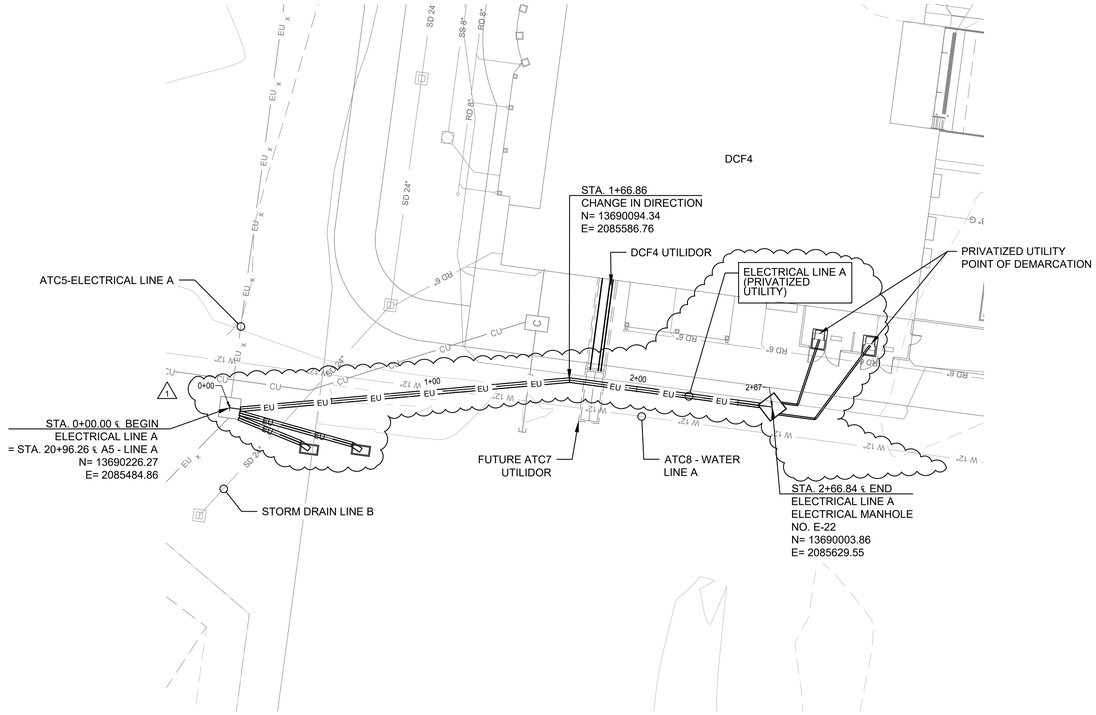
DESIGN FILE:

SHEET NOTES

1. EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL VERIFY EXACT LOCATIONS IN FIELD PRIOR TO EXCAVATING OR TRENCHING OPERATIONS.
2. REFER TO ELECTRICAL SHEETS FOR DUCT BANK SIZE AND NUMBER AND SIZE OF CONDUITS.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM # 9813
07/20/2026



1 PLAN ELECTRICAL LINE A
SCALE: 1" = 30'

TRUE NORTH

0 5' 10'
VERT. SCALE OF FEET

0 30' 60'
HORIZ. SCALE OF FEET

No.	Description	D.O.No.	Action	Date
1	REVISED MAY A00002			JULY 2026

Designed by: G. LEAF
Date: MAY 2025
Rev.
Drawn by: D. TAPIA
Solicitation No.: W9126G25RA020
Reviewed by: J. VOLLMAND
Contract No.:
Submitted by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS
FORT WORTH, TEXAS

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DRAWING NUMBER: LA 20-0003

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AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220527

ELECTRICAL LINE A
PLAN AND PROFILE

Sheet reference number
D4-CU250
Sheet of

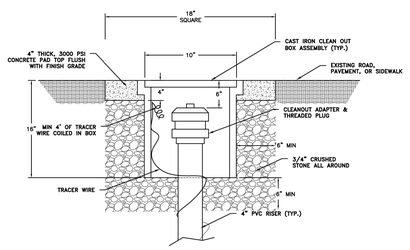
DESIGN FILE:

Contr No.

W9126G26RA028-0002

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
PROFESSIONAL ENGINEER
TBPELS FIRM F-9951
07/20/2026



CLEANOUT DETAIL

REVISIONS
1/12 – MSG EDITS
6/13 – MSG EDITS
01/16 – MSG EDITS

AMERICAN WATER MILITARY SERVICES GROUP
CIVIL
CLEANOUT
DETAIL

AMERICAN WATER MILITARY SERVICES GROUP
CAMDEN, NJ 08102

AMERICAN WATER W.S.G.
1 WATER STREET
CAMDEN, NJ 08102

AMERICAN WATER

DRAWN BY J. ARRIZA
CHECKED BY MWFS FOR APPROVAL
DATE:05-03-2010
PROJECT N/A
USE DIMENSIONS ONLY
SCALE N.T.S.

USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES

MSG-WW-07

FINAL

MSG-WW-07

4 CLEANOUT DETAIL
N.T.S.

No.	Description	D.O.No.	Action	Date
1	REVISED IAW A00002			JULY 2026

Designed by: G. LEAF
Date: MAY 2025
Rev.
Drwn by: E. CHAVEZ
Solicitation No.: W9126G26RA020
Contract No.:
Reviewed by: J. WILLIAMS
Approved by: M. LOVING
Submitted by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CONTRACT DRAWINGS
FORT WORTH, TEXAS

MERRICK

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220527

SANITARY SEWER DETAILS

Sheet reference number
D4-CU501

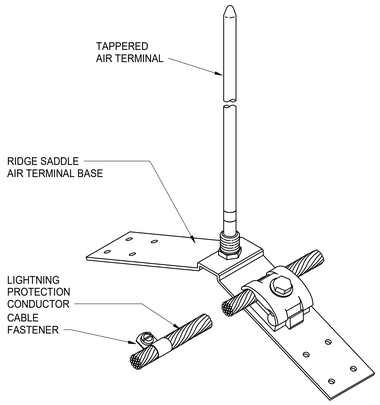
Sheet of

DESIGN FILE:

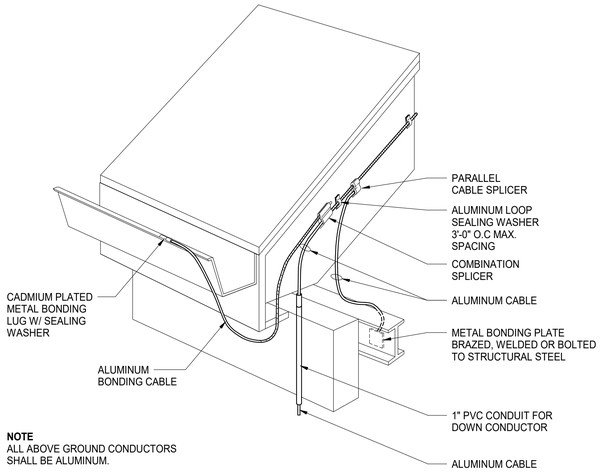
Contr No.:

SHEET NOTES

1. SEE STRUCTURAL DRAWINGS FOR EXACT SIZE AND LOCATION OF STRUCTURAL FRAMING.
2. STRUCTURAL FRAMEWORK SHALL BE MADE ELECTRICALLY CONTINUOUS BY WELDING.
3. ALL SPLICES BELOW GRADE SHALL BE THE EXOTHERMIC WELD TYPE.
4. AIR TERMINALS SHALL EXTEND NO LESS THAN 24" ABOVE THE ROOF.
5. CONNECT AIR TERMINAL TO THE STRUCTURAL STEEL FRAMING WITH CONDUCTOR ROUTED THROUGH THE ROOF AS DETAILED EXCEPT WELD TO HORIZONTAL MEMBER.
6. CONNECT AIR TERMINAL TO THE TOP OF THE STRUCTURAL STEEL COLUMN WITH CONDUCTOR ROUTED THROUGH THE ROOF AS DETAILED.
7. GROUND RODS SHALL BE CONNECTED TO THE BOTTOM OF THE STRUCTURAL STEEL COLUMN WITH #4/0 AWG BARE COPPER CONDUCTOR AS DETAILED.
8. ALL METAL EQUIPMENT ON THE ROOF SHALL BE BONDED TO THE LIGHTNING PROTECTION SYSTEM.
9. THROUGH ROOF FLASHING SHALL BE ALUMINUM WITH 8 INCH ROUND BASE AND VERTICAL TUBE WITH NEOPRENE SEAL, FLASHING SHALL BE THE PRODUCT OF THE MANUFACTURER OF THE LIGHTNING PROTECTION SYSTEM. A MEMBRANE FLASHING SHALL BE PROVIDED OVER THE THROUGH ROOF FLASHING.

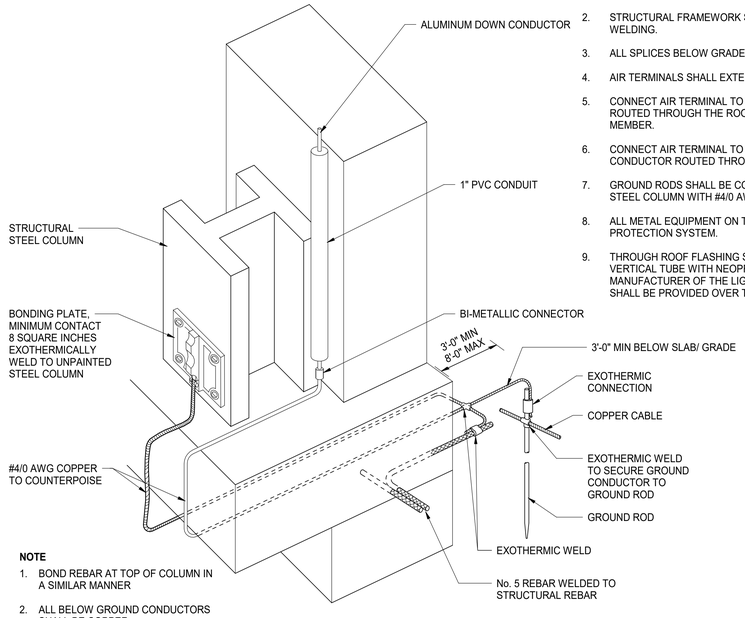


1 AIR TERMINAL AT ROOF RIDGE
N.T.S.



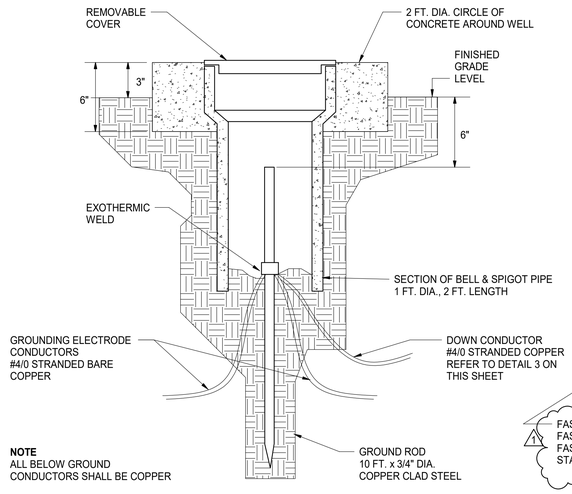
NOTE
ALL ABOVE GROUND CONDUCTORS SHALL BE ALUMINUM.

2 TYPICAL GUTTER BOND, STEEL BOND, AND DOWN CONDUCTOR BOND DETAIL
N.T.S.



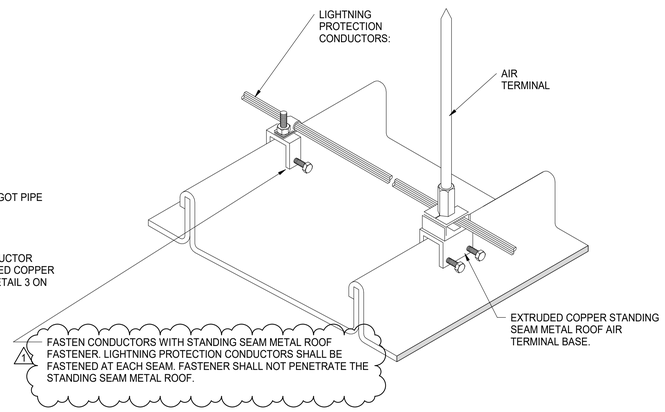
NOTE
1. BOND REBAR AT TOP OF COLUMN IN A SIMILAR MANNER
2. ALL BELOW GROUND CONDUCTORS SHALL BE COPPER.

3 TYPICAL BONDING PLATE, DOWN CONDUCTOR AND GROUNDING CONNECTION DETAIL
N.T.S.

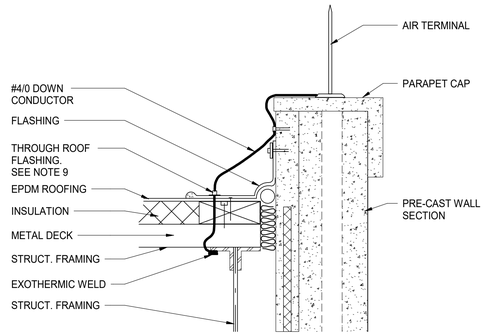


NOTE
ALL BELOW GROUND CONDUCTORS SHALL BE COPPER

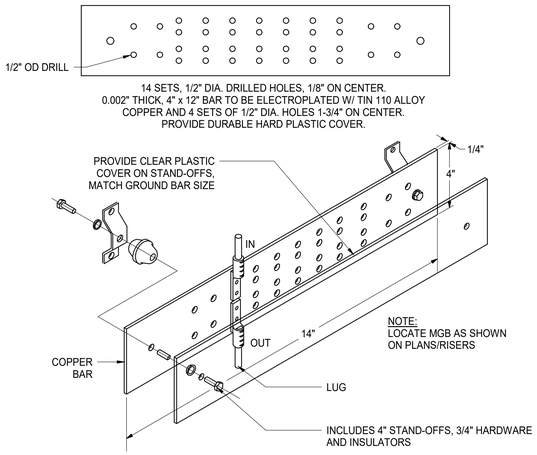
4 GROUND ROD INSPECTION / TEST WELL DETAIL
N.T.S.



5 AIR TERMINAL ON STANDING SEAM METAL ROOF
N.T.S.



6 AIR TERMINAL AT EDGE OF ROOF
N.T.S.



7 MAIN GROUNDING BAR DETAIL
N.T.S.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Dwn by: J. CHAMPION
Solicitation No.: W912QR25RA020
Contract No.
Reviewed by: K. BENNETT
Submitted by: C. LANGUM
File name:
Plot date: 7/16/2026 1:08 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI-S220527

GROUNDING - LIGHTNING PROTECTION SYSTEM DETAILS

Sheet reference number
D4-EG501
Sheet of

Cont No.

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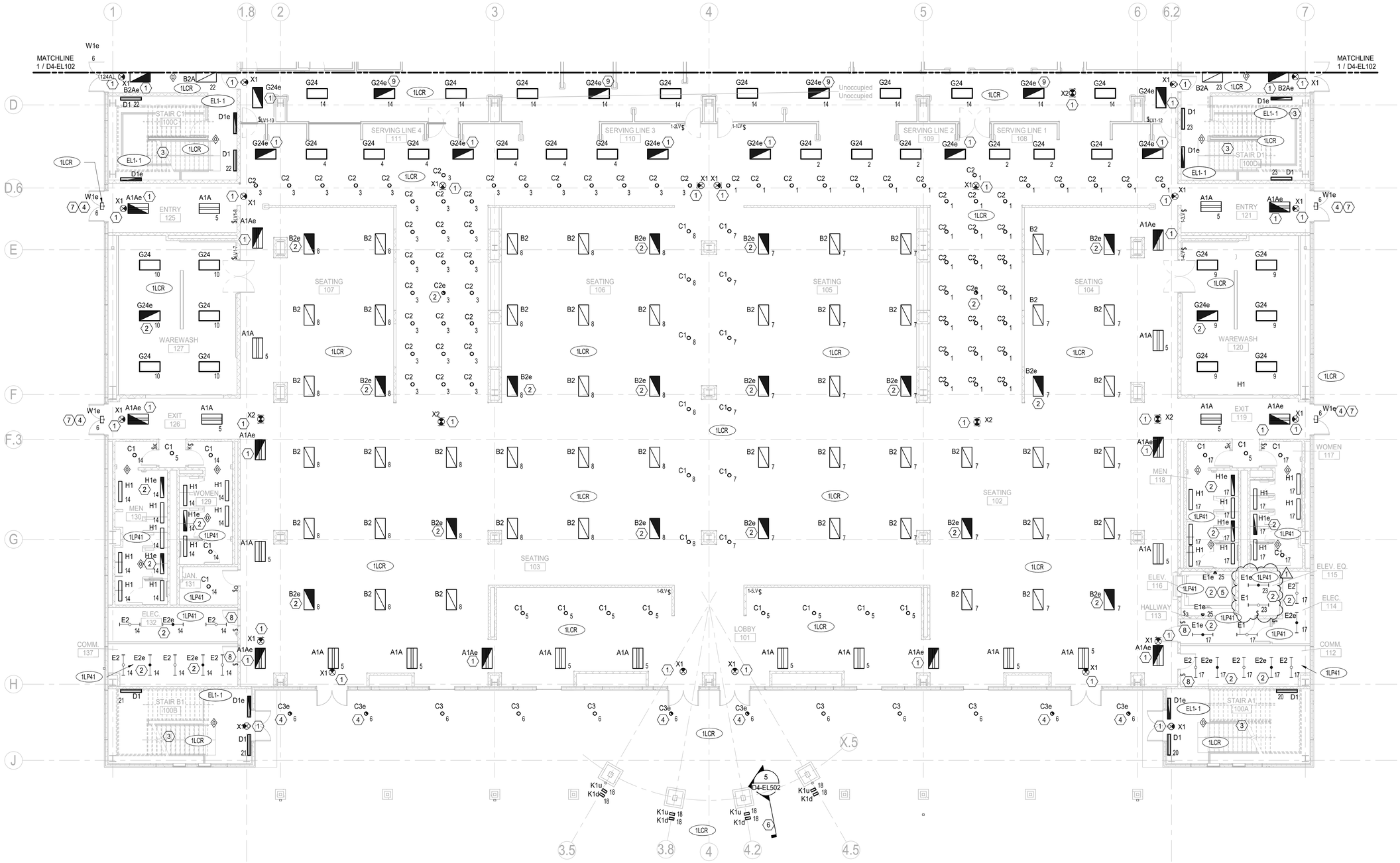


1 FIRST FLOOR LIGHTING PLAN - AREA A
1/8" = 1'-0"

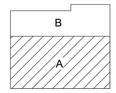
PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEETS D4-EL500 SERIES FOR LUMINAIRE DETAILS.
3. INSTALL 'X1' EXIT SIGNS (WALL MOUNTED) AT ELEVATIONS OF 8'-0" ABOVE FINISH FLOOR.
4. ALL LIGHTING CIRCUIT HOMERUNS SHALL BE FROM LIGHTING SWITCH JUNCTION BOX.
5. INSTALL ALL "E1" AND "E2" LIGHT FIXTURES AT 10'-0" AFF UNLESS INDICATED OTHERWISE.
6. ALL EMERGENCY LIGHTING CIRCUITS SHALL BE ROUTED IN SEPARATE CONDUIT SYSTEMS FROM NON-EMERGENCY SYSTEMS.
7. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.
8. REFER TO D4-EL500 SERIES DRAWINGS FOR LOW VOLTAGE SWITCHING CONFIGURATIONS.
9. PROVIDE SINGLE OCCUPANCY SENSOR SWITCHING PER DETAIL 3/D4-EL502.
10. PROVIDE MULTIPLE OCCUPANCY SENSOR SWITCHING PER DETAIL 4/D4-EL502.

KEYNOTES

1. CIRCUIT UNSWITCHED EMERGENCY FIXTURES TO EL1-3.
2. PROVIDE SWITCHED EMERGENCY FIXTURES TO EL1-5 AND NORMAL POWER USING GENERATOR TRANSFER DEVICE AS SHOWN. REFER TO WIRING SCHEMATIC DETAIL 2/D4-EL502.
3. CIRCUIT UP TO 2ND FLOOR STAIRWELL LIGHTING AND DOWN TO CRAWL SPACE LIGHTING. NORMAL POWER LIGHTS ARE CONTROLLED THROUGH THE OCCUPANCY SENSOR, REFER TO DETAIL 4/D4-EL502.
4. PROVIDE SWITCHED EMERGENCY FIXTURES TO EL1-6 AND NORMAL POWER USING GENERATOR TRANSFER DEVICE AS SHOWN. REFER TO WIRING SCHEMATIC DETAIL 2/D4-EL502.
5. INSTALL E1e FIXTURE VERTICALLY IN ELEVATOR SHAFT. COORDINATE LOCATION WITH ELECTRICAL CAB TRAVEL PATH.
6. MOUNT K1 FIXTURE ON ANGLED ROOF. REFER TO DETAIL 5/D4-EL502.
7. INSTALL EXTERIOR FIXTURE FOR DETAIL 1/D4-EL502. MOUNT AT 10'-0" ABOVE FINISH GRADE.
8. PROVIDE ILLUMINATED HANDLE LIGHT SWITCH.
9. PROVIDE SWITCHED EMERGENCY FIXTURES TO EL1-4 AND NORMAL POWER USING GENERATOR TRANSFER DEVICE AS SHOWN. REFER TO WIRING SCHEMATIC DETAIL 2/D4-EL502.



KEY PLAN

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Dwn by: J. CHAMPION
Solicitation No.: W912GZ25RA020
Contract No.
Reviewed by: K. BRACKETT
Submitted by: C. LANGUM
File name:
Plot date: 1 inch = in.
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
2000 FORT WORTH AVENUE
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

FIRST FLOOR LIGHTING PLAN - AREA A

Sheet reference number
D4-EL101
Sheet of

Contr No.

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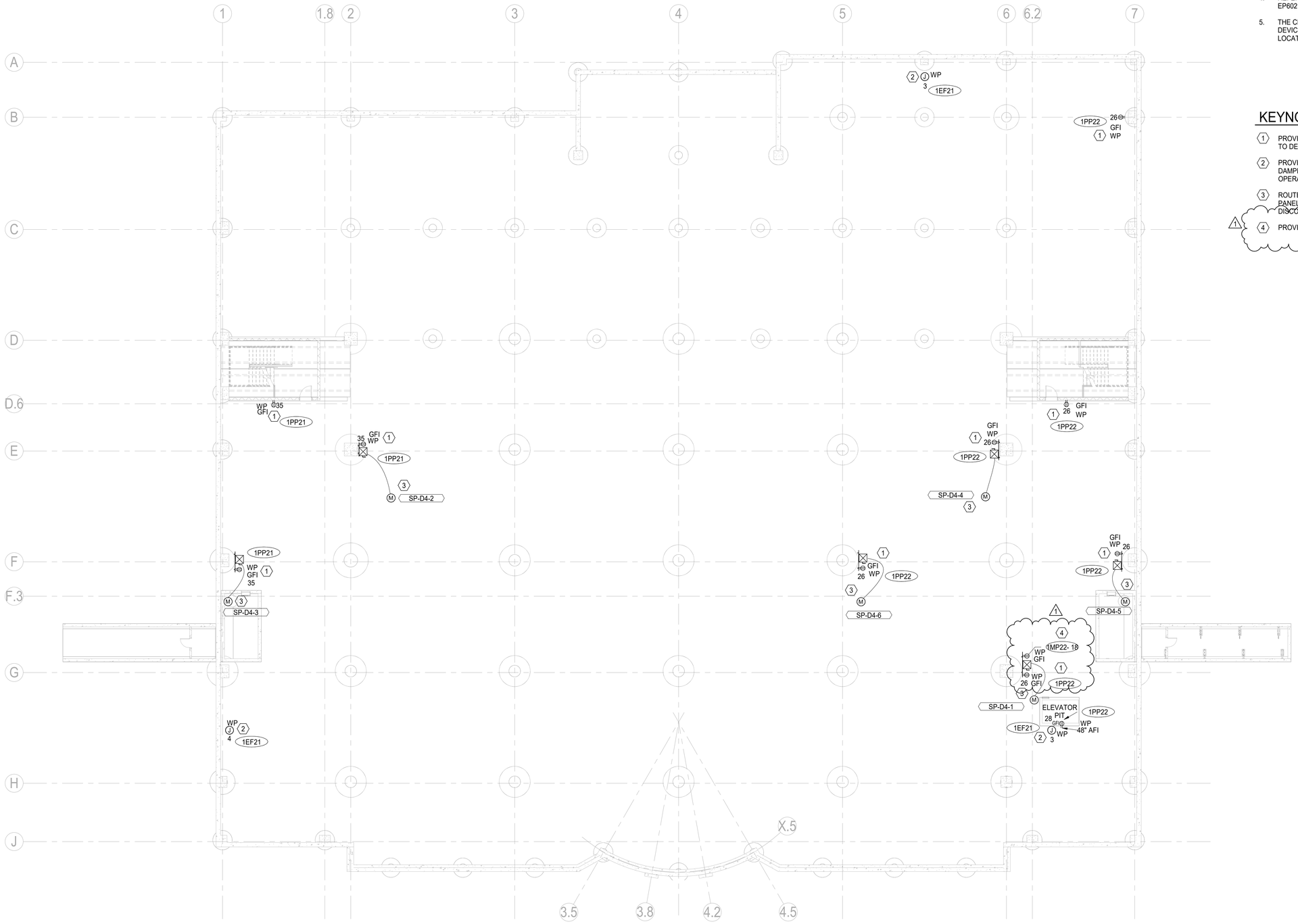


1 CRAWL SPACE POWER PLAN
3/32" = 1'-0"

PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON SHEET D4-EP602 FOR EQUIPMENT CIRCUITING.
5. THE CRAWL SPACE SHALL BE CONSIDERED AN OUTDOOR ENVIRONMENT. ALL DEVICES, DISTRIBUTIONS, ETC SHALL BE SUITABLE FOR OUTDOOR, DAMP LOCATION ENVIRONMENT.

KEYNOTES

1. PROVIDE WEATHERPROOF IN-USE RECEPTACLE. REFER TO DETAIL 1/D4-EP501. LOCATE 24" ABOVE GRADE.
2. PROVIDE 120V CIRCUIT INDICATED TO FIRE/SMOKE DAMPER. REFER TO "FA" SERIES DRAWINGS FOR OPERATION OF DAMPER.
3. ROUTE POWER CIRCUIT IN RGS CONDUIT BACK TO PANEL AS INDICATED ON SCHEDULE. MOUNT SAFETY DISCONNECT SWITCH ON UNISTRUT FRAMING.
4. PROVIDE RECEPTACLE FOR OIL MONITORING SYSTEM.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Dwn by: J. CHAMPION
Solicitation No.: W912QR24A020
Contract No.
Reviewed by: K. BENNETT / R. BURNETT
Submitted by: C. LANDUM
File name:
Plot date: 7/16/2026 13:08:41
Plot scale: 1:1

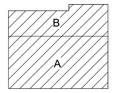
U.S. ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI-S220527

CRAWL SPACE POWER PLAN



KEY PLAN

Sheet reference number
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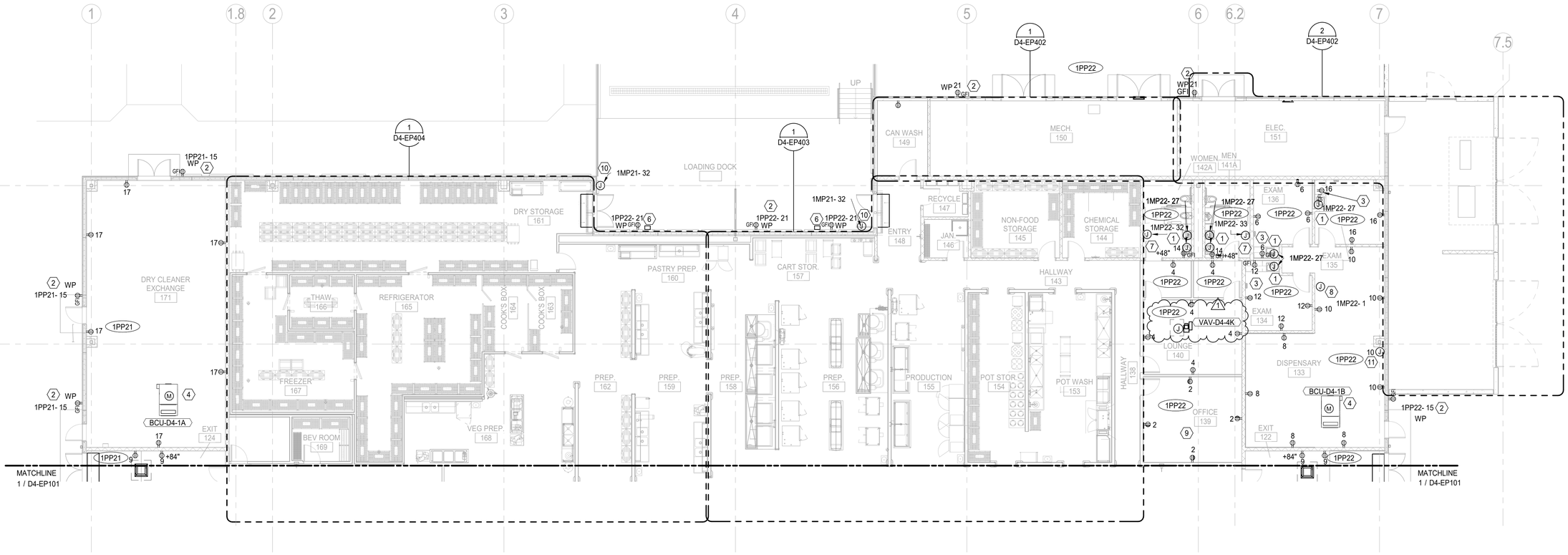


1 FIRST FLOOR POWER PLAN - AREA B

1/8" = 1'-0"

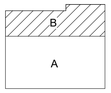
PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON SHEET D4-EP602 FOR EQUIPMENT CIRCUITING.
5. REFER TO D4-EP400 SERIES DRAWINGS FOR ENLARGED ELECTRICAL POWER PLANS.
6. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.

KEYNOTES

1. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "HANDS FREE" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO TEN (10) WATER VALVES. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
2. PROVIDE WEATHER PROOF IN USE RECEPTACLE. REFER TO 1/D4-EP501. LOCATE 24" ABOVE GRADE.
3. MOUNT RECEPTACLE 6" ABOVE COUNTER/BACKSPLASH.
4. MOUNT MECHANICAL DISCONNECT ABOVE ACCESSIBLE CEILING OR BEHIND ACCESS PANEL.
5. NOT USED.
6. LOADING DOCK VEHICLE RESTRAINT SYSTEM EXTERIOR INDICATOR LIGHTS. REFER TO DETAIL 5/D4-EP501. CONCEAL CONDUIT TO DEVICE.
7. ~~PROVIDE J-BOX FOR ELECTRIC HAND DRYER. LOCATE AT 54" AFF.~~
8. PROVIDE 120V POWER FOR MECHANICAL CONTROLS, COORDINATE EXACT LOCATIONS WITH MECHANICAL CONTRACTOR. PROVIDE JUNCTION BOX BEHIND ACCESSIBLE CEILING PANEL.
9. RECEPTACLES IN OFFICE SHALL BE 1/2 SWITCHED, TOP OUTLET SHALL ALWAYS BE POWERED ON. BOTTOM OUTLET SHALL BE SWITCHED OFF. LABEL RECEPTACLE, REFER TO DETAIL 6/D4-EP501. SWITCHED RECEPTACLE SHALL BE CONTROLLED BY ROOM OCCUPANCY SENSOR. REFER TO DETAIL 6/D4-EL502.
10. PROVIDE 120V POWER TO ALL BUZZER LOCATIONS. REFER TO DETAIL 8/D4-EP501 AND SHEET D4-TN102 FOR LOCATIONS.
11. PROVIDE JBOX FOR POWER WHIP FOR SYSTEMS FURNITURE.



KEY PLAN

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW A0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Drawn by: J. CHAMPION
Solicitation No. W9126G25RA030
Contract No.
Reviewed by: K. BONNEY
Submitted by: C. LANGUM
File name:
Plot date: Plotted on date
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CONTRACT DRAWINGS

MERRICK®

DRAWING NUMBER: LA 20-0003

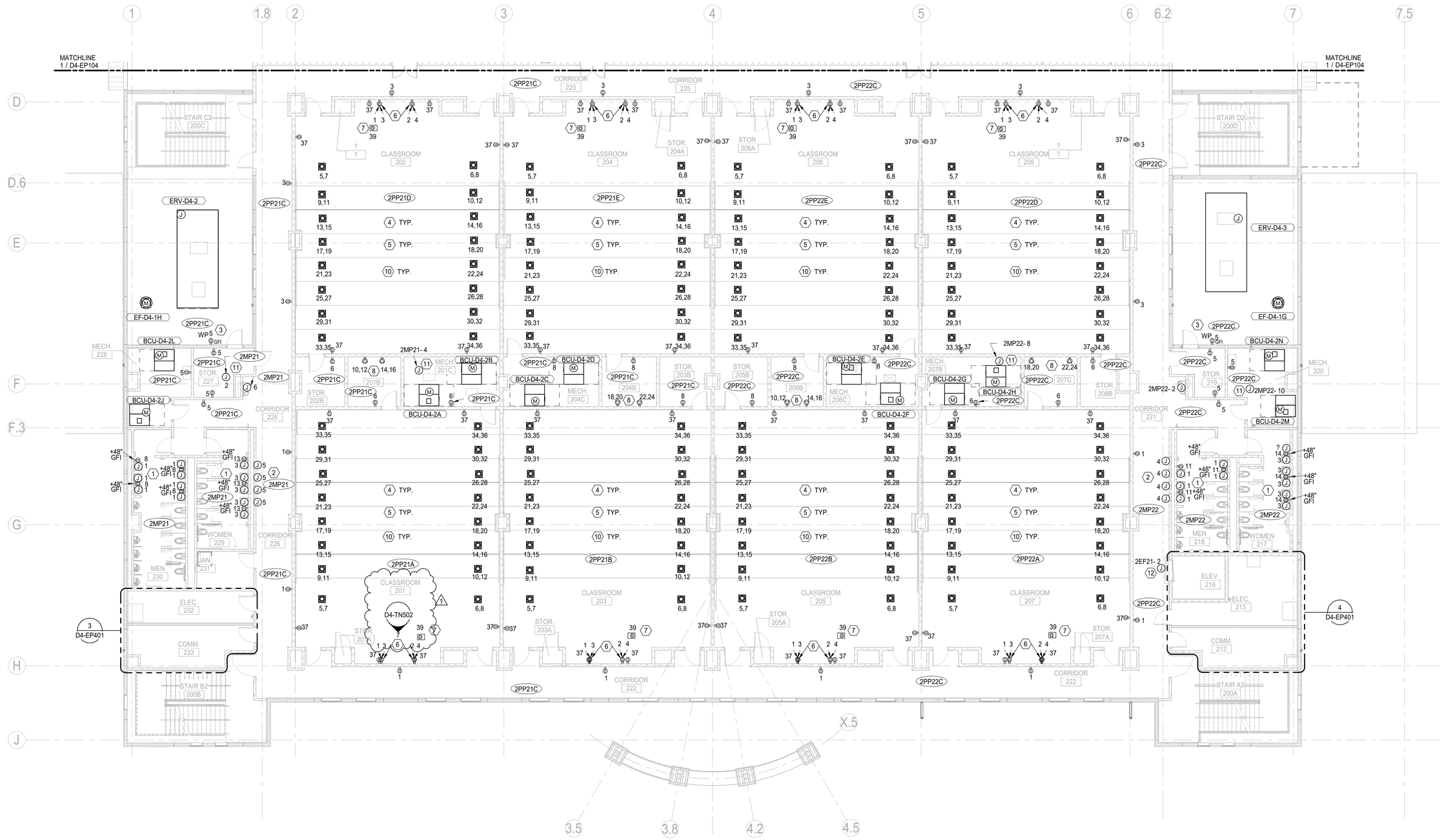
IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI:S220527

FIRST FLOOR POWER PLAN - AREA B

Sheet reference number
D4-EP102
Sheet of

Cont No.

7/16/2026 13:08:50



SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON SHEET D4-EP602 FOR EQUIPMENT CIRCUITING.
5. REFER TO D4-EP400 SERIES DRAWINGS FOR ENLARGED ELECTRICAL POWER PLANS.
6. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.

1 SECOND FLOOR POWER PLAN - AREA A

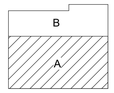
1/8" = 1'-0"

8 6 4 2 0 8 16

PLAN NORTH

KEYNOTES

1. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "HANDS FREE" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO TEN (10) WATER VALVES. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
2. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "CANTEEN FILL" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO FOUR (4) WATER VALVES. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
3. PROVIDE WEATHERPROOF IN USE RECEPTACLE. REFER TO DETAIL 1/D4-EP501 MOUNT 24" AFF.
4. PROVIDE FLUSH FLOOR BOX FURNITURE FEED. COORDINATE EXACT LOCATION OF BOX WITH FURNITURE SYSTEM AND CLASSROOM FURNITURE SELECTED PRIOR TO ROUGH-IN. REFER TO DETAILS 3,6,7/D4-TN501. PROVIDE HANDLE TIES FOR BREAKERS SHARING NEUTRALS. ALL CONDUITS FEEDING CLASSROOM DESK/PODIUM SHALL BE ROUTED UNDER THE CONCRETE FLOORS.
5. COORDINATE IN-STEP CONDUITS WITH MECHANICAL DUCTS/GRILLS PRIOR TO ROUGH-IN.
6. PROVIDE 2-DUPLEX RECEPTACLE IN A/V WALL BOXES LOCATED AT 48" & 72" AFF. REFER TO 6,7/D4-TN502. COORDINATE EXACT LOCATION WITH VIDEO WALL PRIOR TO ROUGH-IN.
7. PROVIDE FLUSH FLOOR BOX FOR PODIUM / PORTABLE FURNITURE. REFER TO DETAILS 6,7/D4-TN501. COORDINATE EXACT LOCATION WITH FURNITURE PRIOR TO ROUGH-IN.
8. PROVIDE FLUSH MOUNT TWIST LOCK RECEPTACLE (NEMA L6-20R) AND MATCHING PLUG FOR GFGI COMM RACK EQUIPMENT.
9. NOT USED.
10. FURNITURE FEED OUTLETS SHALL BE 1/2 CONTROLLED BY OCCUPANCY SENSORS TO MEET ASHRAE 90.1 2010, ARTICLE 8.4.2. ONE CIRCUIT SHALL BE POWERED AT ALL TIMES. THE SECOND CIRCUIT SHALL BE CONTROLLED THROUGH LOW VOLTAGE OCCUPANCY SENSOR, REFER TO DETAIL 7/D4-EP501.
11. PROVIDE 120V POWER FOR MECHANICAL CONTROLS. COORDINATE EXACT LOCATIONS WITH MECHANICAL CONTROLS CONTRACTOR.
12. J-BOX FOR ELEVATOR SMOKE CURTAIN SYSTEM. COORDINATE FINAL LOCATION WITH ELEVATOR SUBCONTRACTOR.



KEY PLAN

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date
1	REVISED IAW A0W0002	JULY 2026

Action	D.O. No.

Designed by: D. HARRINGTON
Date: MAY 2025
Rev:
Dwn by: J. CHAMPION
Solicitation No.: W9126G25RA020
Contract No.
Reviewed by: K. BRAUER / K. STUCKEY
Approved by: C. LANDUM
File name:
Plot date: 1=size to sheet
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

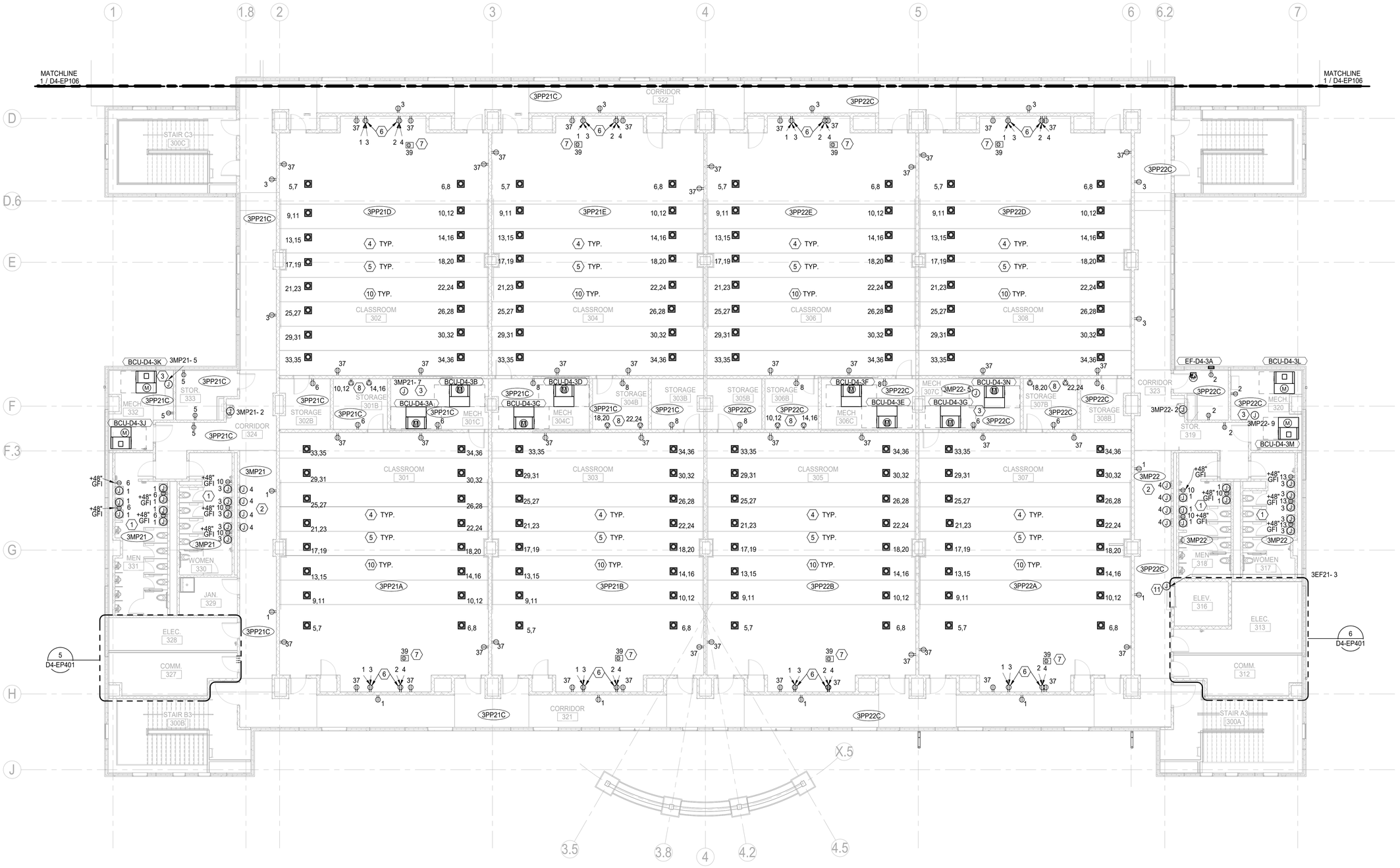
IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

SECOND FLOOR POWER PLAN - AREA A

Sheet reference number
D4-EP103
Sheet of

Contr No.

7/16/2026 13:09:05



SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON SHEET D4-EP602 FOR EQUIPMENT CIRCUITING.
5. REFER TO D4-EP400 SERIES DRAWINGS FOR ENLARGED ELECTRICAL POWER PLANS.
6. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.

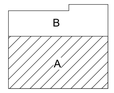
1 THIRD FLOOR POWER PLAN - AREA A

1/8" = 1'-0"

8 6 4 2 0 8 16

KEYNOTES

1. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "HANDS FREE" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO TEN (10) WATER VALVES. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
2. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "CANTEEN FILL" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO FOUR (4) WATER VALVES. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
3. PROVIDE 120V POWER FOR MECHANICAL CONTROLS. COORDINATE EXACT LOCATIONS WITH MECHANICAL CONTROLS CONTRACTOR.
4. PROVIDE FLUSH FLOOR BOX FURNITURE FEED. COORDINATE EXACT LOCATION OF BOX WITH FURNITURE SYSTEM AND CLASSROOM FURNITURE SELECTED PRIOR TO ROUGH-IN. REFER TO 3,6,7/D4-TN501. PROVIDE HANDLE TIES FOR BREAKERS SHARING NEUTRALS. ALL CONDUITS FEEDING CLASSROOM DESK/PODIUM SHALL BE ROUTED UNDER THE CONCRETE FLOORS.
5. COORDNIATE IN-STEP CONDUITS WITH MECHANICAL DUCTS/GRILLS PRIOR TO ROUGH-IN.
6. PROVIDE 2-DUPLEX RECEPTACLE IN A/V WALL BOXES LOCATED AT 48" & 72" AFF. REFER TO 6, 7/D4-TN502. COORDINATE EXACT LOCATION WITH VIDEO WALL PRIOR TO ROUGH-IN.
7. PROVIDE FLUSH FLOOR BOX FOR PODIUM/PORTABLE FURNITURE. REFER TO 6,7/D4-TN501. COORDINATE EXACT LOCATION WITH FURNITURE PRIOR TO ROUGH-IN.
8. PROVIDE FLUSH MOUNT TWIST LOCK RECEPTACLE (NEMA L6-20R) AND MATCHING PLUG FOR GFGI COMM RACK EQUIPMENT.
9. NOT USED
10. FURNITURE FEED OUTLETS SHALL BE 1/2 CONTROLLED BY OCCUPANCY SENSORS TO MEET ASHRAE 90.1 2010, ARTICLE 8.4.2. ONE CIRCUIT SHALL BE POWERED AT ALL TIMES. THE SECOND CIRCUIT SHALL BE CONTROLLED THROUGH LOW VOLTAGE OCCUPANCY SENSOR, REFER TO DETAIL 7/D4-EP501.
11. J-BOX FOR ELEVATOR SMOKE CURTAIN SYSTEM. COORDINATE FINAL LOCATION WITH ELEVATOR SUBCONTRACTOR.



KEY PLAN

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Rev.

Date: MAY 2025
Solicitation No.: W9126G26RA030
Contract No.:
File name:
Plot date: Friday, July 17, 2026
Plot scale: 1:1

Designed by: D. HARRINGTON
Dwn by: J. CHAMPION
Reviewed by: K. BRYANT
Submitted by: C. LANGUM

MERRICK®

U.S. ARMY ENGINEER DISTRICT, FORT WORTH ATTN: CESWF-PDE-MD FORT WORTH, TEXAS

DRAWING NUMBER: LA 20-0003

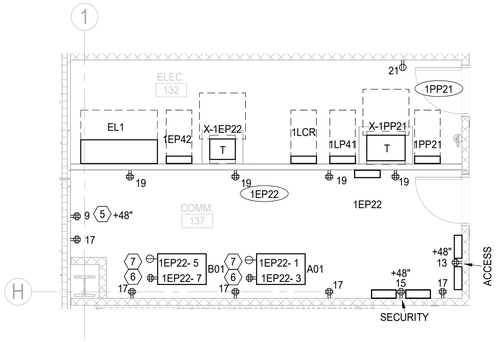
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

THIRD FLOOR POWER PLAN - AREA A

Sheet reference number
D4-EP105
Sheet of

Contr No.:

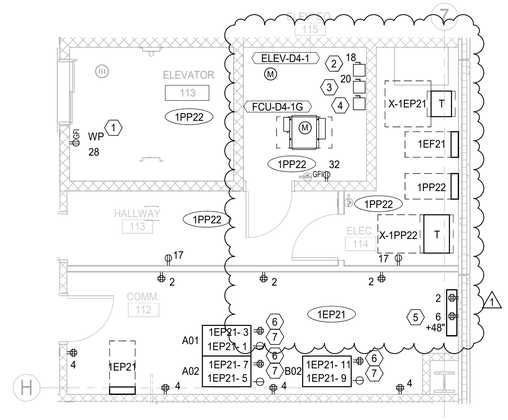
7/16/2026 13:09:17



ENLARGED PLAN - FIRST FLOOR ELEC. ROOM 132 & COMM. ROOM 137

1 — 1/4" = 1'-0"

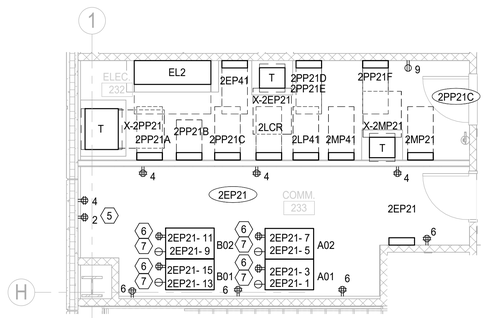
PLAN NORTH



ENLARGED PLAN - FIRST FLOOR ELEC. ROOM 114 & COMM. ROOM 112

2 — 1/4" = 1'-0"

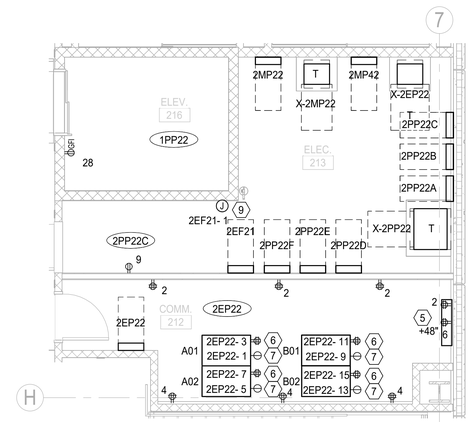
PLAN NORTH



ENLARGED PLAN - SECOND FLOOR ELEC. ROOM 232 & COMM. ROOM 233

3 — 1/4" = 1'-0"

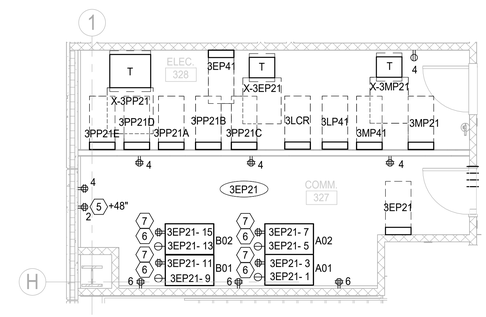
PLAN NORTH



ENLARGED PLAN - SECOND FLOOR ELEC. ROOM 213 & COMM. ROOM 212

4 — 1/4" = 1'-0"

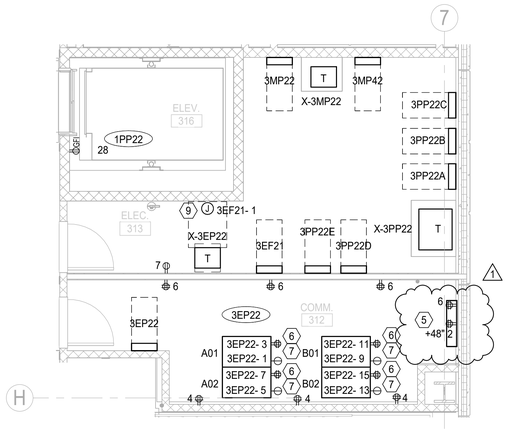
PLAN NORTH



ENLARGED PLAN - THIRD FLOOR ELEC. ROOM 328 & COMM. ROOM 327

5 — 1/4" = 1'-0"

PLAN NORTH



ENLARGED PLAN - THIRD FLOOR ELEC. ROOM 313 & COMM. ROOM 312

6 — 1/4" = 1'-0"

PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON SHEET D4-EP602 FOR EQUIPMENT CIRCUITING.
5. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.

KEYNOTES

1. ELECTRICAL EQUIPMENT LOCATED IN HOSTWAY LESS THAN 48" ABOVE PIT FLOOR SHALL BE NEMA 4 PER ASME A17.1, 2.6.3.3.4. ELEVATOR WIRING SHALL BE WET LOCATION CABLE.
2. PROVIDE CIRCUIT BREAKER (20A/1P) DISCONNECT FOR ELEVATOR CAR LIGHT AND RECEPTACLE.
3. PROVIDE CIRCUIT BREAKER (20A/1P) DISCONNECT FOR ELEVATOR CAR HEATING AND AIR CONDITIONING.
4. ELEVATOR FUSED DISCONNECT WITH SHUNT TRIP. REFER TO ELECTRICAL ONE LINE DIAGRAM. ELEVATOR SHALL BE SINGLE POINT CONNECTION.
5. TELECOMM EQUIPMENT. REFER TO D4-TN SERIES DRAWINGS FOR ADDITIONAL INFORMATION.
6. PROVIDE DOUBLE DUPLEX RECEPTACLE. MOUNT ON CABLE TRAY ABOVE RACK.
7. PROVIDE 120V, 1PH, 30A (L5-30R) TWIST LOCK RECEPTACLE AND MATCHING PLUG FOR GFGI RACK MOUNTED UPS. (COORDINATE RECEPTACLE NEMA CONFIGURATION WITH 502 COMM SQUARDRON POC PRIOR TO WORK). PROVIDE (2#10 + #10G) IN 3/4" EMT. MOUNT ON CABLE TRAY ABOVE RACK.
8. NOT USED.
9. PROVIDE JUNCTION BOX FOR FACP POWER. PROVIDE LOCKABLE, RED HANDLE CIRCUIT BREAKER WITH "FIRE" ENGRAVED ON THE BREAKER HANDLE.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS — DANIEL P. HARRINGTON — 113569 — PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Solicitation No.: W912DQ23RA020
Contract No.:
Rev.
Dwn by: J. CHAMPION
Reviewed by: K. BENNETT
Submitted by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPL.S220527

ENLARGED ELECTRICAL POWER PLANS

Sheet reference number
D4-EP401

Sheet of

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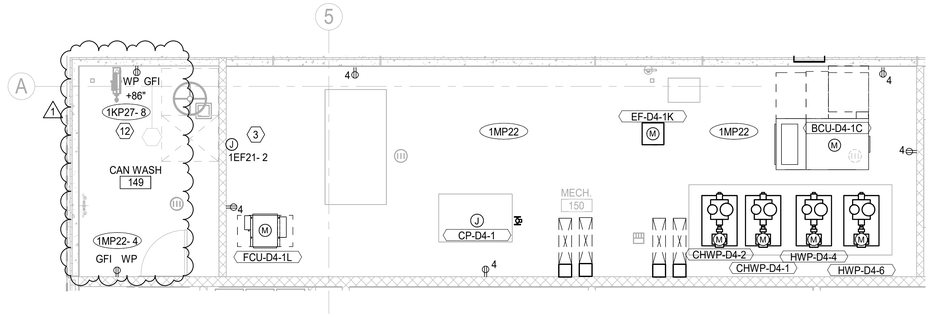
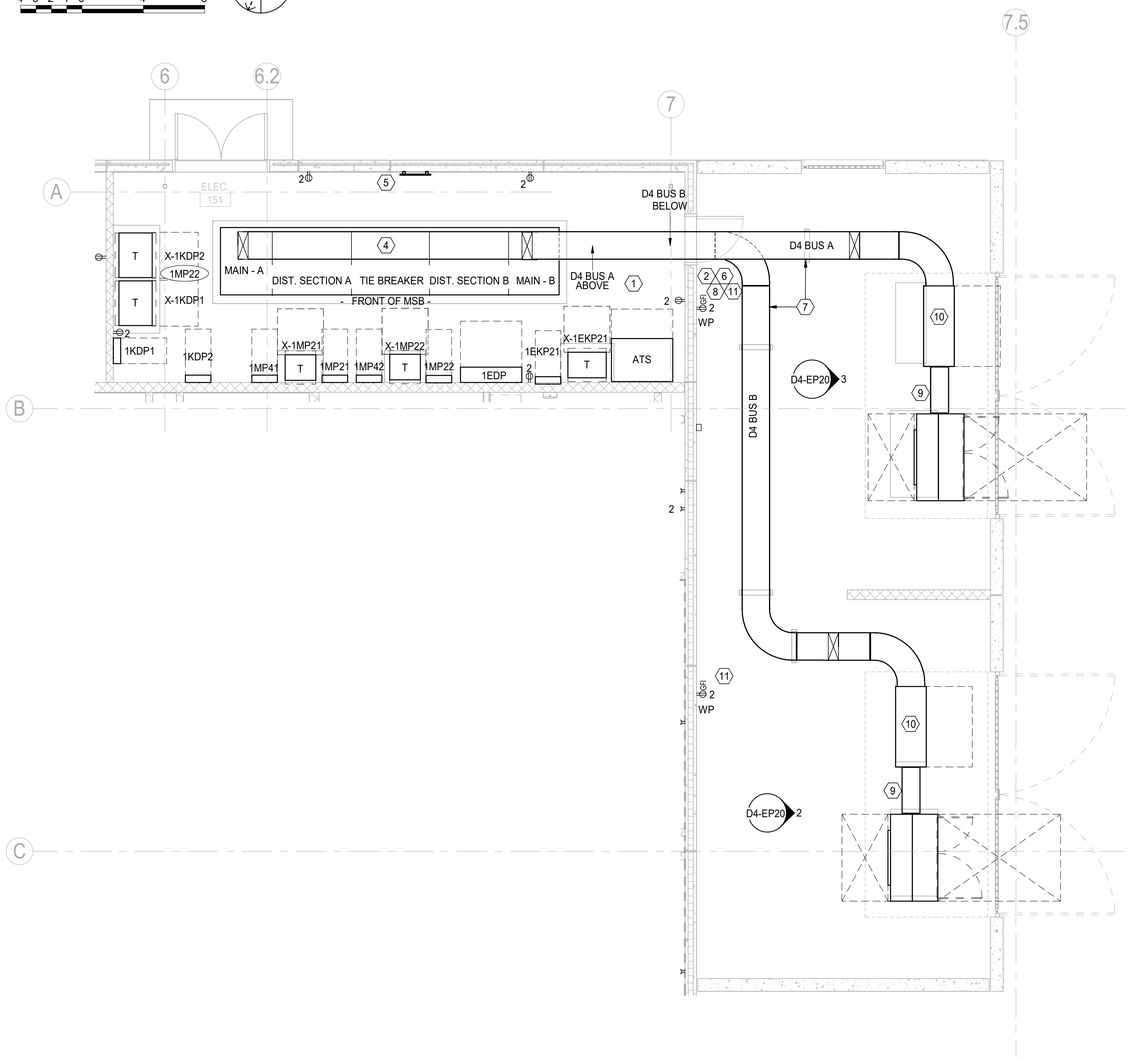


1 ENLARGED PLAN - FIRST FLOOR MECH. ROOM 150

1/4" = 1'-0"

PLAN NORTH



2 ENLARGED PLAN - FIRST FLOOR ELEC. ROOM 151 AND TRANSFORMER YARD

1/4" = 1'-0"

PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON SHEET D4-EP602 FOR EQUIPMENT CIRCUITING.
5. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.

KEYNOTES

1. PROVIDE CEILING SUSPENDED CABLE BUSWAY FROM UTILITY TRANSFORMERS TO "MAIN-A" AND "MAIN-B" CABINETS IN SWITCHGEAR. REFER TO DETAIL 3/D4-EP501. SUSPEND MINIMUM 9'-0" AFF.
2. REFER TO D4-ES SERIES ELECTRICAL SITE DRAWINGS FOR CONTINUATION. PROVIDE THROUGH WALL, WEATHERPROOF PENETRATION PER MANUFACTURER'S RECOMMENDATIONS.
3. PROVIDE JUNCTION BOX FOR FACP POWER. PROVIDE LOCKABLE, RED HANDLE CIRCUIT BREAKER WITH "FIRE" ENGRAVED ON THE BREAKER HANDLE.
4. DUE TO VARIATIONS IN MANUFACTURER EQUIPMENT CONFIGURATIONS SWITCHBOARD SHOWN, REPRESENTS ANTICIPATED FOOTPRINT SIZE. DRAWINGS ARE NOT INTENDED TO SHOW EXACT NUMBER OF SECTIONS. CONTRACTOR SHALL PROVIDE EQUIPMENT SIZED TO FIT ALLOWABLE SPACE AND MAINTAIN NEC WORKING CLEARANCES.
5. PROVIDE MAIN GROUND BUSBAR. MOUNT AT 24" AFF. REFER TO DETAIL 7/EG501.
6. EXPANSION SECTION BY CABLE BUS PROVIDER.
7. PROVIDE ABOVE GROUND ENGINEERED EXTERIOR OUTDOOR RATED CABLE BUS SYSTEM ON CABLE TRAY.
8. COORDINATE CABLE BUS PENETRATION ELEVATION WITH ENGINEERED CABLE BUS SYSTEM PROVIDER AND PRECAST PANEL PROVIDER.
9. PROVIDE WIREWAY CONNECTING TRANSFORMER AND TAP BOX. INSTALLED 3" ABOVE TRANSFORMER SLAB AND SHALL BE CENTERED ON THE SIDE PANEL OF THE TRANSFORMERS SECONDARY COMPARTMENT. CABLING WILL BE FURNISHED AND INSTALLED BY CPS ENERGY.
10. TAP BOX TO BE INSTALLED PER CPS STANDARDS.
11. PROVIDE WEATHER PROOF IN USE RECEPTACLE. REFER TO 1/D4-EP501. LOCATE 24" ABOVE GRADE.
12. PROVIDE RECEPTACLE FOR HOSE REEL. COORDINATE FINAL HEIGHT WITH APPROVED HOSE REEL PRODUCT PER MANUFACTURER'S RECOMMENDATIONS.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Drawn by: J. CHAMPION
Solicitation No.: W9126G26RA020
Contract No.:
Reviewed by: K. GRIMES
Submitted by: C. LANGUM
File name:
Plot date: Thursday 7/16/26
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
PROJECT DELIVERED BY
FORT WORTH, TEXAS

MERRICK

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

ENLARGED POWER PLANS

Sheet reference number
D4-EP402

Sheet of

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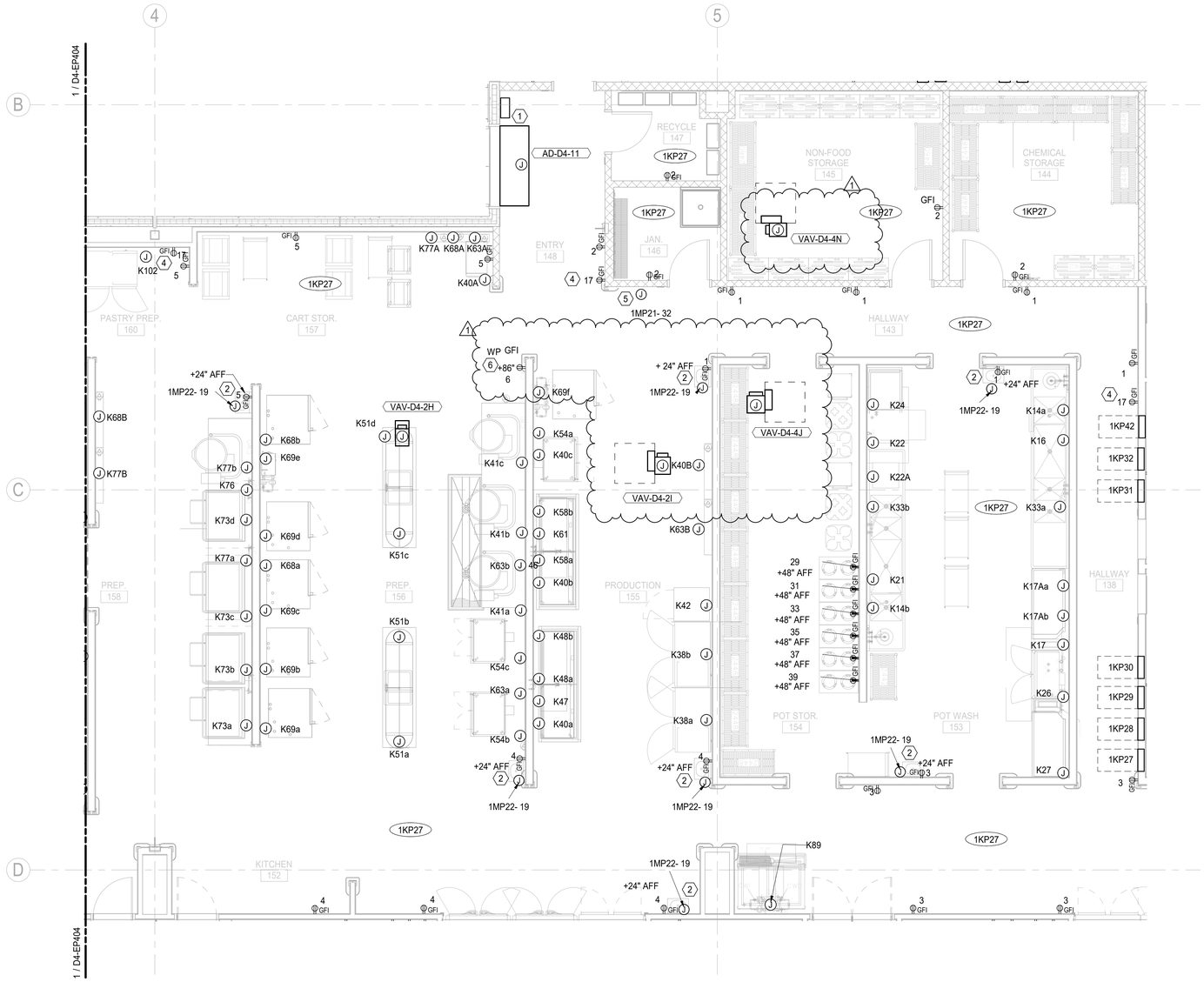


1 ENLARGED POWER PLAN - KITCHEN AREA B1
1/4" = 1'-0"

PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.
5. REFER TO SHEETS D4-EP603 THROUGH D4-EP605 FOR KITCHEN EQUIPMENT CONNECTION SCHEDULES. CONNECTION OF EQUIPMENT SHOWN GENERICALLY AS A JUNCTION BOX. REFER TO KITCHEN EQUIPMENT CONNECTION SCHEDULES FOR ADDITIONAL INFORMATION ON CONNECTION TYPES.
6. PROVIDE WEATHER-RESISTANT AND TAMPER-RESISTANT RECEPTACLES WITH WEATHERPROOF, IN USE COVERS FOR ALL RECEPTACLES IN THE KITCHEN AND KITCHEN SUPPORT SPACES. REFER TO DETAIL 1/D4-EP501.

KEYNOTES

1. VEHICLE RESTRAINT SYSTEM CONTROLLER. COORDINATE LOCATION WITH MANUFACTURER RECOMMENDATIONS. PROVIDE CONCEALED CONDUIT TO RESTRAIN DEVICES. REFER TO DETAIL 5/D4-EP501.
2. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "HANDS FREE" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO TEN (10) WATER VALVES. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
3. NOT USED
4. LOCATE RECEPTACLE IN A/V WALLBOX. REFER TO D4-TN SERIES AND DETAIL 4/D4-TN502.
5. PROVIDE 120V POWER TO ALL BUZZER LOCATIONS. REFER TO DETAIL 8/D4-EP501 AND DETAIL 1/D4-TN102 FOR LOCATIONS.
6. PROVIDE RECEPTACLE FOR HOSE REEL. COORDINATE FINAL HEIGHT WITH APPROVED HOSE REEL PRODUCT PER MANUFACTURER'S RECOMMENDATIONS.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Solicitation No.: W912GS25RA020
Contract No.:
Drawn by: J. CHAMPION
Reviewed by: K. STARKS / BT
Approved by: C. LANGUM
File name:
Plot date: 7/16/2026 13:09:39
Plot scale: 1:1

MERRICK®

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

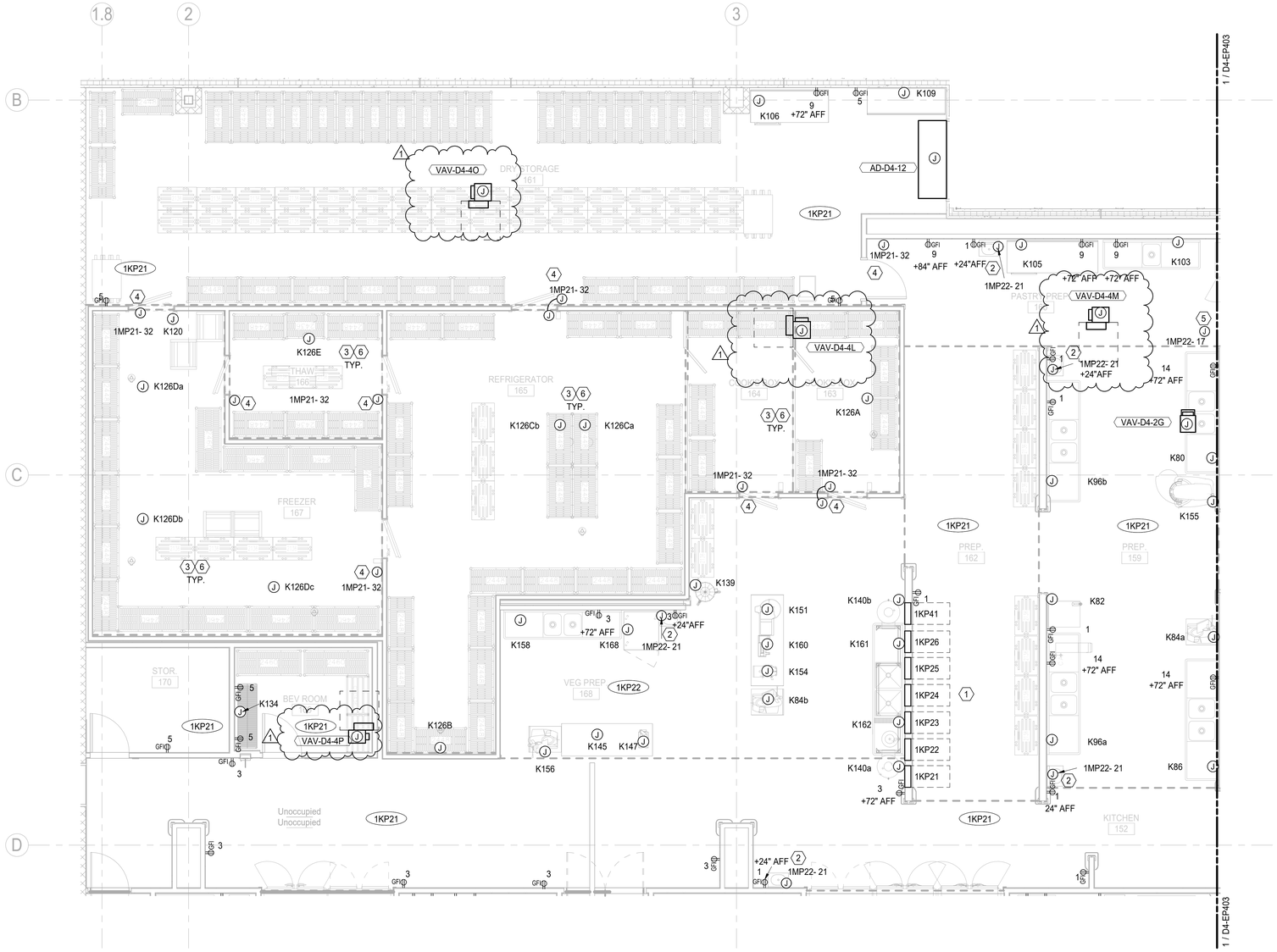
ENLARGED POWER PLAN - KITCHEN AREA B1

KEY PLAN

Sheet reference number
D4-EP403
Sheet of

Cover No.

7/16/2026 13:09:39



1 ENLARGED POWER PLAN - KITCHEN AREA B2

1/4" = 1'-0"

PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.
5. REFER TO SHEETS D4-EP603 THROUGH D4-EP605 FOR KITCHEN EQUIPMENT CONNECTION SCHEDULES. CONNECTION OF EQUIPMENT SHOWN GENERICALLY AS A JUNCTION BOX. REFER TO KITCHEN EQUIPMENT CONNECTION SCHEDULES FOR ADDITIONAL INFORMATION ON CONNECTION TYPES.
6. PROVIDE WEATHER-RESISTANT AND TAMPER-RESISTANT RECEPTACLES WITH WEATHERPROOF, IN USE COVERS FOR ALL RECEPTACLES IN THE KITCHEN AND KITCHEN SUPPORT SPACES. REFER TO DETAIL 1/DE-EP501.

KEYNOTES

1. COORDINATE ROUGH-IN LOCATION OF PANELS WITH PLUMBING CONTRACTOR PRIOR TO WORK.
2. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "HANDS FREE" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO TEN (10) WATER VALVES. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
3. PROVIDE SEAL-OFF FITTING AT EACH REFRIGERATOR AND FREEZER CONDUIT RUN TO PREVENT MOISTER MIGRATION THROUGH CONDUIT.
4. PROVIDE 120V POWER TO ALL BUZZER LOCATIONS. REFER TO DETAIL 8/D4-EP501 AND DETAIL 1/D4-TN102 FOR LOCATIONS.
5. PROVIDE 120V POWER FOR MECHANICAL CONTROLS, COORDINATE EXACT LOCATIONS WITH MECHANICAL CONTRACTOR. PROVIDE JUNCTION BOX BEHIND ACCESSIBLE CEILING PANEL.
6. REFER TO DETAIL 7/D4-EP502 FOR WALK-IN COOLER/FREEZER REMOTE REFRIGERATION PACKAGE.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev:
Dwn by: J. CHAMPION
Solicitation No.: W912GS25RA030
Contract No.:
Reviewed by: K. BRADLEY
Submitted by: C. LANDUM
File name:
Plot date: 7/16/2026 13:09:44
Plot scale: 1:1

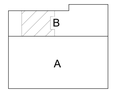
U.S. ARMY ENGINEER DISTRICT, FORT WORTH (CESWF-PDD-DE) FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - JACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI:S220527

ENLARGED POWER PLAN - KITCHEN AREA B2



KEY PLAN

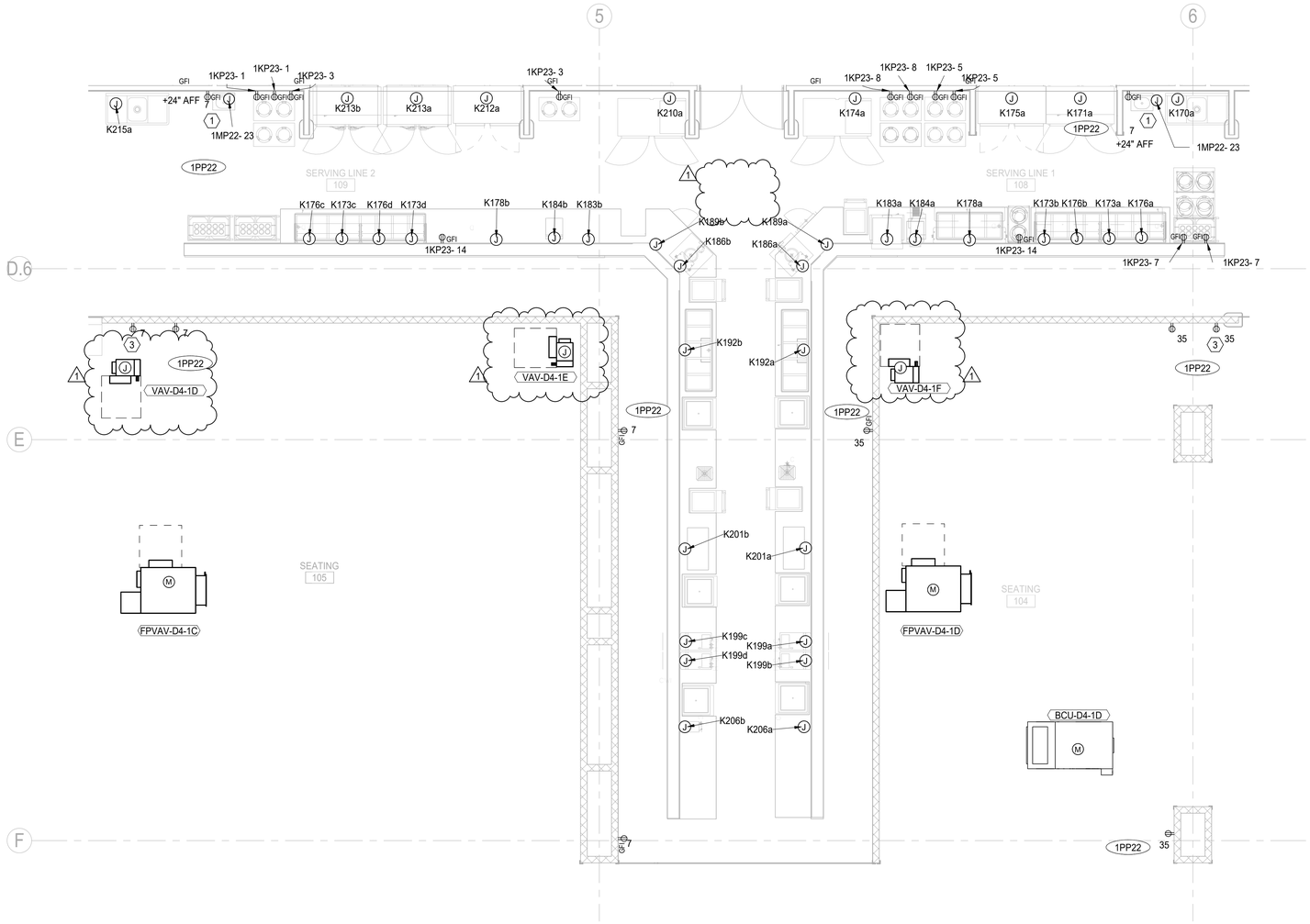
Sheet reference number

D4-EP404

Sheet of

Grid No.

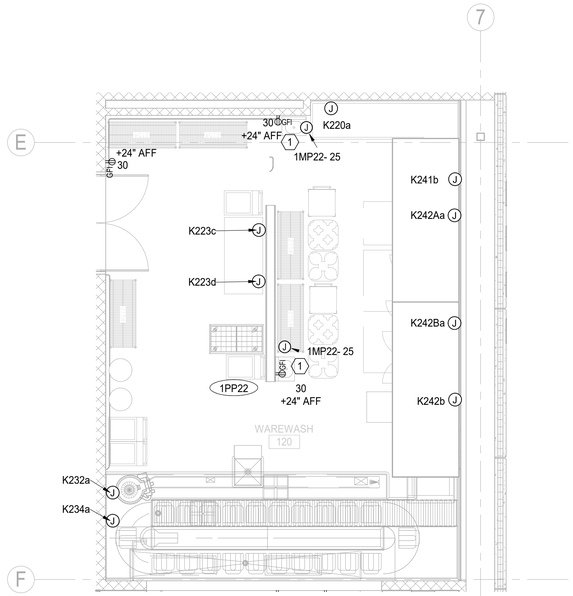
7/16/2026 13:09:44



1 ENLARGED POWER PLAN - SERVING LINE 1 & 2

1/4" = 1'-0"

PLAN NORTH



2 ENLARGED POWER PLAN - WAREWASH 120

1/4" = 1'-0"

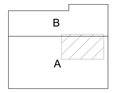
PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.
5. REFER TO SHEETS D4-EP603 THROUGH D4-EP605 FOR KITCHEN EQUIPMENT CONNECTION SCHEDULES. CONNECTION OF EQUIPMENT SHOWN GENERICALLY AS A JUNCTION BOX. REFER TO KITCHEN EQUIPMENT CONNECTION SCHEDULES FOR ADDITIONAL INFORMATION ON CONNECTION TYPES.
6. PROVIDE WEATHER-RESISTANT AND TAMPER-RESISTANT RECEPTACLES WITH WEATHERPROOF, IN USE COVERS FOR ALL RECEPTACLES IN THE KITCHEN, SERVING LINES AND KITCHEN SUPPORT SPACES. REFER TO DETAIL 1/DE-EP501.

KEYNOTES

1. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "HANDS FREE" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO TEN (10) WATER VALVES. FOR EXTERIOR APPLICATIONS, LOCATE LOW VOLTAGE WIRING BEHIND SINK SKIRT. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
2. NOT USED.
3. LOCATE RECEPTACLE IN A/V WALLBOX. REFER TO KEYED NOTE 4 ON D4-TN101 AND DETAIL 4/D4-TN502.



KEY PLAN

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Dwn by: J. CHAMPION
Solicitation No.: W9126G25RA020
Contract No.
Reviewed by: K. BENNETT
Approved by: C. LANGUM
File name:
Plot date: 7/16/2026 13:09:50
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH 819 TAYLOR STREET FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

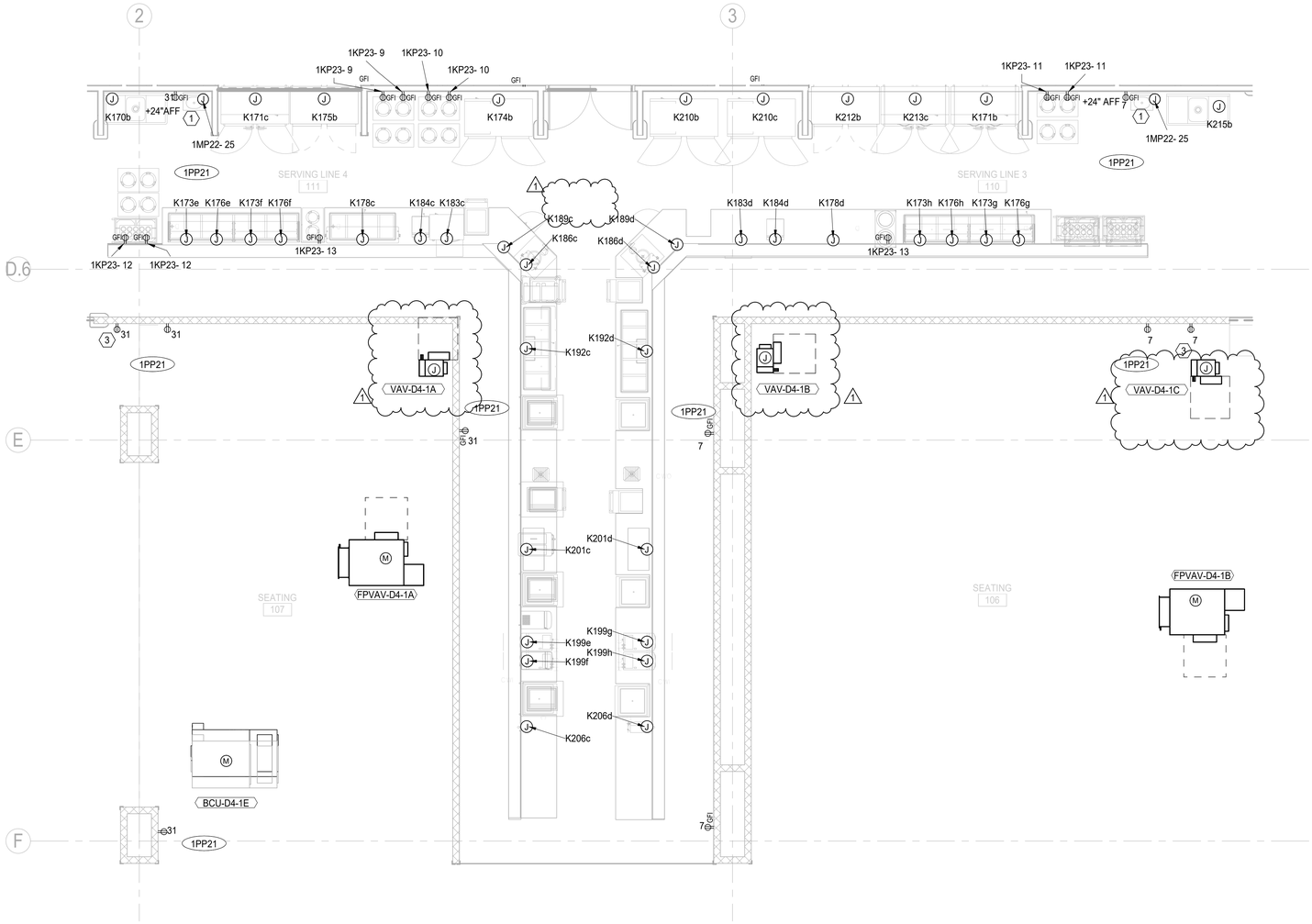
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI-S220527

ENLARGED POWER PLAN - SERVING LINE 1 & 2 WAREWASH

Sheet reference number
D4-EP405
Sheet of

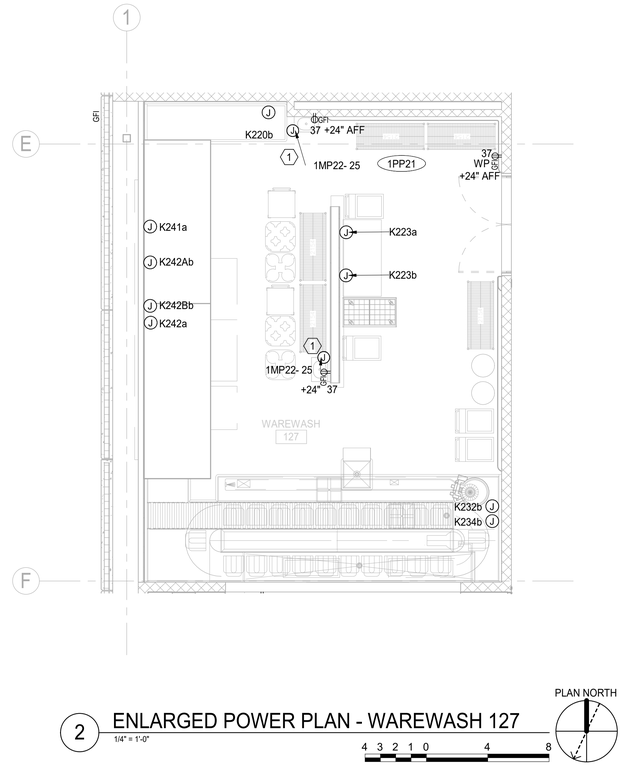
Cont No.

7/16/2026 13:09:50



1 ENLARGED POWER PLAN - SERVING LINE 3 & 4

1/4" = 1'-0"



2 ENLARGED POWER PLAN - WAREWASH 127

1/4" = 1'-0"

PLAN NORTH

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR ELECTRICAL GENERAL NOTES, ELECTRICAL SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-EP601 FOR ELECTRICAL ONE-LINE DIAGRAM.
3. REFER TO D4-EP600 SERIES DRAWINGS FOR ELECTRICAL POWER CONNECTION AND PANEL SCHEDULES.
4. ALL CONDUIT AND BOXES SHALL BE CONCEALED IN WALLS (INCLUDING PRE-CAST PANELS) AND CEILINGS.
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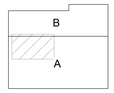
KEYNOTES

1. PROVIDE JUNCTION BOX ABOVE CEILING BEHIND AN ACCESS PANEL FOR "HANDS FREE" WATER VALVE LOW VOLTAGE CIRCUITING. PROVIDE A JUNCTION BOX FOR UP TO TEN (10) WATER VALVES. FOR EXTERIOR APPLICATIONS, LOCATE LOW VOLTAGE WIRING BEHIND SINK SKIRT. COORDINATE EXACT LOCATION OF AUTOMATIC SENSOR J-BOX WITH PLUMBING CONTRACTOR PRIOR TO ROUGH IN. REFER TO DETAIL 4/D4-EP501.
2. PROVIDE 120V POWER FOR MECHANICAL CONTROLS, COORDINATE EXACT LOCATIONS WITH MECHANICAL CONTRACTOR. PROVIDE JUNCTION BOX BEHIND ACCESSIBLE CEILING PANEL.
3. LOCATE RECEPTACLE IN A/V WALLBOX. REFER TO KEYED NOTE 4 ON D4-TN101 AND DETAIL 4/D4-TN502.



KEY PLAN

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Solicitation No.: W912GG25RA030
Contract No.
Dwn by: J. CHAMPION
Reviewed by: K. STANLEY
Submitted by: C. LANGUM
File name:
Plot date: Plotter name
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH CONTRACTS FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI.S220527

ENLARGED POWER PLAN - SERVING LINE 3 & 4 WAREWASH

Sheet reference number

D4-EP406

Sheet of

Cont No.

7/16/2026 13:09:55

W9126G26RA002 AN0002

MECHANICAL EQUIPMENT CONNECTION SCHEDULE - PART 1

ROOM	ITEM	NAME	VOLT	PHASE	KVA	HP	FLA (A)	DISCONNECT	STARTER	C/B SIZE	WIRE SIZE	CONDUIT	PANEL	CIRCUIT	NOTES
103	AD-D4-1	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP21	2	(2) 0.5 HP FANS; 1
101	AD-D4-2	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP21	4	(2) 0.5 HP FANS; 1
101	AD-D4-3	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP22	6	(2) 0.5 HP FANS; 1
102	AD-D4-4	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP22	8	(2) 0.5 HP FANS; 1
119	AD-D4-5	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP22	10	(2) 0.5 HP FANS; 1
121	AD-D4-6	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP22	12	(2) 0.5 HP FANS; 1
122	AD-D4-7	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP22	16	(2) 0.5 HP FANS; 1
126	AD-D4-8	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP21	6	(2) 0.5 HP FANS; 1
125	AD-D4-9	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP21	8	(2) 0.5 HP FANS; 1
124	AD-D4-10	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP21	10	(2) 0.5 HP FANS; 1
148	AD-D4-11	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP21	26	(2) 0.5 HP FANS; 1
161	AD-D4-12	AIR CURTAIN, UNHEATED	120 V	1	1.22	1	10.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 +#12G	3/4" EMT	1MP21	28	(2) 0.5 HP FANS; 1
238	AHU-D4-1	AIR HANDLING UNIT	480 V	3	22.45	20	27	60A/3P NON-FUSED	20 HP VFD	60A/3P	3 #4 + #10G	1" EMT	2MP43	25,27,29	1
238	AHU-D4-2 (A)	AIR HANDLING UNIT	480 V	3	17.46	15	21	30A/3P NON-FUSED	15 HP VFD	50A/3P	3 #6 + #10G	3/4" EMT	2MP43	31,33,35	1
238	AHU-D4-2 (B)	AIR HANDLING UNIT	480 V	3	17.46	15	21	30A/3P NON-FUSED	15 HP VFD	50A/3P	3 #6 + #10G	3/4" EMT	2MP43	37,39,41	1
239	AHU-D4-3	AIR HANDLING UNIT	480 V	3	17.46	15	21	60A/3P NON-FUSED	15 HP VFD	50A/3P	3 #6 + #10G	3/4" EMT	2MP43	26,28,30	1
239	AHU-D4-4	AIR HANDLING UNIT	480 V	3	9.15	7 1/2	11	30A/3P NON-FUSED	7.5 HP VFD	25A/3P	3 #10 + #10G	3/4" EMT	2MP43	32,34,36	1
171	BCU-D4-1A	BLOWER COIL UNIT	480 V	3	1.75	1	2.1	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	1MP42	2,4,6	1
133	BCU-D4-1B	BLOWER COIL UNIT	480 V	3	1.75	1	2.1	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	1MP41	1,3,5	1
150	BCU-D4-1C	BLOWER COIL UNIT	480 V	3	3.99	3	4.8	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	1MP41	7,9,11	1
104	BCU-D4-1D	BLOWER COIL UNIT	480 V	3	1.75	1	2.1	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	1MP42	8,10,12	1
107	BCU-D4-1E	BLOWER COIL UNIT	480 V	3	1.75	1	2.1	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	1MP42	14,16,18	1
103	BCU-D4-1L	BLOWER COIL UNIT	480 V	3	1.75	1	2.1	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	37,39,41	1
102	BCU-D4-1M	BLOWER COIL UNIT	480 V	3	1.75	1	2.1	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	37,39,41	1
201C	BCU-D4-2A	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	2,4,6	1
201C	BCU-D4-2B	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	8,10,12	1
204C	BCU-D4-2C	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	14,16,18	1
204C	BCU-D4-2D	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	20,22,24	1
206C	BCU-D4-2E	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	7,9,11	1
206C	BCU-D4-2F	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	1,3,5	1
207B	BCU-D4-2G	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	13,15,17	1
207B	BCU-D4-2H	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	19,21,23	1
228	BCU-D4-2J	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	26,28,30	1
228	BCU-D4-2L	BLOWER COIL UNIT	480 V	3	3.99	3	4.8	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	37,39,41	1
220	BCU-D4-2M	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	25,27,29	1
220	BCU-D4-2N	BLOWER COIL UNIT	480 V	3	3.99	3	4.8	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	37,39,41	1
301C	BCU-D4-3A	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP41	2,4,6	1
301C	BCU-D4-3B	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP41	8,10,12	1
304C	BCU-D4-3C	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP41	14,16,18	1
304C	BCU-D4-3D	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP41	20,22,24	1
306C	BCU-D4-3E	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP42	1,3,5	1
306C	BCU-D4-3F	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP42	7,9,11	1
307C	BCU-D4-3G	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP42	13,15,17	1
332	BCU-D4-3J	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP41	26,28,30	1
332	BCU-D4-3K	BLOWER COIL UNIT	480 V	3	3.99	3	4.8	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP41	32,34,36	1
320	BCU-D4-3L	BLOWER COIL UNIT	480 V	3	3.99	3	4.8	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP42	25,27,29	1
320	BCU-D4-3M	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP42	31,33,35	1
307C	BCU-D4-3N	BLOWER COIL UNIT	480 V	3	2.49	1.5	3	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	15A/3P	3 #12 + #12G	3/4" EMT	3MP42	19,21,23	1
100A	CUH-D4-1	CABINET UNIT HEATER	120 V	1	0.13	1/10	1.1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	2MP22	6	1, 2
100D	CUH-D4-2	CABINET UNIT HEATER	120 V	1	0.13	1/10	1.1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	2MP22	6	1, 2
122	CUH-D4-3	CABINET UNIT HEATER	120 V	1	0.06	1/12	0.5	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	2MP22	6	1, 2
100B	CUH-D4-4	CABINET UNIT HEATER	120 V	1	0.13	1/10	1.1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	3	1, 2
100C	CUH-D4-5	CABINET UNIT HEATER	120 V	1	0.13	1/10	1.1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	3	1, 2
124	CUH-D4-6	CABINET UNIT HEATER	120 V	1	0.06	1/12	0.5	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	3	1, 2
150	CHWP-D4-1	CHILLED WATER PUMP	480 V	3	28.27	25	34	100A/3P NON-FUSED	25 HP VFD	80A/3P	3 #3 + #8G	1-1/4" EMT	MSB	12	1
150	CHWP-D4-2	CHILLED WATER PUMP	480 V	3	28.27	25	34	100A/3P NON-FUSED	25 HP VFD	80A/3P	3 #3 + #8G	1-1/4"" EMT	MSB	13	1
150	CP-D4-1	CIRCULATION PUMP	120 V	1	0.29	1/8	1.4	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	1	1
115	ELEV-D4-1	ELEVATOR	480 V	3	54.04	50	65	200A/3P NON-FUSED	FURNISHED W/ EQUIP.	150A/3P	3 #1/0 + #6G	1-1/2" EMT	MSB	22	1
ROOF	EF-D4-1A	EXHAUST FAN	480 V	3	6.32	5	7.6	30A/3P NON-FUSED	5 HP VFD	20A/3P	3 #12 + #12G	3/4" EMT	1MP41	2,4,6	1
ROOF	EF-D4-1B	EXHAUST FAN	480 V	3	6.32	5	7.6	30A/3P NON-FUSED	5 HP VFD	20A/3P	3 #12 + #12G	3/4" EMT	1MP41	8,10,12	1
ROOF	EF-D4-1C	EXHAUST FAN	480 V	3	6.32	5	7.6	30A/3P NON-FUSED	5 HP VFD	20A/3P	3 #12 + #12G	3/4" EMT	1MP41	14,16,18	1
ROOF	EF-D4-1D	EXHAUST FAN	480 V	3	6.32	5	7.6	30A/3P NON-FUSED	5 HP VFD	20A/3P	3 #12 + #12G	3/4" EMT	1MP41	20,22,24	1
ROOF	EF-D4-1E	EXHAUST FAN	120 V	1	1.18	1/2	9.8	20A/1P STO	1/2 HP VFD	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	16	1
ROOF	EF-D4-1F	EXHAUST FAN	120 V	1	0.70	1/4	5.8	20A/1P STO	1/4 HP VFD	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	18	1
ROOF	EF-D4-1G	EXHAUST FAN	480 V	3	1.33	3/4	1.6	30A/3P NON-FUSED	3/4 HP VFD	15A/3P	3 #12 + #12G	3/4" EMT	2MP42	31,33,35	1
ROOF	EF-D4-1H	EXHAUST FAN	480 V	3	1.33	3/4	1.6	30A/3P NON-FUSED	3/4 HP VFD	15A/3P	3 #12 + #12G	3/4" EMT	2MP41	32,34,36	1
150	EF-D4-1K	EXHAUST FAN	120 V	1	0.70	1/4	5.8	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	20	1
239	EF-D4-2B	EXHAUST FAN	120 V	1	0.53	1/6	4.4	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	2MP23	14	1
319	EF-D4-3A	EXHAUST FAN	120 V	1	0.53	1/6	4.4	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	3MP22	7	1
236	ERV-D4-1 E1	EXHAUST RECOVERY VENTILATION	480 V	3	9.15	7 1/2	11	30A/3P NON-FUSED	7.5 HP VFD	30A/3P	3 #10 + #10G	3/4" EMT	2MP43	2,4,6	1
236	ERV-D4-1 E2	EXHAUST RECOVERY VENTILATION	480 V	3	9.15	7 1/2	11	30A/3P NON-FUSED	7.5 HP VFD	30A/3P	3 #10 + #10G	3/4" EMT	2MP43	8,10,12	1
236	ERV-D4-1 REC	EXHAUST RECOVERY VENTILATION	480 V	3	1.75	1	2.1	30A/3P NON-FUSED	FURNISHED W/ EQUIP.	20A/3P	3 #12 + #12G	3/4" EMT	2MP43	20,22,24	1
236	ERV-D4-1 S1	EXHAUST RECOVERY VENTILATION	480 V	3	17.46	15	21	30A/3P NON-FUSED	15 HP VFD	50A/3P	3 #6 + #10G	3/4" EMT	2MP43	1,3,5	1
236	ERV-D4-1 S2	EXHAUST RECOVERY VENTILATION	480 V	3	17.46	15	21	30A/3P NON-FUSED	15 HP VFD	50A/3P	3 #6 + #10G	3/4" EMT	2MP43	7,9,11	1
	ERV-D4-2	EXHAUST RECOVERY VENTILATION	480 V	3	39.70	(1) 20HP + (1) 10HP	47.8	100A/3P NON-FUSED	FURNISHED W/ EQUIP.	70A/3P	3 #3 + #8G	3/4" EMT	2MP43	14,16,18	1
	ERV-D4-3	EXHAUST RECOVERY VENTILATION	480 V	3	39.70	(1) 20HP + (1) 10HP	47.8	100A/3P NON-FUSED	FURNISHED W/ EQUIP.	70A/3P	3 #3 + #8G	3/4" EMT	2MP43	13,15,17	1
115	FCU-D4-1G	FAN COIL UNIT	120 V	1	0.34	1/10	2.8	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	2MP22	5	1
150	FCU-D4-1L	FAN COIL UNIT	120 V	1	0.34	1/10	2.8	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	22	1
150	HWP-D4-4	HOT WATER PUMP	480 V	3	17.46	15	21	60A/3P NON-FUSED	15 HP VFD	50A/3P	3 #6 + #10G	3/4" EMT	MSB	20	1
150	HWP-D4-6	HOT WATER PUMP	480 V	3	17.46	15	21	60A/3P NON-FUSED	15 HP VFD	50A/3P	3 #6 + #10G	3/4" EMT	MSB	21	1
CRAWL SPACE	SP-D4-1	SUMP PUMP	120 V	1	1.18	1/2	9.8	20A/1P STO, NEMA 4X	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" LFMC	1MP22	29	1
CRAWL SPACE	SP-D4-2	SUMP PUMP	120 V	1	1.92	1	16	20A/1P STO, NEMA 4X	FURNISHED W/ EQUIP.	35A/1P	2 #10 + #10G	3/4" LFMC	1MP22	9	1
CRAWL SPACE	SP-D4-3	SUMP PUMP	120 V	1	1.66	3/4	13.8	20A/1P STO, NEMA 4X	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" LFMC	1MP22	13	1
CRAWL SPACE	SP-D4-4	SUMP PUMP	120 V	1	1.92	1	16	20A/1P STO, NEMA 4X	FURNISHED W/ EQUIP.	35A/1P	2 #10 + #10G	3/4" LFMC	1MP22	11	1
CRAWL SPACE	SP-D4-5	SUMP PUMP	120 V	1	1.66	3/4	13.8	20A/1P STO, NEMA 4X	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" LFMC	1MP22	7	1
CRAWL SPACE	SP-D4-6	SUMP PUMP	120 V	1	1.66	3/4	13.8	20A/1P STO, NEMA 4X	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" LFMC	1MP22	31	1

CONNECTION SCHEDULE NOTES

1. VERIFY MECHANICAL EQUIPMENT CIRCUIT REQUIREMENTS WITH PROPOSED EQUIPMENT PRIOR TO ORDERING ELECTRICAL. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD COORDINATION.
2. SIZE THERMAL OVERLOAD FOR MOTOR RATING.
3. PROVIDE NEMA 3R DISCONNECT, LIQUID TIGHT FLEX CONDUIT, RGS CONDUIT AND CAST BOXES.
4. MOTOR CONTROLLER AND OVERLOAD PROTECTION FURNISHED WITH EQUIPMENT, REFER TO MECHANICAL DRAWINGS.
5. PROVIDE WYE-DELTA STARTER FOR INDIVIDUAL MOTOR LOADS.
6. STARTERS FOR DOMESTIC WATER BOOSTER PUMP SHALL BE WYE-DELTA AND SEQUENCED TURN ON / OFF.
7. UV FILTERS AND OZONE GENERATORS SHALL BE FED FROM 480V STEP DOWN TRANSFORMER SUPPLIED WITH MECHANICAL EQUIPMENT, REFER TO MECHANICAL FOR ADDITIONAL INFORMATION.
8. SINGLE POINT CONNECTION, REFER TO MECHANICAL SCHEDULES.
9. CONTRACTOR SHALL ENSURE CONDUCTOR IS SIZED APPROPRIATELY FOR EQUIPMENT ACTUALLY SELECTED FOR INSTALLATION.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	O.O. No.
1	REVISED IAW AN0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev:
Dwn by: J. CHAMPION
Solicitation No.: W9126G25RA020
Contract No.
Reviewed by: K. BRACKETT / J. HAYNES / C. LANDUM
File name:
Plot date: Visible in view
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

ELECTRICAL SCHEDULES

Sheet reference number
D4-EP602
Sheet of

Cont No.

7/16/2026 13:10:00

DCF4 FAULT CURRENT SCHEDULE

BUS NAME	VOLTAGE L-L	AVAILABLE FAULT CURRENT 3-PHASE	X/R	LINE/GRND	X/R
B-1EDP	480	32010	3	28879	2
B-1EF21	208	1880	1	1862	1
B-1EKP21	208	5735	1	5822	1
B-1EP21	208	1880	1	1862	1
B-1EP22	208	1824	1	1839	1
B-1EP42	480	10622	1	7141	1
B-1KDP1	208	10539	3	10928	2
B-1KDP2	208	10585	3	10961	2
B-1KP21	208	4789	1	3581	1
B-1KP22	208	4861	1	3648	1
B-1KP23	208	4936	1	3718	1
B-1KP24	208	5013	1	3790	1
B-1KP25	208	5092	1	3865	1
B-1KP26	208	5173	1	3943	1
B-1KP27	208	6409	2	5199	1
B-1KP28	208	6536	2	5339	1
B-1KP29	208	6668	2	5486	1
B-1KP30	208	6805	2	5641	1
B-1KP31	208	6948	2	5805	1
B-1KP32	208	6948	2	5805	1
B-1KP41	480	22145	2	17107	1
B-1KP42	480	28648	2	24417	1
B-1LP41	480	12890	1	8876	1
B-1MP21	208	3587	1	3563	1
B-1MP22	208	3507	1	3481	1
B-1MP41	480	33278	3	30703	2
B-1MP42	480	33278	3	30703	2
B-1PP21	208	4106	1	4590	1
B-1PP22	208	4948	1	5271	1
B-2EF21	208	1833	1	1851	1
B-2EP21	208	1833	1	1851	1
B-2EP22	208	1833	1	1851	1
B-2EP41	480	10173	1	6808	1
B-2LP41	480	4477	1	2735	0
B-2MP21	208	1624	1	1690	1
B-2MP22	208	1741	1	1773	1
B-2MP23	208	1859	1	1853	1
B-2MP41	480	4533	1	2769	0
B-2MP42	480	8004	1	5020	1
B-2MP43	480	21218	2	16183	1
B-2PP21A	208	6057	2	6805	2
B-2PP21B	208	5842	2	6386	2
B-2PP21C	208	5842	2	6386	2
B-2PP21D	208	5948	2	6589	2
B-2PP21E	208	5739	2	6193	2
B-2PP21F	208	5739	2	6193	2
B-2PP22A	208	7041	2	7594	2
B-2PP22B	208	6757	2	7085	2
B-2PP22C	208	6757	2	7085	2
B-2PP22D	208	6896	2	7332	2
B-2PP22E	208	6623	2	6852	2
B-2PP22F	208	6623	2	6852	2
B-3EP21	208	1748	1	1792	1
B-3EP22	208	1748	1	1792	1
B-3EP23	208	1748	1	1792	1
B-3EP41	480	6521	1	4049	1
B-3LP41	480	4249	1	2591	0
B-3MP21	208	1610	1	1680	1
B-3MP22	208	1726	1	1762	1
B-3MP41	480	4300	1	2622	0
B-3MP42	480	7308	1	4557	1
B-3PP21A	208	6083	2	6832	2
B-3PP21B	208	5868	2	6415	2
B-3PP21C	208	5868	2	6415	2
B-3PP21D	208	5974	2	6618	2
B-3PP21E	208	5766	2	6223	2
B-3PP22A	208	6918	2	7510	2
B-3PP22B	208	6644	2	7012	2
B-3PP22C	208	6644	2	7012	2
B-3PP22D	208	6779	2	7253	2
B-3PP22E	208	6515	2	6785	2
B-ATS-1EDP	480	33278	3	30703	2
B-ATS-GEN	480	2612	13	2583	11
B-CHWP-D4-1	480	22874	1	16544	1
B-CHWP-D4-2	480	22784	1	16503	1
B-EL1	480	10063	1	6699	1
B-EL2	480	9657	1	6404	1
B-ELEV-D4-1	480	9063	1	5654	1
B-HWP-D4-4	480	6638	0	3918	0
B-HWP-D4-6	480	6540	0	3890	0
BP-X1EKP21	480	21427	1	15829	1
BP-X1EP21	480	23411	1	17115	1
BP-X1EP22	480	9225	1	6009	1
BP-X1KDP1	480	31362	3	28695	2
BP-X1KDP2	480	32292	4	29943	2
BP-X1MP21	480	26943	1	21210	1
BP-X1MP22	480	26943	1	21210	1
BP-X1PP21	480	4794	1	2933	0
BP-X1PP22	480	8843	1	5586	1
BP-X2EP21	480	8880	1	5770	1
BP-X2EP22	480	8880	1	5770	1
BP-X2MP21	480	4068	1	2467	0
BP-X2MP22	480	6681	1	4114	0
BP-X2MP23	480	14830	1	9909	1
BP-X2PP21	480	7140	1	4639	1
BP-X2PP22	480	11839	1	8061	1
BP-X3EP21	480	5887	1	3622	0
BP-X3EP22	480	5887	1	3622	0
BP-X3MP21	480	3878	1	2349	0
BP-X3MP22	480	6185	1	3797	0
BP-X3PP21	480	7284	1	4795	1
BP-X3PP22	480	10944	1	7382	1
BP-XSERVICE A	13200	********	8	*********	8
BP-XSERVICE B	13200	********	8	*********	8
BS-X1EKP21	208	5956	1	6202	1
BS-X1EP21	208	1940	1	1962	1
BS-X1EP22	208	1879	1	1936	1
BS-X1KDP1	208	10806	3	11379	3
BS-X1KDP2	208	10855	3	11415	3
BS-X1MP21	208	3728	1	3801	1
BS-X1MP22	208	3645	1	3714	1
BS-X1PP21	208	4218	1	4825	1
BS-X1PP22	208	5110	1	5578	1
BS-X2EP21	208	1889	1	1949	1
BS-X2EP22	208	1889	1	1949	1
BS-X2MP21	208	1668	1	1773	1
BS-X2MP22	208	1793	1	1865	1
BS-X2MP23	208	1917	1	1953	1
BS-X2PP21	208	6171	2	7033	2
BS-X2PP22	208	7191	2	7874	2
BS-X3EP21	208	1798	1	1883	1
BS-X3EP22	208	1798	1	1883	1
BS-X3MP21	208	1654	1	1763	1
BS-X3MP22	208	1776	1	1853	1
BS-X3PP21	208	6196	2	7060	2
BS-X3PP22	208	7063	2	7783	2
BS-XSERVICE A	480	40996	6	44056	5
BS-XSERVICE B	480	38353	4	41933	4
BUS-A	480	39200	5	40380	3
S-ATS	480	33277	3	30703	2

MECHANICAL EQUIPMENT CONNECTION SCHEDULE PART 2

ROOM	ITEM	NAME	VOLT	PHASE	KVA	HP	FLA (A)	DISCONNECT	STARTER	C/B SIZE	WIRE SIZE	CONDUIT	PANEL	CIRCUIT	NOTES
107	VAV-D4-1A	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	15	1
106	VAV-D4-1B	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	15	1
106	VAV-D4-1C	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	15	1
105	VAV-D4-1D	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	15	1
105	VAV-D4-1E	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	15	1
104	VAV-D4-1F	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	15	1
159	VAV-D4-2G	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
156	VAV-D4-2H	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
155	VAV-D4-2I	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
154	VAV-D4-4J	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
140	VAV-D4-4K	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
163	VAV-D4-4L	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
160	VAV-D4-4M	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
145	VAV-D4-4N	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
161	VAV-D4-4O	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
169	VAV-D4-4P	VARIABLE AIR VOLUME	120 V	1	2.07	-	1	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP22	17	1
107	FPVAV-D4-1A	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	5	1,2
106	FPVAV-D4-1B	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	7	1,2
105	FPVAV-D4-1C	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP22	3	1,2
104	FPVAV-D4-1D	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP22	5	1,2
103	FPVAV-D4-1E	VAV - FAN POWERED	120 V	1	0.86	1/3	7.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	11	1,2
103	FPVAV-D4-1F	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	9	1,2
103	FPVAV-D4-1G	VAV - FAN POWERED	120 V	1	0.86	1/3	7.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	13	1,2
103	FPVAV-D4-1H	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	15	1,2
102	FPVAV-D4-1I-E	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	17	1,2
103	FPVAV-D4-1I-W	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	29	1,2
102	FPVAV-D4-1J	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	19	1,2
102	FPVAV-D4-1K	VAV - FAN POWERED	120 V	1	0.86	1/3	7.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	21	1,2
102	FPVAV-D4-1L	VAV - FAN POWERED	120 V	1	1.66	3/4	13.8	20A/1P STO	FURNISHED W/ EQUIP.	30A/1P	2 #10 + #10G	3/4" EMT	1MP21	23	1,2
102	FPVAV-D4-1M	VAV - FAN POWERED	120 V	1	0.86	1/3	7.2	20A/1P STO	FURNISHED W/ EQUIP.	20A/1P	2 #12 + #12G	3/4" EMT	1MP21	25	1,2

CONNECTION SCHEDULE NOTES

1. VERIFY MECHANICAL EQUIPMENT CIRCUIT REQUIREMENTS WITH PROPOSED EQUIPMENT PRIOR TO ORDERING ELECTRICAL. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD COORDINATION.
2. SIZE THERMAL OVERLOAD FOR MOTOR RATING.
3. PROVIDE NEMA 3R DISCONNECT, LIQUID TIGHT FLEX CONDUIT, RGS CONDUIT AND CAST BOXES.
4. MOTOR CONTROLLER AND OVERLOAD PROTECTION FURNISHED WITH EQUIPMENT, REFER TO MECHANICAL DRAWINGS.
5. PROVIDE WYE-DELTA STARTER FOR INDIVIDUAL MOTOR LOADS.
6. STARTERS FOR DOMESTIC WATER BOOSTER PUMP SHALL BE WYE-DELTA AND SEQUENCED TURN ON / OFF.
7. UV FILTERS AND OZONE GENERATORS SHALL BE FED FROM 480V STEP DOWN TRANSFORMER SUPPLIED WITH MECHANICAL EQUIPMENT, REFER TO MECHANICAL FOR ADDITIONAL INFORMATION.
8. SINGLE POINT CONNECTION, REFER TO MECHANICAL SCHEDULES.
9. CONTRACTOR SHALL ENSURE CONDUCTOR IS SIZED APPROPRIATELY FOR EQUIPMENT ACTUALLY SELECTED FOR INSTALLATION.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Own by: J. CHAMPION
Solicitation No.: W9126G22RA020
Contract No.:
Reviewed by: K. STEWART
Submitted by: C. LANGUM
File name:
Plot date: Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

ELECTRICAL SCHEDULES

Sheet reference number
D4-EP602A
Sheet of

Cont No.

7/16/2026 13:10:04

KITCHEN EQUIPMENT ELECTRICAL CONNECTION SCHEDULE - PART 1

ITEM	NAME	VOLT	PH	ELEC. HP	FLA (A)	CONNECTION	MTG. HEIGHT	DISCONNECT	C/B SIZE	WIRE SIZE	CONDUIT	PANEL	CIRCUIT	STANDBY POWER	NOTES
K14a	DISPOSER, GARBAGE	208 V	3	3/4	2.6	HARDWIRED	14"	INTEGRAL	20A/3P	3 #12 + #12G	3/4" EMT	1KP27	7,9,11	NO	1,12
K14b	DISPOSER, GARBAGE	208 V	3	3/4	2.6	HARDWIRED	14"	INTEGRAL	20A/3P	3 #12 + #12G	3/4" EMT	1KP27	23,25,27	NO	1,12
K16	POT & PAN SCRUBBER	208 V	3	3/4	2.6	HARDWIRED	14"	INTEGRAL	20A/3P	3 #12 + #12G	3/4" EMT	1KP27	30,32,34	NO	1,12
K17	WAREWASHER, RACK CONVEYER	480 V	3	2.0	40.1	HARDWIRED	68"	INTEGRAL	60A/3P	3 #6 + #10G	3/4" EMT	1KP42	19,21,23	NO	1,12
K17Aa	BOOSTER HEATER	480 V	3	-	16.3	HARDWIRED	18"	INTEGRAL	25A/3P	3 #10 + #12G	3/4" EMT	1KP42	7,9,11	NO	1,12
K17Ab	BOOSTER HEATER	480 V	3	-	16.3	HARDWIRED	18"	INTEGRAL	25A/3P	3 #10 + #12G	3/4" EMT	1KP42	13,15,17	NO	1,12
K21	WAREWASHER, POWER WASH	208 V	3	.75	2.6	HARDWIRED	14"	INTEGRAL	20A/3P	3 #12 + #12G	3/4" EMT	1KP27	24,26,28	NO	1,12
K22	UTENSIL WASHER, DOOR TYPE	480 V	3	-	28.6	HARDWIRED	18"	INTEGRAL	40A/3P	3 #8 + #10G	3/4" EMT	1KP42	25,27,29	NO	1,12
K22A	BOOSTER HEATER	480 V	3	-	16.3	HARDWIRED	18"	INTEGRAL	25A/3P	3 #10 + #12G	3/4" EMT	1KP42	31,33,35	NO	1,12
K24	HOOD, CONDENSATE	120 V	1	-	15	HARDWIRED	CEILING	INTEGRAL	20A/1P	2 #12 + #12G	3/4" EMT	1KP27	19	NO	1,13
K26	HOOD, CONDENSATE	120 V	1	-	15	HARDWIRED	CEILING	INTEGRAL	20A/1P	2 #12 + #12G	3/4" EMT	1KP27	15	NO	1,13
K27	SOILED, DISH TABLE	120 V	1	-	3	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP27	10	NO	22
K33a	HOOD, CONDENSATE	120 V	1	-	15.0	HARDWIRED	CEILING	INTEGRAL	20A/1P	2 #12 + #12G	3/4" EMT	1KP27	13	NO	1,13
K33b	HOOD, CONDENSATE	120 V	1	-	15.0	HARDWIRED	CEILING	INTEGRAL	20A/1P	2 #12 + #12G	3/4" EMT	1KP27	21	NO	1,13
K38a	REFRIGERATOR, REACH-IN	120 V	1	5/8	8.2	NEMA 5-20R GFI	84"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1EKP21	3	YES	2,22
K38b	REFRIGERATOR, REACH-IN	120 V	1	5/8	8.2	NEMA 5-20R GFI	84"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1EKP21	5	YES	2,22
K40A	FIRE SUPPRESSION SYSTEM	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1EKP21	8	NO	12,24
K40a	HOOD, EXHAUST	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	1	NO	4,12,23
K40B	CONTROL PANEL, HOOD, WATERWASH	120 V	1	-	15.0*	HARDWIRED	CEILING	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	29	NO	5,12,23
K40b	HOOD, EXHAUST	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	41	NO	4,12,23
K40c	HOOD, EXHAUST	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	21	NO	4,12,23
K41a	KETTLE, STEAM JACKETED	120 V	1	-	5.0	NEMA 5-20R GFI	24"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	8	NO	2,3,22
K41b	KETTLE, STEAM JACKETED	120 V	1	-	5.0	NEMA 5-20R GFI	24"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	12	NO	2,3,22
K41c	KETTLE, STEAM JACKETED	120 V	1	-	5.0	NEMA 5-20R GFI	24"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	37	NO	2,3,22
K42	FREEZER, REACH-IN	120 V	1	3/4	11.2	NEMA 5-20R GFI	84"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1EKP21	1	YES	2,22
K47	STAND, EQUIPMENT	120 V	1	-	15.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1EKP21	7	YES	2,22
K48a	GRIDDLE, GAS	120 V	1	-	1.0	NEMA 5-20R GFI	42"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	33	NO	2,3,22
K48b	GRIDDLE, GAS	120 V	1	-	1.0	NEMA 5-20R GFI	42"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	23	NO	2,3,22
K51a	TABLE, WORK - DROP CORD	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	28	NO	6
K51b	TABLE, WORK - DROP CORD	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	30	NO	6
K51c	TABLE, WORK - DROP CORD	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	32	NO	6
K51d	TABLE, WORK - DROP CORD	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	34	NO	6
K54a	OVEN-STEAMER, COMBINATION	120 V	1	-	15.4	(2) NEMA 5-20R GFI	36" AND 60"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	7	NO	2,3,22
K54b	OVEN-STEAMER, COMBINATION	120 V	1	-	15.4	(2) NEMA 5-20R GFI	36" AND 60"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	16	NO	2,3,22
K54c	OVEN-STEAMER, COMBINATION	120 V	1	-	15.4	(2) NEMA 5-20R GFI	36" AND 60"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	20	NO	2,3,22
K58a	GRIDDLE, GAS	120 V	1	-	1.0	NEMA 5-20R GFI	42"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	11	NO	2,3,22
K58b	GRIDDLE, GAS	120 V	1	-	1.0	NEMA 5-20R GFI	42"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	17	NO	2,3,22
K61	STAND, EQUIPMENT	120 V	1	-	15.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1EKP21	9	YES	2,22
K63A	FIRE SUPPRESSION SYSTEM	120 V	1		15.0	NEMA 5-20R GFI	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	6	NO	4,12,23
K63a	HOOD, EXHAUST - LIGHTS	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	42	NO	4,12,23
K63B	CONTROL PANEL, HOOD, WATERWASH	120 V	1	-	15.0	HARDWIRED	48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	4	NO	5,12,23
K63b	HOOD, EXHAUST - LIGHTS	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP28	38	NO	4,12,23
K68A	FIRE SUPPRESSION SYSTEM	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	5	NO	12,24
K68a	HOOD, EXHAUST	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP29	41	NO	4,12,23
K68B	CONTROL PANEL, HOOD, WATERWASH	120 V	1	-	15.0	HARDWIRED	48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	3	NO	5,12,23
K68b	HOOD, EXHAUST	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP29	37	NO	4,12,23
K69a	COMBI-STEAMER (TWO UNITS - ONE ABOVE, ONE BELOW)	120 V	1	-	7.5	(2) NEMA 5-20R GFI	24" AND 48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	7	NO	2,3,22
K69b	COMBI-STEAMER (TWO UNITS - ONE ABOVE, ONE BELOW)	120 V	1	-	7.5	(2) NEMA 5-20R GFI	24" AND 48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	11	NO	2,3,22
K69c	COMBI-STEAMER (TWO UNITS - ONE ABOVE, ONE BELOW)	120 V	1	-	7.5	(2) NEMA 5-20R GFI	24" AND 48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	15	NO	2,3,22
K69d	COMBI-STEAMER (TWO UNITS - ONE ABOVE, ONE BELOW)	120 V	1	-	7.5	(2) NEMA 5-20R GFI	24" AND 48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	19	NO	2,3,22
K69e	COMBI-STEAMER (TWO UNITS - ONE ABOVE, ONE BELOW)	120 V	1	-	7.5	(2) NEMA 5-20R GFI	24" AND 48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	23	NO	2,3,22
K69f	COMBI-STEAMER (TWO UNITS - ONE ABOVE, ONE BELOW)	120 V	1	-	7.5	(2) NEMA 5-20R GFI	24" AND 48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP28	3	NO	2,3,22
K73a	TILT SKILLET	120 V	1	-	15.0	NEMA 5-20R GFI	24"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	10	NO	2,3,22
K73b	TILT SKILLET	120 V	1	-	15.0	NEMA 5-20R GFI	24"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	14	NO	2,3,22
K73c	TILT SKILLET	120 V	1	-	15.0	NEMA 5-20R GFI	24"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	18	NO	2,3,22
K73d	TILT SKILLET	120 V	1	-	15.0	NEMA 5-20R GFI	24"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	22	NO	2,3,22
K76	KETTLE, STEAM JACKETED	120 V	1	-	5.0	NEMA 5-20R GFI	24"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP29	26	NO	2,3,22
K77A	FIRE SUPPRESSION SYSTEM	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	6	NO	2,24
K77a	HOOD, EXHAUST	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	42	NO	12,24
K77B	CONTROL PANEL HOOD	120 V	1	-	15.0	HARDWIRED	48"	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	4	NO	5,12,23
K77b	HOOD, EXHAUST - LIGHTS	120 V	1	-	15.0	HARDWIRED	CEILING	NA	20A/1P ST	2 #12 + #12G	3/4" EMT	1KP29	38	NO	12,24
K80	SINK, SKULLERY, 2 COMPARTMENTS	120 V	1	-	3.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP21	7	NO	22
K82	STAND, EQUIPMENT	120 V	1	-	15.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP21	6	NO	22
K84a	SLICER, FOOD	120 V	1	1/2	3.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP21	17	NO	2,22
K84b	SLICER, FOOD	120 V	1	1/2	3.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP22	8	NO	2,22
K86	SINK, SKULLERY, 2 COMPARTMENTS	120 V	1	-	3.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP21	19	NO	22
K89	ICE MAKER W/O BIN	120 V	1	-	11.7	HARDWIRED	96"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP27	41	NO	1
K96a	SINK, SKULLERY, 2 COMPARTMENTS	120 V	1	-	3.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP21	2	NO	22
K96b	SINK, SKULLERY, 2 COMPARTMENTS	120 V	1	-	3.0	NEMA 5-20R GFI	48"	NA	20A/1P	2 #12 + #12G	3/4" EMT	1KP21	4	NO	22

- CONTINUED ON SHEET D4-EP604 -

NOTES

1. EQUIPMENT SHALL BE HARDWIRED. IF EQUIPMENT IS EQUIPPED WITH A UNIT SWITCH AND MEETS THE REQUIREMENTS OF NEC ARTICLE 422, A DISCONNECT SWITCH IS NOT REQUIRED. IF EQUIPMENT DOES NOT HAVE A UNIT SWITCH, THE DISCONNECT SHALL BE SIZED AS SHOWN UNLESS ACTUAL KITCHEN EQUIPMENT IS DIFFERENT THAN WHAT WAS DESIGNED. PROVIDE FUSE TYPE AND AMPACITY IN DISCONNECT AS RECOMMENDED BY EQUIPMENT MANUFACTURER AS REQUIRED. USE WEATHERPROOF DISCONNECTS OUTDOORS.
2. COORDINATE THE RECEPTACLE CONFIGURATION WITH KITCHEN EQUIPMENT CONTRACTOR. IF EQUIPMENT IS NOT SUPPLIED WITH A CORD AND PLUG, CONTRACTOR SHALL PROVIDE AND INSTALL APPROPRIATELY SIZED CORD AND PLUG.
3. EQUIPMENT IS LOCATED UNDER HOOD. PROVIDE SHUNT-TRIP BREAKER IN PANEL. SHUNT-TRIP TO BE ACTUATED BY ACTIVATION OF FIRE SUPPRESSION SYSTEM.
4. PROVIDE 120V WIRE FROM TIMER PANEL TO UV HOOD CONTROL PANEL AND INTERCONNECTION BETWEEN HOOD LIGHTS AND TEMP SENSOR, REFER TO MANUFACTURER DRAWINGS FOR MORE INFORMATION.
5. PROVIDE CONNECTION TO FIRE SUPPRESSION SYSTEM. ALSO PROVIDE CONNECTION FROM SYSTEM TO THE BUILDING FIRE ALARM SYSTEM AND INTERCONNECTIONS TO SHUT-OFF EQUIPMENT UNDER HOOD AND GAS SOLENOID VALVE(S).
6. PROVIDE DROP CORD WITH INSULATE GRIP CONNECTOR BODY, IP20 SUITABILITY; WITH NEMA CONFIGURATIONS AS INDICATED. COORDINATE NEMA CONFIGURATION WITH EQUIPMENT PRIOR TO ORDERING.
7. CONTROLLED BY WALL TOGGLE SWITCH, NEAR KITCHEN HOOD. COORDINATE WITH OTHER TRADES FOR EXACT LOCATION OF SWITCH.
8. SINGLE POINT CONNECTION TO TOP MOUNTED NEMA 12 CONTROL CABINET.
9. PROVIDE LOCK ON DEVICE ON CIRCUIT BREAKER IN PANELBOARD.
10. PROVIDE POWER FOR WALK-IN LIGHTS AND DOOR HEATER. PROVIDE CONDUIT AND WIRE TO CONNECT MANUFACTURER PROVIDED LIGHT FIXTURES AND LIGHT SWITCHES.
11. PROVIDE 4'-0" 32 W, T8,3000K LAMPS AND 26W COMPACT FLUORESCENT LAMPS FOR FREEZER / COOLER PROVIDED VAPOR PROOF LIGHT FIXTURES, REFER TO PLAN FOR EXACT QUANTITY.
12. PROVIDE LOCK OPEN CIRCUIT BREAKER AT PANEL PER NEC 422.31(B).
13. PROVIDE JUNCTION BOX AT CEILING FOR CONNECTION TO HOOD, PROVIDE SWITCH AT WALL +42"AFF NEAR EACH HOOD AND LABEL AS "CONDENSATE HOOD LIGHTS". INTERLOCK CONDENSATE HOOD AND FAN STARTER FOR SIMULTANEOUS OPERATION OF DISH MACHINE AND CONDENSATE HOOD.
14. PANEL IS WITHIN SITE, NO ADDITIONAL DISCONNECT IS NEEDED.
15. PROVIDE ELECTRICAL WIRING AND CONDUIT BETWEEN WATER WASH CONTROL STATION AND J-BOX OF HOOD LIGHTS, FIRE SUPPRESSION SYSTEM NC SWITCH, FAN CONTROL CENTER, SOLENOID VALVE, AS RECOMMENDED BY MANUFACTURER.
16. UNIT HAS INTERNAL 480V TRANSFORMER TO 208Y/120V.
17. CONTRACTOR TO PROVIDE MAIN POWER FEED TO REFRIGERATION PACKAGED UNIT AND CONNECT CONTROL AND DEFROST SYSTEM AS CALLED FOR IN THE MANUFACTURER'S WIRING DIAGRAM.
18. NOT USED.
19. PROVIDE 4-WIRE COLOR CODED SERVICE FROM THE TIME CLOCK AT THE REFRIGERATION PACKAGE TO BLOWER COIL IN FIXTURE FOR AUTOMATIC DEFROST, REFER TO MANUFACTURER'S SHOP DRAWINGS.
20. PROVIDE CONNECTION TO DRAIN-LINE HEATER IN FREEZER.
21. PART OF PACKAGED UNIT, PROVIDE FIELD WIRING WITH LIQUID TIGHT CONDUIT, AS REQUIRED BY MANUFACTURER.
22. PROVIDE DUPLEX OUTLET.
23. PROVIDE SWITCH FOR FLUORESCENT LIGHT UNDER HOOD AND A SWITCH FOR FAN UNDER HOOD AT WALL +42"AFF. REFER TO MANUFACTURER'S DRAWINGS FOR MORE INFORMATION.
24. PROVIDE INTERCONNECTING WIRES BETWEEN UV BALLAST BOXES, REFER TO MANUFACTURER'S DRAWINGS FOR MORE INFORMATION.

SHEET NOTES

A. ALL RECEPTACLES IN KITCHEN SHALL BE GFCI TYPE, PER NEC.

B. CONFIRM ALL ROUGH-IN HEIGHTS AND ELECTRICAL REQUIREMENTS WITH APPROVED SHOP DRAWINGS AND FINAL KITCHEN EQUIPMENT ROUGH-IN DRAWINGS PRIOR TO ROUGH-IN.

C. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING, CONDUIT, FITTINGS, SOLENOIDS, JUNCTION BOXES, SWITCHES, PANEL BOXES, AND/OR DISCONNECT SWITCHES, ETC. REQUIRED FOR A COMPLETE AND OPERATIONAL KITCHEN EQUIPMENT.

D. CONFIRM ALL NEMA CONFIGURATIONS WITH EQUIPMENT PLUG PRIOR TO WORK.

E. COORDINATE WITH KITCHEN DRAWINGS D-K100 SERIES.

F. PROVIDE EMT CONDUIT UNLESS OTHERWISE NOTED.

G. THE NOTATION 20* IN THE FLA COLUMN DENOTES THAT THE EQUIPMENT NEEDS A DEDICATED 20 AMP CIRCUIT. KITCHEN EQUIPMENT MANUFACTURER DID NOT GIVE THE EXACT FLA RATING.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Drwn by: J. CHAMPION
Solicitation No.: W912GS25RA020
Contract No.
Reviewed by: K. GRIMES
Submitted by: C. LANGUM
Approved by:
File name:
Plot date: 1/16/2026 11:10:09
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
POST OFFICE BOX 17300
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

ELECTRICAL SCHEDULES - KITCHEN & TRANSFORMER

Sheet reference number
D4-EP603
Sheet of

Cover No.

7/16/2026 13:10:09

PANEL: MAIN SWITCHBOARD (MSB) OC DEVICE TYPE: Breaker ENCLOSURE: NEMA 1 MAINS(A): BKR CONTINUOUS(A): 3000
LOCATION: MAIN ELEC 151 DEVICE FAMILY: Bolt On MOUNTING: Free Standing WIRING: 3-Phase 4-Wire BUS SC RATING(A) 65000
FED FROM: BS-XSERVICE A VOLTAGE: 480/277 FAULT CURRENT(A): 40380
2500A MSB, Cu BUS, 100% RATED NEUTRAL 2500AF/2500AT MAIN CB 100% RATED NEUTRAL

CUBICLE NO	DESCRIPTION	CONNECTED kVA	DEMAND kVA	DESIGN kVA	DESIGN MAX AMPS	OC DEVICE TYPE	OC DEVICE SIZE	P	NOTES
1	F-3MP42	48.76	48.76	60.28	75.61	CB	125	3	PANEL 3MP42
2	F-3MP41	28.86	28.86	35.20	49.42	CB	125	3	PANEL 3MP41
3	F-X3PP21	121.52	67.91	68.99	85.67	CB	225	3	PANEL 3PP21A VIA XFMR
4	F-X3PP22	122.24	68.27	69.35	87.29	CB	225	3	PANEL 3PP22A VIA XFMR
5	F-2MP43	225.61	225.61	280.26	338.02	CB	400	3	PANEL 2MP23
6	F-2MP42	24.66	24.66	30.01	37.22	CB	125	3	PANEL 2MP42
7	F-2MP41	32.05	32.05	39.17	54.96	CB	125	3	PANEL 2MP41
8	F-X2PP21	107.67	60.03	60.63	79.34	CB	225	3	PANEL 2PP21A VIA XFMR
9	F-X2PP22	107.67	60.03	60.63	79.34	CB	225	3	PANEL 2PP22A VIA XFMR
10	F-1MP41	59.05	59.05	73.36	91.58	CB	225	3	PANEL 1MP41
11	F-1MP42	34.64	33.69	39.85	49.41	CB	225	3	PANEL 1MP42
12	F-CHWP-D4-1	25.07	25.07	31.33	37.69	CB	80	3	CHWP-D4-1
13	F-CHWP-D4-2	0.00	0.00	0.00	0.00	CB	80	3	CHWP-D4-2 (REDUN)
14	SPARE	0.00	0.00	0.00	0.00	CB	400	3	SPARE
15	SPARE	0.00	0.00	0.00	0.00	CB	400	3	SPARE
16	SPACE	0.00	0.00	0.00	0.00		0	3	
17	SPACE	0.00	0.00	0.00	0.00		0	3	
18	SPACE	0.00	0.00	0.00	0.00		0	3	
19	SPACE	0.00	0.00	0.00	0.00		0	3	
20	F-HWP-D4-4	30.08	30.08	33.84	40.70	CB	50	3	HWP-D4-4
21	F-HWP-D4-6	0.00	0.00	0.00	0.00	CB	50	3	HWP-D4-6 (REDUN)
22	F-ELEV-D4-1	44.56	44.56	55.70	67.00	CB	150	3	ELEVATOR
23	F-X1PP21	12.68	11.50	11.65	17.34	CB	125	3	PANEL 1PP21
24	F-X1PP22	20.32	16.60	16.75	22.50	CB	125	3	PANEL 1PP22 VIA XFMR
25	F-1LP41	19.35	19.35	24.19	34.35	CB	225	3	PANEL 1LP41
26	F-X1KDP1	144.17	95.17	95.17	122.79	CB	350	3	PANEL 1KDP1 VIA XFMR
27	F-X1KDP2	185.28	122.95	122.95	158.83	CB	350	3	PANEL 1KDP2 VIA XFMR
28	F-1KP41	180.91	117.59	117.59	141.44	CB	400	3	PANEL 1KP41
29	F-1KP42	127.70	83.01	83.01	99.84	CB	400	3	PANEL 1KP42
30	F-ATS 1EDP	211.22	156.18	169.90	231.85	CB	400	3	ATS-1EDP 100% RTD ADJ
31	SPARE	0.00	0.00	0.00	0.00	CB	400	3	SPARE
32	SPARE	0.00	0.00	0.00	0.00	CB	400	3	SPARE
33	SPACE	0.00	0.00	0.00	0.00		0	3	
34	SPACE	0.00	0.00	0.00	0.00		0	3	
35	SPACE	0.00	0.00	0.00	0.00		0	3	
36	SPACE	0.00	0.00	0.00	0.00		0	3	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	1909.29	2399.3	* A-N	664904.5	2399.3	CONNECTED	1909.29
TOTAL DEMAND	1383.09	1743.2	* B-N	634159.6	2288.3	DEMAND	1383.09
TOTAL DESIGN	1521.34	1919.6	* C-N	610230.5	2202.0	DESIGN	1521.34

SECTION 'A' (1-18) FED FROM SERVICE TRANSFORMER 'A', 100% RATED CB, ADJ TRIP
PROVIDE 2500AT/3P TIE CB 100% RATED, ADJ TRIP, ADJ GFI
SECTION 'B' (19-36) FED FROM SERVICE TRANSFORMER 'B', 100% RATED CB, ADJ TRIP

PANEL: 1EDP OC DEVICE TYPE: Breaker ENCLOSURE: NEMA 1 MAINS(A): BKR CONTINUOUS(A): 400
LOCATION: MAIN ELEC 151 DEVICE FAMILY: Bolt On MOUNTING: Surface WIRING: 3-Phase 4-Wire BUS SC RATING(A) 65000
FED FROM: VOLTAGE: 480/277 FAULT CURRENT(A): 32010
400A Cu BUS, 400AT MAIN CB, 100% RATED ADJ TRIP 100% RATED NEUTRAL

CUBICLE NO	DESCRIPTION	CONNECTED kVA	DEMAND kVA	DESIGN kVA	DESIGN MAX AMPS	OC DEVICE TYPE	OC DEVICE SIZE	P	NOTES
1	F-X1EKP21	45.11	36.57	36.57	49.91	CB	125	3	PANEL 1EKP21
2	F-X1EP21	16.62	14.57	14.57	21.43	CB	50	3	PANEL 1EP21 / 1EF21 V
3	F2EP41	69.71	57.31	65.22	109.13	CB	225	3	PANEL 2EP41
4	F3EP41	43.68	27.44	27.44	37.84	CB	125	3	PANEL 3EP41
5	F1EP42	36.17	34.89	40.70	82.61	CB	125	3	PANEL 1EP42
6	SPACE	0.00	0.00	0.00	0.00		0	1	
7	SPACE	0.00	0.00	0.00	0.00		0	1	
8	SPACE	0.00	0.00	0.00	0.00		0	1	
9	SPACE	0.00	0.00	0.00	0.00		0	1	
10	SPACE	0.00	0.00	0.00	0.00		0	1	
11	SPACE	0.00	0.00	0.00	0.00		0	1	
12	SPARE	0.00	0.00	0.00	0.00	CB	125	3	
13	SPARE	0.00	0.00	0.00	0.00	CB	125	3	
14	SPARE	0.00	0.00	0.00	0.00	CB	125	3	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	211.22	289.3	* A-N	80174.0	289.3	CONNECTED	211.22
TOTAL DEMAND	156.18	213.5	* B-N	74209.6	267.8	DEMAND	156.18
TOTAL DESIGN	169.90	231.8	* C-N	56838.3	205.1	DESIGN	169.90

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1EP21 OC DEVICE TYPE: Breaker ENCLOSURE: NEMA 1 MAINS(A): BKR CONTINUOUS(A): 100
LOCATION: COMM 112 DEVICE FAMILY: Bolt On MOUNTING: Surface WIRING: 3-Phase 4-Wire BUS SC RATING(A) 10000
FED FROM: BS-X1EP21 VOLTAGE: 208/120 FAULT CURRENT(A): 1880
100A Cu BUS, 100A/3P MAIN CB 200% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
30	1		R - 112 RACK A01	RECEPT	2500	1	3940			2	1440	RECEPT	R - 112		20	1
20	1		R - 112 RACK A01	RECEPT	1000	3		2440		4	1440	RECEPT	R - 112		20	1
30	1		R - 112 RACK A02	RECEPT	2500	5			3220	6	720	RECEPT	R - 112 CATV		20	1
20	1		R - 112 RACK A02	RECEPT	1000	7	1000			8	0	SPARE	SPARE		20	1
30	1		R - 112 RACK B02	RECEPT	2500	9		2500		10	0	SPARE	SPARE		20	1
20	1		R - 112 RACK B02	RECEPT	1000	11			1000	12	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	13	0			14	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	15		0		16	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	17			0	18	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	19	0			20	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	21		0		22	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	23			0	24	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	25	0			26	0	OTHER	SPD	NOTE 2	60	3
20	1		SPARE	SPARE	0	27		0		28	–		""		""	
20	1		SPARE	SPARE	0	29			0	30	–		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	14.10	41.1	* A-N	4940.0	41.1	CONNECTED	14.10
TOTAL DEMAND	12.05	34.4	* B-N	4940.0	41.1	DEMAND	12.05
TOTAL DESIGN	12.05	34.4	* C-N	4220.0	35.1	DESIGN	12.05

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.
NOTE 2: CONTRACTOR SHALL COORDINATE CIRCUIT BREAKER AND CONDUCTOR SIZES WITH SPD MANUFACTURER
RECOMMENDATIONS. PROVIDE 4#6AWG +#6AWG GROUND MINIMUM

PANEL: 1EP21 OC DEVICE TYPE: Breaker ENCLOSURE: NEMA 1 MAINS(A): BKR CONTINUOUS(A): 100
LOCATION: ELEC 151 DEVICE FAMILY: Bolt On MOUNTING: Surface WIRING: 3-Phase 4-Wire BUS SC RATING(A) 10000
FED FROM: VOLTAGE: 208/120 FAULT CURRENT(A): 1880
100A Cu BUS, 100A/3P MAIN CB 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		SMOKE CURTAIN	OTHER	600	1	1801			2	1201	OTHER	R - 150 FACP		20	1
20	1	CRAWL SPACE	F/S DAMPER	OTHER	480	3		720		4	240	OTHER	F/S DAMPER		20	1
20	1		SPARE	SPARE	0	5			0	6	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	7	0			8	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	9		0		10	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	11			0	12	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	13	0			14	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	15		0		16	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	17			0	18	0	SPARE	SPARE		20	1
0	1		SPACE	SPACE	0	19	0			20	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	21		0		22	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	23			0	24	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	25	0			26	0	OTHER	SPD	NOTE 2	60	3
0	1		SPACE	SPACE	0	27		0		28	–		""		""	
0	1		SPACE	SPACE	0	29			0	30	–		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	2.52	15.0	* A-N	1801.3	15.0	CONNECTED	2.52
TOTAL DEMAND	2.52	15.0	* B-N	720.0	6.0	DEMAND	2.52
TOTAL DESIGN	2.52	15.0	* C-N	0.0	0.0	DESIGN	2.52

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.
NOTE 2: CONTRACTOR SHALL COORDINATE CIRCUIT BREAKER AND CONDUCTOR SIZES WITH SPD MANUFACTURER
RECOMMENDATIONS. PROVIDE 2#10AWG +#10AWG GROUND MINIMUM

PANEL: 1EKP21 OC DEVICE TYPE: Breaker ENCLOSURE: NEMA 1 MAINS(A): BKR CONTINUOUS(A): 225
LOCATION: MAIN ELECTRICAL 151 DEVICE FAMILY: Bolt On MOUNTING: Surface WIRING: 3-Phase 4-Wire BUS SC RATING(A) 10000
FED FROM: VOLTAGE: 208/120 FAULT CURRENT(A): 5822
225A Cu BUS, 225A MAIN CB 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		K42 - FREEZER REACH	KITCHEN	1345	1	1669			2	324	KITCHEN	K126B - COIL REFRIDG		20	1
20	1		K38a - FRIDGE REACH	KITCHEN	985	3		2233		4	2496	KITCHEN	K168 - BLAST FREEZER		20	2
20	1		K38b - FRIDGE REACH	KITCHEN	985	5			2233	6						
20	1		K47 - STAND, EQUIP	KITCHEN	1801	7	2161			8	360	KITCHEN	K40A - FIRE SUP SYS		20	1
20	1		K61- STAND, EQUIP	KITCHEN	1801	9		3602		10	1801	KITCHEN	K120 WALKIN COOLER		20	1
20	1		K174a- FRIDGE REACH	KITCHEN	985	11			985	12	0	SPARE	SPARE		20	1
20	1		K175a- FRIDGE PASS T	KITCHEN	1033	13	1033			14	0	SPARE	SPARE		20	1
20	1		K174b- FRIDGE REACH	KITCHEN	985	15		1201		16	216	KITCHEN	K126Cb-COIL,REFRIDGE		20	1
20	1		K175b- FRIDGE PASS T	KITCHEN	1033	17			1681	18	648	KITCHEN	K126Ca-COIL,REFRIDGE		20	1
75	3		K126 FRIG RACK SYS	OTHER	20751	19	7240			20	324	KITCHEN	K126A - COIL, COOK		20	1
""			""		–	21		8711		22	1801	KITCHEN	K126E-DRAIN LINE HT		20	1
""			""		–	23			7828	24	1830	KITCHEN	K126Da WALKIN COIL		20	2
20	2		K126Db WALKIN COIL	KITCHEN	1830	25	1830			26	–		""		""	
""			""		–	27		1830		28	1830	KITCHEN	K126Dc WALKIN COIL		20	2
20	1		SPARE	SPARE	0	29			915	30	–		""		""	
0	1		SPACE	SPACE	0	31	0			32	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	33		0		34	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	35			0	36	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	37	0			38	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	39		0		40	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	41			0	42	0	SPACE	SPACE		0	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	45.11	146.2	* A-N	13916.3	115.9	CONNECTED	45.11
TOTAL DEMAND	36.57	115.2	* B-N	17562.2	146.2	DEMAND	36.57
TOTAL DESIGN	36.57	115.2	* C-N	13627.9	113.5	DESIGN	36.57

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1EP22 OC DEVICE TYPE: Breaker ENCLOSURE: NEMA 1 MAINS(A): BKR CONTINUOUS(A): 100
LOCATION: COMM 137 DEVICE FAMILY: Bolt On MOUNTING: Surface WIRING: 3-Phase 4-Wire BUS SC RATING(A) 10000
FED FROM: BS-X1EP22 VOLTAGE: 208/120 FAULT CURRENT(A): 1839
100A Cu BUS, 100A/3P MAIN CB 200% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
30	1		R - 137 RACK A01	RECEPT	2500	1	2500			2	0	SPARE	SPARE		20	1
20	1		R - 137 RACK A01	RECEPT	1000	3		1000		4	0	SPARE	SPARE		20	1
30	1		R - 137 RACK B01	RECEPT	2500	5			2500	6	0	SPARE	SPARE		20	1
20	1		R - 137 RACK B02	RECEPT	1000	7	1000			8	0	SPARE	SPARE		20	1
20	1		R - 137 CATV	RECEPT	1440	9		1440		10	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	11			0	12	0	SPARE	SPARE		20	1
20	1		O-137 OCS	OTHER	360	13	360			14	0	SPARE	SPARE		20	1
20	1		O-137 SERVICING	OTHER	360	15		360		16	0	SPARE	SPARE		20	1
20	1		R - 137	RECEPT	1800	17			1800	18	0	SPARE	SPARE		20	1
20	1		R - 137	RECEPT	1440	19	1440			20	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	21		0		22	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	23			0	24	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	25	0			26	0	OTHER	SPD	NOTE 2	60	3
20	1		SPARE	SPARE	0	27		0		28	–		""		""	
20	1		SPARE	SPARE	0	29			0	30	–		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	12.40	44.1	* A-N	5300.0	44.1	CONNECTED	12.40
TOTAL DEMAND	11.11	37.4	* B-N	2800.0	23.3	DEMAND	11.11
TOTAL DESIGN	11.11	37.4	* C-N	4300.0	35.8	DESIGN	11.11

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.
NOTE 2: CONTRACTOR SHALL COORDINATE CIRCUIT BREAKER AND CONDUCTOR SIZES WITH SPD MANUFACTURER
RECOMMENDATIONS. PROVIDE 4#6AWG +#6AWG GROUND MINIMUM.

PANEL: 1EP42 OC DEVICE TYPE: Breaker ENCLOSURE: NEMA 1 MAINS(A): MLO CONTINUOUS(A): 225
LOCATION: ELEC 132 DEVICE FAMILY: Bolt On MOUNTING: Surface WIRING: 3-Phase 4-Wire BUS SC RATING(A) 25000
FED FROM: B-1EDP VOLTAGE: 480/277 FAULT CURRENT(A): 10622
225A Cu BUS, MAIN LUGS ONLY 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
100	1		EL1 LTG INVERTER	LIGHTIN	12245	1	12245			2	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	3		0		4	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	5			0	6	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	7	0			8	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	9		0		10	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	11			0	12	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	13	0			14	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	15		0		16	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	17			0	18	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	19	0			20	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	21		0		22	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	23			0	24	0	SPARE	SPARE		20	1
0	1		SPACE	SPACE	0	25	0			26	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	27		0		28	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	29			0	30	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	31	0			32	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	33		0		34	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	35			0	36	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	37	5300			38	12400	NONE	F-X1EP22		50	3
0	1		SPACE	SPACE	0	39		2800		40	–		""		""	
0	1		SPACE	SPACE	0	41			4300	42	–		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	24.61	63.2	* A-N	17525.1	63.2	CONNECTED	36.17
TOTAL DEMAND	23.33	60.3	* B-N	2800.0	10.1	DEMAND	34.89
TOTAL DESIGN	26.38	71.4	* C-N	4300.0	15.5	DESIGN	40.70

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

MSB	1EF21
1EDP	1EKP21
1EP21	1EP22
-	1EP42

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER
THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Solicitation No.: W912QR25RA020
Contract No.:
Rev.:
Dwn by: J. CHAMPION
Ckd by: K. BENNETT
Rvwd by: C. LANGUM
Appd by: K. BENNETT
File name:
Plot date: 7/16/2026 13:11
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH CONTRACTING DIVISION FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI-S220527

ELECTRICAL PANEL SCHEDULES - 1st FLOOR

Sheet reference number
D4-EP606
Sheet of

Cont'd No.

7/16/2026 13:10:11

W9126G26RA028-0003

PANEL: 1KP27 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: KITCHEN 138 | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: | VOLTAGE: 208/120 | FAULT CURRENT(A): 6409
225A Cu BUS, MAIN LUG ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		R-143, 153, 155	RECEPT	1080	1	1980			2	900	RECEPT	R-144 - 148		20	1
20	1		R-123, 152, 153	RECEPT	1080	3		1980		4	900	RECEPT	R-152, 155, 156		20	1
20	1		R-157, 158, 160	RECEPT	1080	5			1320	6	240	OTHER	R - 156 - HOSE REEL		20	1
20	3	GFI	K14a - DISPOSER	KITCHEN	937	7	552			8	240	OTHER	R - 149 - HOSE REEL		20	1
""			""		-	9		672		10	360	KITCHEN	K27 - SOILED DISH	GFI	20	1
""			""		-	11			1924	12	3224	KITCHEN	K39b - CABINET HEAT		20	2
20	1	GFI	K33a - HOOD CONDEN	KITCHEN	1801	13	3413			14	-		""		""	
20	1	GFI	K26 - HOOD CONDEN	KITCHEN	1801	15		1801		16	0	SPARE	SPARE		20	1
20	1		R - 138,148,160	RECEPT	540	17			2150	18	3224	KITCHEN	K39c - CABINET HEAT		20	2
20	1	GFI	K24 - HOOD CONDEN	KITCHEN	1801	19	3413			20	-		""		""	
20	1	GFI	K33b - HOOD CONDEN	KITCHEN	1801	21		3598		22	1801	RECEPT	K35 POWER WASHER		20	1
20	3	GFI	K14b - DISPOSER	KITCHEN	937	23			624	24	937	KITCHEN	K21 - POWERWASH		20	3
""			""		-	25	624			26	-		""		""	
""			""		-	27		624		28	-		""		""	
20	1		R - 154 EAST 1	KITCHEN	180	29			492	30	937	KITCHEN	K16 - POT SCRUBBER		20	3
20	1		R - 154 EAST 2	KITCHEN	180	31	492			32	-		""		""	
20	1		R - 154 EAST 3	KITCHEN	180	33		492		34	-		""		""	
20	1		R - 154 EAST 4	KITCHEN	180	35			180	36	0	SPACE	SPARE		20	1
20	1		R - 154 EAST 5	KITCHEN	180	37	180			38	0	SPACE	SPARE		20	1
20	1		R - 154 EAST 6	KITCHEN	180	39		180		40	0	SPACE	SPARE		20	1
20	1		K89 - ICE MAKER	KITCHEN	1405	41			1405	42	0	SPACE	SPARE		20	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	28.08	88.7	* A-N	10646.3	88.7	CONNECTED	28.08
TOTAL DEMAND	20.77	64.1	* B-N	9341.1	77.8	DEMAND	20.77
TOTAL DESIGN	20.77	64.1	* C-N	8090.4	67.4	DESIGN	20.77

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1KP28 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: KITCHEN 138 | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: B-1KDP2 | VOLTAGE: 208/120 | FAULT CURRENT(A): 6536
225A Cu BUS, MAIN LUG ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1	GFI	K40a - HOOD LIGHTS	KITCHEN	1801	1	1801			2	0	SPARE	SPARE		20	1
20	1		K69f - COMBI-STEAMx2	KITCHEN	901	3		2702		4	1801	KITCHEN	K63B - CTROL PANEL	GFI	20	1
0	1		SHUNT TRIP	OTHER	0	5			1801	6	1801	KITCHEN	K63A - FIRE SUPPRESS		20	1
20	1		K54a - OVEN STEAMER	KITCHEN	1848	7	2448			8	600	KITCHEN	K41a - KETTLE STEAM		20	1
0	1		SHUNT TRIP	OTHER	0	9		0		10	0	OTHER	SHUNT TRIP		0	1
20	1		K58a - GRIDDLE GAS	KITCHEN	120	11			721	12	600	KITCHEN	K41b - KETTLE STEAM		20	1
0	1		SHUNT TRIP	OTHER	0	13	0			14	0	OTHER	SHUNT TRIP		0	1
20	1		SPARE	SPARE	0	15		1848		16	1848	KITCHEN	K54b - OVEN STEAMER		20	1
20	1		K58b - GRIDDLE GAS	KITCHEN	120	17			120	18	0	OTHER	SHUNT TRIP		0	1
0	1		SHUNT TRIP	OTHER	0	19	1848			20	1848	KITCHEN	K54c - OVEN STEAMER		20	1
20	1		K40c - HOOD EXHAUST	KITCHEN	1801	21		1801		22	0	OTHER	SHUNT TRIP		0	1
20	1		K48b - GRIDDLE GAS	KITCHEN	120	23			120	24	0	SPARE	SPARE		20	1
0	1		SHUNT TRIP	OTHER	0	25	0			26	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	27		1800		28	1800	KITCHEN	K51a - DROP CORD		20	1
20	1	GFI	K40B - CTROL PANEL	KITCHEN	1801	29			3601	30	1800	KITCHEN	K51b - DROP CORD		20	1
20	1		SPARE	SPARE	0	31	1800			32	1800	KITCHEN	K51c - DROP CORD		20	1
20	1		K48a - GRIDDLE GAS	KITCHEN	120	33		1920		34	1800	KITCHEN	K51d - DROP CORD		20	1
0	1		SHUNT TRIP	OTHER	0	35			0	36	0	SPARE	SPARE		20	1
20	1		K41c - KETTLE STEAM	KITCHEN	600	37	2402			38	1801	KITCHEN	K63b - HOOD EXHAUST	GFI	20	1
0	1		SHUNT TRIP	OTHER	0	39		0		40	0	SPARE	SPARE		20	1
20	1	GFI	K40b - HOOD LIGHTS	KITCHEN	1801	41			3603	42	1801	KITCHEN	K63a - HOOD LIGHTS	GFI	20	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	30.34	85.8	* A-N	10299.6	85.8	CONNECTED	30.34
TOTAL DEMAND	19.72	55.7	* B-N	10071.4	83.9	DEMAND	19.72
TOTAL DESIGN	19.72	55.7	* C-N	9966.0	83.0	DESIGN	19.72

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1KP29 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: KITCHEN 138 | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: | VOLTAGE: 208/120 | FAULT CURRENT(A): 6668
225A Cu BUS, MAIN LUG ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		SPARE	SPARE	0	1	1801			2	1801	KITCHEN	K77C - HOOD UV BULB		20	1
20	1		K68B - CONTROL PANEL	KITCHEN	1801	3		3603		4	1801	KITCHEN	K77B - CONTROL PANEL		20	1
20	1		K68A - FIRE SUPPRESS	KITCHEN	1801	5			3603	6	1801	KITCHEN	K77A - FIRE SUPPRES		20	1
20	1		K69a - COMBI-STEAMx2	KITCHEN	1801	7	1801			8	0	SPARE	SPARE		20	1
0	1		SHUNT TRIP	OTHER	0	9		1801		10	1801	KITCHEN	K73a - TILT SKILLET		20	1
20	1		K69b - COMBI-STEAMx2	KITCHEN	901	11			901	12	0	OTHER	SHUNT TRIP		0	1
0	1		SHUNT TRIP	OTHER	0	13	1801			14	1801	KITCHEN	K73b - TILT SKILLET		20	1
20	1		K69c - COMBI-STEAMx2	KITCHEN	901	15		901		16	0	OTHER	SHUNT TRIP		0	1
0	1		SHUNT TRIP	OTHER	0	17			1801	18	1801	KITCHEN	K73c - TILT SKILLET		20	1
20	1		K69d - COMBI-STEAMx2	KITCHEN	901	19	901			20	0	OTHER	SHUNT TRIP		0	1
0	1		SHUNT TRIP	OTHER	0	21		1801		22	1801	KITCHEN	K73d - TILT SKILLET		20	1
20	1		K69e - COMBI-STEAMx2	KITCHEN	901	23			901	24	0	OTHER	SHUNT TRIP		0	1
0	1		SHUNT TRIP	OTHER	0	25	600			26	600	KITCHEN	K76 - KETTLE STEAM		20	1
20	1		SPARE	SPARE	0	27		0		28	0	OTHER	SHUNT TRIP		0	1
20	1		SPARE	SPARE	0	29			0	30	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	31	0			32	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	33		0		34	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	35			0	36	0	SPARE	SPARE		20	1
20	1		K68b - HOOD EXHAUST	KITCHEN	1801	37	3603			38	1801	KITCHEN	K77b - HOOD EXHAUST		20	1
20	1		SPARE	SPARE	0	39		0		40	0	SPARE	SPARE		20	1
20	1		K68a - HOOD EXHAUST	KITCHEN	1801	41			3603	42	1801	KITCHEN	K77a - HOOD EXHAUST		20	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	29.42	90.0	* A-N	10507.8	87.5	CONNECTED	29.42
TOTAL DEMAND	19.12	58.5	* B-N	8106.0	67.5	DEMAND	19.12
TOTAL DESIGN	19.12	58.5	* C-N	10808.0	90.0	DESIGN	19.12

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1KP30 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: KITCHEN 138 | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: | VOLTAGE: 208/120 | FAULT CURRENT(A): 6805
225A Cu BUS, MAIN LUG ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		K170a - PREP TABLE	KITCHEN	360	1	2161			2	1801	KITCHEN	K167e - DISPENSER		20	1
20	2		K171a - CABEINET HT	KITCHEN	3224	3		3413		4	1801	KITCHEN	K167f - DISPENSER		20	1
""			""		-	5			4212	6	5200	KITCHEN	K176a - DROP IN HOT		50	2
20	1		SPARE	SPARE	0	7	2600			8	-		""		""	
20	1		K167a - DISPENSER	KITCHEN	1801	9		2904		10	2205	KITCHEN	K173a - FOOD WARMER		20	2
20	1		K167b - DISPENSER	KITCHEN	1801	11			2904	12	-		""		""	
20	1		K167c - DISPENSER	KITCHEN	1801	13	4401			14	5200	KITCHEN	K176b - DROP IN HOT		50	2
20	1		K167d - DISPENSER	KITCHEN	1801	15		4401		16	-		""		""	
20	1		SPARE	SPARE	0	17			1102	18	2205	KITCHEN	K173b - FOOD WARMER		20	2
20	1		SPARE	SPARE	0	19	1102			20	-		""		""	
20	1		SPARE	SPARE	0	21		1501		22	1501	KITCHEN	K182a - DISPENSER		20	1
20	1		SPARE	SPARE	0	23			1105	24	1105	KITCHEN	K178a - DROP IN COLD		20	1
20	1		SPARE	SPARE	0	25	1777			26	1777	KITCHEN	K184a - TOASTER CONV		20	1
20	1		SPARE	SPARE	0	27		420		28	420	KITCHEN	K183a - WARMER		20	1
20	1		SPARE	SPARE	0	29			1321	30	2642	KITCHEN	K189a - CABINET COOK		20	2
20	1		SPARE	SPARE	0	31	1321			32	-		""		""	
20	1		SPARE	SPARE	0	33		829		34	829	KITCHEN	K186a - DROP IN SOUP		20	1
20	1		SPARE	SPARE	0	35			1105	36	1105	KITCHEN	K192a - DROP IN COLD		20	1
20	1		K206a - COFFEE	KITCHEN	1777	37	2378			38	600	KITCHEN	K201a - MILK		20	1
20	2		K208a - YOGURT	KITCHEN	2496	39		2389		40	1141	KITCHEN	K199a - BEVERAGE		20	1
""			""		-	41			2389	42	1141	KITCHEN	K199b - BEVERAGE		20	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	45.74	132.0	* A-N	15740.9	131.1	CONNECTED	45.74
TOTAL DEMAND	29.73	85.8	* B-N	15857.3	132.0	DEMAND	29.73
TOTAL DESIGN	29.73	85.8	* C-N	14137.4	117.7	DESIGN	29.73

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1KP31 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: KITCHEN 138 | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: | VOLTAGE: 208/120 | FAULT CURRENT(A): 6948
225A Cu BUS, MAIN LUG ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		K210a - FRIDGE REACH	KITCHEN	985	1	2087			2	2205	KITCHEN	K173c - FOOD WARMER		20	2
20	1		K212a - FRIDGE PASS	KITCHEN	1033	3		2135		4	-		""		""	
20	2		K213a - CABINET HEAT	KITCHEN	3120	5			4160	6	5200	KITCHEN	K176c - DROP IN HOT		50	2
""			""		-	7	4160			8	-		""		""	
20	2		K213b - CABINET HEAT	KITCHEN	3120	9		4160		10	5200	KITCHEN	K176d - DROP IN HOT		50	2
""			""		-	11			4160	12	-		""		""	
20	1		K167g - DISPENSER	KITCHEN	1801	13	2904			14	2205	KITCHEN	K173d - FOOD WARMER		20	2
20	1		K167h - DISPENSER	KITCHEN	1801	15		2904		16	-		""		""	
20	1		K167j - DISPENSER	KITCHEN	1801	17			3302	18	1501	KITCHEN	K182b - DISPENSER		20	1
20	1		K215a - PREP TABLE	KITCHEN	360	19	1465			20	1105	KITCHEN	K178b - DROP IN COLD		20	1
20	1		SPARE	SPARE	0	21		1777		22	1777	KITCHEN	K184b - TOASTER		20	1
20	1		SPARE	SPARE	0	23			420	24	420	KITCHEN	K183b - WARMER		20	1
20	1		SPARE	SPARE	0	25	1321			26	2642	KITCHEN	K189b - CABINET COOK		20	2
20	1		SPARE	SPARE	0	27		1321		28	-		""		""	
20	1		SPARE	SPARE	0	29			829	30	829	KITCHEN	K186b - DROP IN SOUP		20	1
20	1		SPARE	SPARE	0	31	1105			32	1105	KITCHEN	K192b - DROP IN COLD		20	1
20	1		SPARE	SPARE	0	33		600		34	600	KITCHEN	K201b - MILK		20	1
20	1		SPARE	SPARE	0	35			1141	36	1141	KITCHEN	K199c - BEVERAGE		20	1
0	1		SPACE	SPACE	0	37	1141			38	1141	KITCHEN	K199d - BEVERAGE		20	1
0	1		SPACE	SPACE	0	39		1777		40	1777	KITCHEN	K206b - COFFEE		20	1
0	1		SPACE	SPACE	0	41			0	42	0	SPACE	SPACE		0	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	42.87	122.2	* A-N	14182.1	118.1	CONNECTED	42.87
TOTAL DEMAND	27.86	79.4	* B-N	14674.8	122.2	DEMAND	27.86
TOTAL DESIGN	27.86	79.4	* C-N	14012.2	116.7	DESIGN	27.86

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1KP32 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: KITCHEN 138 | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: | VOLTAGE: 208/120 | FAULT CURRENT(A): 6948
225A Cu BUS, MAIN LUG ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		K220a - 'L' DISHTBL	KITCHEN	360	1	2762			2	2402	KITCHEN	K234a - TRAY ACCUM		35	1
20	1		K223a - TABLE	KITCHEN	360	3		360		4	0	SPARE	SPARE		20	1
20	1		K223b - TABLE	KITCHEN	360	5			2161	6	1801	KITCHEN	K241a HOOD	GFI	20	1
20	1		K228a - POWER WASH	KITCHEN	1801	7	1801			8	0	SPARE	SPARE		20	1
20	3	GFI	K232a - DISPOSER	KITCHEN	1765	9		588		10	0	SPARE	SPARE		20	1
""			""		-	11			588	12	0	SPARE	SPARE		20	1
""			""		-	13	588			14	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	15		0		16	0	SPARE	SPARE		20	1
0	1		SPACE	SPACE	0	17			0	18	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	19	0			20	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	21		0		22	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	23			0	24	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	25	0			26	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	27		0		28	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	29			0	30	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	31	0			32	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	33		0		34	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	35			0	36	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	37	0			38	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	39		0		40	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	41			0	42	0	SPACE	SPACE		0	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	8.85	42.9	* A-N	5151.5	42.9	CONNECTED	8.85
TOTAL DEMAND	5.75	27.9	* B-N	948.4	7.9	DEMAND	5.75
TOTAL DESIGN	5.75	27.9	* C-N	2749.8	22.9	DESIGN	5.75

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER
THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Solicitation No.: W912GG24A030
Contract No.
Dwn by: J. CHAMPION
Reviewed by: K. STANLEY
Submitted by: C. LANDUM
File name:
Plot date: Y-M-DD H:M:S
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH CONTRACTORS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX , WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI:S220527

ELECTRICAL PANEL SCHEDULES - 1st FLOOR

1KP27	1KP28
1KP29	1KP30
1KP31	1KP32
-	-

Sheet reference number
D4-EP608
Sheet of

Cont No.

7/16/2026 13:10:12

PANEL: 1KP41 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 400
LOCATION: KITCHEN | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 35000
FED FROM: | VOLTAGE: 480/277 | FAULT CURRENT(A): 22145
400A Cu BUS, MAIN LUGS ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
100	3	GFI	K242b WAREWASH	KITCHEN	57781	1	30152			2	32673	KITCHEN	K242Aa BLOWER	GFI	60	3
"			"		–	3		30152		4	–		"		"	
"			"		–	5			30152	6	–		"		"	
60	3	GRI	K242Ab BLOWER	KITCHEN	32673	7	10891			8	0	SPARE	SPARE		60	3
"			"		–	9		10891		10	–		"		"	
"			"		–	11			10891	12	–		"		"	
100	3	GFI	K242a WAREWASH	KITCHEN	57781	13	19260			14	0	SPARE	SPARE		60	3
"			"		–	15		19260		16	–		"		"	
"			"		–	17			19260	18	–		"		"	
0	1		SPACE	SPACE	0	19	0			20	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	21		0		22	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	23			0	24	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	25	0			26	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	27		0		28	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	29			0	30	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	31	0			32	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	33		0		34	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	35			0	36	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	37	0			38	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	39		0		40	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	41			0	42	0	SPACE	SPACE		0	1

	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
ALL CONNECTED							
TOTAL CONNECTED	180.91	217.6	* A-N	60303.1	217.6	CONNECTED	180.91
TOTAL DEMAND	117.59	141.4	* B-N	60303.1	217.6	DEMAND	117.59
TOTAL DESIGN	117.59	141.4	* C-N	60303.1	217.6	DESIGN	117.59

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1LP41 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): BKR | CONTINUOUS(A): 225
LOCATION: ELEC 132 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 35000
FED FROM: B-MSB | VOLTAGE: 480/277 | FAULT CURRENT(A): 12890
225A Cu BUS, 225A/3P MAIN CB | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		L-SERVE LINE 1/2	LIGHTIN	1056	1	1944			2	888	LIGHTIN	L - WAREWASH E/W		20	1
20	1		L-SERVE LINE 3/4	LIGHTIN	1056	3		2758		4	1702	LIGHTIN	L - VEG PREP/PREP		20	1
20	1		L-COORIDORS/LOBBY	LIGHTIN	524	5			2226	6	1702	LIGHTIN	L - POT WSH/SERVE LN		20	1
20	1		L - EXTERIOR	LIGHTIN	1229	7	2339			8	1110	LIGHTIN	L - DRY CLNR XCHANGE		20	1
20	1		L- SEATING EAST	LIGHTIN	732	9		1332		10	600	LIGHTIN	L - DRY STORAGE		20	1
20	1		L- SEATING WEST	LIGHTIN	732	11			732	12	0	SPARE	SPARE		20	1
20	1		L - DOCK/COLUMNS	LIGHTIN	321	13	1174			14	853	LIGHTIN	L - 128-132		20	1
20	1		L - 169/170	LIGHTIN	200	15		1172		16	972	LIGHTIN	L - 133-145		20	1
20	1		L - 112-118	LIGHTIN	794	17			1088	18	294	LIGHTIN	L - STAIRWELL A1		20	1
20	1		L - 146-151	LIGHTIN	788	19	1082			20	294	LIGHTIN	L - STAIRWELL B1		20	1
20	1		L - YARD / STREET	LIGHTIN	650	21		964		22	314	LIGHTIN	L - STAIRWELL C1		20	1
20	1		L-ELEVATOR MECH RM	LIGHTIN	19	23			333	24	314	LIGHTIN	L - STAIRWELL D1		20	1
20	1		L-ELEVATOR	LIGHTIN	152	25	1076			26	924	LIGHTIN	L - CRAWL SPACE		20	1
20	1		SPARE	SPARE	0	27		1134		28	1134	LIGHTIN	L - CRAWL SPACE		20	1
20	1		SPARE	SPARE	0	29			0	30	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	31	0			32	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	33		0		34	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	35			0	36	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	37	0			38	0	OTHER	SPD		60	3
20	1		SPARE	SPARE	0	39		0		40	–		"		"	
20	1		SPARE	SPARE	0	41			0	42	–		"		"	

	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
ALL CONNECTED							
TOTAL CONNECTED	19.35	27.5	* A-N	7615.0	27.5	CONNECTED	19.35
TOTAL DEMAND	19.35	27.5	* B-N	7360.0	26.6	DEMAND	19.35
TOTAL DESIGN	24.19	34.3	* C-N	4379.0	15.8	DESIGN	24.19

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.
NOTE 2: CONTRACTOR SHALL COORDINATE CIRCUIT BREAKER AND CONDUCTOR SIZE WITH SPD MANUFACTURER RECOMMENDATIONS. PROVIDE 4#6AWG + #6AWG GROUND, MINIMUM.

PANEL: 1MP22 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): BKR | CONTINUOUS(A): 150
LOCATION: MAIN ELEC 151 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: F-1KP27 | VOLTAGE: 208/120 | FAULT CURRENT(A): 3507
150A Cu BUS, 150A/3P MAIN CB | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		MECH CONTROLS	OTHER	1201	1	2101			2	900	RECEPT	R-151		20	1
30	1		FPVAV-D4-1C	MOTORS	1657	3		2735		4	1080	RECEPT	R-199, 150		20	1
30	1		FPVAV-D4-1D	MOTORS	1657	5			2882	6	1225	MOTORS	AD-D4-3		20	1
30	1		SP-D4-05	MOTORS	1657	7	2882			8	1225	MOTORS	AD-D4-4		20	1
35	1		SP-D4-02	MOTORS	1921	9		3146		10	1225	MOTORS	AD-D4-5		20	1
35	1		SP-D4-04	MOTORS	1921	11			3146	12	1225	MOTORS	AD-D4-6		20	1
20	1		SP-D4-03	MOTORS	1657	13	1657			14	0	SPARE	SPARE		20	1
20	1		D4-VAV-1A THRU 1	OTHER	721	15		1944		16	1225	MOTORS	AD-D4-7		20	1
20	1		D4-VAV-2I+4J to 4P	OTHER	961	17			1201	18	240	OTHER	R - CRAWL - OIL SYS		20	1
20	1		HANDFREE SINK	OTHER	600	19	600			20	0	MOTORS	SPARE		20	3
20	1		HANDFREE SINK	OTHER	600	21		600		22	–		"		"	
20	1		HANDFREE SINK	OTHER	600	23			600	24	–		"		"	
20	1		HANDFREE SINK	OTHER	600	25	600			26	0	SPACE	SPACE		0	1
20	1		HANDFREE SINK	OTHER	600	27		600		28	0	SPACE	SPACE		0	1
20	1		SP-D4-01	MOTORS	1177	29			1177	30	0	SPACE	SPACE		0	1
30	1		SP-D4-06	MOTORS	1657	31	2668			32	1150	HAND DR	R-142A		20	1
20	1		R-141A	HAND DR	1150	33		1150		34	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	35			0	36	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	37	0			38	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	39		0		40	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	41			0	42	0	SPACE	SPACE		0	1

	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
ALL CONNECTED							
TOTAL CONNECTED	29.42	87.0	* A-N	10451.7	87.0	CONNECTED	29.42
TOTAL DEMAND	28.46	83.0	* B-N	9983.9	83.1	DEMAND	28.46
TOTAL DESIGN	33.31	95.9	* C-N	9001.0	75.0	DESIGN	33.31

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1KP42 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 400
LOCATION: KITCHEN | DEVICE FAMILY: Bolt On | MOUNTING: Flush | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 35000
FED FROM: B-MSB | VOLTAGE: 480/277 | FAULT CURRENT(A): 28647
400A Cu BUS, MAIN LUGS ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	3		SPARE	SPARE	0	1	0			2	0	SPARE	SPARE	GFI	60	3
"			"		–	3		0		4	–		"		"	
"			"		–	5			0	6	–		"		"	
25	3	GFI	K17Aa - BOOSTER HTR	KITCHEN	13552	7	4517			8	0	SPARE	SPARE	GFI	60	3
"			"		–	9		4517		10	–		"		"	
"			"		–	11			4517	12	–		"		"	
25	3	GFI	K17Ab - BOOSTER HTR	KITCHEN	13552	13	4517			14	0	SPARE	SPARE	GFI	60	3
"			"		–	15		4517		16	–		"		"	
"			"		–	17			4517	18	–		"		"	
60	3	GFI	K17 - RACK CONVEY	KITCHEN	33339	19	16101			20	14965	KITCHEN	K242Ba BOOSTER HEAT	GFI	60	3
"			"		–	21		16101		22	–		"		"	
"			"		–	23			16101	24	–		"		"	
40	3	GFI	K22 - UTENSIL WASH	KITCHEN	23778	25	12914			26	14965	KITCHEN	K242Bb BOOSTER HEAT	GFI	60	3
"			"		–	27		12914		28	–		"		"	
"			"		–	29			12914	30	–		"		"	
25	3		K22A - BOOSTER HTR	KITCHEN	13552	31	4517			32	0	SPACE	SPACE		0	1
"			"		–	33		4517		34	0	SPACE	SPACE		0	1
"			"		–	35			4517	36	0	SPACE	SPACE		0	1
20	3		SPARE	SPARE	0	37	0			38	0	SPACE	SPACE		0	1
"			"		–	39		0		40	0	SPACE	SPACE		0	1
"			"		–	41			0	42	0	SPACE	SPACE		0	1

	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
ALL CONNECTED							
TOTAL CONNECTED	127.70	153.6	* A-N	42566.9	153.6	CONNECTED	127.70
TOTAL DEMAND	83.01	99.8	* B-N	42566.9	153.6	DEMAND	83.01
TOTAL DESIGN	83.01	99.8	* C-N	42566.9	153.6	DESIGN	83.01

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1MP21 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): BKR | CONTINUOUS(A): 150
LOCATION: MAIN ELEC 151 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: BS-X1MP21 | VOLTAGE: 208/120 | FAULT CURRENT(A): 3587
150A Cu BUS, 150A/3P MAIN CB | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		CP-D4-1	MOTORS	186	1	1411			2	1225	MOTORS	AD-D4-1		20	1
20	1		CUH-D4-4,5,6	MOTORS	360	3		1585		4	1225	MOTORS	AD-D4-2		20	1
20	1		FPVAV-D4-1A	MOTORS	1177	5			2402	6	1225	MOTORS	AD-D4-8		20	1
20	1		FPVAV-D4-1B	MOTORS	1177	7	2402			8	1225	MOTORS	AD-D4-9		20	1
30	1		FPVAV-D4-1F	MOTORS	1177	9		2402		10	1225	MOTORS	AD-D4-10		20	1
20	1		FPVAV-D4-1E	MOTORS	865	11			865	12	0	SPARE	SPARE		20	1
20	1		FPVAV-D4-1G	MOTORS	865	13	865			14	0	SPARE	SPARE		20	1
30	1		FPVAV-D4-1H	MOTORS	1177	15		2354		16	1177	MOTORS	EF-D4-1E		20	1
30	1		FPVAV-D4-1I-E	MOTORS	1177	17			1873	18	697	MOTORS	EF-D4-1F		20	1
30	1		FPVAV-D4-1J	MOTORS	1177	19	1321			20	144	MOTORS	EF-D4-1K		20	1
20	1		FPVAV-D4-1K	MOTORS	865	21		1201		22	336	MOTORS	FCU-D4-1L		20	1
30	1		FPVAV-D4-1L	MOTORS	1177	23			2375	24	1201	OTHER	O-139, 148 DOCK SYST		20	1
20	1		FPVAV-D4-1M	MOTORS	865	25	2090			26	1225	MOTORS	AD-D4-11		20	1
20	1		MECH CONTROLS	MOTORS	1200	27		2425		28	1225	MOTORS	AD-D4-12		20	1
30	1		FPVAV-D4-1I-W	MOTORS	1177	29			1873	30	697	MOTORS	F-D4-1K		20	1
20	1		SPARE	SPARE	0	31	600			32	600	OTHER	BUZZER		20	1
20	1		SPARE	SPARE	0	33		0		34	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	35			0	36	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	37	0			38	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	39		0		40	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	41			0	42	0	SPACE	SPACE		0	1

	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
ALL CONNECTED							
TOTAL CONNECTED	28.04	83.0	* A-N	8686.2	72.3	CONNECTED	28.04
TOTAL DEMAND	28.04	83.0	* B-N	9966.5	83.0	DEMAND	28.04
TOTAL DESIGN	34.60	103.7	* C-N	9386.8	78.2	DESIGN	34.60

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 1MP41 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: MAIN ELEC 151 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 65000
FED FROM: B-MSB | VOLTAGE: 480/277 | FAULT CURRENT(A): 33278
225A Cu BUS, MAIN LUGS ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
15	3		BCU-D4-1B	MOTORS	1746	1	2688			2	6319	MOTORS	EF-D4-1A		20	3
"			"		–	3		2688		4	–		"		"	
"			"		–	5			2688	6	–		"		"	
15	3		BCU-D4-1C	MOTORS	3991	7	3436			8	6319	MOTORS	EF-D4-1B		20	3
"			"		–	9		3436		10	–		"		"	
"			"		–	11			3436	12	–		"		"	
20	3		SPARE	SPARE	0	13	2106			14	6319	MOTORS	EF-D4-1C		20	3
"			"		–	15		2106		16	–		"		"	
"			"		–	17			2106	18	–		"		"	
20	3		SPARE	SPARE	0	19	2106			20	6319	MOTORS	EF-D4-1D		20	3
"			"		–	21		2106		22	–		"		"	
"			"		–	23			2106	24	–		"		"	
0	1		SPACE	SPACE	0	25	0			26	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	27		0		28	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	29			0	30	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	31	0			32	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	33		0		34	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	35			0	36	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	37	8686			38	28039	NONE	FP-X1MP21		70	3
0	1		SPACE	SPACE	0	39		9966		40	–		"		"	
0	1		SPACE	SPACE	0	41			9387	42	–		"		"	

	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
ALL CONNECTED							
TOTAL CONNECTED	59.05	73.3	* A-N	19023.0	68.6	CONNECTED	59.05
TOTAL DEMAND	59.05	73.3	* B-N	20303.4	73.3	DEMAND	59.05
TOTAL DESIGN	73.36	91.6	* C-N	19723.4	71.2	DESIGN	73.36

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

1KP41	1KP42
-	-
1LP41	1MP21
1MP22	1MP41

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER
THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Rev.
Date: MAY 2025
Solicitation No.: V91126G26RA020
Contract No.:
File name:
Plot date: Fri 08-01-16 9:15
Plot scale: 1:1

Designed by: D. HARRINGTON
Drawn by: J. CHAMPION
Reviewed by: K. STRINGER
Approved by: C. LANGUM

MERRICK®

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, PROJECT DESIGN FORT WORTH, TEXAS

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220627

ELECTRICAL PANEL SCHEDULES - 1st FLOOR

Sheet reference number
D4-EP609
Sheet of

Contr No.

7/16/2026 13:10:13

PANEL: 2EP21 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): BKR | CONTINUOUS(A): 100
LOCATION: ELEC 232 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: | VOLTAGE: 208/120 | FAULT CURRENT(A): 1851
100A Cu BUS, 100A/3P MAIN CB | 200% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
30	1		R - 233 RACK A01	RECEPT	2500	1	3220			2	720	RECEPT	R - 233 CATV		20	1
20	1		R - 233 RACK A01	RECEPT	1000	3		2440		4	1440	RECEPT	R - 233		20	1
30	1		R - 233 RACK A02	RECEPT	2500	5			3940	6	1440	RECEPT	R - 233		20	1
20	1		R - 233 RACK A02	RECEPT	1000	7	1000			8	0	SPARE	SPARE		20	1
30	1		R - 233 RACK B01	RECEPT	2500	9		2500		10	0	SPARE	SPARE		20	1
20	1		R - 233 RACK B01	RECEPT	1000	11			1000	12	0	SPARE	SPARE		20	1
30	1		R - 233 RACK B02	RECEPT	2500	13	2500			14	0	SPARE	SPARE		20	1
20	1		R - 233 RACK B02	RECEPT	1000	15		1000		16	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	17			0	18	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	19	0			20	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	21		0		22	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	23			0	24	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	25	0			26	0	OTHER	SPD	NOTE 2	60	3
20	1		SPARE	SPARE	0	27		0		28	-		""		""	
20	1		SPARE	SPARE	0	29			0	30	-		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	17.60	56.0	* A-N	6720.0	56.0	CONNECTED	17.60
TOTAL DEMAND	13.80	41.9	* B-N	5940.0	49.5	DEMAND	13.80
TOTAL DESIGN	13.80	41.9	* C-N	4940.0	41.1	DESIGN	13.80

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.
NOTE 2: CONTRACTOR SHALL COORDINATE CIRCUIT BREAKER AND CONDUCTOR SIZE WITH SPD MANUFACTURER RECOMMENDATIONS. PROVIDE 4#6AWG + #6AWG GROUND, MINIMUM.

PANEL: 2MP21 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): BKR | CONTINUOUS(A): 100
LOCATION: COMM 233 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: BS-X2MP21 | VOLTAGE: 208/120 | FAULT CURRENT(A): 1690
100A Cu BUS, 100A/3P MAIN CB | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		R-230	RECEPT	600	1	1200			2	600	OTHER	O-227 MECH CONT.		20	1
20	1		R-229	RECEPT	480	3		1080		4	600	OTHER	O-201C MECH CONT.		20	1
20	1		M-226 CANTEEN	MOTORS	480	5			1081	6	600	MOTORS	M-229 EWC	GFI BREAKER	20	1
20	1		SPARE	SPARE	0	7	540			8	540	RECEPT	R-230		20	1
20	1		SPARE	SPARE	0	9		0		10	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	11			0	12	0	SPARE	SPARE		20	1
20	1		R-229	RECEPT	720	13	720			14	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	15		0		16	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	17			0	18	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	19	0			20	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	21		0		22	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	23			0	24	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	25	0			26	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	27		0		28	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	29			0	30	0	SPACE	SPACE		0	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	4.62	20.5	* A-N	2460.4	20.5	CONNECTED	4.62
TOTAL DEMAND	4.62	20.5	* B-N	1080.4	9.0	DEMAND	4.62
TOTAL DESIGN	4.89	20.5	* C-N	1080.8	9.0	DESIGN	4.89

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 2MP23 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): BKR | CONTINUOUS(A): 100
LOCATION: MECH 238 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: BS-X2MP23 | VOLTAGE: 208/120 | FAULT CURRENT(A): 1859
100A Cu BUS, 100A/3P MAIN CB | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		R-239	RECEPT	720	1	1080			2	360	OTHER	ERV-D4-1 CTRL / LTG		20	1
20	1		R-238	RECEPT	900	3		1260		4	360	OTHER	AHU-D4-1 CTRL / LTG		20	1
20	1		R-236	RECEPT	360	5			720	6	360	OTHER	AHU-D4-2 CTRL / LTG		20	1
20	1		SPARE	SPARE	0	7	360			8	360	OTHER	AHU-D4-3 CTRL / LTG		20	1
20	1		O-239 MECH CONT.	OTHER	600	9		960		10	360	OTHER	AHU-D4-4 CTRL / LTG		20	1
20	1		O-238 MECH CONT.	OTHER	600	11			960	12	360	OTHER	MUA-D4-1 CTRL / LTG		20	1
20	1		R-ROOF	RECEPT	360	13	888			14	528	MOTORS	EF-D4-2B		20	1
20	1		O-ROOF MECH CONT.	OTHER	600	15		600		16	0	SPACE	SPACE		0	1
15	1		FCU-D4-2C	OTHER	729	17			729	18	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	19	0			20	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	21		0		22	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	23			0	24	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	25	0			26	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	27		0		28	0	SPACE	SPACE		0	1
20	1		SPARE	SPARE	0	29			0	30	0	SPACE	SPACE		0	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	7.56	23.5	* A-N	2326.8	19.4	CONNECTED	7.56
TOTAL DEMAND	7.56	23.5	* B-N	2820.0	23.5	DEMAND	7.56
TOTAL DESIGN	7.69	23.5	* C-N	2408.9	20.1	DESIGN	7.69

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 2MP42 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 125
LOCATION: ELEC 213 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: B-MSB | VOLTAGE: 480/277 | FAULT CURRENT(A): 8003
125A Cu BUS, MAIN LUGS ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
15	3		BCU-D4-2F	MOTORS	2494	1	831			2	0	SPARE	SPARE		20	1
""			""		-	3		831		4	0	SPARE	SPARE		20	1
""			""		-	5			831	6	0	SPARE	SPARE		20	1
15	3		BCU-D4-2E	MOTORS	2494	7	831			8	0	SPARE	SPARE		20	1
""			""		-	9		831		10	0	SPARE	SPARE		20	1
""			""		-	11			831	12	0	SPARE	SPARE		20	1
15	3		BCU-D4-2G	MOTORS	2494	13	831			14	0	SPARE	SPARE		20	1
""			""		-	15		831		16	0	SPARE	SPARE		20	1
""			""		-	17			831	18	0	SPARE	SPARE		20	1
15	3		BCU-D4-2H	MOTORS	2494	19	831			20	0	SPARE	SPARE		20	1
""			""		-	21		831		22	0	SPARE	SPARE		20	1
""			""		-	23			831	24	0	SPARE	SPARE		20	1
15	3		BCU-D4-2M	MOTORS	2494	25	831			26	0	SPARE	SPARE		20	1
""			""		-	27		831		28	0	SPARE	SPARE		20	1
""			""		-	29			831	30	0	SPARE	SPARE		20	1
15	3		EF-D4-1G	MOTORS	1330	31	443			32	0	SPARE	SPARE		20	1
""			""		-	33		443		34	0	SPARE	SPARE		20	1
""			""		-	35			443	36	0	SPARE	SPARE		20	1
15	3		BCU-D4-1M, 2N	MOTORS	5280	37	3977			38	5581	NONE	FP-X2MP22		50	3
""			""		-	39		3238		40	-		""		""	
""			""		-	41			3643	42	-		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	24.66	30.9	* A-N	8576.1	30.9	CONNECTED	24.66
TOTAL DEMAND	24.66	30.9	* B-N	7837.1	28.3	DEMAND	24.66
TOTAL DESIGN	30.01	37.2	* C-N	8243.4	29.7	DESIGN	30.01

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 2EP41 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 225
LOCATION: ELEC 232 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 22000
FED FROM: B-1EDP | VOLTAGE: 480/277 | FAULT CURRENT(A): 10173
225 Cu BUS, MAIN LUGS ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		SPARE	SPARE	0	1	0			2	0	SPARE	SPARE		20	1
100	1		EL2 LTG INVERTER	LIGHTIN	12520	3		12520		4	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	5			0	6	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	7	0			8	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	9		0		10	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	11			0	12	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	13	0			14	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	15		0		16	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	17			0	18	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	19	0			20	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	21		0		22	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	23			0	24	0	SPARE	SPARE		20	1
0	1		SPACE	SPACE	0	25	0			26	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	27		0		28	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	29			0	30	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	31	0			32	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	33		0		34	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	35			0	36	0	SPACE	SPACE		0	1
50	3		P-X2EP22	NONE	18441	37	15361			38	17600	NONE	F-X2EP21		50	3
""			""		-	39		11520		40	-		""		""	
""			""		-	41			9160	42	-		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	48.51	86.6	* A-N	15360.9	55.4	CONNECTED	69.71
TOTAL DEMAND	36.10	71.9	* B-N	24007.7	86.6	DEMAND	57.31
TOTAL DESIGN	39.22	83.2	* C-N	9160.0	33.1	DESIGN	65.22

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 2MP22 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): BKR | CONTINUOUS(A): 100
LOCATION: ELEC 213 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: BS-X2MP22 | VOLTAGE: 208/120 | FAULT CURRENT(A): 1773
100A Cu BUS, 100A/3P MAIN CB | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		R-218	RECEPT	480	1	1079			2	600	MOTORS	M- 221 EWC	GFI BREAKER	20	1
20	1		R-217	RECEPT	480	3		879		4	400	MOTORS	M- 221 CANTEEN		20	1
20	1		FCU-D4-1G	MOTORS	336	5			1345	6	1009	MOTORS	CUH-D4-1,2,3		20	1
20	1		SPARE	SPARE	0	7	600			8	600	OTHER	O-207B MECH CONT.		20	1
20	1		SPARE	SPARE	0	9		600		10	600	OTHER	O-220 MECH CONT.		20	1
20	1		R-218	RECEPT	540	11			540	12	0	SPARE	SPARE		20	1
20	1		SPARE	SPARE	0	13	540			14	540	RECEPT	R-217		20	1
20	1		SPARE	SPARE	0	15		0		16	0	SPARE	SPARE		20	1
0	1		SPACE	SPACE	0	17			0	18	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	19	0			20	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	21		0		22	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	23			0	24	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	25	0			26	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	27		0		28	0	SPACE	SPACE		0	1
0	1		SPACE	SPACE	0	29			0	30	0	SPACE	SPACE		0	1

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	5.58	18.5	* A-N	2219.2	18.5	CONNECTED	5.58
TOTAL DEMAND	5.58	18.5	* B-N	1479.3	12.3	DEMAND	5.58
TOTAL DESIGN	6.17	19.7	* C-N	1883.5	15.7	DESIGN	6.17

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

PANEL: 2MP41 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 125
LOCATION: ELEC 232 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 10000
FED FROM: | VOLTAGE: 480/277 | FAULT CURRENT(A): 4533
125A BUS, MAIN LUGS ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
20	1		SPARE	SPARE	0	1	831			2	2494	MOTORS	BCU-D4-2A		15	3
20	1		SPARE	SPARE	0	3		831		4	-		""		""	
20	1		SPARE	SPARE	0	5			831	6	-		""		""	
20	1		SPARE	SPARE	0	7	831			8	2494	MOTORS	BCU-D4-2B		15	3
20	1		SPARE	SPARE	0	9		831		10	-		""		""	
20	1		SPARE	SPARE	0	11			831	12	-		""		""	
20	1		SPARE	SPARE	0	13	831			14	2494	MOTORS	BCU-D4-2C		15	3
20	1		SPARE	SPARE	0	15		831		16	-		""		""	
20	1		SPARE	SPARE	0	17			831	18	-		""		""	
20	1		SPARE	SPARE	0	19	831			20	2494	MOTORS	BCU-D4-2D		15	3
20	1		SPARE	SPARE	0	21		831		22	-		""		""	
20	1		SPARE	SPARE	0	23			831	24	-		""		""	
100	3		P-2LP41	NONE	8457	25	4719			26	2494	MOTORS	BCU-D4-2J		15	3
""			""		-	27		3568		28	-		""		""	
""			""		-	29			2630	30	-		""		""	
60	3		FP-X2MP21	NONE	4618	31	2902			32	1330	MOTORS	EF-D4-1H		15	3
""			""		-	33		1523		34	-		""		""	
""			""		-	35			1524	36	-		""		""	
15	3		BCU-D4-1L, 2L	MOTORS	5280	37	1760			38	0	OTHER	SPD	NOTE 2	60	3
""			""		-	39		1760		40	-		""		""	
""			""		-	41			1760	42	-		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	32.05	45.7	* A-N	12675.8	45.7	CONNECTED	32.05
TOTAL DEMAND	32.05	45.7	* B-N	10152.8	36.6	DEMAND	32.05
TOTAL DESIGN	39.17	55.0	* C-N	9223.2	33.3	DESIGN	39.17

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.
NOTE 2: CIRCUIT BREAKER AND CONDUCTOR SIZE PER SPD MANUFACTURER (4#6AWG + #6AWG GROUND, MIN)

PANEL: 2MP43 | OC DEVICE TYPE: Breaker | ENCLOSURE: NEMA 1 | MAINS(A): MLO | CONTINUOUS(A): 400
LOCATION: MECH 238 | DEVICE FAMILY: Bolt On | MOUNTING: Surface | WIRING: 3-Phase 4-Wire | BUS SC RATING(A) 42000
FED FROM: B-MSB | VOLTAGE: 480/277 | FAULT CURRENT(A): 21218
400A Cu BUS, MAIN LUGS ONLY | 100% RATED NEUTRAL

OC AMPS	P	NOTES	DESCRIPTION	DEMAND CODE	VA	CKT	PHASE LOADS VA A	B	C	CKT	VA	DEMAND CODE	DESCRIPTION	NOTES	OC AMPS	P
50	3		ERV-D4-1 S1	MOTORS	17459	1	8868			2	9145	MOTORS	ERV-D4-1 E1		30	3
""			""		-	3		8868		4	-		""		""	
""			""		-	5			8868	6	-		""		""	
50	3		ERV-D4-1 S2	MOTORS	17459	7	8868			8	9145	MOTORS	ERV-D4-1 E2		30	3
""			""		-	9		8868		10	-		""		""	
""			""		-	11			8868	12	-		""		""	
70	3		ERV-D4-3	MOTORS	39700	13	26467			14	39700	MOTORS	ERV-D4-2		70	3
""			""		-	15		26467		16	-		""		""	
""			""		-	17			26467	18	-		""		""	
30	3		SPARE	SPARE	1499	19	499			20	1496	MOTORS	ERV-D4-1 REC		20	3
""			""		-	21		499		22	-		""		""	
""			""		-	23			499	24	-		""		""	
60	3		AHU-D4-1	MOTORS	22447	25	13302			26	17459	MOTORS	AHU-D4-3		50	3
""			""		-	27		13302		28	-		""		""	
""			""		-	29			13302	30	-		""		""	
50	3		AHU-D4-2 (A)	MOTORS	17459	31	8868			32	9145	MOTORS	AHU-D4-4		25	3
""			""		-	33		8868		34	-		""		""	
""			""		-	35			8868	36	-		""		""	
50	3		AHU-D4-2 (B)	MOTORS	17459	37	8143			38	7555	NONE	FP-X2MP23		50	3
""			""		-	39		8632		40	-		""		""	
""			""		-	41			8222	42	-		""		""	

ALL CONNECTED	KVA	MAX PH AMPS	* PHASE TOTALS	VA	AMPS	BUS TOTALS	KVA
TOTAL CONNECTED	225.61	272.4	* A-N	75013.1	270.7	CONNECTED	225.61
TOTAL DEMAND	225.61	272.4	* B-N	75501.0	272.4	DEMAND	225.61
TOTAL DESIGN	280.26	338.0	* C-N	75091.4	271.0	DESIGN	280.26

NOTE 1: THE "BUS SC RATING(A)" DENOTES MINIMUM EQUIPMENT AIC RATING INCLUDING ALL PROTECTION DEVICES.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER
THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON | Date: MAY 2025 | Rev.
Dwn by: J. CHAMPION | Solicitation No.: W912DQ23RA020
Reviewed by: K. BENNETT | Contract No.
Submitted by: C. LANGUM | File name: | Plot date: | Plot scale: 1:1
MERRICK®
U.S. ARMY ENGINEER DISTRICT, FORT WORTH CONTRACTING DIVISION FORT WORTH, TEXAS
DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS DINING CLASSROOM FACILITY (DCF4)
MPL-S220527
ELECTRICAL PANEL SCHEDULES - 2nd FLOOR

2EP21	2EP41
2MP21	2MP22
2MP23	2MP41
2MP42	2MP43

Sheet reference number
D4-EP611
Sheet of

Cont'd No.

7/16/2026 13:10:15

ELECTRICAL DISTRIBUTION LEGEND

— — - Ex - — —	EXISTING AERIAL PRIMARY
— — -EUx- — —	EXISTING UNDERGROUND PRIMARY
— — -CUx- — —	EXISTING UNDERGROUND TELECOMMUNICATIONS
—— EU ——	UNDERGROUND ELECTRICAL PRIMARY CONCRETE ENCASED DUCT BANK, SIZED AS SHOWN. NEW VERSUS EXISTING CALLED OUT BY KEYED NOTES.
— — - ES - — —	UNDERGROUND ELECTRICAL SECONDARY CONCRETE ENCASED DUCT BANK, SIZED AS SHOWN.
E-1	ELECTRICAL MANHOLE. NUMBER INDICATES MANHOLE NUMBER.
VFI-1	NEW OIL INSULATED VACUUM FAULT INTERRUPTERS SWITCHGEAR. NUMBER INDICATES SWITCHGEAR NUMBER.
S-1	NEW 6OOA, THREE PHASE ABOVE GRADE TERMINATION CABINET. NUMBER INDICATES CABINET NUMBER.
SX	EXISTING 600A, THREE PHASE ABOVE GRADE TERMINATION CABINET SHALL REMAIN.
	NEW 45 FOOT, CLASS 2, WOOD, TERMINATION POLE.
	EXISTING 45 FOOT WOOD POLE SHALL REMAIN.
T-A	NEW THREE PHASE, 13.2 KV DELTA-WYE, PAD-MOUNTED TRANSFORMER. T-A INDICATES TRANSFORMER IDENTIFICATION.
—— E ——	NEW THREE PHASE, FOUR WIRE, 3#336 ACSR AND 1#2/0 NEUTRAL AERIAL PRIMARY, UNLESS OTHERWISE NOTED.
— — EAP - — —	EXISTING THREE PHASE, FOUR WIRE, 3#336 ACSR AND 1#2/0 NEUTRAL AERIAL PRIMARY.
—— FUP ——	FUTURE UNDERGROUND ELECTRICAL PRIMARY CONCRETE ENCASED DUCT BANK
	NEW DOWN GUY.
	NEW DUCT LINE STUB-OUT. SIZED AS INDICATED.
	EXISTING DUCT LINE STUB-OUT. SIZED AS INDICATED.
HH	NEW FIBERGLASS HANDHOLE
E-7-1	NEW ELECTRICAL MANHOLE FOR CIRCUIT 7, SIZED AS SHOWN ON MANHOLE SCHEDULE.
E-7-0	EXISTING ELECTRICAL MANHOLE FOR CIRCUIT 7, SIZED AS SHOWN ON MANHOLE SCHEDULE.
—— CU ——	NEW UNDERGROUND COMMUNICATION LINES. NEW VERSUS EXISTING CALLED OUT BY KEYED NOTES.
	DEMOLITION OF EQUIPMENT SHOWN IN HATCH AREA.
——x——	CHAIN-LINK FENCE.

AREA LIGHTING LEGEND

	EXISTING LIGHT TO BE DEMO'D AND REMOVED.
—— UL ——	NEW UNDERGROUND SECONDARY LINE SIZED AS SHOWN. / = PHASE CONDUCTOR N = NEUTRAL GND = GROUND
HH	NEW HANDHOLE SIZED AS INDICATED.
L10	NEW LED WALKWAY LIGHT ON POLE. L10 NUMBER INDICATES POLE NUMBER.
U L1	NEW FLOOD LIGHT FIXTURE TYPE U ON ROUND STEEL POLE. L1 INDICATES POLE NUMBER.
WA SL-2	NEW LED STREET LIGHT ON 30 FOOT POLE. SL-2 INDICATES STREET LIGHT NUMBER .
WB SL-5	NEW LED STREET LIGHT ON 30 FOOT POLE. SL-5 INDICATES STREET LIGHT NUMBER .
WC SL-8	NEW LED STREET LIGHT ON 29 FOOT POLE MOUNTED ON LOW SECURITY WALL. SL-8 INDICATES STREET LIGHT NUMBER.
Z	NEW LED BOLLARD LIGHT FIXTURE TYPE Z.

MISCELLANEOUS ELECTRICAL SYMBOLS

1	KEYED NOTES
X1	EQUIPMENT CONNECTION, REFER TO APPROPRIATE SCHEDULE FOR ADDITIONAL INFORMATION.

GENERAL NOTES

1. LETTERS SUCH AS "WP" ADJACENT TO ANY SYMBOL INDICATE SPECIAL CONSTRUCTION IS REQUIRED, SEE ABBREVIATIONS SHEET FOR DEFINITIONS.
2. SIZES OF UNDERGROUND WIRE AND CABLE ARE BASED ON COPPER CONDUCTORS. UNDERGROUND ALUMINUM CONDUCTOR IS NOT ACCEPTABLE.
3. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES.
4. ELEVATIONS FOR ELECTRICAL EQUIPMENT ARE SHOWN TO CENTER OF DEVICE OR ENCLOSURE UNLESS NOTED OTHERWISE.
5. NOT ALL SYMBOLS ARE USED ON THIS PROJECT.
6. SEE ELECTRICAL (ATC8, EB2 AND WCP8) DRAWINGS FOR ADDITIONAL ELECTRICAL REQUIREMENTS.
7. COORDINATE WITH OTHER UTILITY PROVIDER BEFORE INSTALLING UNDERGROUND DUCT LINES AND LIGHT POLE FOUNDATIONS TO AVOID OTHER UTILITIES IN THE AREA.
8. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH UFC 3-501-01 ELECTRICAL ENGINEERING, UFC 3-550-01 EXTERIOR ELECTRICAL POWER DISTRIBUTION AND NATIONAL ELECTRICAL CODE (NEC), CPS ENERGY AND NESC.

GENERAL ELECTRICAL REQUIREMENTS

1. VERIFICATION: VERIFY ALL DIMENSIONS, ELEVATIONS, SITE CONDITIONS, AND EQUIPMENT PROVIDED BY OTHER TRADES BEFORE STARTING WORK OR PROCURING ELECTRICAL EQUIPMENT.
2. CONFLICTS: IF CONFLICTS SHOULD OCCUR, THE MORE RESTRICTIVE (INCLUDING SPECIFICATIONS) SHALL TAKE PRECEDENCE.
3. CODES: ALL MATERIALS AND WORK SHALL CONFORM TO THE REQUIREMENTS OF UFC'S, NESC, NFPA AND CPS ENERGY CODES.
4. CONSTRUCTION METHODS AND PROJECT SAFETY: THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED SITE AND DO NOT INDICATE METHODS, PROCEDURES OR SEQUENCE OF CONSTRUCTION.
5. SIMILAR WORK: WHERE CONSTRUCTION DETAILS ARE NOT SHOWN, SUCH DETAILS SHALL BE THE SAME AS FOR SIMILAR WORK SHOWN ON DRAWINGS.
6. PENETRATIONS: REFER TO PROJECT DRAWINGS AND SPECIFICATIONS FOR PENETRATION REQUIREMENTS FOR CONDUIT, CABLE DUCT, SLEEVES, CHASES, ETC.; PROVIDE SMOKE SEALING AND FIRE STOPPING AT ALL FLOORS, SMOKE PARTITIONS AND FIRE RATED WALLS. CONTRACTOR SHALL SUBMIT FOR APPROVAL PENETRATION PLANS FOR ALL ELECTRICAL PENETRATIONS THROUGH STRUCTURAL ITEMS (FLOORS, FOUNDATIONS, ETC.).
7. EXCAVATIONS: LOCATE AND PROTECT UNDERGROUND OR CONCEALED CONDUIT, DUCT BANK, OR OTHER UTILITIES WHERE NEW WORK IS BEING PERFORMED.
8. EQUIPMENT LOADS: EQUIPMENT LOADS SHALL NOT EXCEED THE ALLOWABLE LOADING FOR THE SUPPORTING MEMBERS AND THEIR CONNECTIONS AS NOTED IN THE STRUCTURAL PLANS.
9. DRAWINGS: THE ELECTRICAL DRAWINGS ILLUSTRATE ELECTRICAL EQUIPMENT WITH CONNECTED DUCT LINES AND DESIGN REQUIREMENTS, REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS FOR NON-ELECTRICAL ITEMS WHICH REQUIRE COORDINATION AND SPECIAL PROVISIONS FOR COMPLETE AND OPERATIONAL SYSTEMS.
10. DEVIATION: ANY DEVIATION FROM THE CONTRACT DOCUMENT SET OF ELECTRICAL DRAWINGS AND SPECIFICATIONS SHALL ONLY BE MADE AFTER WRITTEN APPROVAL BY THE CONTRACTING OFFICER.
11. COORDINATION: THE ELECTRICAL PLANS INDICATE ONLY THE APPROXIMATE LOCATION OF OTHER DISCIPLINE'S EQUIPMENT, AS WELL AS THE RELATED ELECTRICAL REQUIREMENTS NECESSARY TO SUPPORT SUCH EQUIPMENT. THE FINAL POSITIONING AND SERVICE INTERCONNECTION OF THESE ITEMS IS DEPENDENT UPON THE EQUIPMENT PROVIDED BY CONTRACTOR AND SHALL BE IN ACCORDANCE WITH ALL RELEVANT BUILDING CODES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WORK BETWEEN SUBCONTRACTORS AND CRAFTS IN THIS REGARD, AND PROVIDING NECESSARY SPACE ALLOCATION AND DIMENSIONS IN A TIMELY MANNER TO ALL PARTIES INVOLVED TO ENSURE PROPER COORDINATION.
12. SCALE: THE ELECTRICAL DRAWINGS ARE SCALED AS INDICATED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EQUIPMENT SIZES, DISTANCES, HEIGHTS TO PROVIDE COMPLETE AND OPERATIONAL SITE ELECTRICAL SYSTEMS.

1

DIVISION OF SCOPE BETWEEN CONTRACTOR AND CPS ENERGY FOR MEDIUM VOLTAGE WORK

FACILITY CONTRACTOR SHALL PROVIDE PAD FOR CPS PROVIDED PAD MOUNTED UTILITY TRANSFORMER, SECONDARY CONDUITS, AND SECONDARY CONDUCTORS. CONTRACTOR SHALL INSTALL TRANSFORMER TAP BOX.

CPS ENERGY SHALL PROVIDE, INSTALL, AND TERMINATE ALL MEDIUM VOLTAGE CABLING. CPS ENERGY SHALL PROVIDE AND INSTALL ALL MEDIUM VOLTAGE EQUIPMENT SUCH AS SWITCHES, VACUUM FAULT INTERRUPTERS, TRANSFORMERS, TERMINATION CABINETS, ETC AND ALL REQUIRED INFRASTRUCTURE UP STREAM OF THE PAD MOUNTED UTILITY TRANSFORMER.

ELECTRICAL ABBREVIATIONS

A	AMPERE
ACSR	ALUMINUM-CONDUCTOR STEEL-REINFORMED CABLE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERES INTERRUPTING CAPACITY
ALUM	ALUMINUM
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BKR	BREAKER
C	CONDUIT
CKT	CONDUIT
CT	CURRENT TRANSFORMER
CU	COPPER
D	DEEP; DEPTH
DEGREE C	DEGREE CENTIGRADE
DIA	DIAMETER
DOD	DEPARTMENT OF DEFENSE
ELEC	ELECTRICAL
EPR	ETHYLENE PROPYLENE RUBBER
EQUIP	EQUIPMENT
EX	EXISTING
FDR	FEEDER
FT	FOOT; FEET
GALV	GALVANIZED
GND	GROUND
HH	HANDHOLE
HPS	HIGH PRESSURE SODIUM
HT	HEIGHT
HZ	HERTZ
kV	KILOVOLTS
kVA	KILOVOLT AMPERES
kcmil	THOUSAND CIRCULAR MILLS
kvaR	KILOVOLT AMPERES REACTIVE
LA	LIGHTNING ARRESTOR
LED	LIGHT EMITTING DIODE
MAX	MAXIMUM
MFR	MANUFACTURER
MIN	MINIMUM
MTD	MOUNTED
MH	METAL HANDLE; MANHOLE
MVA	MEGA - VOLT - AMPERE
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURE'S
NESC	NATIONAL ELECTRICAL SAFETY CODE
NEUT.	NEUTRAL
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
N.O.	NORMALLY OPENED
NTS	NOT TO SCALE
OH	OVERHEAD
P	POLE
PE	PROFESSIONAL ENGINEER
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
RGS	RIGID GALVANIZED STEEL
RUS	RURAL UTILITIES SERVICE
SCH	SCHEDULE
SEC	SECONDARY
SecTER	COOPER TERMINATION CABINET
SL	STREETLIGHT
SPARE	SPARE ITEM OR DEVICE
SWGR	SWITCHGEAR
THWN	NYLON JACKET WIRE
TRANSF.	TRANSFORMER
UF	UNDERGROUND FEEDER
UFC	UNIFIED FACILITIES CRITERIA
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORIES OR UNDERGROUND LIGHTING (SECONDARY LINE)
US	UNDERGROUND SERVICE
USE	UNDERGROUND SERVICE ENTRANCE (CABLE)
V	VOLTS
VFI	COOPER VACUUM FAULT INTERRUPTER SWITCHGEAR
W	WATT
WP	WEATHERPROOF
XFMR	TRANSFORMER
Y	WYE
1/C	ONE CONDUCTOR
<	LESS THAN
>	GREATER THAN
%	PERCENTAGE
#	NUMBER

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED
PROFESSIONAL ENGINEER
THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date	Action	D.O.No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HARRINGTON
Date: MAY 2025
Rev:
Dwn by: L. SMITH
Solicitation No.: W912GCFR0AU20
Reviewed by: K. KAMPSCHROER
Contract No.:
Submitted by: C. LANGUM
File name: DU-5001.dwg
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS

MERRICK®

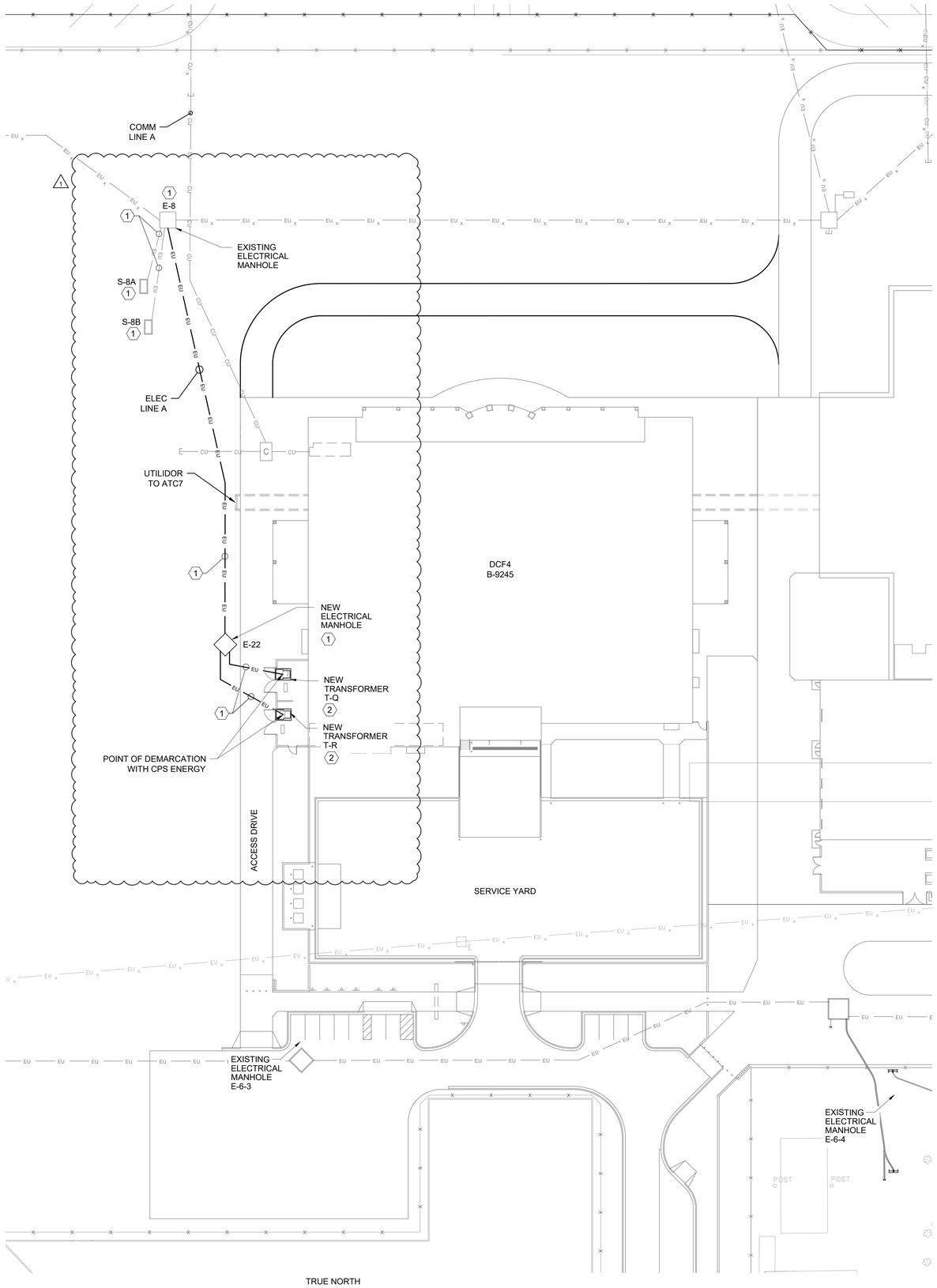
DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPI S220527

ELECTRICAL LEGEND AND ABBREVIATIONS

Sheet reference number
D4-ES001
Sheet of

DESIGN FILE:
Contr No.:



1 ELECTRICAL SITE PLAN
SCALE: 1" = 30'
0 30' 60'

TRUE NORTH

SHEET NOTES

1. REFER TO D4-ES001 FOR SYMBOLS, LEGEND, AND ABBREVIATIONS.
2. REFER TO D4-ES601 FOR SITE ELECTRICAL SCHEDULES.
3. REFER TO D4-ES601 FOR SITE ELECTRICAL ONE-LINE DIAGRAM, TRANSFORMER SIZES, AND ADDITIONAL INFRASTRUCTURE INFORMATION.

KEYNOTES

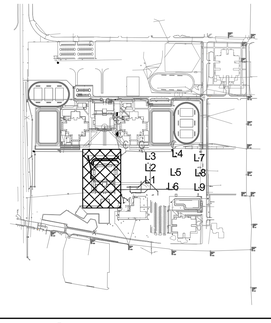
1. CPS DESIGNED, PROVIDED, AND INSTALLED EQUIPMENT, INFRASTRUCTURE, AND CABLING. ROUTING AND LOCATIONS SHOWN ARE SUGGESTED ROUTING AND ASSUMED LOCATIONS OF EXISTING STRUCTURES AND IS PROVIDED FOR INFORMATIONAL USES ONLY.
2. CPS PROVIDED AND INSTALLED TRANSFORMER. CONTRACTOR SHALL PROVIDE PAD AND TAP BOX. REFER TO 3/D4-ES502 AND 1/D4-ES501.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

No.	Description	Date
1	REVISED AWARD	JULY 2026



Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Own by: L. SMITH
Solicitation No.: W9126G25RA030
Reviewed by: M. KERNEY
Contract No.
Submitted by: C. LANGUM
File name: D4-ES101.dwg
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, POWER DISTRIBUTION FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

BRA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
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MPL S220527

ELECTRICAL SITE PLAN

Sheet reference number
D4-ES101
Sheet of

DESIGN FILE:

Cont No:

W912GZ26RA028-0002

Sheet reference number
D4-ES503
Sheet of

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPLS220527

ELECTRICAL DETAILS

U.S. ARMY ENGINEER DISTRICT,
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

Designed by: D. HARRINGTON	Date: MAY 2025	Rev.
Dwn by: L. SMITH	Solicitation No. W912GZ25RA020	
Reviewed by: K. BINKLEY	Contract No.	
Submitted by: C. LANGUM	File name: D4-ES503.dwg Plot date: Plot scale: 1:1	

DRAWING NUMBER: LA 20-0003

No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

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US Army Corps of Engineers
Fort Worth District

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DESIGN FILE:

W912GZ26RA028-0002

Sheet reference number
D4-ES505
Sheet
of

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPLS220527

ELECTRICAL DETAILS

U.S. ARMY ENGINEER DISTRICT,
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

Designed by: D. HARRINGTON	Date: MAY 2025	Rev.
Dwn by: L. SMITH	Solicitation No. W912GZ25RA020	
Reviewed by: K. BINKLEY	Contract No.	
Submitted by: C. LANGUM	File name: D4-ES505.dwg Plot date: Plot scale: 1:1	

DRAWING NUMBER: LA 20-0003

No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

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US Army Corps of Engineers
Fort Worth District

Contr No.
DESIGN FILE:

W9126G26RA028-0002

TRANSFORMER SCHEDULE - TRANSFORMER IS PROVIDED AND INSTALLED BY CPS ENERGY SCHEDULE FOR REFERENCE ONLY									
TRANSFORMER NUMBER	SITE LOCATION	TRANSFORMER SIZE (KVA)	PHASE	PRIMARY VOLTAGE (KV)	SECONDARY VOLTAGE (V)	PRIMARY FUSE (AMPS)	SURGE ARRESTER	INSTALLATION METHOD	FACILITY SERVED
NEW T-Q	DCF4	2000	3	13.2 DELTA	480Y/277	130E BY CPS	10 KV BY CPS	UNDERGROUND PRIMARY FEEDER AND PAD	DCF4 MAIN SWITCHBOARD
NEW T-R	DCF4	2000	3	13.2 DELTA	480Y/277	130E BY CPS	10 KV BY CPS	UNDERGROUND PRIMARY FEEDER AND PAD	DCF4 MAIN SWITCHBOARD

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED
PROFESSIONAL ENGINEER

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No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Drawn by: L. SMITH
Solicitation No.: W9126G25RA020
Reviewed by: K. PRINCETT
Contract No.:
Submitted by: C. LANQUIM
File name: D4-ES601.dwg
Plot date:
Plot scale: 1:1

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DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPLS220527

DCF4 ELECTRICAL
ONE-LINE DIAGRAM

Sheet reference number
D4-ES601
Sheet of

DESIGN FILE:
Contr No.

FIRE ALARM / MASS NOTIFICATION LEGEND

FIRE ALARM / MASS NOTIFICATION ABBREVIATIONS

GTD	GENERATOR TRANSFER DEVICE
A, AMP	AMPERE
ACCP	ALARM CENTER CONTROL PANEL
AF	AMPS FRAME
AFG	ABOVE FINISH GRADE
AFF	ABOVE FINISH FLOOR
AIC	AMPS INTERRUPTING CAPACITY
ASYM	AMPS ASYMMETRICAL
AT	AMPS TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAGE
BLDG	BUILDING
BP/IS	BYPASS/ISOLATION
COMM	COMMUNICATION
CATV	COMMUNIITY ANTENNA TELEVISION
CB	CIRCUIT BREAKER
CKT	CIRCUIT
Cu	COPPER
CONT	CONTINUOUS
C	CONDUIT
CD	CANDELLA
dB	DECIBEL
dBA	DECIBEL, A-WEIGHTED
DISC	DISCONNECT
DWG	DRAWING
EXT	EXTERIOR
ELEC	ELECTRICAL OR ELECTRIC
EMCS	ENERGY MANAGEMENT CONTROL SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
EPO	EMERGENCY POWER OFF
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST (E)	EXISTING
EXP	EXPOSED
FACP	FIRE ALARM CONTROL PANEL
FAEP	FIRE ALARM EXTENDER PANEL
FE	FURNISHED WITH EQUIPMENT
GFGI	GOVERNMENT FURNISHED, GOVERNMENT INSTALLED
GFI, GFCI	GROUND FAULT INTERRUPTER
G, GND, GRD	GROUND
HPF	HIGH POWER FACTOR
IMC	INTERMEDIATE METAL CONDUIT
IG	ISOLATED GROUND
J BOX	JUNCTION BOX
KAIC	KILOAMPS INTERRUPTING CAPACITY
KV	KILOVOLTS
KVA	KILOVOLT AMPERES
KW	KILOWATT
KWH	KILOWATT HOURS
KO	CONTRACTING OFFICER
MNS	MASS NOTIFICATION SYSTEM
N.C.	NORMALLY CLOSED
N, NEUT	NEUTRAL
NEC	NATIONAL ELECTRICAL CODE
N.O.	NORMALLY OPEN
NL	NIGHT LIGHT
PA	PUBLIC ADDRESS
PNL	PANEL
PH	PHASE
PVC	POLYVINYL CHLORIDE
RECP	RECEPTACLE
REF	REFERENCE
REQD	REQUIRED
RGS	RIGID GALVANIZED STEEL
SEC	SECONDARY
SPEC	SPECIFICATIONS
SPD	SURGE PROTECTIVE DEVICE
SPKR	SPEAKER
SSMR	STANDING SEAM METAL ROOF
ST	SHUNT TRIP
STO	SWITH-WITH THERMAL OVERLOAD
SYM	SYMMETRICAL
TEL	TELEPHONE
TGB	TELECOMMUNICATIONS MAIN GROUND BUS
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
V	VOLT
VA	VOLT AMPERE
VFD	VARIABLE FREQUENCY DRIVE
VT	VOLTAGE TRANSFORMER
WP	WEATHER PROOF
XFMR	TRANSFORMER

FIRE ALARM / MASS NOTIFICATION SYMBOLS

FAC	FIRE ALARM COMMUNICATOR
FACP	FIRE ALARM CONTROL PANEL
NGA	NETWORK GRAPHIC ANNUNCIATOR
ACU	AUTONOMOUS CONTROL UNIT (MASS NOTIFICATION PANEL)
FPH	FIRE FIGHTER PHONE CONSOLE
LOC	LOCAL OPERATOR CONSOLE
BATT	SYSTEM BATTERY AND CHARGER
GSM	GENSET MONITOR MODULE
FPC	FIRE PUMP CONTROLLER
	FIRE FIGHTERS PHONE JACK
	FIRE ALARM SYSTEM ANTENNA
EOL	END OF LINE DEVICE

FIRE ALARM / MASS NOTIFICATION INITIATION DEVICES

F	MANUAL FIRE ALARM STATION - 48" A.F.F.
CO^2	MANUAL RELEASE - CARBON DIOXIDE SYSTEM - 48" A.F.F.
CO^2	INITIATING DEVICE, ABORT STATION - CARBON DIOXIDE SYSTEM - 48" A.F.F.
DC	MANUAL RELEASE - DRY CHEMICAL SYSTEM - 48" A.F.F.
DC	INITIATING DEVICE, ABORT STATION - DRY CHEMICAL SYSTEM - 48" A.F.F.
HL	MANUAL RELEASE - HALON SYSTEM - 48" A.F.F.
HL	INITIATING DEVICE, ABORT STATION - HALON SYSTEM - 48" A.F.F.
X	SMOKE DETECTOR P - PHOTOELECTRIC I - IONIZATION AS - AIR SAMPLING
H	HEAT DETECTOR
	FIRE DAMPER
	FIRE / SMOKE DAMPER
X	PHOTOELECTRIC DUCT TYPE SMOKE DETECTOR S - SUPPLY R - RETURN
xx	FLAME DETECTOR xx = DETECTION TYPE
CO	GAS DETECTOR / SENSOR CO = CARBON MONOXIDE
WF	WATERFLOW DETECTOR SWITCH
VS	VALVE SUPERVISORY SWITCH
PIV	POST INDICATOR VALVE
MM	MONITOR MODULE
CM	RELAY CONTROL MODULE
LP	LOW PRESSURE SWITCH
HP	HIGH PRESSURE SWITCH
KB	EMERGENCY KEY BOX
$ K	FIREMANS KEY SWITCH

FIRE ALARM / MASS NOTIFICATION DEVICES

H	NOTIFICATION APPLIANCE, AUDIBLE ONLY - WALL MOUNT - LETTER = H(HORN), C(CHIME) OR B(BELL)
110	NOTIFICATION APPLIANCE, COMBINED AUDIBLE AND VISIBLE WALL MOUNT - HORN WITH - FLASHING LIGHT NUMBER INDICATES CANDELA RATING - 'WP' = WEATHERPROOF
75 WP	NOTIFICATION APPLIANCE, COMBINED AUDIBLE AND VISIBLE - FLASHING LIGHT - NUMBER INDICATES CANDELA RATING, EXTERIOR / WEATHERPROOF
M	MINI HORN NOTIFICATION APPLIANCE WITH 15cd STROBE (SINGLE STATION)
S	WALL SPEAKER (FIRE ALARM OR MASS NOTIFICATION SYSTEM)
30	WALL SPEAKER WITH 'WHITE' STROBE (FIRE ALARM SYSTEM) FLASHING LIGHT - NUMBER INDICATES CANDELA RATING,
S C	FLUSH MOUNTED CEILING SPEAKER - FA / MNS
30cd C	CEILING SPEAKER WITH 'AMBER' STROBE (MASS NOTIFICATION SYSTEM) FLASHING LIGHT - NUMBER INDICATES CANDELA RATING,
30cd C	CEILING SPEAKER WITH DUAL STROBES - 'AMBER' STROBE (MASS NOTIFICATION SYSTEM), AND 'WHITE' STROBE (FIRE ALARM SYSTEM) FLASHING LIGHTS - NUMBER INDICATES CANDELA RATING,
30 WP	VISUAL NOTIFICATION APPLIANCE - FLASHING STROBE, WALL MOUNTED, FIRE ALARM - CLEAR LENS - (WHITE) LIGHT, "WP" INDICATED WEATHER PROOF - NUMBER INDICATES CANDELA RATING
30 WP	VISUAL NOTIFICATION APPLIANCE - FLASHING STROBE, WALL MOUNTED, MASS NOTIFICATION - AMBER LENS - (YELLOW) LIGHT, "WP" INDICATED WEATHER PROOF - NUMBER INDICATES CANDELA RATING
30cd	VISUAL NOTIFICATION APPLIANCE, CEILING MOUNTED - FLASHING STROBE UNIT, FIRE ALARM - CLEAR LENS - NUMBER INDICATES CANDELA RATING
30	VISUAL NOTIFICATION APPLIANCE, CEILING MOUNTED - FLASHING STROBE UNIT, MASS NOTIFICATION - AMBER LENS - NUMBER INDICATES CANDELA RATING
	WALL ALARM BELL (FIRE ALARM SYSTEM)
V	WALL ALARM BELL - VIBRATING (FIRE ALARM SYSTEM)
SS	WALL ALARM BELL - SINGLE STROKE (FIRE ALARM SYSTEM)
RI	REMOTE INDICATING LAMP FOR DETECTOR.
RT	REMOTE DUCT DETECTOR TEST AND INDICATION STATION.

WHERE MORE THAN ONE VISUAL/AUDIO DEVICE ARE COLLOCATED, THE DEVICE SHALL BE ONE DEVICE, INSTALLED IN ONE JUNCTION BOX.

FIRE ALARM / MASS NOTIFICATION HAZARD LEGEND

- LIGHT HAZARD
- ORDINARY HAZARD GROUP 1
- ORDINARY HAZARD GROUP 2
- EXTRA HAZARD GROUP 1
- EXTRA HAZARD GROUP 2

FIRE ALARM / MASS NOTIFICATION GENERAL NOTES

1. REFER TO DETAIL 2/D4-FA602 FOR DEVICE MOUNTING HEIGHTS.
2. REFER TO SHEETS D4-FA600 SERIES FOR FIRE ALARM / MASS NOTIFICATION RISER DIAGRAM.
3. ALL FIRE ALARM CONDUIT AND BOXES SHALL BE FACTORY PAINTED RED.
4. ALL CONDUIT AND BOXES SHALL BE CONCEALED WITHIN WALL (INCLUDING PRECAST PANELS) AND ABOVE CEILINGS.
5. COORDINATE AUDIO AND VISUAL APPLIANCES WITH OTHER DISCIPLINES. COLOCATE CEILING AND WALL DEVICES WITH OTHER DISCPLINES TO THE GREATEST EXTENT PRACTICAL.
6. ALL VISUAL STROBE APPLIANCES SHALL BE FIELD SELECTABLE 15/30/75/110cd.
7. COORDINATE ALL FA / MNS DEVICES ON WALLS AND CEILING LOCATION WITH OTHER DISCIPLINES PRIOR TO ROUGH IN.
8. FA / MNS DEVICES SPECIFICALLY SHOWN IN THE DRAWINGS SHALL BE INSTALLED IN THE LOCATION SHOWN AND PER NFPA 72 AND UFC 4-021-01.
9. AUDIO APPLIANCES dB LEVELS SHALL BE PROVIDED AT 15 dB ABOVE AMBIENT LEVEL. A SPACE BY SPACE METHOD SHALL BE APPLIED TO ENSURE SPEAKERS ARE ABOVE LOUDER SPACES.
10. MINIMUM COMMON INTELLIGIBILITY SCALE (CIS) VALUE SHALL BE 0.8 IN THE MOST REMOTE AREA OF EACH ROOM AT 5'-0" AFF.
11. NORMALLY UNOCCUPIED SPACES SHALL BE CONSIDERED CRAWLSPACE, STORAGE ROOMS, MECHANICAL ROOMS, ELECTRICAL ROOMS, JANITOR ROOMS, COMMUNICATION ROOMS: ALL OTHER ROOMS SHALL BE CONSIDERED NORMALLY OCCUPIED.
12. NORMALLY UNOCCUPIED AREAS OF THE BUILDING ARE PERMITTED TO HAVE A CIS SCORE LESS THAN THE MINIMUM REQUIRED VALUE IF PERSONNEL CAN DETERMINE THAT A VOICE SIGNAL IS BEING BROADCAST AND THEY MUST WALK 50 FT OR LESS TO A LOCATION WITH AT LEAST THE MINIMUM REQUIRED CIS VALUE WITHIN THE SAME AREA.
13. EXTERIOR SPEAKERS SHALL BE 2 WATT TO MEET THE MINIMUM OF 70 dB AND 15 dB ABOVE AMBIENT, WITH A CIS VALUE OF 0.8 AT 16'-0" FROM THE SPEAKER WITH A NOT TO EXCEED 110dB AT HEARING LEVEL.
14. VERIFICATION: VERIFY ALL DIMENSIONS, ELEVATIONS, SITE CONDITIONS, AND EQUIPMENT PROVIDED BY OTHER TRADES BEFORE STARTING WORK OR PROCURING ELECTRICAL EQUIPMENT.
15. CONFLICTS: IF CONFLICTS IN THE CONSTRUCTIONS DOCUMENTS SHOULD OCCUR, THE MORE RESTRICTIVE REQUIREMENTS (INCLUDING SPECIFICATIONS) SHALL TAKE PRECEDENCE.
16. CODES: ALL MATERIALS AND WORK SHALL CONFORM TO THE REQUIREMENTS OF THE IBC, UFC'S, AND NFPA CODES.
17. CONSTRUCTION METHODS AND PROJECT SAFETY: THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED BUILDING AND DO NOT INDICATE METHODS, PROCEDURES OR SEQUENCE OF CONSTRUCTION.
18. SIMILAR WORK: WHERE CONSTRUCTION DETAILS ARE NOT SHOWN, SUCH DETAILS SHALL BE THE SAME AS FOR SIMILAR WORK SHOWN ON DRAWINGS.
19. PENETRATIONS: REFER TO PROJECT DRAWINGS AND SPECIFICATIONS FOR PENETRATION REQUIREMENTS FOR CONDUIT, BUSWAY, SLEEVES, CHASES, ETC.; PROVIDE SMOKE SEALING AND FIRE STOPPING AT ALL FLOORS, SMOKE PARTITIONS AND FIRE RATED WALLS. CONTRACTOR SHALL SUBMIT FOR APPROVAL PENETRATION PLANS FOR ALL ELECTRICAL PENETRATIONS THROUGH STRUCTURAL ITEMS (FLOORS, FOUNDATIONS, ETC.).
20. EXCAVATIONS: LOCATE AND PROTECT UNDERGROUND OR CONCEALED CONDUIT, DUCT BANK, OR OTHER UTILITIES WHERE NEW WORK IS BEING PERFORMED.
21. EQUIPMENT LOADS: EQUIPMENT LOADS SHALL NOT EXCEED THE ALLOWABLE LOADING FOR THE SUPPORTING MEMBERS AND THEIR CONNECTIONS AS NOTED IN THE STRUCTURAL PLANS.
22. DRAWINGS: THE FIRE ALARM AND MASS NOTIFICATION DRAWINGS ILLUSTRATE FA / MNS EQUIPMENT AND DESIGN REQUIREMENTS, REFER TO ARCHITECTURAL AND FIRE PROTECTION DRAWINGS FOR NON-ELECTRICAL ITEMS WHICH REQUIRE COORDINATION AND SPECIAL PROVISIONS FOR COMPLETE AND OPERATIONAL SYSTEMS.
23. DEVIATION: ANY DEVIATION FROM THE CONTRACT DOCUMENT SET OF FIRE ALARM DRAWINGS AND SPECIFICATIONS SHALL ONLY BE MADE AFTER WRITTEN APPROVAL BY THE CONTRACTING OFFICER.
24. SCALE: THE DRAWINGS SHALL NOT BE SCALED. REFER TO DIMENSIONING ON THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EQUIPMENT SIZES, DISTANCES, HEIGHTS TO PROVIDE COMPLETE AND OPERATIONAL ELECTRICAL SYSTEMS.

US Army Corps of Engineers
Fort Worth District

COLORADO REGISTERED PROFESSIONAL ENGINEER 32681

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY KEVIN P. BRESLIN, JR. P.E. 32681 ON 07/20/2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AN0002			JULY 2026

Designed by: Z. RUIZ
Date: MAY 2025
Rev:
Dwn by: Z. RUIZ
Solicitation No.: W9126G25RA020
Reviewed by: D. WASHINGTON, D. WASHINGTON, C. LANDUM
Contract No.
File name:
Plot date: 7/20/26 8:41:09 AM
Plot scale: 1:1

MERRICK®

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

FIRE ALARM - MASS NOTIFICATION LEGEND

Sheet reference number
D4-FA001
Sheet of

Contr No:

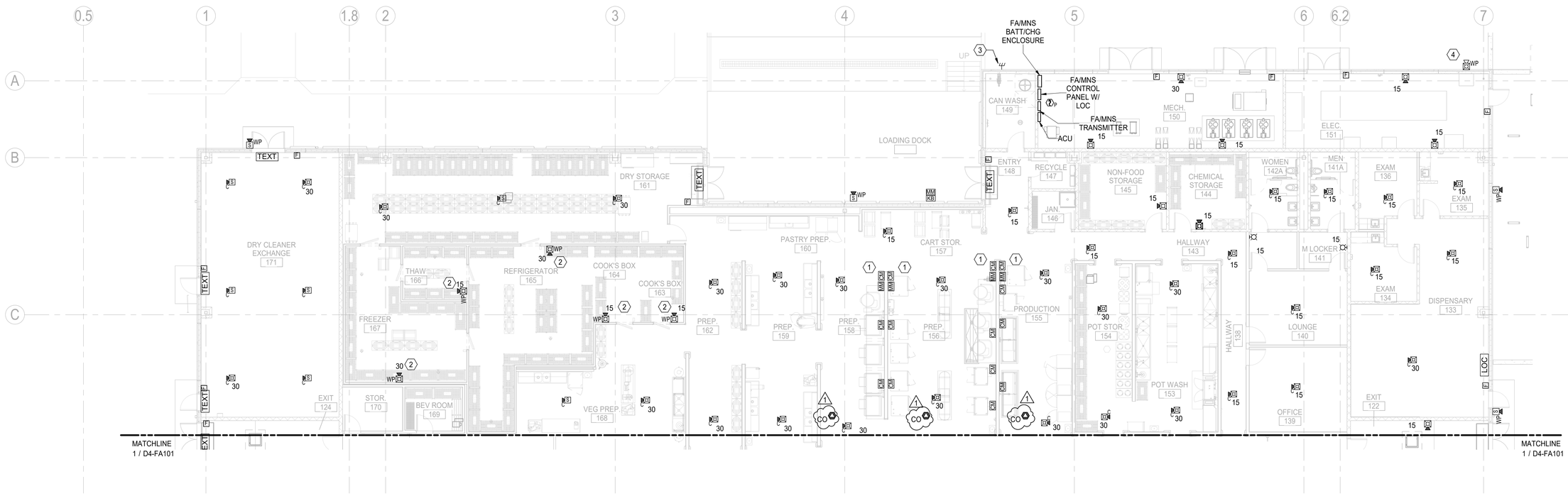
7/9/2026 8:41:09 AM

SHEET NOTES

1. REFER TO SHEET D4-FA001 FOR FIRE ALARM / MASS NOTIFICATION DESIGN CRITERIA, GENERAL NOTES, SYMBOLS AND ABBREVIATIONS.
2. REFER TO SHEET D4-FA601 FOR FIRE ALARM / MASS NOTIFICATION RISER DIAGRAM AND D4-FA602 FOR FIRE ALARM / MASS NOTIFICATION MATRIX AND INSTALLATION DETAILS.
3. ALL FIRE ALARM CONDUIT AND BOXES SHALL BE FACTORY PAINTED RED.
4. ALL CONDUIT AND BOXES SHALL BE CONCEALED WITHIN WALLS (INCLUDING PRECAST PANELS) AND ABOVE CEILINGS.

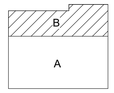
KEYNOTES

1. PROVIDE ADDRESSABLE MONITOR MODULE AT KITCHEN HOOD FIRE SUPPRESSION SYSTEM. PROVIDE CONTROL MODULES TO SHUNT TRIP POWER TO EQUIPMENT LOCATED UNDER THE KITCHEN HOOD, GAS SUPPLY SOLENOID VALVE TO CLOSE AND SHUT-OFF GAS SUPPLY TO EQUIPMENT UNDER THE KITCHEN HOOD AND SHUT DOWN RESPECTIVE SUPPLY FAN TO THE HOOD. COORDINATE LOCATION AND QUANTITY OF CONTROL MODULES WITH KITCHEN EQUIPMENT CONTRACTOR AND ELECTRICAL DRAWINGS D4-EP SERIES DRAWINGS.
2. FIRE ALARM DEVICES IN COOLERS/FREEZERS SHALL INCLUDE PROVISIONS OF SEAL-OFF AND TRANSITION TO FLEXIBLE CONDUIT TO MINIMIZE CONDENSATION.
3. PROVIDE WALL MOUNTED FA/MNS ANTENNA. REFER TO SHEET D4-FA601 FOR ADDITIONAL REQUIREMENTS.
4. FIRE ALARM DEVICE SHALL INITIATE ON WATER FLOW ONLY.



1 FIRST FLOOR FIRE ALARM / MASS NOTIFICATION PLAN - AREA B
1/8" = 1'-0"

PLAN NORTH



KEY PLAN

US Army Corps of Engineers
Fort Worth District

COLORADO REGISTERED PROFESSIONAL ENGINEER 32681

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No.	Description	D.O. No.	Action	Date
1	REV/SED JAV AM8002			JULY 2026

Date: MAY 2025
Solicitation No.: V91126G26RA020
Contract No.:
File name:
Plot date: Version in use
Plot scale: 1:1
Rev.

Designed by: Z. BUIZ
Dwn by: Z. BUIZ
Reviewed by: D. CHARNINGTON
Submitted by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH PROJECT DESIGN FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI.S220527

FIRST FLOOR FIRE ALARM - MASS NOTIFICATION PLAN - AREA B

Sheet reference number
D4-FA102
Sheet of

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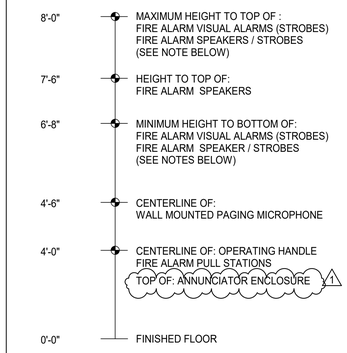
	INPUTS	LOCATION		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	
	OUTPUTS			LOCAL OUTPUT AT ALL PANELS													OCCUPANT NOTIFICATION										OFFSITE TRANSMISSION							BLDG. SYSTEM CONTROLS													OUTPUTS
				FIRE ALARM SIGNAL (COMMON) - ACTUATE LED INDICATOR	FIRE ALARM SIGNAL (COMMON) - ACTUATE AUDIBLE INDICATOR	MASS NOTIFICATION SIGNAL (COMMON) - ACTUATE LED INDICATOR	MASS NOTIFICATION SIGNAL (COMMON) - ACUATE AUDIBLE INDICATOR	SUPERVISORY SIGNAL (COMMON) - ACTUATE LED INDICATOR	SUPERVISORY SIGNAL (COMMON) - ACTUATE AUDIBLE INDICATOR	TROUBLE SIGNAL (COMMON) - ACTUATE LED INDICATOR	TROUBLE SIGNAL (COMMON) - ACTUATE AUDIBLE INDICATOR	DISPLAY ALPHA NUMERIC MESSAGE ON FA AND REMOTE PANELS	NETWORK GRAPHIC ANNUNCIATOR TERMINAL VISUAL ALARM INDICATOR	NETWORK GRAPHIC ANNUNCIATOR TERMINAL AUDIBLE ALARM INDICATOR	CARBON MONOXIDE SIGNAL (COMMON) - ACTUATE LED INDICATOR	CARBON MONOXIDE SIGNAL (COMMON) - ACTUATE AUDIBLE INDICATOR	FIRE ALARM - ACTUATE STROBES AND AUDIO	MASS NOTIFICATION - ACTIVATE STROBES AND AUDIO	FIRE ALARM - MUTE STROBES AND AUDIO	ACTIVATE EXTERIOR SPEAKER/STROBE ON EXTERIOR ABOVE WATER ENTRY	OUTPUT SIGNAL TO UTILIDOR F.A. DEVICES OF ATC7 AND ATC8	FIRE ALAM - MUTE UTILIDOR F.A. DEVICES OF DCF4	ACTIVATE AUDIBLE CARBON MONOXIDE MESSAGE AND CLEAR STROBES	MASS NOTIFICATION - ACTIVATE STROBES AND AUDIO IN UTILIDORS ONLY	FIRE ALARM - ACTIVATE STROBES AND AUDIO IN UTILIDORS ONLY		TRANSMIT ALARM SIGNAL NOTIFICATION TO CENTRAL STATION	TRANSMIT SUPERVISORY SIGNAL NOTIFICATION TO CENTRAL STATION	TRANSMIT TROUBLE SIGNAL NOTIFICATION TO CENTRAL STATION	TRANSMIT MASS NOTIFICATION SYSTEM IN USE TO CENTRAL STATION	TRANSMIT EMERGENCY KEY BOX TAMPER SWITCH TO CENTRAL STATION	TRANSMIT CARBON MONOXIDE NOTIFICATION TO CENTRAL STATION		SHUTDOWN RESPECTIVE AIR-HANDLING EQUIPMENT	CLOSE SMOKE DAMPER VIA DETECTOR RELAY MODULE	ELEVATOR RECALL TO RECALL FLOOR (1ST FLOOR)	ELEVATOR RECALL TO ALTERNATE FLOOR (2ND FLOOR)	ELEVATOR FIRE FIGHTERS SOLID HAT WARNING	ELEVATOR FIRE FIGHTERS FLASHING HAT WARNING	SHUTDOWN POWER TO ELEVATOR	KITCHEN ELECTRICAL PANEL EQUIPMENT SHUTDOWN (SHUNT TRIP)	KITCHEN GAS VALVE SHUT-OFF	OVERRIDE DIMMING CONTROLS TO 100% LEVEL	SHUT-DOWN RESPECTIVE SUPPLY FAN TO HOOD	OPEN HOISTWAY VENTING DAMPER VIA DETECTOR RELAY MODULE	OPEN / CLOSE HOISTWAY VENTING DAMPER VIA DETECTOR RELAY MODULE		
FIRE ALARM	MANUAL PULL STATIONS	ALL FLOORS	1	X	X							X	X	X			X				X						X															X				1
FIRE ALARM	SMOKE OR HEAT DETECTORS	ALL FLOORS	2	X	X							X	X	X			X				X						X															X				2
FIRE ALARM	ELEVATOR LOBBY SMOKE DETECTOR	FIRST FLOOR	3	X	X							X	X	X			X				X						X									X	X					X				3
FIRE ALARM	ELEVATOR LOBBY SMOKE DETECTOR	SECOND AND THIRD FLOORS	4	X	X							X	X	X			X				X						X								X		X					X				4
FIRE ALARM	ELEVATOR EQUIP. ROOM SMOKE DETECTOR	ELEV. EQUIP. RM. 115	5	X	X							X	X	X			X				X						X								X			X				X				5
FIRE ALARM	ELEVATOR SHAFT SMOKE DETECTOR	TOP OF ELEVATOR SHAFT	6	X	X							X	X	X			X				X						X								X			X				X		X		6
FIRE ALARM	DUCT SMOKE DETECTORS	ALL FLOORS	7					X	X			X	X	X														X					X													7
FIRE ALARM	FIRE/SMOKE DAMPERS	ALL FLOORS	8					X	X			X	X	X														X					X	X**												8
FIRE ALARM	WATER FLOW SWITCHES	CRAWL SPACE AND STAIRWELLS	9	X	X							X	X	X			X			X	X					X															X				9
FIRE ALARM	WATER FLOW SWITCH	CRAWL SPACE BELOW ELEVATOR EQUIP. RM. 115	10	X	X							X	X	X			X			X	X					X												X	X			X				10
FIRE ALARM	EMERGENCY KEY BOX TAMPER SWITCH	EMERGENCY KEY BOX	11									X	X	X																X																11
FIRE ALARM	CARBON MONOXIDE DETECTOR	KITCHEN	12									X	X	X	X	X					X		X								X									X	X	X				12
FIRE ALARM	FACP FIRE ALARM INPUT FROM ATC7 / ATC8	FROM ATC7 / ATC8	13																						X																					13
FIRE PROTECTION	TAMPER SWITCHES	CRAWLSPACE AND STAIRS B1 AND D1	14					X	X			X	X	X														X																		14
FIRE PROTECTION	PIV TAMPER SWITCH	MONITOR MODULE IN ELEC. RM. 150	15					X	X			X	X	X														X																		15
FIRE PROTECTION	KITCHEN HOOD FIRE SUPPRESSION SYSTEM RELEASE (ONE PER 2 HOODS)	PRODUCTION 155, PREP 156, 158	16	X	X							X	X	X			X				X						X												X	X	X	X			16
FIRE PROTECTION	SUPERVISED SHUT-OFF VALVE FOR ELEVATOR EQUIP. ROOM	CRAWL SPACE	17					X	X			X	X	X														X																		17
FIRE PROTECTION	SUPERVISED SHUT-OFF VALVE FOR ELEVATOR PIT	CRAWL SPACE	18					X	X			X	X	X														X																		18
FIRE PROTECTION	FIREMAN'S SWITCH (KEYED) ELEVATOR HOISTWAY VENTING	ELEVATOR LOBBY RM. 116	19																																									X	19
			20																																											20
			21																																											21
MASS NOTIFICATION	MNS MICROPHONE ACTIVATION	ALL FLOORS	22			X	X					X	X	X				X	X			X								X																22
MASS NOTIFICATION	MNS PRERECORDED MESSAGE ACTIVATION	ALL FLOORS	23			X	X					X	X	X				X	X			X								X																23
MASS NOTIFICATION	MNS INPUT FROM ATC7 / ATC8	FROM ATC7 / ATC8	24																			X		X																						24
			25																																											25
			26																																											26
			27																																											27
			28																																											28
POWER	FA / MNS PANEL AC POWER FAILURE	MECH. RM. 150	29							X	X	X	X	X															X																	29
POWER	FA / MNS PANEL LOW BATTERY	MECH. RM. 150	30							X	X	X	X	X															X																	30
POWER	FA / MNS PANEL OPEN CIRCUIT	MECH. RM. 150	31							X	X	X	X	X															X																	31
POWER	FA / MNS PANEL GROUND FAULT	MECH. RM. 150	32							X	X	X	X	X															X																	32
POWER	FA / MNS PANEL SHORT CIRCUIT	MECH. RM. 150	33							X	X	X	X	X															X																	33
POWER	FA / MNS EQUIPMENT FAILURE	MECH. RM. 150	34							X	X	X	X	X															X																	34
			35																																											35
			36																																											36
	INPUTS	LOCATION		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM	NN	OO	PP	QQ	

X** = DELAY DAMPER CONTROL UNTIL AHU SHUTDOWN

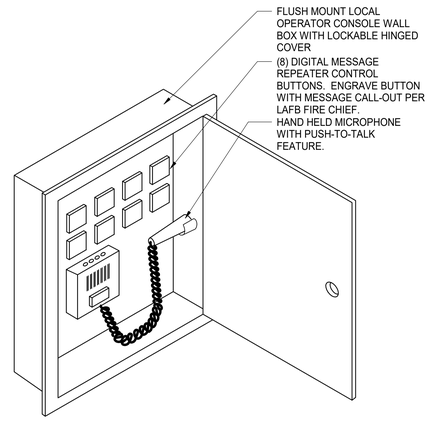
1 FIRE ALARM / MASS NOTIFICATION MATRIX
N.T.S.

MOUNTING HEIGHT NOTES

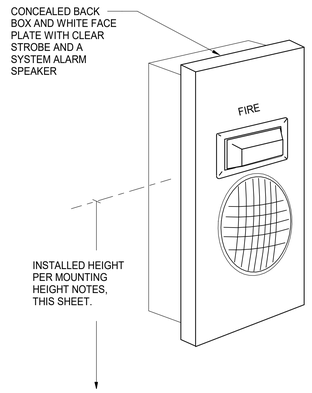


ALL FIRE ALARM VISUAL ALARMS (STROBES) AND COMBINATION AUDIBLE/VISUAL ALARMS (SPEAKER/STROBE) SHALL BE MOUNTED AT A HEIGHT OF 7'-6" TO THE TOP OF THE DEVICE UNLESS NOTED OTHERWISE. MAXIMUM HEIGHT OF UP TO 8'-0" SHALL BE PERMITTED WHERE A CONFLICT EXISTS AT THE PREFERRED HEIGHT.

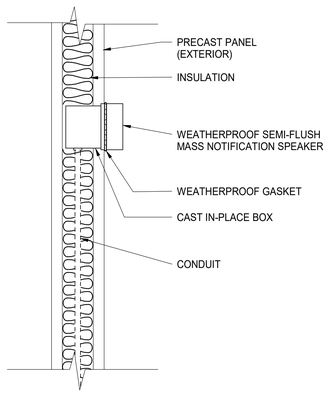
2 FA / MNS DEVICE MOUNTING HEIGHTS
N.T.S.



3 MASS NOTIFICATION LOCAL OPERATOR CONSOLE (LOC)
N.T.S.



5 FIRE ALARM/ MASS NOTIFICATION STROBES/SPEAKER MOUNTING DETAILS
N.T.S.



4 FA / MNS WEATHERPROOF SPEAKER DETAIL
N.T.S.

US Army Corps of Engineers
Fort Worth District

COLORADO REGISTERED PROFESSIONAL ENGINEER 32681

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY KEVIN P. BRESLIN, JR. P.E. 32681 ON 07/20/2026

No.	Description	Date	Action	O.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: Z. RUIZ
Dwn by: Z. RUIZ
Reviewed by: D.MARKINGTON
Submitted by: C. LANGUM
Date: MAY 2025
Rev:
Solicitation No.: W912R026RA020
Contract No.:
File name:
Plot date: 7/20/2026 8:41:12 AM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
POWER SYSTEM DESIGNS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

FIRE ALARM - MASS NOTIFICATION MATRIX AND DETAILS

Sheet reference number
D4-FA602
Sheet of

Cont No.

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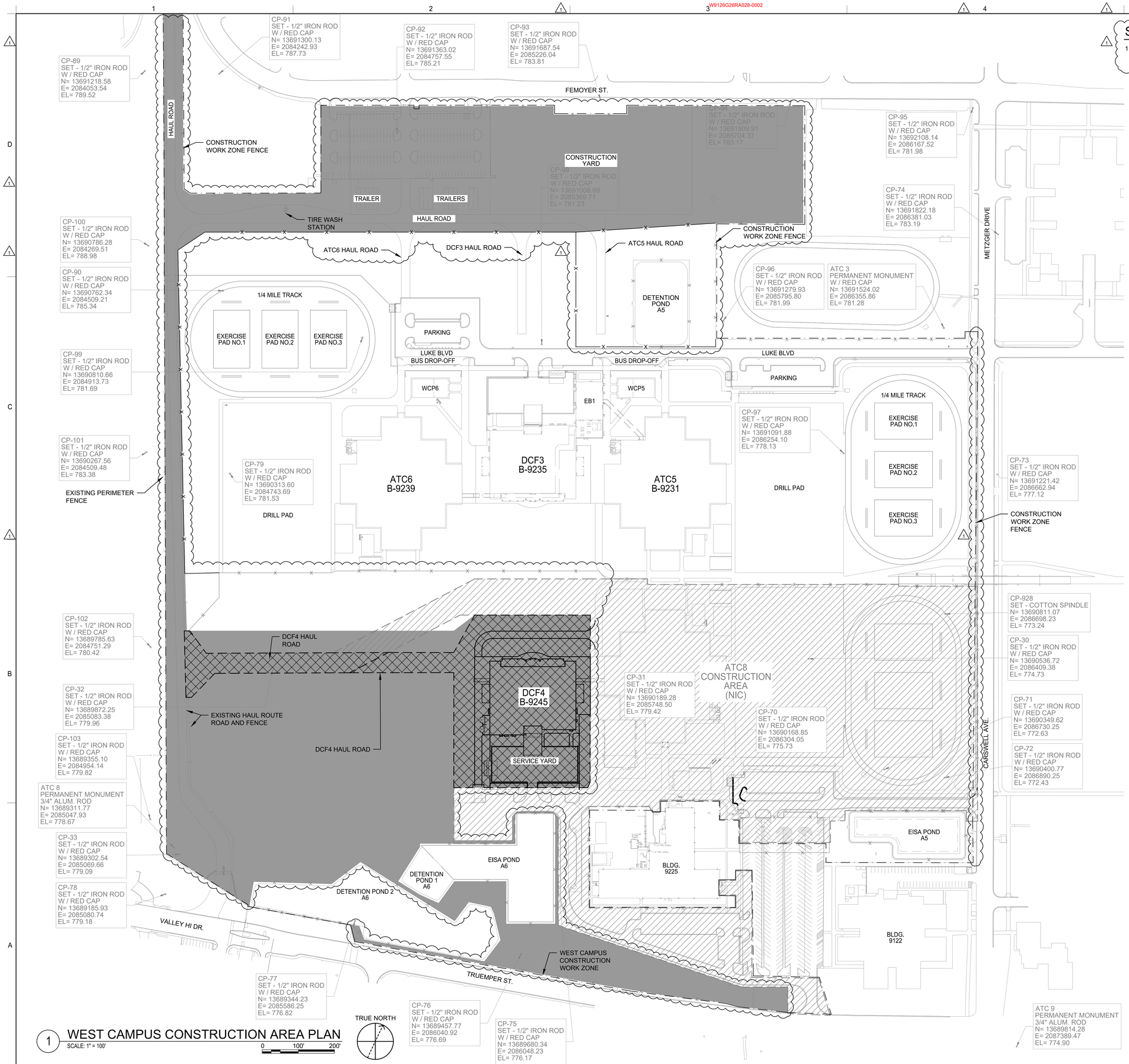


1 WEST CAMPUS CONSTRUCTION AREA PLAN

SCALE: 1" = 100'

0 100' 200'

SHEET NOTES

1. CONTRACTOR IS RESPONSIBLE FOR ON-GOING MOWING AND FENCE-SCREEN MAINTENANCE, INCLUDING CONTINUITY OF RESPONSIBILITY FROM THE DCF4 SITE TO THE EAGLE ROCK ENTRANCE.

LEGEND

- DCF4 CONSTRUCTION AREA
- ATC8 CONSTRUCTION AREA (NIC)
- APPROXIMATE CONSTRUCTION LIMIT LINE
- DCF4 MOWING AND FENCE-SCREEN MAINTENANCE AREA

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
GEOFFREY E. LEAF
131589
LICENSED
TBPELS FIRM # 10115
07/20/2026

No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: G. LEAF
Date: MAY 2025
Rev.
Dwn by: E. CHAVEZ
Solicitation No.: W9126G25RA020
Reviewed by: J. MATTHEWS
Contract No.:
Submitted by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

DESIGN FILE

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220527

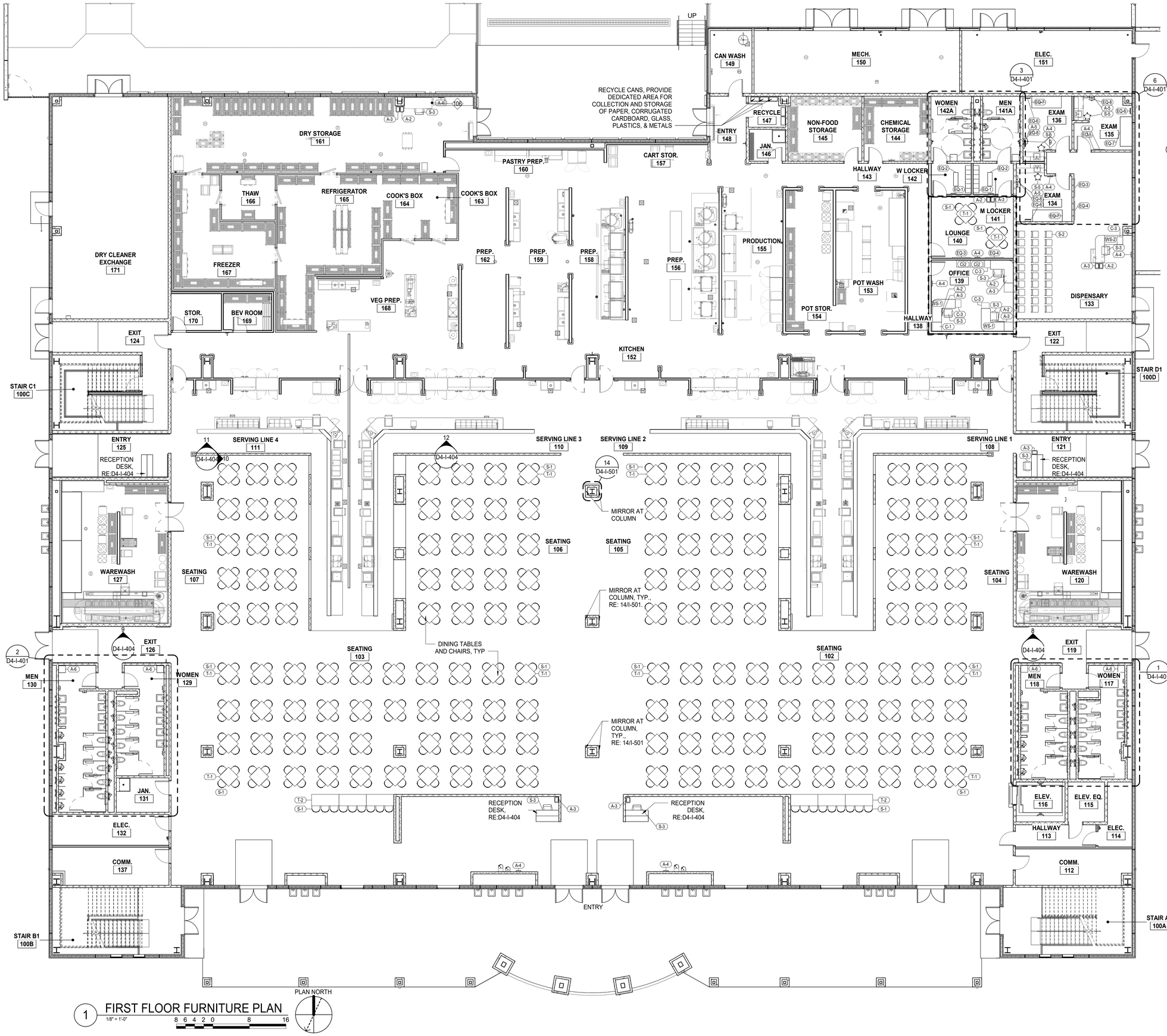
WEST CAMPUS
CONSTRUCTION AREA PLAN

Sheet reference number

D4-G-103

Sheet of

Contr No.



1 FIRST FLOOR FURNITURE PLAN
1/8" = 1'-0"

SHEET NOTES

1. FURNITURE IS SHOWN FOR INFORMATION ONLY TO ILLUSTRATE ROOM LAYOUT AND FOR MECHANICAL AND ELECTRICAL COORDINATION.
2. REFER TO ELECTRICAL/ TELECOM / MECHANICAL FOR ADDITIONAL COORDINATION.
3. REFER TO KITCHEN DRAWINGS FOR KITCHEN EQUIPMENT AND LAYOUT.
4. REFER TO D4-I-601 FOR FINISH SELECTIONS.

FURNITURE INFORMATION: TABLE AND SEATING

1. RECEPTION DESK TO BE INCLUDED IN CONTRACT RE: D4-I-404
2. REFER TO FINISHES ON FINISH SELECTION, SHEET D4-I-601.
3. FURNITURE PHYSICALLY ATTACHED TO THE BUILDING SHALL BE INCLUDED IN CONTRACT.
4. LOOSE FURNITURE, AS SUMMARIZED BELOW IN THE "FURNITURE INFORMATION" SHALL BE DENOTED BY NOT IN CONTRACT, "NIC".
5. CONTRACTOR FURNISHED CONTRACTOR INSTALLED (CFCI) ITEMS LISTED FOR REFERENCE

FIRST FLOOR - FURNITURE INFORMATION - NIC

Type Mark	Type	Count
A-2	Recycle Receptacle, NIC	6
A-3	Trash Receptacle, NIC	9
A-4	Wall Mounted Clock, CFCI	11
A-5	Waste Receptacle w Lid, CFCI	3
A-6	Large Waste Receptacle, CFCI	6
C-1	Wardrobe, NIC	3
C-2	4 Drawer Lateral File, NIC	2
C-3	File Pedestal, NIC	5
EQ-1	Double Tier Lockers, CFCI	12
EQ-2	Locker Room Bench, CFCI	2
EQ-3	4' Corkboard, CFCI	2
EQ-4	4' Whiteboard, CFCI	2
EQ-5	Medical Chart Holder, CFCI	3
EQ-6	Hazard Container, CFCI	3
EQ-7	Exam Table, CFCI	3
EQ-8	Glove Box Holder, CFCI	3
S-1	Dining Chair, NIC	618
S-2	Waiting Chair, NIC	30
S-3	Ergonomic Work Chair, NIC	8
S-5	Medical Stool, NIC	3
T-1	Square Dining Table, NIC	150
T-2	Rectangular Table, NIC	6
WS-1	L-Shaped Workstation, NIC	3
WS-2	L-Shaped Workstation w Transaction Counter, NIC	1
WS-3	Desk, NIC	1

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER
MARY J. JOHNSON
12561
STATE OF TEXAS
07/20/2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002	M0002		JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Solicitation No.: W9126G26RA020
Rev.
Dwn by: T. JOHNSON
Contract No.:
Reviewed by: J. ROTH
Submitted by: C. LANGUM
File name:
Plot date: 7/16/2026 11:58:46 AM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

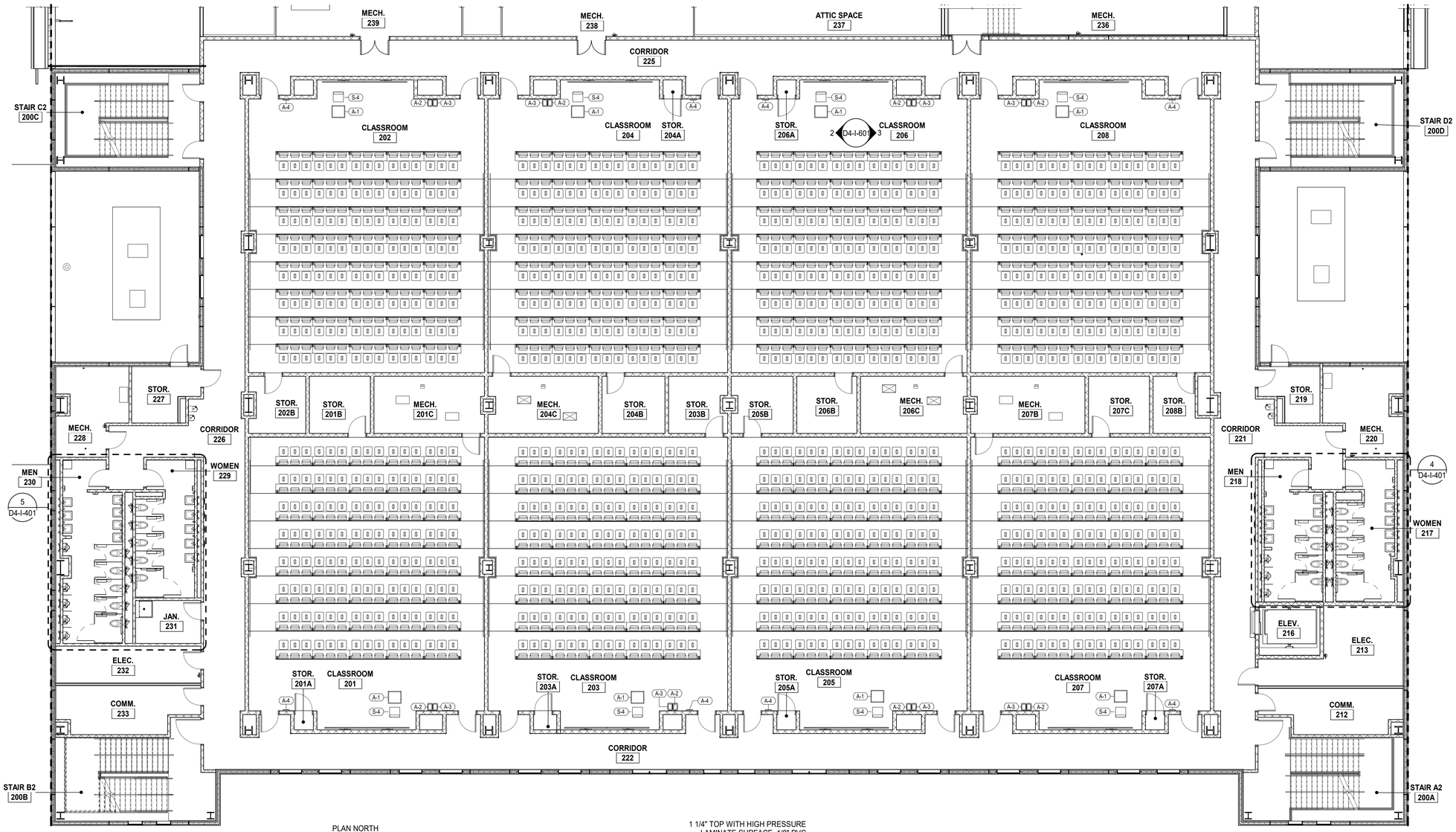
FIRST FLOOR FURNITURE PLAN

Sheet reference number
D4-I-101
Sheet of

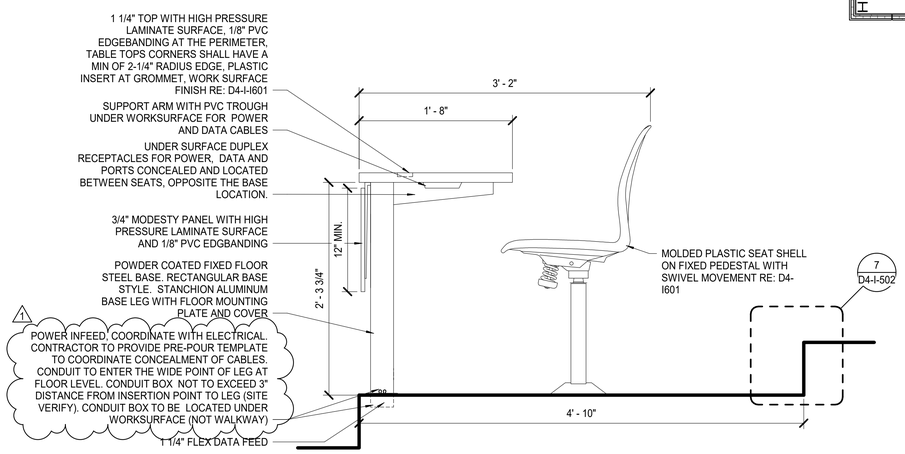
Contr No.:

KEY PLAN

7/16/2026 11:58:35 AM



1 SECOND FLOOR FURNITURE PLAN
1/8" = 1'-0"



2 FIXED DESK DETAIL
1 1/2" = 1'-0"

SHEET NOTES

1. FURNITURE IS SHOWN FOR INFORMATION ONLY TO ILLUSTRATE ROOM LAYOUT AND FOR MECHANICAL AND ELECTRICAL COORDINATION.
2. REFER TO ELECTRICAL/ TELECOM / MECHANICAL FOR ADDITIONAL COORDINATION.
3. REFER TO KITCHEN DRAWINGS FOR KITCHEN EQUIPMENT AND LAYOUT.
4. REFER TO D4-I-601 FOR FINISH SELECTIONS.

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER
TONY J. JOHNSON
12561
STATE OF TEXAS
07/20/2026

FURNITURE INFORMATION: SEATING AND TABLE

1. CLASSROOMS: 120 HARD PLASTIC SEATS WITHOUT ARMS SHALL BE PROVIDED IN ALL CLASSROOMS; 201, 202, 203, 204, 205, 206, 207, 208. TOTAL CLASSROOM SEATS: 960
2. REFER TO FINISH SELECTION SHEET D4-I-601 FOR FIXED TABLE AND CHAIRS FINISHES.
3. FURNITURE PHYSICALLY ATTACHED TO THE BUILDING SHALL BE INCLUDED IN CONTRACT.
4. LOOSE FURNITURE, AS SUMMARIZED BELOW IN THE "FURNITURE INFORMATION" SHALL BE DENOTED BY NOT IN CONTRACT, "NIC".
5. CONTRACTOR FURNISHED CONTRACTOR INSTALLED (CFCI) ITEMS LISTED FOR REFERENCE

SECOND FLOOR - FURNITURE INFORMATION - NIC

Type Mark	Type	Count
A-1	Lectern, NIC	8
A-2	Recycle Receptacle, NIC	8
A-3	Trash Receptacle, NIC	8
A-4	Wall Mounted Clock, CFCI	8
A-6	Large Waste Receptacle, CFCI	4
S-4	Stool, NIC	8

No.	Description	D.O. No.	Action	Date
1	REVISED IAW A0002			JULY 2026

Designed by: A. RIVARD
Dwn by: T. JOHNSON
Reviewed by: H. ACOTO
Submitted by: C. LANGUM
Date: MAY 2025
Solicitation No.: W9126G24RA020
Contract No.:
Rev:
File name:
Plot date: 7/20/26 1:17:08 PM
Plot scale: 1:1

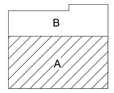
U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

SECOND FLOOR FURNITURE PLAN



KEY PLAN

Sheet reference number
D4-I-102
Sheet of

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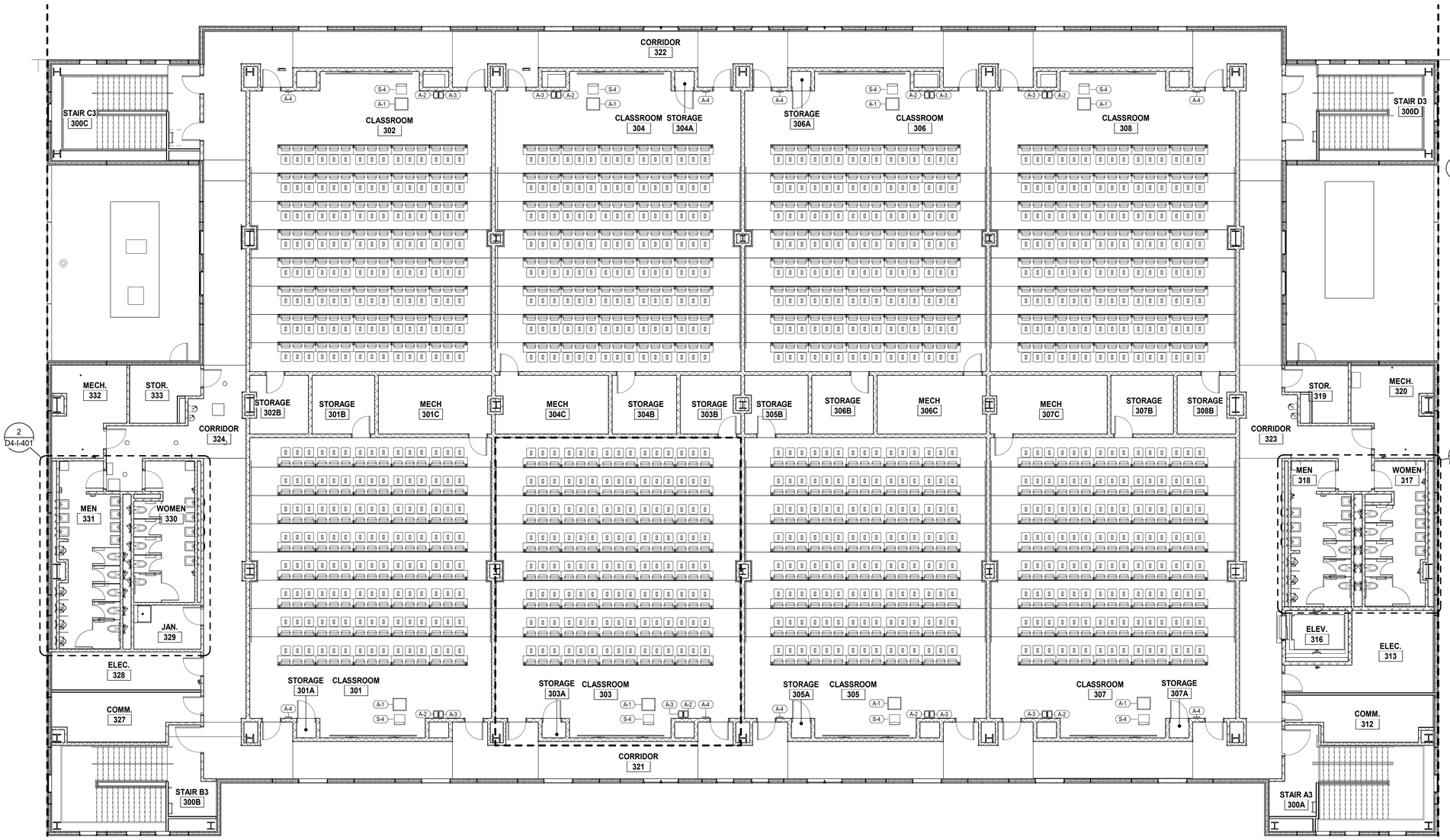


1 THIRD FLOOR FURNITURE PLAN
1/8" = 1'-0"

8 6 4 2 0 8 16

PLAN NORTH

SHEET NOTES

1. FURNITURE IS SHOWN FOR INFORMATION ONLY TO ILLUSTRATE ROOM LAYOUT AND FOR MECHANICAL AND ELECTRICAL COORDINATION.
2. REFER TO ELECTRICAL/ TELECOM / MECHANICAL FOR ADDITIONAL COORDINATION.
3. REFER TO KITCHEN DRAWINGS FOR KITCHEN EQUIPMENT AND LAYOUT.
4. REFER TO D4-I-601 FOR FINISH SELECTIONS.

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER
TONY J. JOHNSON
12561
STATE OF TEXAS
07/20/2026

FURNITURE INFORMATION

1. CLASSROOMS: 120 HARD PLASTIC SEATS WITHOUT ARMS SHALL BE PROVIDED IN ALL CLASSROOMS; 301, 302, 303, 304, 305, 306, 307, 308. TOTAL CLASSROOM SEATS: 960
2. REFER TO FINISH SELECTION SHEET D4-I-601 FOR FIXED TABLE AND CHAIRS FINISHES.
3. FURNITURE PHYSICALLY ATTACHED TO THE BUILDING SHALL BE INCLUDED IN CONTRACT.
4. LOOSE FURNITURE, AS SUMMARIZED BELOW IN THE "FURNITURE INFORMATION" SHALL BE DENOTED BY NOT IN CONTRACT, "NIC". REFER TO FURNITURE, FIXTURES AND EQUIPMENT (FFE) FOR LOOSE FURNITURE.
5. CONTRACTOR FURNISHED CONTRACTOR INSTALLED (CFCI) ITEMS LISTED FOR REFERENCE

THIRD FLOOR - FURNITURE INFORMATION - NIC

Type Mark	Type	Count
A-1	Lectern, NIC	8
A-2	Recycle Receptacle, NIC	8
A-3	Trash Receptacle, NIC	8
A-4	Wall Mounted Clock, CFCI	8
A-6	Large Waste Receptacle, CFCI	4
S-4	Stool, NIC	8

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev:
Dwn by: T. JOHNSON
Solicitation No.: W9126G25RA020
Contract No.:
Reviewed by: M. CRITO
Supervised by: C. LANGUM
File name:
Plot date: 11/13/25 3:00:11 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

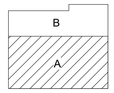
MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

THIRD FLOOR FURNITURE PLAN

Sheet reference number
D4-I-103
Sheet of



KEY PLAN

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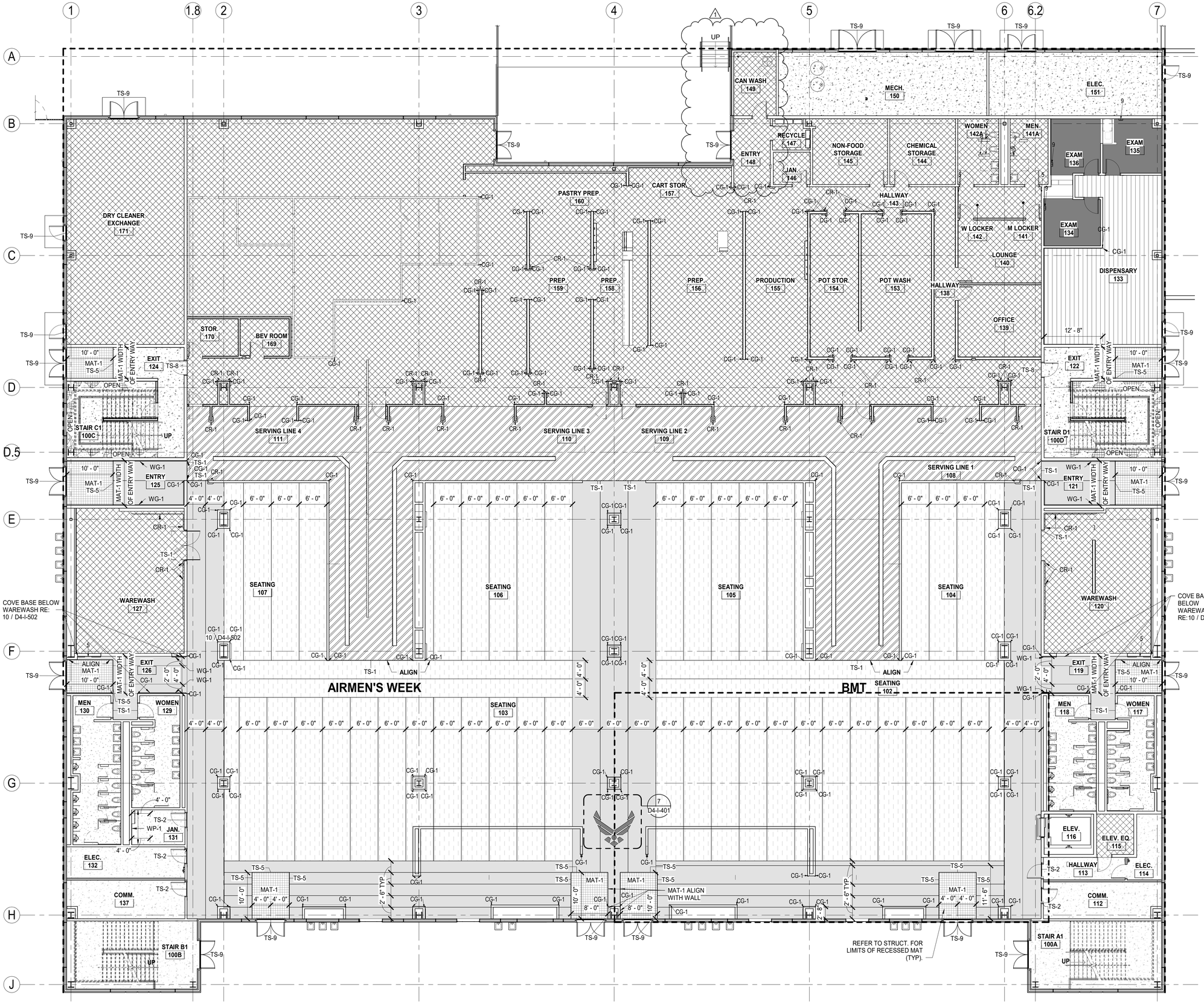


1 FIRST FLOOR FINISH PLAN
1/8" = 1'-0"

SHEET NOTES

1. WHERE DIMENSIONS SHOWN FOR PLACEMENT OF VCT, LVT OR VS, ALIGN EDGE OF VCT, LVT OR VS WITH EDGE OF FINISH WALL AND COLUMN (TYP).
2. REFER FLOOR TRANSITION DETAILS, D4-I-502. WHERE FLOOR FINISH CHANGES. TRANSITION STRIP DETAIL, (TS-# TRANSITION STRIP DETAIL NAME).
3. CORNER GUARDS (CG), CRASH RAIL (CR), AND WALL GUARDS (WG), RE: D4-I-501 DETAILS & D4-I-601 FINISH SELECTION.
4. REFER TO D4-I-601 FOR FINISH SELECTIONS.
5. REFER TO D4-I-602/603 FOR ROOM FINISH SCHEDULE.
6. REFER TO SPECS FOR ELEVATOR FINISHES.

FINISH LEGEND

- LVT-1 (LUXURY VINYL TILES)
- LVT-2 (LUXURY VINYL TILES)
- LVT- 3 (LUXURY VINYL TILES
- CPT-1 (CARPET TILES)
- MAT-1 (ENTRANCE MAT)
- SC (STAINED CONCRETE)
- EPX-1 (EPOXY)
- POLY-1 (POLYURETHANE RESINOUS FLOORING)
- POLY-2 (POLYURETHANE RESINOUS FLOORING)
- VCT-1
- VS-1 (NOT USED)
- VS-2 (SHEET VINYL)
- VS-3 (SHEET VINYL)
- CORNER GUARD (CG-1), REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY
- CRASH RAIL (CR-1), REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY
- WALL GUARD (WG-1), REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER TONY J. JOHNSON 12561 STATE OF TEXAS
07/20/2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Dwn by: T. JOHNSON
Reviewed by: M. SCOTT
Submitted by: C. LANGUM
Date: MAY 2025
Solicitation No.: W912R5-25-R-A030
Contract No.:
Rev.:
File name:
Plot date: 7/16/2026 12:01:39 PM
Plot scale: 1:1

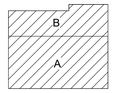
U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

FIRST FLOOR FINISH PLAN



KEY PLAN

Sheet reference number
D4-I-104
Sheet of

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SHEET NOTES

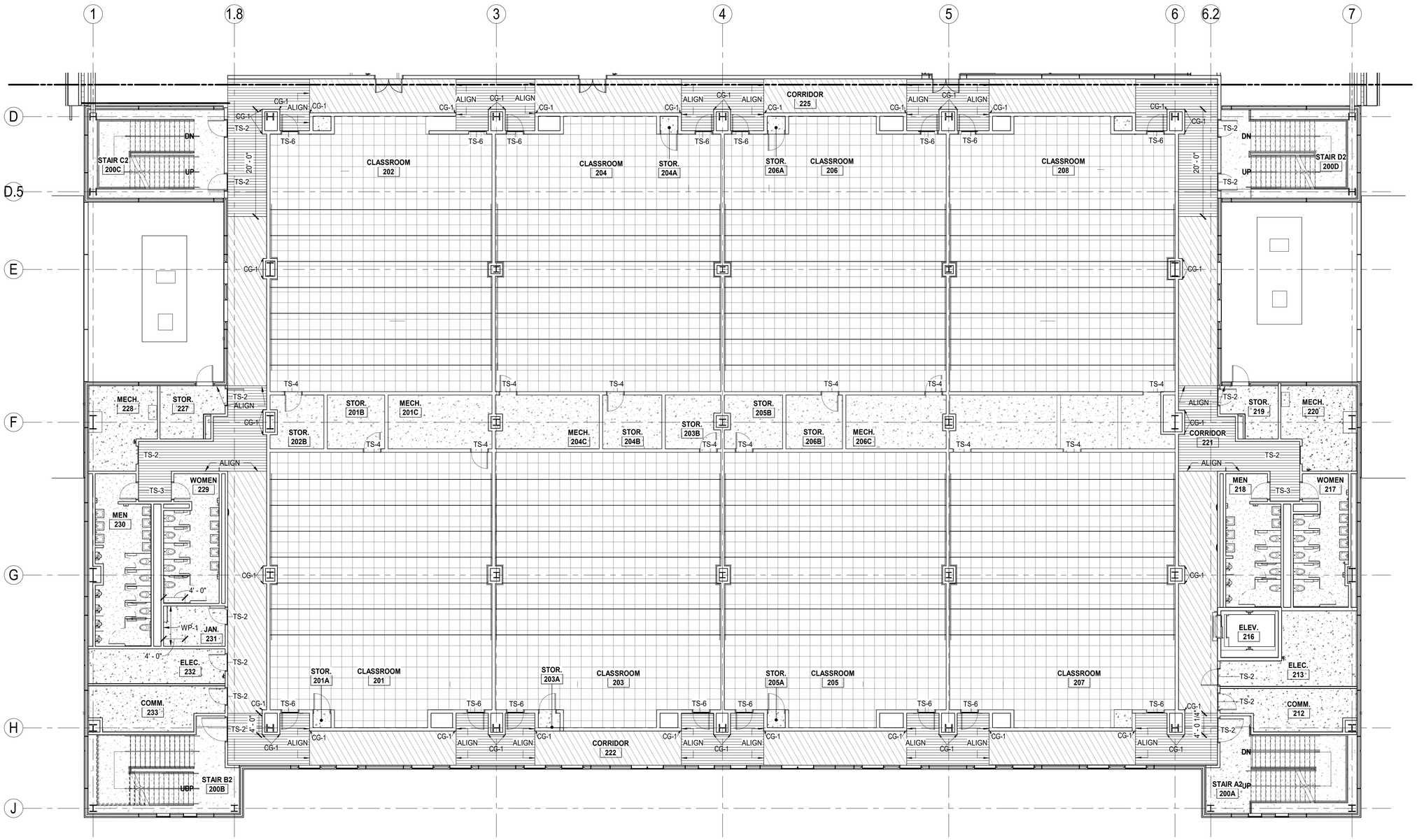
1. WHERE DIMENSIONS SHOWN FOR PLACEMENT OF VCT, LVT OR VS, ALIGN EDGE OF VCT, LVT OR VS WITH EDGE OF FINISH WALL AND COLUMN (TYP).
2. REFER FLOOR TRANSITION DETAILS, D4-I-502, WHERE FLOOR FINISH CHANGES. TRANSITION STRIP DETAIL, (TS-# TRANSITION STRIP DETAIL NAME).
3. CORNER GUARDS (CG), CRASH RAIL (CR), AND WALL GUARDS (WG), RE: D4-I-501 DETAILS & D4-I-601 FINISH SELECTION.
4. REFER TO D4-I-601 FOR FINISH SELECTIONS.
5. REFER TO D4-I-602/603 FOR ROOM FINISH SCHEDULE.
6. REFER TO SPECS FOR ELEVATOR FINISHES.

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER
TONY J. JOHNSON
12561
STATE OF TEXAS
07/20/2026

FINISH LEGEND

- LVT-1 (LUXURY VINYL TILES)
- LVT-2 (LUXURY VINYL TILES)
- LVT- 3 (LUXURY VINYL TILES
- CPT-1 (CARPET TILES)
- MAT-1 (ENTRANCE MAT)
- SC (STAINED CONCRETE)
- EPX-1 (EPOXY)
- POLY-1 (POLYURETHANE RESINOUS FLOORING)
- POLY-2 (POLYURETHANE RESINOUS FLOORING)
- VCT-1
- VS-1 (NOT USED)
- VS-2 (SHEET VINYL)
- VS-3 (SHEET VINYL)
- CORNER GUARD (CG-1), REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY
- CRASH RAIL (CR-1), REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY
- WALL GUARD (WG-1), REFER TO SHEET NOTES ON D4-I-601 FINISH SELECTION AND D4-I-501 - APPLICABLE TO FIRST FLOOR ONLY



1 SECOND FLOOR FINISH PLAN
1/8" = 1'-0"

PLAN NORTH

KEY PLAN

NO.	REVISED IAW AM0002 Description	D.O. No.	Action	Date
1				JULY 2026

Date: MAY 2025
Solicitation No.: W912R5-25-B-0030
Contract No.:
Designed by: A. RIVARD
Dwn by: T. JOHNSON
Reviewed by: J. SCOTT
Submitted by: C. LANGUM
File name:
Plot date: Friday, 7/16/26
Plot scale: 1:1
Rev.

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

SECOND FLOOR FINISH PLAN

Sheet reference number
D4-I-105
Sheet of

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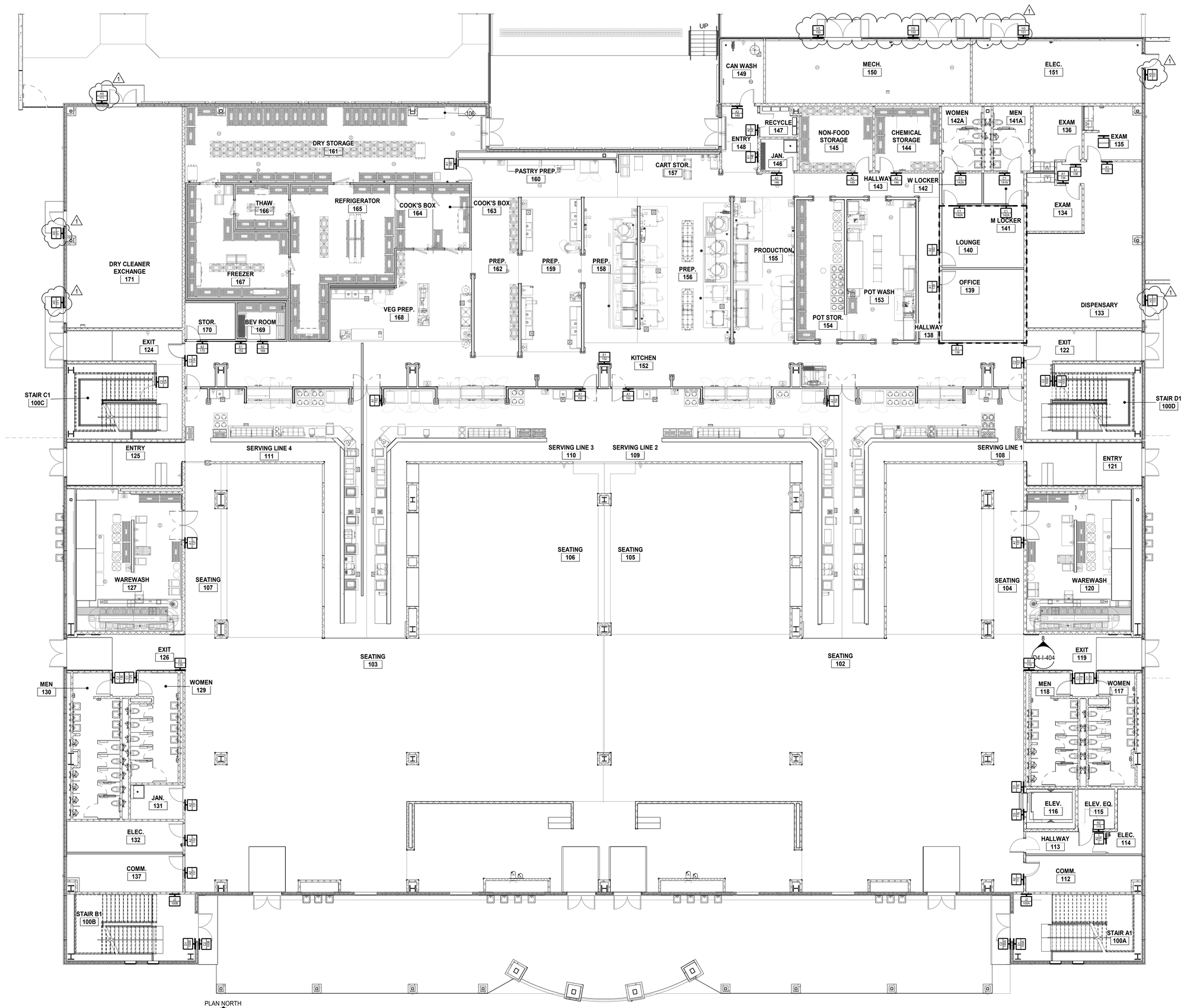


FIRST FLOOR SIGNAGE PLAN

1 FIRST FLOOR SIGNAGE PLAN
1/8" = 1'-0"
8 6 4 2 0 8 16

PLAN NORTH

GENERAL SIGNAGE NOTES

1. FOR SIGNAGE DETAILS AND TYPES REFER TO D4-I-604.
2. FOR SIGNAGE LOCATIONS AND INFORMATION TO BE APPROVED BY USER REFER TO D4-I-605. REFER TO SID FOR SIGNAGE FINISHES.
3. LOCATE SIGNS ON WALL OUTSIDE OF ROOM. IF WALL SPACE IS LIMITED, ROOM SIGNAGE IS TO BE MOUNTED ON DOOR AT TYPICAL SIGNAGE HEIGHT.
4. SIGNAGE MESSAGE CONTENT SHALL BE COORDINATED WITH USERS.
5. SIGNAGE MESSAGE MAY NOT BE ABBREVIATED UNLESS MESSAGE WILL NOT FIT ON THE SIGN. PROPOSED SIGN ABBREVIATIONMUST BE APPROVED BY USERS.
6. ALL LETTERING SHALL BE TREBUCHET MS BOLD.
7. PROVIDE SIGN TYPE D3 AT INSIDE EACH STAIR AT EACH FLOOR LANDING INDICATING FLOOR LEVEL (TACTILE), IDENTIFICATION OF STAIR (STAIR A OR B), "EXIT AT LEVEL 1" AND AN ARROW POINTING IN DIRECTION OF FIRST FLOOR PLUS BOTTOM TERMINUS "BOTTOM LEVEL 1", UPPER TERMINUS "TOP LEVEL 3". STAIRS SHALL ALSO SAY "NO ROOF ACCESS". ARRANGEMENT OF SIGNS FROM TOP TO BOTTOM SHALL BE AS FOLLOWS: STAIR IDENTIFICATION IN MINIMUM 1" HIGH LETTERS; NO ROOF ACCESS IN MINIMUM 1" HIGH LETTERS, FLOOR LEVEL IN MIDDLE OF SIGN MINIMUM 5" HIGH NUMBERS; TERMINUS LEVELS IN 1" HIGH LEVELS AT BOTTOM OF SIGN. SIGN LOCATION SHALL BE 60" AFF AND VISIBE BOTH WHEN THE DOOR IS OPEN AND CLOSED.
8. DOOR MFG. SHALL PROVIDE LABEL ON FIRE RATED DOORS STATING SATING INFORMATION FOR DOOR ASSEMBLE.
9. COMPLY WITH UFC 3-120-01 FOR SPECIFIC SIGNAGE REQUIREMENTS.
10. REFER TO SPECS FOR SIGNAGE FINISHES AND INFORMATION.

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER TONY J. JOHNSON 12561 STATE OF TEXAS
07/20/2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AMI0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Dwn by: T. JOHNSON
Solicitation No.: W912G025RA020
Reviewed by: M. OTTO
Contract No.:
Submitted by: C. LANGUM
File name:
Plot date: 7/16/2026 4:43:45 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
JOINT BASE SAN ANTONIO
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

FIRST FLOOR SIGNAGE PLAN

Sheet reference number
D4-I-107
Sheet of

Contr No.

7/16/2026 4:43:45 PM

TOILET ACCESSORY SCHEDULE

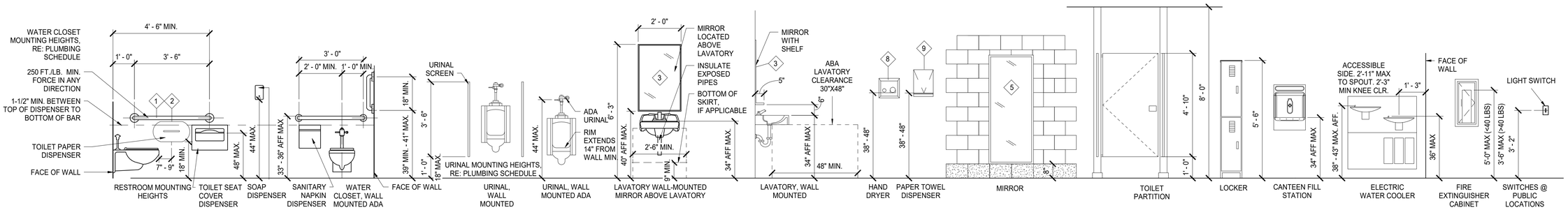
SPEC ID	MARK	DESCRIPTION	UNIT HEIGHT	UNIT WIDTH	UNIT DEPTH
GB	1	GRAB BARS	1 1/4"	474"	1 1/4"
TTDJ	2	JUMBO TOILET ROLL DISPENSER	11 3/8"	20 13/16"	5 5/16"
MR	3	18" X 36" MIRROR	36"	18"	1/4"
US	4	UTILITY SHELF / MOP RACK	13"	34"	8"
MR	5	24" X 60" MIRROR	60"	24"	1/4"
SND	6	PARTITION MOUNTED NAPKIN DISPOSAL	15 1/8"	10 11/16"	4"
SND	7	SURFACE MOUNTED NAPKIN DISPOSAL	15 1/8"	10 11/16"	4"
DRY	8	ELECTRIC HAND DRYER	10 3/8"	11 5/8"	4"
PTD	9	SURFACE MOUNTED PAPER TOWEL DISPENSER	13 1/2"	10 3/16"	4 7/8"
SD	10	SURFACE MOUNTED SOAP DISPENSER	8 1/8"	4 3/4"	3 1/2"

SHEET NOTES

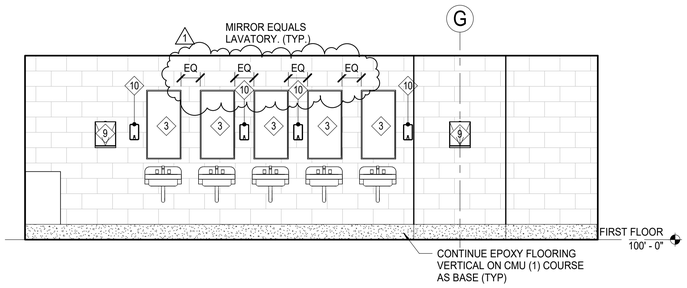
1. REFER TO D4-I-402 FOR TYPICAL MOUNTING HEIGHTS
2. REFER TO SPECIFICATIONS FOR ACCESSORY INFORMATION. ITEMS SHALL BE IN COMPLIANCE WITH ADA/ABA.
3. MOUNTING HEIGHTS OF GRAB BARS SHALL BE TO THE TOP OF THE GRAB SURFACE A.F.F..
4. MOUNTING HEIGHTS OF TOILET ACCESSORIES SHALL BE FROM THE BOTTOM OF THE UNIT A.F.F..
5. REFER TO D4-I-601 FOR GLAZED BLOCK WALL PATTERN.
6. REFER D4-A-600 FOR RESTROOM SIGNAGE.

US Army Corps of Engineers
Fort Worth District

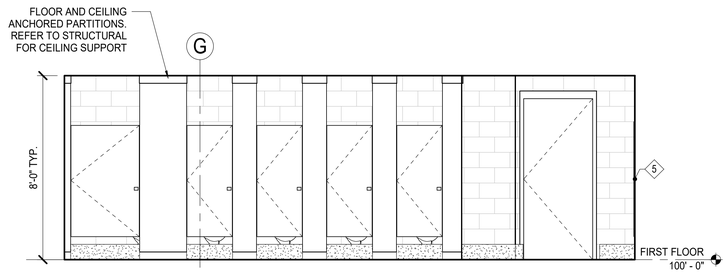
REGISTERED INTERIOR DESIGNER TONY J. JOHNSON 12561 STATE OF TEXAS
07/20/2026



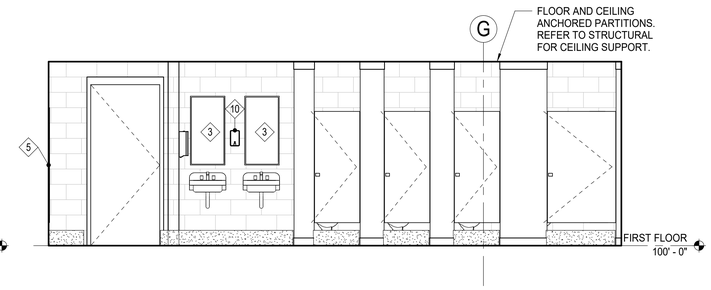
1 TYPICAL FIXTURE HEIGHT MOUNTING ELEVATIONS
1/2" = 1'-0"



2 FIRST FLOOR RESTROOM ELEVATION
3/8" = 1'-0"



3 FIRST FLOOR RESTROOM ELEVATION
3/8" = 1'-0"



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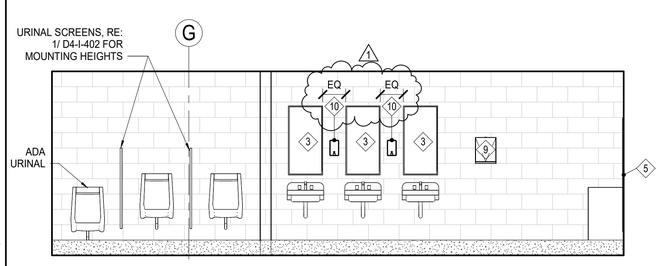
3/8" = 1'-0"



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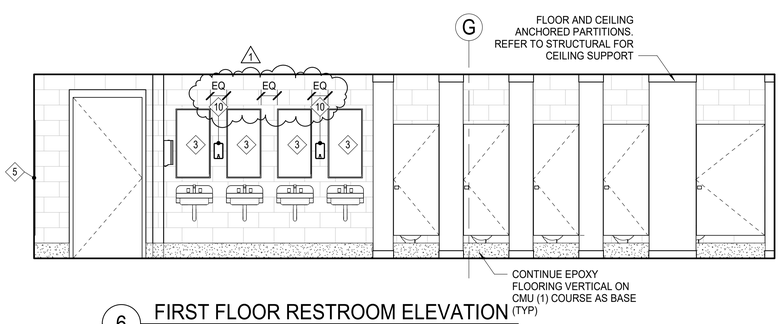
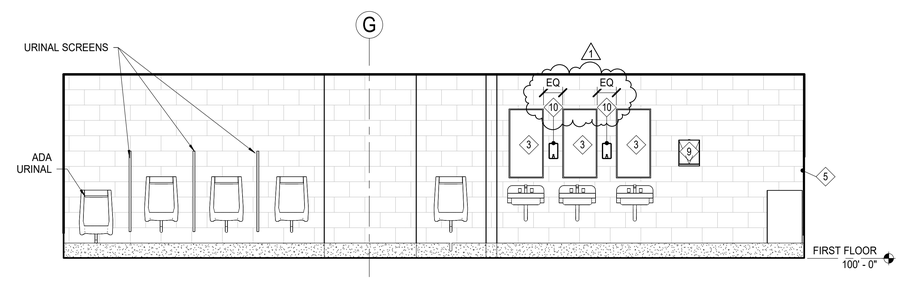


6 FIRST FLOOR RESTROOM ELEVATION
3/8" = 1'-0"



7 FIRST FLOOR RESTROOM ELEVATIONS
3/8" = 1'-0"

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Dwn by: T. JOHNSON
Solicitation No. W9126G25RA020
Contract No.
Reviewed by: M. CRITCO
File name:
Plot date: 1 inch=1 in. in file
Plot scale: 1:1
Submitted by: C. LANGUM
U.S. ARMY ENGINEER DISTRICT, FORT WORTH 819 TAYLOR STREET FORT WORTH, TEXAS
MERRICK®
DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPS.220527

INTERIOR ELEVATIONS

Sheet reference number
D4-I-402
Sheet of

Cont No.

7/16/2026 12:04:10 PM

TOILET ACCESSORY SCHEDULE

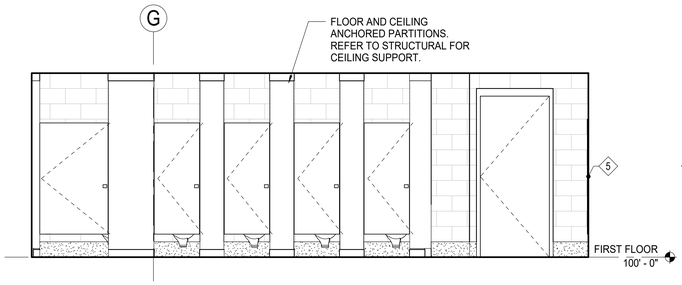
SPEC ID	MARK	DESCRIPTION	UNIT HEIGHT	UNIT WIDTH	UNIT DEPTH
GB	1	GRAB BARS	1 1/4"	474"	1 1/4"
TTDJ	2	JUMBO TOILET ROLL DISPENSER	11 3/8"	20 13/16"	5 5/16"
MR	3	18" X 36" MIRROR	36"	18"	1/4"
US	4	UTILITY SHELF / MOP RACK	13"	34"	8"
MR	5	24" X 60" MIRROR	60"	24"	1/4"
SND	6	PARTITION MOUNTED NAPKIN DISPOSAL	15 1/8"	10 11/16"	4"
SND	7	SURFACE MOUNTED NAPKIN DISPOSAL	15 1/8"	10 11/16"	4"
DRY	8	ELECTRIC HAND DRYER	10 3/8"	11 5/8"	4"
PTD	9	SURFACE MOUNTED PAPER TOWEL DISPENSER	13 1/2"	10 3/16"	4 7/8"
SD	10	SURFACE MOUNTED SOAP DISPENSER	8 1/8"	4 3/4"	3 1/2"

SHEET NOTES

1. REFER TO D4-I-402 FOR TYPICAL MOUNTING HEIGHTS
2. REFER TO SPECIFICATIONS FOR ACCESSORY INFORMATION. ITEMS SHALL BE IN COMPLIANCE WITH ADA/ABA.
3. MOUNTING HEIGHTS OF GRAB BARS SHALL BE TO THE TOP OF THE GRAB SURFACE A.F.F..
4. MOUNTING HEIGHTS OF TOILET ACCESSORIES SHALL BE FROM THE BOTTOM OF THE UNIT A.F.F..
5. REFER TO D4-I-601 FOR GLAZED BLOCK WALL PATTERN.
6. REFER D4-A-600 FOR RESTROOM SIGNAGE.

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER TONY J. JOHNSON 12561 STATE OF TEXAS
07/20/2026



1 FIRST FLOOR RESTROOM ELEVATIONS
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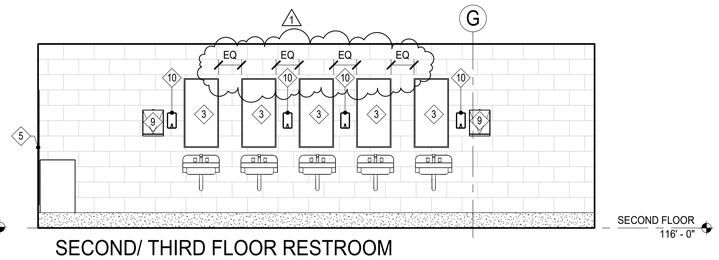

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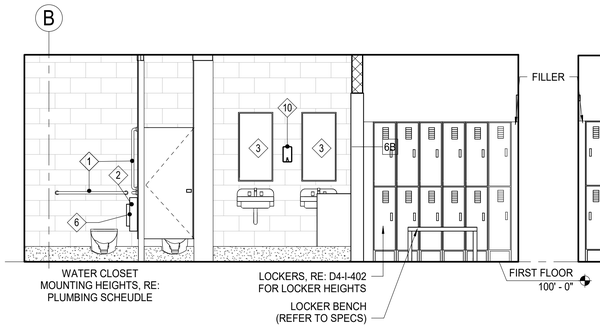

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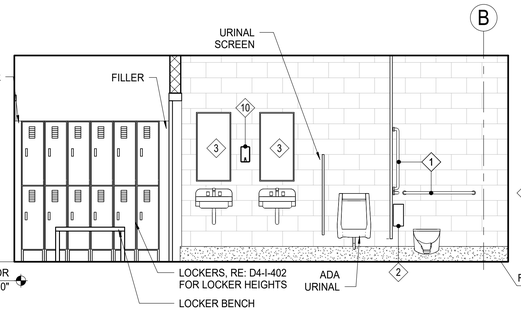
3/8" = 1'-0"



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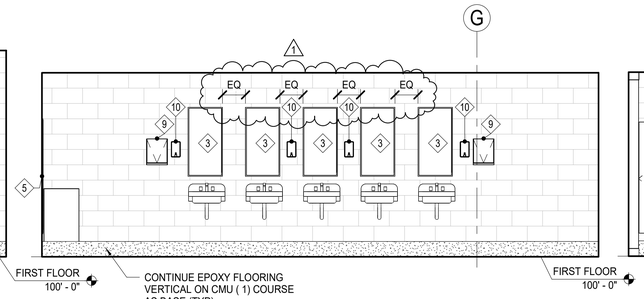
3/8" = 1'-0"



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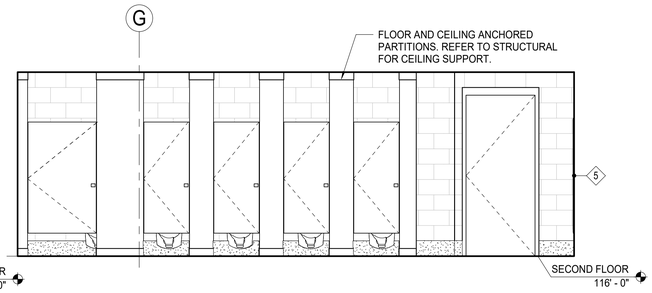

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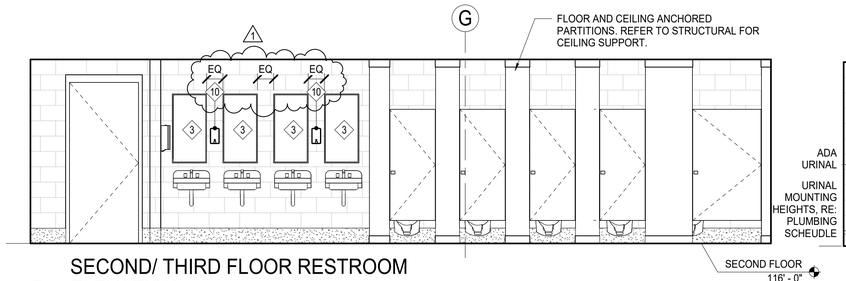

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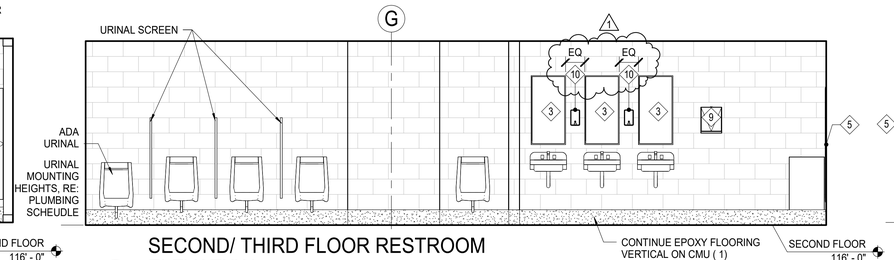

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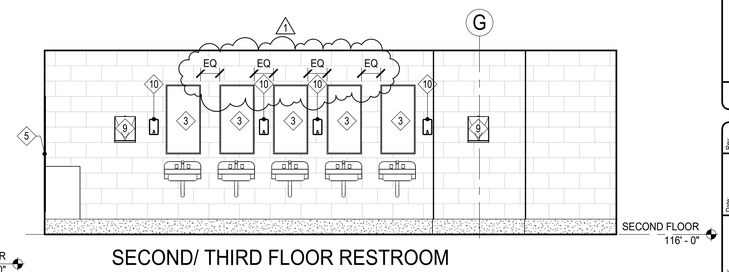

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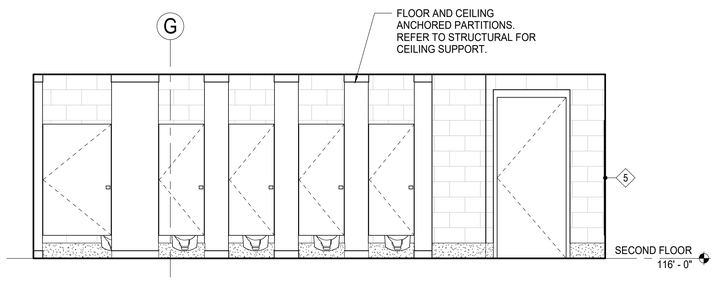

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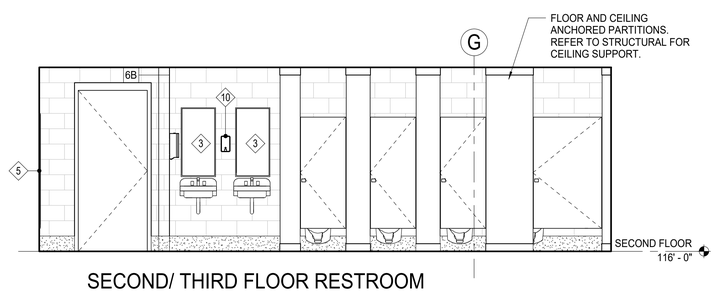

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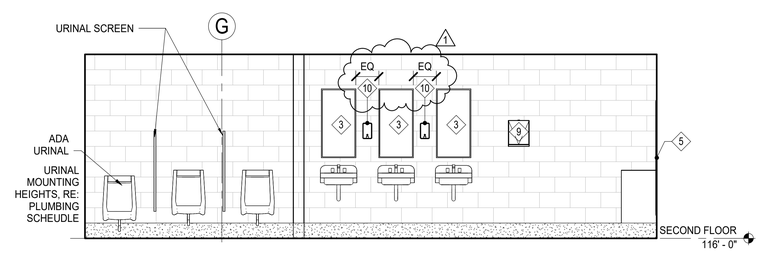
3/8" = 1'-0"



12 SECOND/ THIRD FLOOR RESTROOM ELEVATION
3/8" = 1'-0"

No.	Description	Date	Action
1	REVISED IAW AM0002	JULY 2026	

Designed by: A. RIVARD
Date: MAY 2025
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Rev.
Dwn by: T. JOHNSON
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Reviewed by: M. LEWIS
Submitted by: C. LANGUM
File name:
Plot date: 7/16/2026 12:04:55 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

INTERIOR ELEVATIONS

Sheet reference number
D4-I-403
Sheet of

Cont'd No.

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COLOR AND MATERIAL SELECTIONS

FLOORING

CARPET TILE (CPT)
CPT-1
SIZE: 24" x 24" CARPET TILES, NON DIRECTIONAL PATTERN AND INSTALLATION METHOD, COLOR: TIDAL

LUXURY VINYL TILE (LVT)
LVT-1
LUXURY VINYL TILE, 22 MIL, PATTERN: ASHLAR, SIZE:25CM X 1M; COLOR: LIGHT GREY,

LVT-2
LUXURY VINYL TILE, 22 MIL, PATTERN: ASHLAR, SIZE: 25CM X 1M; COLOR; MEDIUM BLUE-GREY,

LVT-3
LUXURY VINYL TILE, 22 MIL, PATTERN: ASHLAR, SIZE: 25CM X 1M; COLOR: DARK GRAY

EPOXY FLOORING (EPX)
EPX-1
STANDARD FLAKE BLENDS, DECORATIVE FLAKES SYSTEMS, COLOR: MIX OF LIGHT GREY, MEDIUM GREY AND LIGHT GREY/BLUE

POLYURETHANE RESINOUS FLOORING (POLY)
POLY-1
STONCLAD UT - STEEL GRAY

POLY-2
STONCLAD UT- PEWTER

VINYL COMPOSITION TILE (VCT)
VCT-1
STANDARD EXCELON VINYL COMPOSITION TILE, 12" X 12" COLOR CLASSIC WHITE 51911

VINYL SHEET FLOORING (VS)
VS-1 NOT USED

VS-2
SHEET VINYL, 6'-6"X100 LF ROLL; COLOR: NAVY BLUE, WELD ROD COLOR: TO COORDINATE WITH SHEET VINYL COLOR

VS-3
SHEET VINYL, 6'-6" X 100LF ROLL; COLOR: LIGHT GREY, WELD ROD COLOR: TO COORDINATE WITH SHEET VINYL COLOR

ENTRY MAT (MAT)
MAT-1
WITH CARPET INSERTS. SIZE: RE: D4-I-104 & STRUCTURAL DRAWINGS; FRAME COLOR: MIL FINISH, INSERT COLOR: MIX OF DARK NAVY, NAVY AND GREY

SEALED CONCRETE (SC)
SC-1
CLEAR CONCRETE SEALER; INSTALL: BROOM FINISH; COLOR: CLEAR

WALL FINISHES

PAINT (P)
P-1 NOT USED
P-2 NOT USED
P-3 NOT USED
P-4 RGB: 132, 133,133
P-5 NOT USED

WALL FINISHES

P-6 RGB: 241, 242, 238
P-7 NOT USED
P-8 RGB: 209, 188, 168, RE: SPECS
P-9 RGB: 70, 69, 68, RE: SPECS

FIBER REINFORCED PANELS (FRP)
FRP-1 FRP; COLOR: WHITE, TEXTURED FINISH

GLAZED BLOCK (GLB)
GLB-1 COLOR: WHITE, RE: SPECS
GLB-2 COLOR: BLUE, RE: SPECS
GLB-3 COLOR: LIGHT GRAY, RE: SPECS

GROUT: RE: SPECS, COLOR: LIGHT GRAY

ACOUSTIC PANELS (AP)
AP-1
VINYL PANEL,WOVEN BACK, PATTERN: RANDOM MATCH, REVERSE HANG, SIZE: 13OZ, 52"-54" X 50 YD, RE: DETAILS 2 & 3/ D4-I-601,COLOR: LIGHT GRAY

AP-2
VINYL PANEL,WOVEN BACK, PATTERN: RANDOM MATCH, REVERSE HANG, SIZE: 13OZ, 52"-54" X 50 YD, RE: DETAILS 2 & 3/ D4-I-601, COLOR: MEDIUM GREY

HIGH BUILD EPOXY COATING (HBC)
HBC-1
HIGH PERFORMANCE, HIGH SOLIDS, HIGH GLOSS, PIGMENTED WALL SYSTEM, SIZE:10 MIL THICKNESS; FINISH: HARD,SMOOTH, TILE-LIKE; COLOR: OFF WHITE.

BASE TREATMENTS

EPOXY FLOORING (EPX) - TO BE USED WITH THE EPOXY FLOORING

EPX-1 STANDARD FLAKE BLENDS, DECORATIVE FLAKES SYSTEMS; 4" HIGH EPOXY COVE BASE; COLOR: GREY

VINYL SHEET FLOORING (VS) - TO BE USED WITH VINYL SHEET FLOORING

VS-1 NOT USED

VS-2 SHEET VINYL, 4" HIGH RUBBER COVE BASE - WITH TOE; COLOR: NAVY BLUE WELD ROD COLOR: TO COORDINATE WITH SHEET VINYL

VS-3 SHEET VINYL, 4" HIGH RUBBER COVE BASE - WITH TOE; COLOR: LIGHT GREY;WELD ROD COLOR: TO COORDINATE WITH SHEET VINYL

BASE TREATMENTS

RESILIENT BASE (RB) - TO BE USED WITH CARPET, LUXURY VINYL TILE & SEALED CONCRETE FLOORING

RB-1 4" HIGH RUBBER COVE BASE - WITH TOE; COLOR: CHARCOAL

RB-2 4" HIGH RUBBER COVE BASE - WITH TOE; COLOR: NAVY

POLYURETHANE RESINOUS FLOORING (POLY) - TO BE USED WITH POLYURETHANE RESINOUS FLOORING

POLY-1 POLYURETHANE RESINOUS FLOORING WITH TOPCOAT URETHANE; COLOR: STEEL GRAY 8"H

POLY-2 POLYURETHANE RESINOUS FLOORING WITH TOPCOAT URETHANE; COLOR: PEWTER 8"H

CEILING FINISHES

ACOUSTIC TILE CEILING (ACT)
ACT-1 2'-0" X 2'-0" CEILING TILE, FINE FISSURED, COLOR: WHITE; 15/16" EXPOSED TEE SUSPENSION SYSTEM; COLOR: WHITE

PAINTED CEILING (P)
P-6 RGB: 241, 242, 238
SHEEN IN RESTROMS: EGGSHELL

HIGH BUILD EPOXY COATING (HBC)
HBC-1
HIGH PERFORMANCE, HIGH SOLIDS, HIGH GLOSS, PIGMENTED WALL SYSTEM, SIZE:10 MIL THICKNESS ;FINISH: HARD,SMOOTH, TILE-LIKE; COLOR: OFF WHITE.

FIBER REINFORCED PANELS (FRP)
FRP-1 COLOR: BRIGHT WHITE, TEXTURED FINISH

MISCELLANEOUS FINISHES

SOLID SURFACE (SS)

SS-1
SOLID SURFACE; SIZE: 13MM THICKNESS, SLAB SIZE: 60" x 144", RE: FLOOR PLAN AND DETAILS; COLOR: OFF-WHITE (WINDOW SILLS AND COUNTERTOPS)

SS-2
QUARTZ; SIZE:1.18" THICKNESS; SLAB COLOR: PRAA SANDS, WATERSTONE COLLECTION

PLASTIC LAMINATE (PLAM)
PLAM-1 FINISH: TEXTURED GLOSS, INSTALL: VERTICAL GRAIN, COLOR: CHERRY

TOILET PARTITIONS (TP)
TP-1 BLACK CORE PHENOLIC; GRAPHITE

CORNER GUARD (CG)
CG-1 STAINLESS STEEL CORNER GUARDS; 3" WINGS

MISCELLANEOUS FINISHES

KITCHEN CORNER CRASH RAIL (CR)
CR-1 ALUMINUM CRASH RAIL, COLOR: CLEAR ANODIZED ALUMINUM

WALL GUARD (WG)
WG-1 CRASH RAIL; FINISH:STAINLESS STEEL; SIZE: 5-1/2" TALL

FIRE EXTINGUISHER CABINETS
PAINT TO MATCH SURROUNDING WALL

WALL SWITCH HANDLES, STANDARD RECEPTACLE BODIES AND ELECTRICAL DEVICE COVER PLATES WHITE

SIGNAGE
BACKGROUND: BRUSHED ALUMINUM; MORE INFORMATION ON SIGNAGE TYPES, D4-I-604

LOCKERS
DOUBLE TIER LOCKER, FRAME HEIGHT: 66", FRAME WIDTH:12". FRAME DEPTH: 15", TWO DOORS PER FRAME; COLOR FOR FRAME AND DOORS: GREY

LOCKER BENCH
LOCKER BENCH; SIZE: 36"w x 9-1/2"d x 17-3/4"h; WOODEN SEAT COLOR: CLEAR GLOSS; PEDESTAL COLOR: GREY

INTERIOR DOOR AND WINDOW FRAMES AND PAINTED STAIR PARTS
P-8 COLOR: RGB 209 188 168

INTERIOR METAL DOORS, INTERIOR PAINTED METAL (HANDRAILS)
P-8 COLOR: RGB 209 188 168

TRAFFIC DOORS
CHASE DOORS, COLOR:TO MATCH ADJACENT SURFACES

EXTERIOR DOORS, DOOR FRAMES AND WINDOW FRAMES
MATCH CURTAIN WALL AND GLAZED ASSEMBLIES, SEE SPEC SECTION 084400

FRP DOORS
COLOR: TAN OR MATCH SIMILAR

EXTERIOR PAINTED METAL COMPONENTS INDICATED ON DRAWINGS
PAINT TO MATCH METAL PANEL, COLOR DARK BRONZE

METAL STAIR NOSING (MSN)
MSN-1 RE:7 / D4-I-502 , COLOR: SILVER METALLIC

RUBBER RISER (RR)
RR-1 COLOR- MATCH TO ADJACENT WALL BASE. OCCURS AT RISER'S PLATFORM ON CLASSROOMS ONLY.

WALL PROTECTION PANEL (WP)
WP-1 WALL PROTECTION, HIGH IMPACT, PVC FREE, RIGID SHEET; SUEDE TEXTURE, SIZE: .040" THICK, COLOR; GRAY

FIXED CLASSROOM SEATING:
SEAT: POLY FINISH, PLASTIC SEAT SHELL, COLOR: BLUE GREY
SEAT BASE: BASE SEATING, POWDERCOATED, COLOR: BLUE GREY

FIXED CLASSROOM SEATING AND WORKSURFACE (BLUE SCHEME):
SEAT: IRWIN SEATING COMPANY, MODEL #650; MOLDED PLASTIC SEAT COLOR #211 GALAXY BLUE; METAL COLOR BLACK

WORKSURFACE: IRWIN SEATING COMPANY; MODEL #900; HIGH WEAR PLASTIC LAMINATE TOP; WILSONART # 4630-60 CLOUD NEBULA; PVC T-MOLD EDGE: BLACK ; METAL COLOR: BLACK

MODESTY PANEL: HIGH PRESSURE LAMINATE COLOR: BLUE GREY

ELEVATOR REFER TO SPECS FOR FINISHES

EXTERIOR FINISHES

STANDING SEAM METAL ROOF (SSMR)
COLOR: DARK BRONZE, RE: SPECS, (ROOF / GUTTERS / DOWNSPOUTS / DOORS AND FRAMES / WINDOW FRAMES) MATCH ADJACENT DCF2 BUILDING

INSULATED METAL WALL PANELS (IMWP)
RE: SPECS (METAL WALL PANELS, COMPOSITE METAL PANELS AND LOUVERS). MATCH ADJACENT DCF2 BUILDING

PRECAST CONCRETE
SMOOTH FINISH, COLOR: RE: SPECS. MATCH ADJACENT DCF2 BUILDING

PRECAST CONCRETE
PRESSURE WASH, LIGHT AGGREGATE FINISH, COLOR: RE: SPECS. MATCH ADJACENT DCF2 BUILDING

PRECAST CONCRETE
SANDBLAST-COURSE PATTERN, COLOR: RE: SPECS. MATCH ADJACENT DCF2 BUILDING

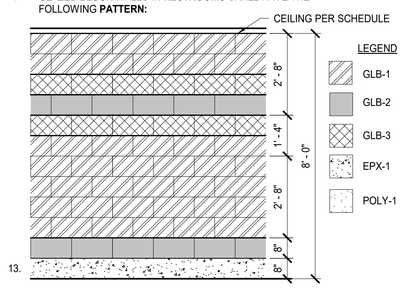
CT-1 CERAMIC TILE
EQUAL TO FIRECLAY TILE 3" X 3" MATTE FINISH, STRAIGHT SET, SHEETED NATURAL PRESS, COLOR PEARL

ABBREVIATIONS

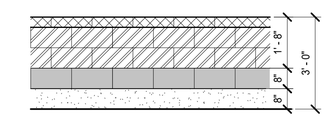
AFF	ABOVE FINISHED FLOOR
ALSF	ALUMINUM STOREFRONT
AP	ACOUSTIC PANEL
ATC	ACOUSTIC TILE CEILING
BR	BUMPER RAIL
CB	CEMENT BOARD
CMU	CONCRETE MASONRY UNIT
CG	CORNER GUARD
CJ	CONTROL JOINTS
CLW	COOLER WALL
CPT	CARPET TILE
CR	CRASH RAIL
CT	CERAMIC TILE
DCF	DINING CLASSROOM FACILITY
EPX	EPOXY
EXP	EXPOSED STRUCTURE
FRP	FIBER REINFORCED PANELS
GLB	GLAZED BLOCK
GN	GENERAL NOTE
GWB	GYPSUM WALL BOARD
HBC	HIGH BUILD EPOXY COATING
LL	LOCKER
LVT	VINYL COMPOSITION TILE
MANUF	BY MANUFACTURER
MAT	ENTRY MAT
MG	METAL GRATE
N/A	NOT APPLICABLE
P	PAINT
PC	PRECAST CONCRETE
PL	PLASTIC LETTERS
PLAM	PLASTIC LAMINATE
POLY	POLYURETHANE
PR	PAPER RAIL
RB	RESILIENT BASE
SC	SEALED CONCRETE
SP	SLIDING PARTITIONS
SS	SOLID SURFACE
TP	TOILET PARTITIONS
VS	VINYL SHEET
WB	WHITE BOARD
WC	WALLCOVERING
WG	WALLGUARD
WPM	WATERPROOF MEMBRANE

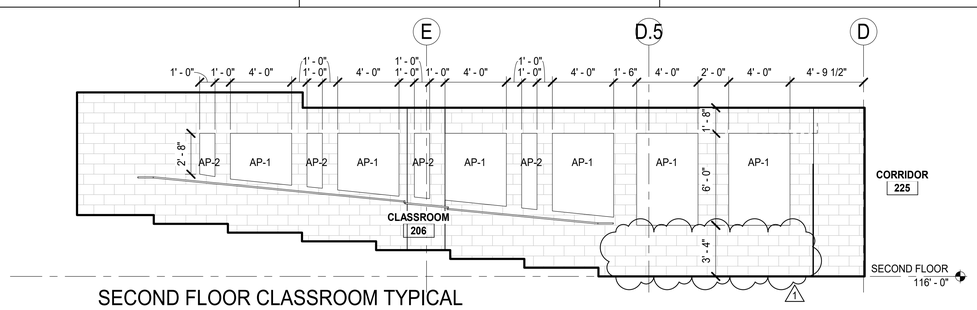
SHEET NOTES

1. THE PRODUCTS FURNISHED SHALL MEET THE COLOR, TEXTURE, AND PATTERN INDICATED AS WELL AS THE MATERIAL QUALITY AND PERFORMANCE SPECIFIED IN THE APPLICABLE TECHNICAL SPECIFICATIONS.
2. VISIBLE GRILLES, DIFFUSERS, AND OTHER MECHANICAL RELATED FINISH OPENING DEVICES INCLUDING FIRE ALARMS SHALL BE PAINTED TO MATCH THE COLOR OF THE ADJACENT SURFACE.
3. REFER TO APPROPRIATE ARCHITECTURAL AND INTERIOR DRAWINGS AND DETAILS TO PROPERLY ASSESS THE FULL EXTENT OF WORK REQUIRED. SPECIFICALLY REFER TO THE REFLECTED CEILING PLANS, AND BUILDING SECTIONS TO DETERMINE HEIGHTS OF REQUIRED WALL MATERIALS, SPECIAL CONDITIONS AND STRUCTURES, ETC.
4. REFER TO EXTERIOR ELEVATIONS FOR EXTERIOR FINISH SELECTIONS.
5. INSTALL CORNER GUARDS (CG-1) UP TO 72" ABOVE TOP OF COVE BASE ON ALL EXTERIOR CORNERS OF GYP BOARD WALLS ON THE GROUND FLOOR. DO NOT PLACE COVE BASE ON TOP OF METAL ANGLE CORNER GUARD. FOR INSTANCES WHERE THERE IS A CORNER GUARD AND COVE BASE, OMIT RUBBER FLOOR BASE.
6. PAINT ALL SOFFIT AND OVERHEAD CONDITIONS P-6. PAINTED GYPSUM BOARD CEILINGS TO HAVE EGGSHELL FINISH IN TOILET ROOMS AND LAUNDRY ROOMS. ALL OTHER GYPSUM BOARD CEILINGS TO HAVE FLAT FINISH UNO.
7. FRP1 PANELS TO EXTEND TO CEILING. REFERENCE FLOOR FINISH PLANS AND PARTITION TYPES DRAWINGS FOR WALLS TO RECEIVE FRP PANELS.
8. FRP IS NOT REQUIRED BEHIND STAINLESS STEEL WALL BACKING PANEL IN KITCHEN. SEE KITCHEN EQUIPMENT ELEVATION DRAWINGS FOR EXTENT OF STAINLESS STEEL WALL BACKING PANEL.
9. CRASH RAILS (CR-1) SHALL BE INSTALLED IN WAREWASH ROOMS REFER TO SHEET D4-I-104 FOR LOCATIONS .
10. WALL GUARDS (WG-1) SHALL BE INSTALLED ON ALL FRP WALLS IN KITCHEN. REFER D4-I-501 & D4-I-602.
11. REFER TO 1/D4-I-104 FOR LOCATION AND DIMENSION OF MAT-1.
12. CRASH RAILS SHALL BE INSTALLED IN KITCHEN, BOTTOM OF CRASH RAIL, RE: 5, 6 & 7/D4-I-501
13. GLAZED BLOCK WALLS IN **RESTROOMS** SHALL HAVE THE FOLLOWING **PATTERN:**

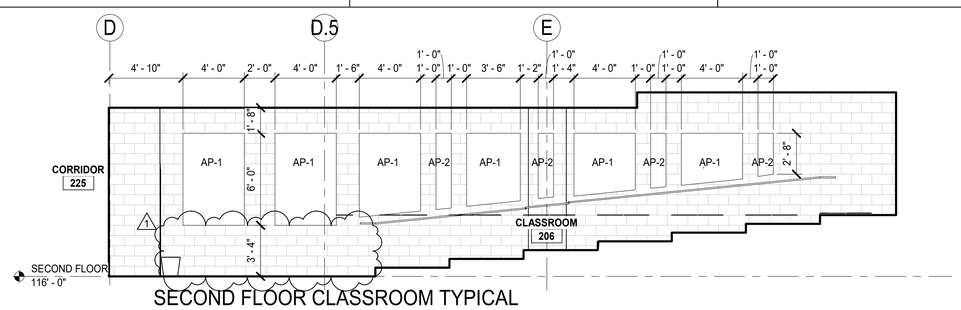


13. GLAZED BLOCK WALLS IN **SERVING LINE** SHALL HAVE THE FOLLOWING **PATTERN:** BACK SIDE OF SERVING LINE (FACING KITCHEN) SHALL BE FRP-1. BASE SHALL BE GLAZED BLOCK ON SERVING LINE SIDE AND POLYURETHANE ON SIDE WITH FRP FINISH.





SECOND FLOOR CLASSROOM TYPICAL WEST ELEVATION
2
1/4" = 1'-0"



SECOND FLOOR CLASSROOM TYPICAL EAST ELEVATION
3
1/4" = 1'-0"

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER TORI J. JOHNSON 12561 STATE OF TEXAS
07/20/2026

No.	Description	Date	Action	O.D. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: A. RIVARD
Date: MAY 2025
Solicitation No.: W9126G26RA020
Rev.
Dwn by: T. JOHNSON
Contract No.:
Reviewed by: M. LEDOUX
File name:
Plot date: Thursday 7:07:46 PM
Submitted by: C. LANGUM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, CONTRACT DOCUMENTS FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS DINING CLASSROOM FACILITY (DCF4)
MPSL220527

FINISH SELECTIONS

Sheet reference number
D4-I-601
Sheet of

Cover No.

7/16/2026 12:07:48 PM

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR	BASE	WALL FINISH NORTH	WALL FINISH EAST	WALL FINISH SOUTH	WALL FINISH WEST	CEILING MATERIAL	CEILING FINISH	GENERAL NOTES
Not Placed										
172	Room									
173	EXTERIOR YARD									
202A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
208A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
FIRST FLOOR										
100A	STAIR A1	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
100B	STAIR B1	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
100C	STAIR C1	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
100D	STAIR D1	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
101	LOBBY	VS-2/ VS-3	RB-1	P-6	P-6	P-6	P-6	GWB/ACT-1	P-6/NA	
102	SEATING	VS-2/ VS-3	RB-1	P-6	P-6	P-6	P-6	GWB/ACT-1	P-6/NA	
103	SEATING	VS-2/VS-3/MAT-1	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
104	SEATING	VS-2/ VS-3	RB-1	P-6	P-6	P-6	P-6	GWB/ACT-1	P-6/NA	
105	SEATING	VS-2/VS-3	RB-1	P-6	P-6	P-6	P-6	GWB/ACT-1	P-6/NA	
106	SEATING	VS-2/ VS-3	RB-1	P-6	P-6	P-6	P-6	GWB/ACT-1	P-6/NA	
107	SEATING	VS-2/VS-3/MAT-1	RB-1	P-6	P-6	P-6	P-6	GWB/ACT-1	P-6/NA	
108	SERVING LINE 1	POLY-1	POLY-1	FRP-1/GLB-1,2,3	FRP-1	FRP-1	FRP-1 - GLB-1,2,3	GWB	P-6	
109	SERVING LINE 2	POLY-1	POLY-1	FRP-1/GLB-1,2,3	FRP-1/GLB-1,2,3	FRP-1	FRP-1	GWB	P-6	
110	SERVING LINE 3	POLY-1	POLY-1	FRP-1/GLB-1,2,3	FRP-1	FRP-1	FRP-1 - GLB-1,2,3	GWB	P-6	
111	SERVING LINE 4	POLY-1	POLY-1	FRP-1/GLB-1,2,3	FRP-1/GLB-1,2,3	FRP-1	FRP-1	GWB	P-6	
112	COMM.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
113	HALLWAY	SC	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
114	ELEC.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
115	ELEV. EQ.	POLY-2	POLY-2	P-6	P-6	P-6	P-6	EXP	NA	EXTEND POLY-2 8" UP WALL
116	ELEV.	-	-	-	-	-	-	-	-	SEE SPECS
117	WOMEN	EPX-1	EPX-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
118	MEN	EPX-1	EPX-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
119	EXIT	VS-2/MAT-1	VS-2	GLB-1	P-6	P-6	P-6	GWB	P-6	
120	WAREWASH	POLY-2	POLY-2	GLB-1	FRP-1	GLB-1	FRP-1/GLB-1	CB	FRP-1	
121	ENTRY	VS-2 / MAT-1	VS-2	P-6	P-6	P-6	P-6	GWB	P-6	
122	EXIT	SC/ MAT-1	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
124	EXIT	SC / MAT-1	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
125	ENTRY	VS-2 / MAT-1	VS-2	P-6	P-6	P-6	P-6	GWB	P-6	
126	EXIT	VS-2 / MAT-1	VS-2	GLB-1	P-6	P-6	P-6	GWB	P-6	
127	WAREWASH	POLY-2	POLY-2	GLB-1	GLB-1/FRP-1	GLB-1	FRP-1	CB	FRP-1	
129	WOMEN	EPX-1	EXP-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
130	MEN	EPX-1	EXP-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
131	JAN.	SC	RB-1	P-6	P-6	P-6	P-6	GWB	NA	
132	ELEC.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
133	DISPENSARY	LVT-3	RB-1	P-6	P-6	P-7	P-6	ACT-1	NA	
134	EXAM	VCT-1	RB-1	P-6	P-6	P-3	P-6	ACT-1	NA	
135	EXAM	VTC-1	RB-1	P-4	P-6	P-6	P-6	ACT-1	NA	
136	EXAM	VTC-1	RB-1	P-4	P-6	P-6	P-6	ACT-1	NA	
137	COMM.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
138	HALLWAY	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
139	OFFICE	POLY-2	POLY-2	P-6	P-6	P-6	P-6	ACT-1	NA	
140	LOUNGE	POLY-2	POLY-2	P-6	P-6	P-6	P-6	ACT-1	NA	
141	M LOCKER	POLY-2	POLY-2	P-6	P-6	P-6	P-4	GWB	P-6	
141A	MEN	POLY-2	POLY-2	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
142	W LOCKER	POLY-2	POLY-2	P-6	P-4	P-6	P-6	GWB	P-6	
142A	WOMEN	POLY-2	POLY-2	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
143	HALLWAY	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
144	CHEMICAL STORAGE	POLY-2	POLY-2	P-6	P-6	P-6	P-6	GWB	P-6	
145	NON-FOOD STORAGE	POLY-2	POLY-2	P-6	P-6	P-6	P-6	GWB	P-6	
146	JAN.	POLY-2	POLY-2	P-6	P-6	P-6	P-6	EXP	NA	
147	RECYCLE	POLY-2	POLY-2	P-6	P-6	P-6	P-6	GWB	P-6	
148	ENTRY	POLY-2	POLY-2	P-9	P-9	P-6	P-6	GWB	P-6	
149	CAN WASH	POLY-2	POLY-2	HBC-1	HBC-1	HBC-1	HBC-1	CB	HBC-1	
150	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
151	ELEC.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
152	KITCHEN	POLY-1	POLY-1	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
153	POT WASH	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	CB	FRP-1	
154	POT STOR.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
155	PRODUCTION	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
156	PREP.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
157	CART STOR.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
158	PREP.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
159	PREP.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
160	PASTRY PREP.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
161	DRY STORAGE	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
162	PREP.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
163	COOK'S BOX	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	MANUF	-	
164	COOK'S BOX	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	MANUF	-	
165	REFRIGERATOR	POLY-2	POLY-2	P-6	P-6	P-6	P-6	MANUF	P-6	
166	THAW	POLY-2	POLY-2	P-6	P-6	P-6	P-6	MANUF	-	

FOR CEILING HEIGHTS RE: D4-A-114 & D4-A-115

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR	BASE	WALL FINISH NORTH	WALL FINISH EAST	WALL FINISH SOUTH	WALL FINISH WEST	CEILING MATERIAL	CEILING FINISH	GENERAL NOTES
167	FREEZER	POLY-2	POLY-2	P-6	P-6	P-6	P-6	MANUF	-	
168	VEG PREP.	POLY-2	POLY-2	FRP-1	FRP-1	FRP-1	FRP-1	GWB	P-6	
169	BEV ROOM	POLY-2	POLY-2	P-6	P-6	P-6	P-6	GWB	P-6	
170	STOR.	POLY-2	POLY-2	P-6	P-6	P-6	P-6	GWB	P-6	
171	DRY CLEANER EXCHANGE	POLY-2	POLY-2	P-6	P-6	P-6	P-6	ACT-1	NA	
SECOND FLOOR										
200A	STAIR A2	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
200B	STAIR B2	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
200C	STAIR C2	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
200D	STAIR D2	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
201	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7/ AP-1 / AP-2	ACT-1	NA	
201A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
201B	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
201C	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
202	CLASSROOM	CPT-1	RB-2	P-6	P-7/ AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
202B	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
203	CLASSROOM	CPT-1	RB-2	P-6	P-7/ AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
203A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
203B	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
204	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
204A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
204B	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
204C	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
205	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
205A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
205B	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
206	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
206A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
206B	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
206C	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
207	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
207A	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
207B	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
207C	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
208	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
208B	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
212	COMM.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
213	ELEC.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
216	ELEV.	-	-	-	-	-	-	-	-	SEE SPECS
217	WOMEN	EPX-1	EPX-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
218	MEN	EPX-1	EPX-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
219	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
220	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
221	CORRIDOR	LVT-2 / LVT-1	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
222	CORRIDOR	LVT-2 / LVT-1	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
225	CORRIDOR	LVT-2 / LVT-1	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
226	CORRIDOR	LVT-2 / LVT-1	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
227	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
228	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
229	WOMEN	EPX-1	EXP-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
230	MEN	EPX-1	EXP-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
231	JAN.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
232	ELEC.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
233	COMM.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
235	ATTIC SPACE	NA	NA	NA	NA	NA	NA	EXP	NA	
236	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
237	ATTIC SPACE	NA	NA	NA	NA	NA	NA	EXP	NA	
238	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
239	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
240	ATTIC SPACE	NA	NA	NA	NA	NA	NA	EXP	NA	

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER
TONY J. JOHNSON
12561
STATE OF TEXAS
07/20/2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: A. RIVARD
Date: MAY 2025
Rev:
Dwn by: T. JOHNSON
Solicitation No.: W9126G25RA020
Reviewed by: M. COSTO
Contract No.:
Submitted by: C. LANGUM
File name:
Plot date: (scale 1:1 on this file)
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

FINISH SCHEDULE

Sheet reference number
D4-I-602
Sheet of

Cont No.

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ROOM FINISH SCHEDULE CONTINUED

ROOM NO.	ROOM NAME	FLOOR	BASE	WALL FINISH NORTH	WALL FINISH EAST	WALL FINISH SOUTH	WALL FINISH WEST	CEILING MATERIAL	CEILING FINISH	GENERAL NOTES
THIRD FLOOR										
300A	STAIR A3	SC	RB-1	P-6	P-6	P-6	P-6	EXP	P-6	EXP / 1HR RATED CEILING
300B	STAIR B3	SC	RB-1	P-6	P-6	P-6	P-6	EXP	P-6	EXP / 1HR RATED CEILING
300C	STAIR C3	SC	RB-1	P-6	P-6	P-6	P-6	EXP	P-6	EXP / 1HR RATED CEILING
300D	STAIR D3	SC	RB-1	P-6	P-6	P-6	P-6	EXP	P-6	EXP / 1HR RATED CEILING
301	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
301A	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
301B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
301C	MECH	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
302	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
302B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
303	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
303A	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
303B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
304	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
304A	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
304B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
304C	MECH	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
305	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
305A	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
305B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
306	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
306A	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
306B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
306C	MECH	SC	RB-1	P-6	P-6	P-6	P-6	EXP	NA	
307	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
307A	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	P-6	NA	
307B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	P-6	NA	
307C	MECH	SC	RB-1	P-6	P-6	P-6	P-6	P-6	NA	
308	CLASSROOM	CPT-1	RB-2	P-6	P-7 / AP-1 / AP-2	P-6	P-7 / AP-1 / AP-2	ACT-1	NA	
308B	STORAGE	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
312	COMM.	SC	RB-1	P-6	P-6	P-6	P-6	-	-	
313	ELEC.	SC	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
316	ELEV.	-	-	-	-	-	-	-	-	SEE SPECS
317	WOMEN	EPX-1	EPX-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
318	MEN	EPX-1	EPX-1	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GLB-1,2,3	GWB	P-6	
319	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
320	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
321	CORRIDOR	LVT-2 / LVT-5	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
322	CORRIDOR	LVT-2 / LVT-5	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
323	CORRIDOR	LVT-2 / LVT-5	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
324	CORRIDOR	LVT-2 / LVT-5	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
327	COMM.	SC	RB-1	P-6	P-6	P-6	P-6	-	-	
328	ELEC.	SC	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
329	JAN.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	
330	WOMEN	EPX-1	EPX-1	GLB-1	GLB-1	GLB-1	GLB-1	GWB	P-6	
331	MEN	EPX-1	EPX-1	GLB-1	GLB-1	GLB-1	GLB-1	GWB	P-6	
332	MECH.	SC	RB-1	P-6	P-6	P-6	P-6	GWB	P-6	
333	STOR.	SC	RB-1	P-6	P-6	P-6	P-6	ACT-1	NA	

FOR CEILING HEIGHTS RE: D4-A-118

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER
TONY J. JOHNSON
12561
STATE OF TEXAS
07/20/2026

No.	Description	Date	Dwn.	Ckd.	Appd.
1	REVISED IAW AM0002	JULY 2026			

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CONTRACT DOCUMENTS
FORT WORTH, TEXAS

Designed by: A. RIVARD
Date: MAY 2025
Rev.
Dwn by: T. JOHNSON
Solicitation No.: W9126G26RA020
Contract No.
Reviewed by: J. LEWIS
Submitted by: C. LANGUM
File name:
Plot date: 7/20/2026 12:44 PM
Plot scale: 1:1

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

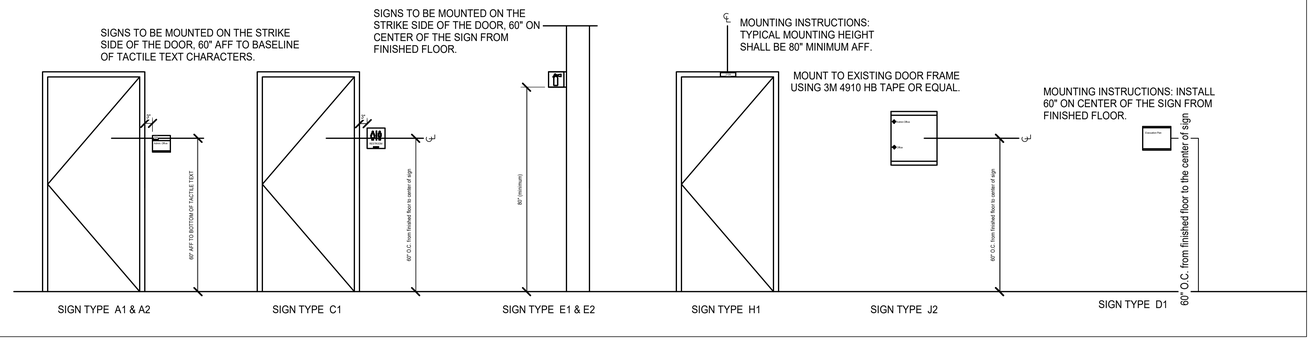
FINISH SCHEDULE

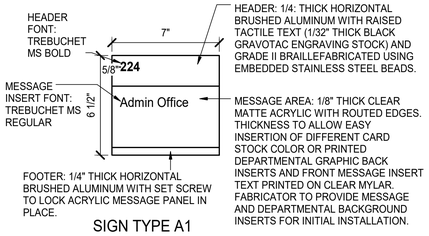
Sheet reference number
D4-I-603
Sheet of

Cont No.

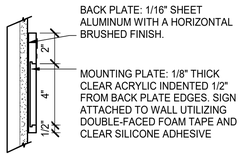
7/20/2026 12:44:56 PM

TYPICAL SIGN MOUNTING HEIGHT ELEVATION VIEW:



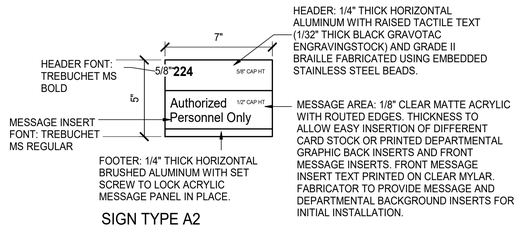


SIGN TYPE A1

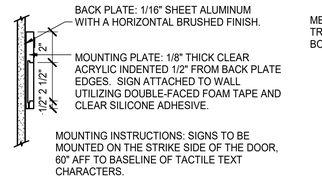


SIDE VIEW

PRIMARY ROOM IDENTIFICATION

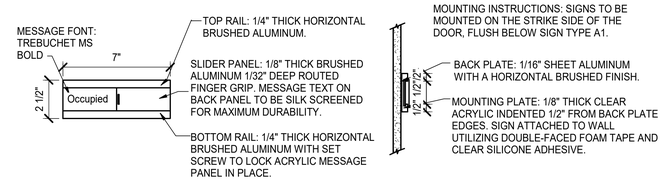


SIGN TYPE A2



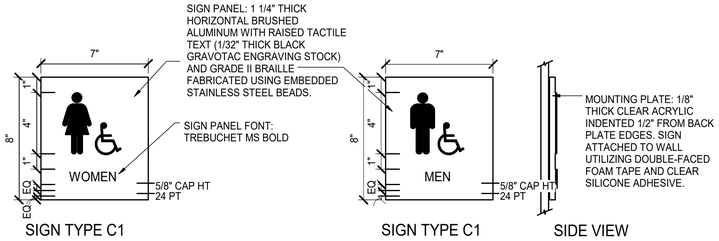
SIDE VIEW

SECONDARY ROOM IDENTIFICATION



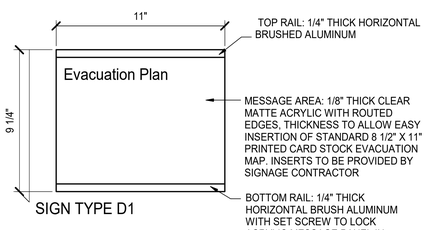
SIGN TYPE B3 SIDE VIEW

OPTIONAL "IN-USE" SLIDER



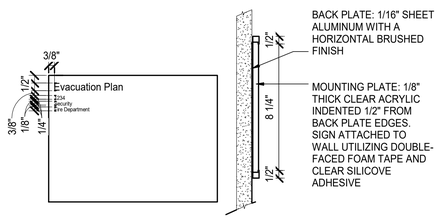
SIGN TYPE C1 SIGN TYPE C1 SIDE VIEW

RESTROOMS

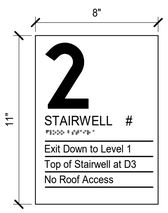


SIGN TYPE D1

EVACUATION MAP



SIDE VIEW

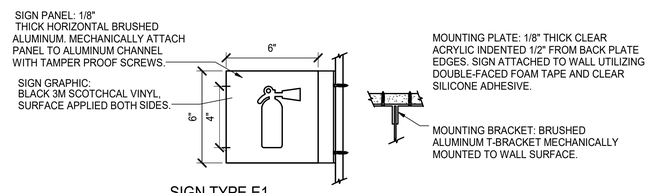


SIGN TYPE D2

STAIRWELLS

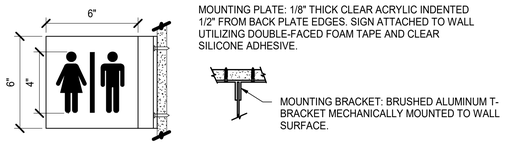
SIGN TYPE D3

EVACUATION



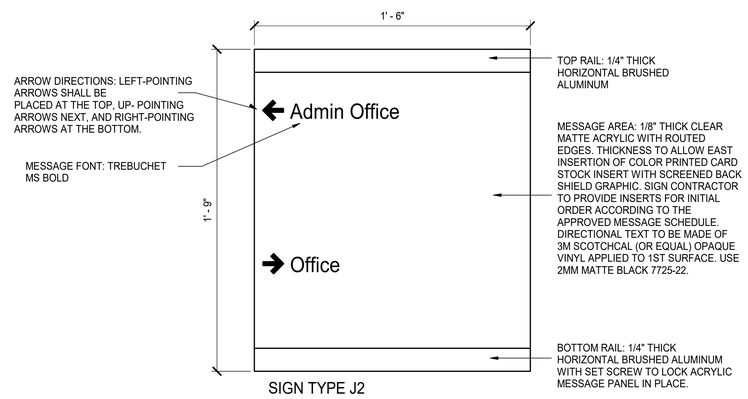
SIGN TYPE E1 TOP VIEW

FLAG MOUNTED



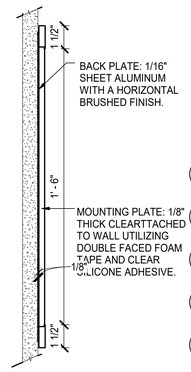
SIGN TYPE E2 TOP VIEW

FLAG MOUNT RESTROOM UNISEX

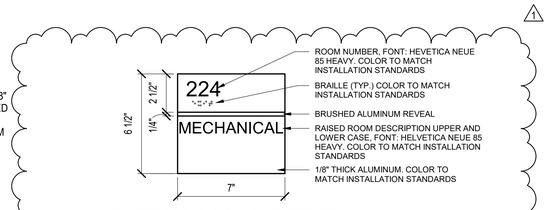


SIGN TYPE J2

SMALL WALL MOUNTED DIRECTIONALS



SIDE VIEW



EXTERIOR ROOM IDENTIFIERS

2 SIGN TYPE H3

1 SIGNAGE TYPES

3" = 1'-0"

US Army Corps of Engineers
Fort Worth District

REGISTERED INTERIOR DESIGNER
TONI J. JOHNSON
12561
STATE OF TEXAS
07/20/2026

No.	Description	Date
1	REVISED IAW AM0002	JULY 2026

Action | O.O. No.

Designed by: A. RIVARD
Date: MAY 2025
Rev:
Dwn by: T. JOHNSON
Solicitation No.: W9126G25RA020
Contract No.:
Reviewed by: M. ASOTO
File name:
File date: 7/16/2026 4:44:54 PM
Submitted by: C. LANGUM
File scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPSL220527

SIGNAGE TYPES

Sheet reference number
D4-I-604
Sheet of

Card No.

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SHEETNOTES

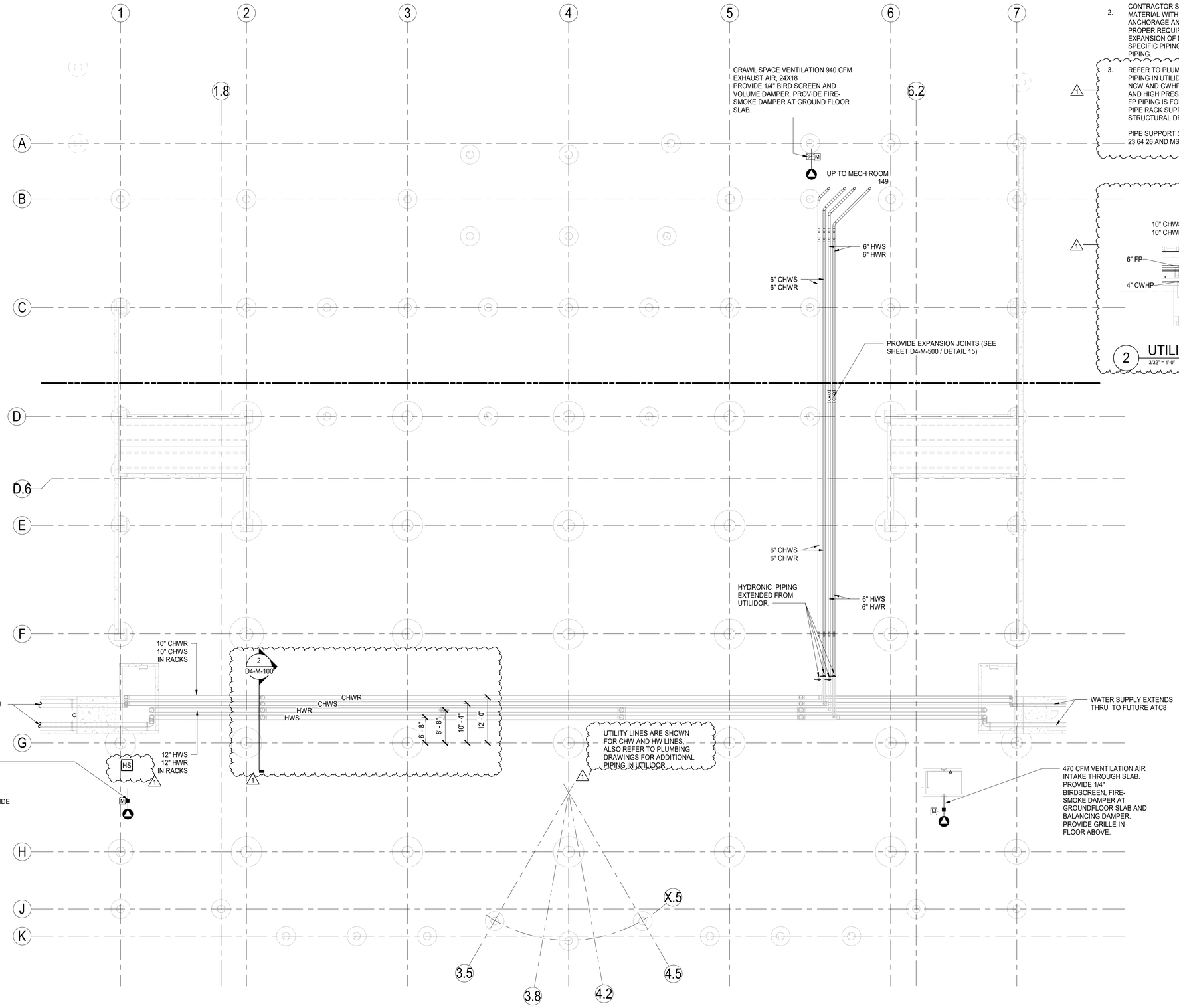
1. REFER TO PLUMBING AND FIRE PROTECTION DRAWINGS FOR ADDITIONAL PIPING IN CRAWLSPACE.
2. CONTRACTOR SHALL REFERENCE PIPING MATERIAL WITH REGARDS TO PROPER ANCHORAGE AND SUPPORT. CONFIRM AND VERIFY PROPER REQUIREMENTS, SPACING AND EXPANSION OF MATERIAL AS REQUIRED FOR THE SPECIFIC PIPING USED, PRIOR TO INSTALLING THE PIPING.
3. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL PIPING IN UTILIDOR FOR CLARIFICATION. NCW AND CWHP ARE NON POTABLE COLD WATER AND HIGH PRESSURE COLD WATER. FP PIPING IS FOR FIRE PROTECTION. PIPE RACK SUPPORTS ARE SHOWN ON STRUCTURAL DRAWINGS.

   PIPE SUPPORT SPACING SHALL BE AS SPECIFIED IN 23 64 26 AND MSS SP -69

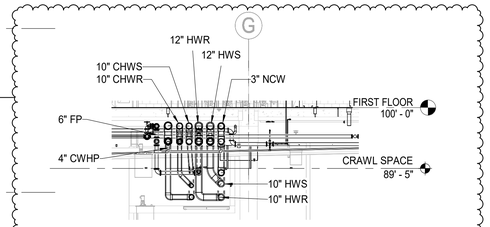
US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. 027885 DESIDERIO HERNANDEZ

JULY 20, 2026



1 OVERALL CRAWL SPACE HVAC & HYDRONIC PLAN
3/32" = 1'-0"



2 UTILIDOR PIPE SECTION
3/32" = 1'-0"

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HERNANDEZ
Date: MAY 2025
Rev.
Solicitation No.: W912GS26RA020
Contract No.:
Drawn by: M. TAYLOR
Reviewed by: M. KRUSER
Submitted by: C. LANGUM
File name:
Plot date: 7/20/2026 2:20:30 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

OVERALL CRAWL SPACE - HVAC & HYDRONIC PLAN

Sheet reference number
D4-M-100
Sheet of

Cover No.

7/20/2026 2:20:30 PM

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SHEET NOTES

1. VAV TERMINAL UNITS SHALL NOT BE INSTALLED AT A HEIGHT GREATER THAN 12 FEET AFF.
2. REFER TO PLUMBING DRAWINGS FOR CONDENSATE DRAINS.
3. COORDINATE WITH ELECTRICAL, COMMUNICATIONS AND ALL OTHER DISCIPLINES AS REQUIRED IN ORDER TO KEEP HVAC EQUIPMENT AND ASSOCIATED HYDRONIC PIPING FROM RUNNING ABOVE ANY ELECTRICAL/COMM EQUIPMENT.

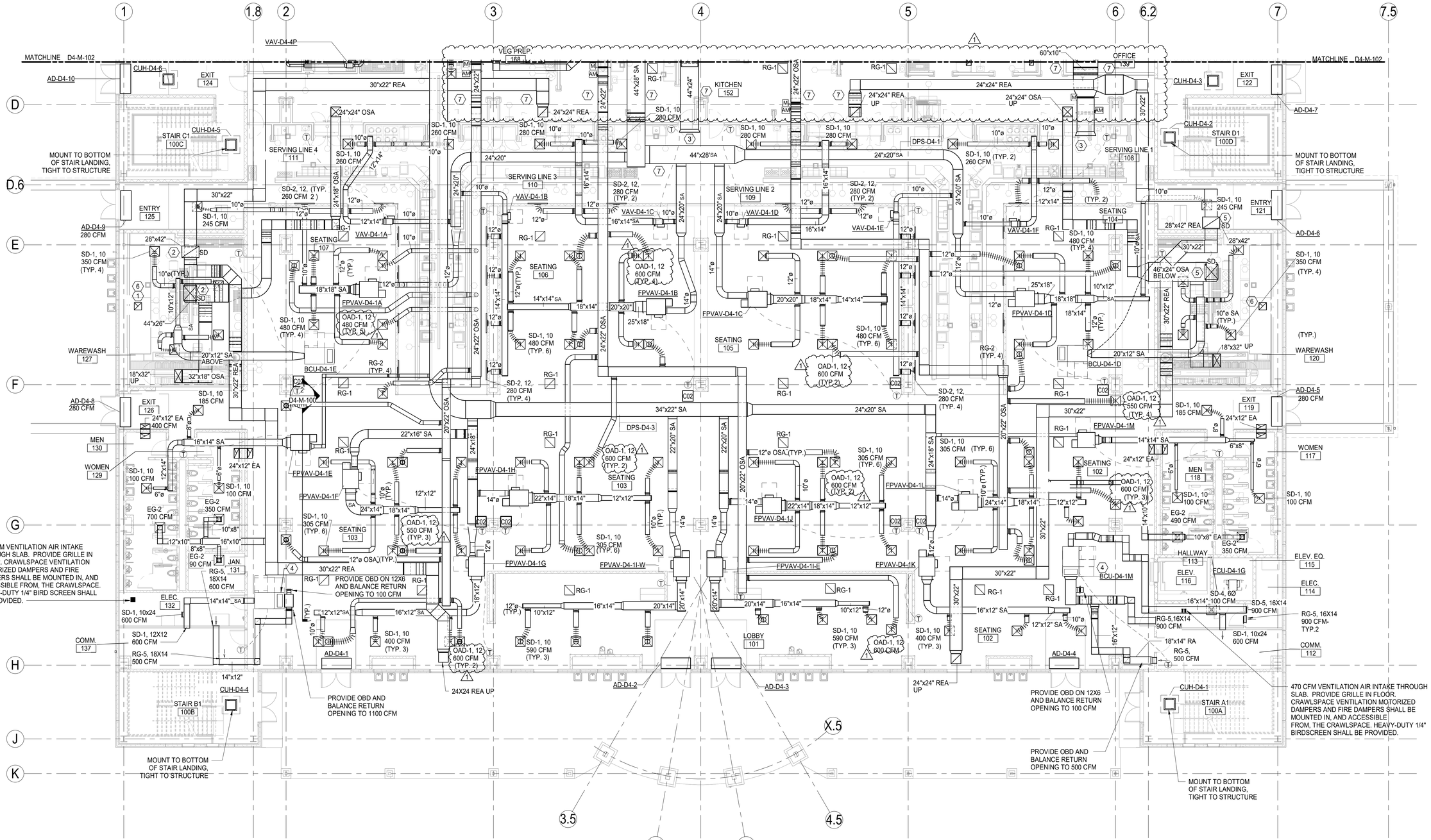
KEYNOTES

1. 18"X18" EXHAUST DUCT UP TO F-D4-1H ON LOW ROOF. PROVIDE CONDENSATE DRAIN CONNECTION AT HOOD.
2. SUPPLY AND RETURN DUCT UP TO ERV-2 UNIT MOUNTED ON ROOF ABOVE. SIZE NOTED PRIOR TO ENTRY INTO UNIT.
3. PROVIDE BELLMOUTH FITTING WITH 1/4" BIRD SCREEN OPEN TO PLENUM FOR RELIEF AIR.
4. REFER TO PLUMBING DRAWINGS FOR CONDENSATE DRAIN ROUTING.
5. SUPPLY AND RETURN DUCT UP TO ERV-3 UNIT MOUNTED ON ROOF A BOVE. SIZE NOTED PRIOR TO ENTRY INTO UNIT.
6. CONNECT 18" x 18" DUCT TO EXHAUST HOOD OVER CLIPPER MACHINE. COORDINATE WITH ACTUAL EQUIPMENT PROVIDED WHEN USING DIFFERENT MANUFACTURER FROM SPECIFIED EQUIPMENT. SEE SHEET D4-KA104 FOR KITCHEN EQUIPMENT PLAN.
7. DUCT TRANSITION TO AVOID STRUCTURE.

US Army Corps of Engineers
Fort Worth District

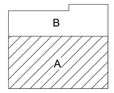
GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ

JULY 20, 2026



1 FIRST FLOOR HVAC PLAN- AREA A
1/8" = 1'-0"

PLAN NORTH



KEY PLAN

No.	Description	D.O. No.	Action	Date
1	REVISED IAW A0002			JULY 2026

Designed by: D. HERNANDEZ
Date: MAY 2025
Solicitation No.: W9126G25RA020
Contract No.:
Rev.
Drawn by: M. TAYLOR
Reviewed by: R. BURSEY
Approved by: C. LANGUM
File name:
Print date: 7/20/2026 2:20:37 PM
Print scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

FIRST FLOOR HVAC PLAN - AREA A

Sheet reference number
D4-M-101
Sheet of

Cont No.

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SHEET NOTES

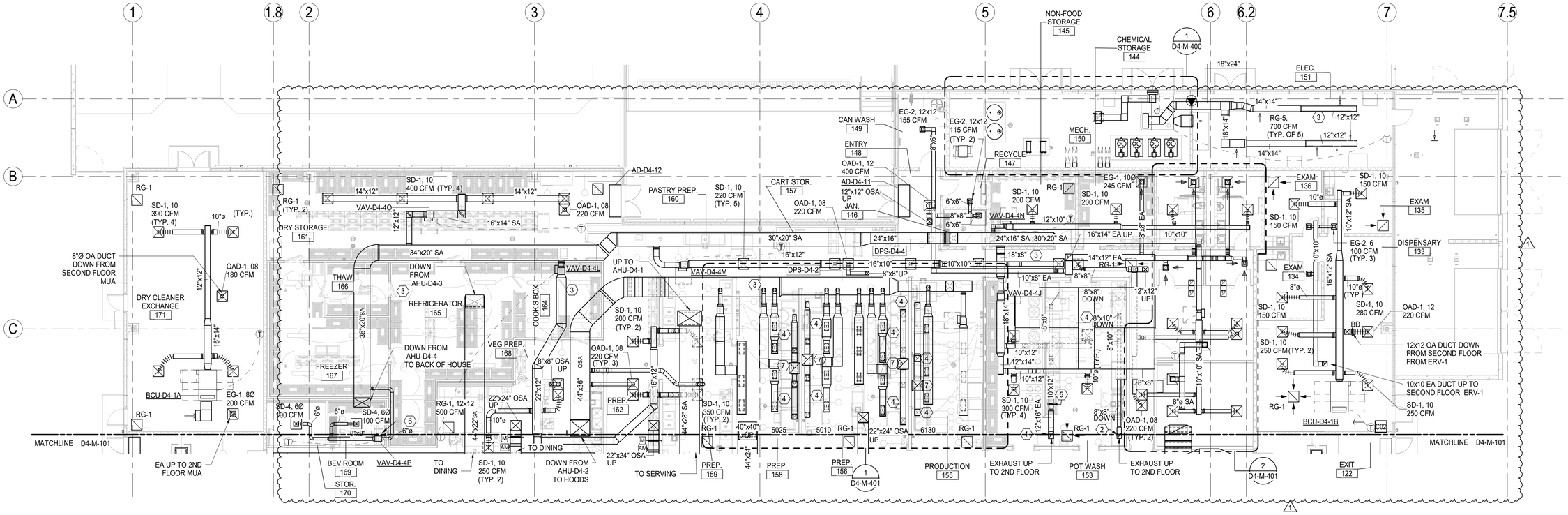
1. COORDINATE SUPPLY / EXHAUST AIRFLOWS AND EXHAUST FAN SIZE FOR KITCHEN & CONDENSATE HOODS WITH ACTUAL KITCHEN EQUIPMENT. COORDINATE WITH SHEET D4-KA104.
2. SEE EQUIPMENT BUILDING (EB) PACKAGE FOR ASSOCIATED, ESSENTIAL EQUIPMENT PROVIDED UNDER THAT CONTRACT.
3. REFER TO PLUMBING DRAWINGS FOR CONDENSATE DRAINS.
4. SLOPE EXHAUST DUCTS TO DRAIN. REFER TO SPECIFICATIONS.

KEYNOTES

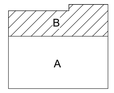
1. EXHAUST DUCT UP TO EF-D4-1E ON FLAT ROOF.
2. EXHAUST DUCT UP TO EF-D4-1F ON FLAT ROOF.
3. COORDINATE WITH ELECTRICAL, COMMUNICATIONS AND ALL OTHER DISCIPLINES AS REQUIRED IN ORDER TO KEEP HVAC EQUIPMENT AND ASSOCIATED HYDRONIC PIPING FROM RUNNING ABOVE ANY ELECTRICAL/COMM EQUIPMENT.
4. ALL DUCT SERVING KITCHEN HOODS SHALL COMPLY WITH SPECIFICATION SECTION 23.30.00, SECTION 3.2.6. COORDINATE ALL FIRE RATING ENCLOSURES/SHAFT ENCLOSURE WITH ARCHITECTURAL FLOOR PLAN. ALL DUCT CONSTRUCTION SHALL COMPLY WITH NFPA 96, UFC 3-410-01, ASHRAE HANDBOOK OF APPLICATIONS (CHAPTER 33, KITCHEN VENTILATION) AND INTERNATIONAL MECHANICAL CODE SECTION 506. DUCTS WILL BE INSTALLED WITH A MINIMUM SLOPE OF 1/4" PER LINEAR FOOT ON HORIZONTAL RUNS UP TO 75 FEET.
5. MANUAL DAMPER WITH REMOTE OPERATOR.
6. PROVIDE 30"x30" ACCESS PANEL FOR EQUIPMENT ACCESS
7. UL LISTED GREASE DUCT COMPONENTS ARE REQUIRED AT ALL GREASE EXHAUST OPENINGS, AND WITH-IN 18 INCHES OF THE DAMPER IN THE HOOD EXHAUST DUCT. PROVIDE A SUITABLE 20" x 20" OPENING FOR PERSONNEL ENTRY, OR AS LARGE AS POSSIBLE FOR CLEANING OF DUCT AT NO MORE THAN 12 FOOT INTERVALS.

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ
JULY 20, 2026



1 FIRST FLOOR HVAC PLAN - AREA B
1/8" = 1'-0"



KEY PLAN

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AN0002			JULY 2026

Designed by: D. HERNANDEZ
Dwn by: M. TAYLOR
Reviewed by: M. BUCKSKY, C. LANDUM
Date: MAY 2025
Solicitation No.: W9126G26RA020
Contract No.:
Rev:
File name:
Plot date: 15/2026 2:20:04 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IRSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

FIRST FLOOR HVAC PLAN - AREA B

Sheet reference number
D4-M-102
Sheet of

Cont No.

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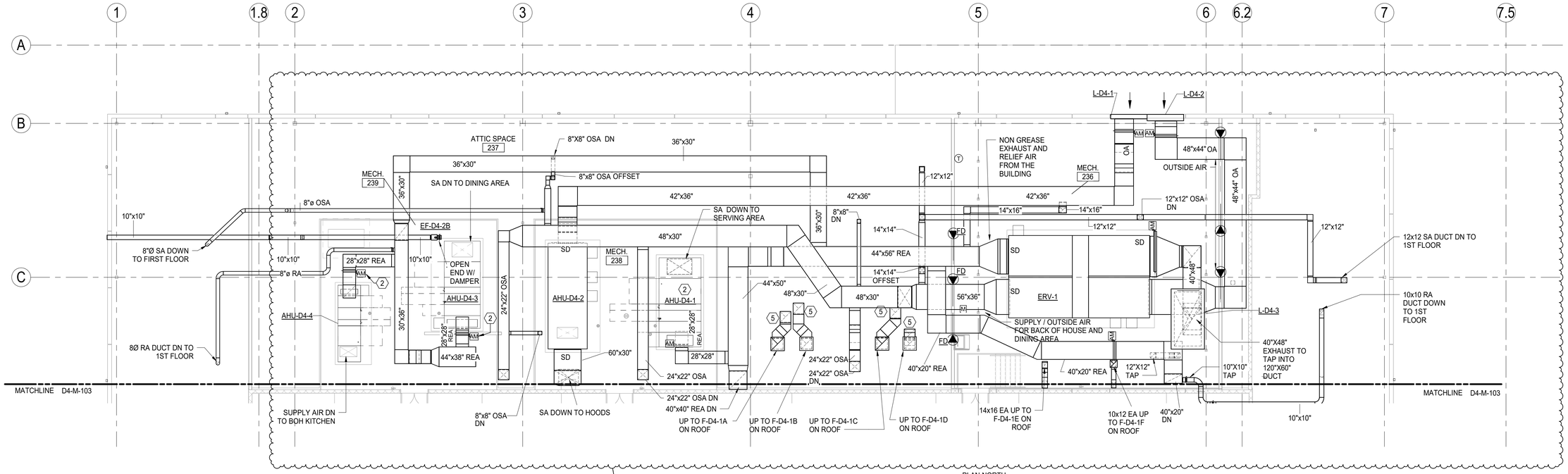
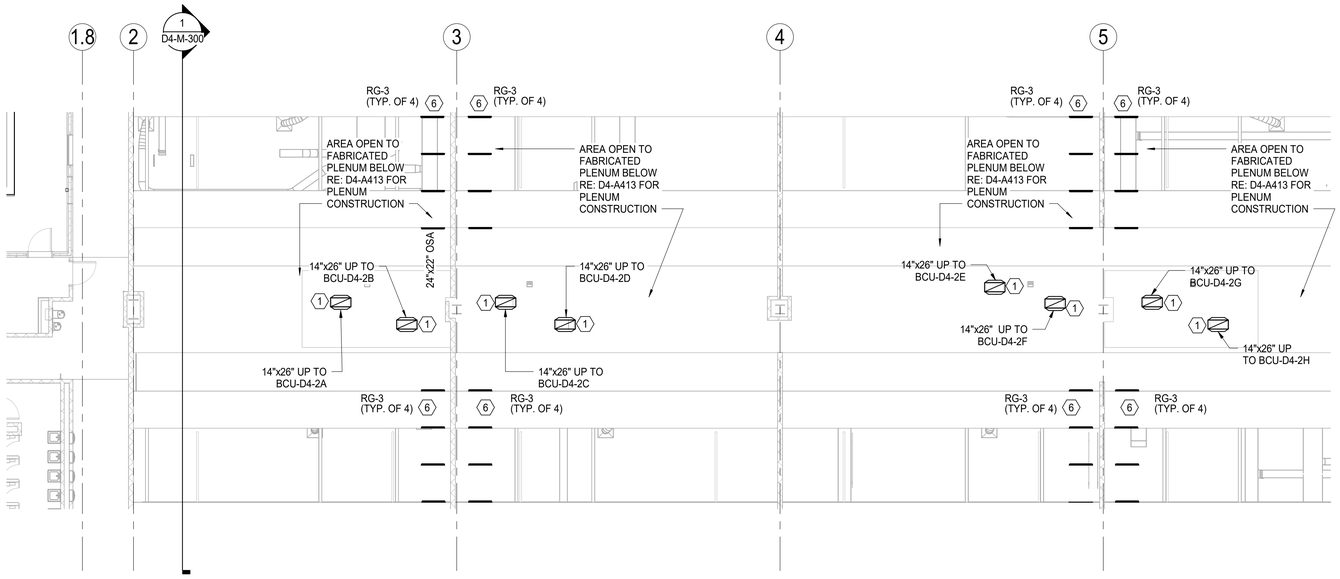


1 SECOND FLOOR HVAC PLAN- AREA B

1/8" = 1'-0"

PLAN NORTH



2 SECOND AND THIRD FLOOR CLASSROOM UNDERFLOOR HVAC

1/8" = 1'-0"

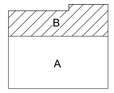
PLAN NORTH

SHEET NOTES

1. REFER TO PLUMBING DRAWINGS FOR CONDENSATE DRAINS.
2. PROVIDE ACCESS PER MANUFACTURER RECOMMENDATIONS AND INTERNATIONAL MECHANICAL CODE REQUIREMENTS TO ALL HVAC DAMPER AND APPURTENANCES AS REQUIRED. CONTRACTOR TO COORDINATE ON SITE AS REQUIRED.
3. COORDINATE DUCT ROUTING WITH ALL OTHER DISCIPLINES.

KEYNOTES

1. RETURN AIR DUCT FROM PLENUM UP TO BCU. SEE SHEET D4-M300 FOR SECTION VIEW. SEE ARCHITECTURAL SHEETS FOR PLENUM COORDINATION. TYPICAL FOR SECOND AND THIRD FLOOR.
2. INSTALL AIRFLOW MONITOR PER MANUFACTURER RECOMMENDATIONS, INCLUDING DUCT DIAMETERS REQUIRED UPSTREAM AND DOWNSTREAM AND ACCESS FOR MAINTENANCE.
3. INSTALL FCU MINIMUM OF 8'-0" A.F.F. COORDINATE EQUIPMENT CLEARANCES AS REQUIRED ON SITE.
4. FIELD COORDINATION REQUIRED. CONTRACTOR IS RESPONSIBLE FOR FINAL COORDINATION OF ACCESS PANEL LOCATIONS PER FIELD CONDITIONS TO PROVIDE ACCESS TO SERVICE MOTORIZED DAMPERS AS REQUIRED BY CODE.
5. FIELD COORDINATION REQUIRED. CONTRACTOR IS RESPONSIBLE FOR FINAL COORDINATION OF ACCESS PANEL LOCATIONS TO BE INSTALLED ON KITCHEN GREASE EXHAUST DUCT AT ALL CHANGES OF DIRECTION, AND/OR AT 20 FOOT INTERVALS OF DUCT RUN. ACCESS PANEL WILL BE CONSTRUCTED PER NFPA 96 REQUIREMENTS.
6. RETURN AIR GRILLE LOCATED IN RASIED FLOOR ABOVE.



KEY PLAN

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ

JULY 20, 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW A00002	JULY 2026		

Designed by: D. HERNANDEZ
Date: MAY 2025
Rev:
Dwn by: M. TAYLOR
Solicitation No.: W9126G25RA020
Contract No.:
Reviewed by: J. SOLANO
Submitted by: C. LANDUM
File name:
Plot date: 7/20/26 2:20:42 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

SECOND FLOOR - AREA B - AND SECOND FLOOR UNDER STAIRWELL HVAC PLAN

Sheet reference number
D4-M-104
Sheet of

Cont No.

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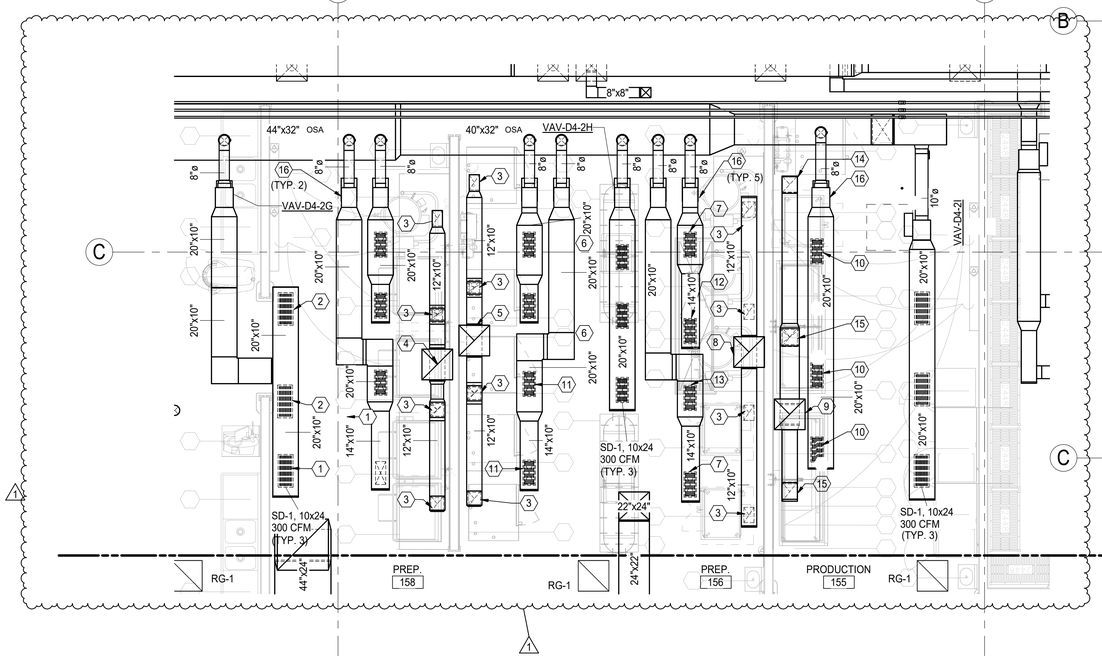
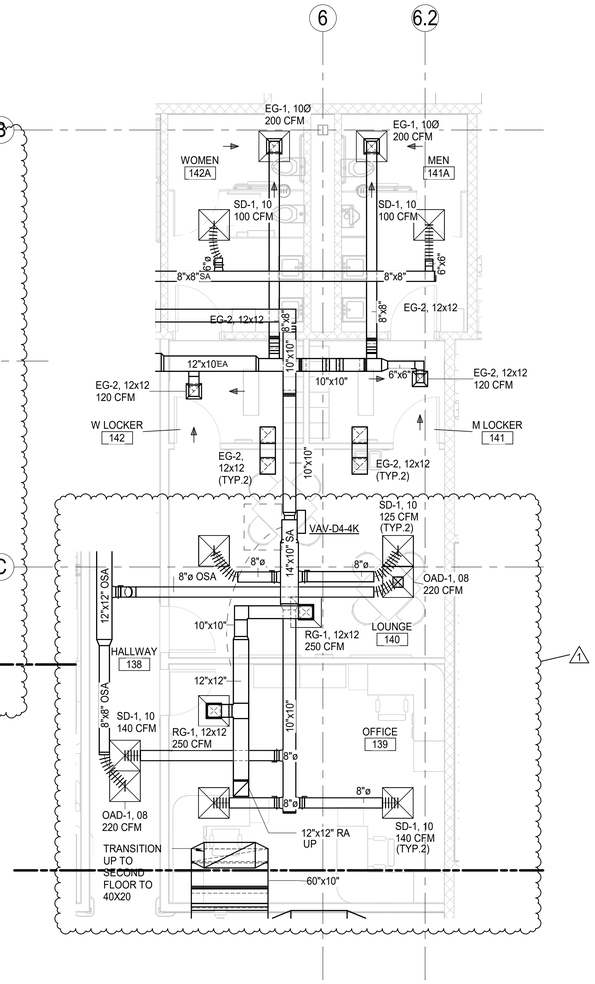


1 ENLARGED KITCHEN HVAC PLAN
1/4" = 1'-0"



2 ENLARGED EMPLOYEE RESTROOMS AND LOUNGE
1/4" = 1'-0"

SHEET NOTES

1. COORDINATE EXHAUST DUCT ROUTING THRU ROOF WITH STRUCTURE.
2. REFER TO FLOW DIAGRAMS FOR MORE INFORMATION.
3. FOR CLASSROOM MECHANICAL ROOMS, REFERENCE ALSO SHEET D4-M300.
4. COORDINATE HOOD CONNECTION AND AIRFLOWS WITH SHEET D4-KA104. VERIFY SUPPLY AIR AND EXHAUST AIR DAMPER OPERATION SO THAT SUPPLY AIR DAMPERS WILL MODULATE BASED ON EXHAUST AIR OPERATION AS SENSED BY AIRFLOW SENSOR USED BY THE EXHAUST AIR FLOW MONITOR. VERIFY OPERATION WITH KITCHEN EQUIPMENT SUBMITTED.
5. CONFIRM AND VERIFY INSTALLATION OF KITCHEN HOOD SHALL BE SECURED TO STRUCTURE, AND THAT ADEQUATE SUPPORT IS PROVIDED TO SUPPORT THE WEIGHT OF WORKMEN TO MAINTAIN THE DEVICES AS REQUIRED ABOVE THE HOOD.

KEYNOTES

1. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 720 CFM AT FULL OPEN POSITION. ADJUSTABLE PER MANUFACTURERS REQUIREMENTS.
2. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 720 CFM AT FULL OPEN POSITION. ADJUSTABLE PER MANUFACTURERS REQUIREMENTS.
3. TRANSITION HOOD EXHAUST COLLAR TO 12x10 EXHAUST AIR DUCT AS REQUIRED.
4. 24x24 EXHAUST DUCT UP TO EXHAUST FAN F-D4-1A ON THE ROOF. TRANSITION EXHAUST AIR DUCT TO THE EXHAUST FAN AS REQUIRED.
5. 24x24 EXHAUST DUCT UP TO EXHAUST FAN F-D4-1B ON THE ROOF. TRANSITION EXHAUST AIR DUCT TO THE EXHAUST FAN AS REQUIRED.
6. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 720 CFM AT FULL OPEN POSITION. ADJUSTABLE PER MANUFACTURERS REQUIREMENTS.
7. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 720 CFM AT FULL OPEN POSITION.
8. 24x24 UP TO EXHAUST DUCT UP TO EXHAUST FAN EF-D4-1C ON THE ROOF. TRANSITION EXHAUST AIR DUCT TO THE EXHAUST FAN AS REQUIRED.
9. 24x24 EXHAUST DUCT UP TO EXHAUST FAN F-D4-1D ON THE ROOF. TRANSITION EXHAUST AIR DUCT TO THE EXHAUST FAN AS REQUIRED.
10. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 1200 CFM AT FULL OPEN POSITION. ADJUSTABLE PER MANUFACTURERS REQUIREMENTS.
11. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 720 CFM AT FULL OPEN POSITION. ADJUSTABLE PER MANUFACTURERS REQUIREMENTS.
12. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 720 CFM AT FULL OPEN POSITION. ADJUSTABLE PER MANUFACTURERS REQUIREMENTS.
13. CONTROL DAMPER LOCATED JUST ABOVE DUCT CONNECTION TO HOOD. BALANCE TO 720 CFM AT FULL OPEN POSITION. ADJUSTABLE PER MANUFACTURERS REQUIREMENTS.
14. TRANSITION HOOD EXHAUST COLLAR TO 14 x12 EXHAUST AIR DUCT AS REQUIRED.
15. TRANSITION HOOD EXHAUST COLLAR TO 15x15 EXHAUST AIR DUCT AS REQUIRED.
16. KITCHEN SUPPLY VAV UNIT TO BE PROVIDED BY KITCHEN HOOD MANUFACTURER. LOCATED ABOVE HOOD AND TO SUPPLY AIR AS REQUIRED TO HOOD.

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ

JULY 20, 2026

No.	Description	Action	D.O. No.	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HERNANDEZ
Date: MAY 2025
Rev.
Drawn by: M. TAYLOR
Solicitation No.: W9126G25RA020
Contract No.:
Reviewed by: J.SOCARRAS
Submitted by: C. LANGUM
File name:
Plot date: Volume Volume
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH ATTN: CESWF-PE-D FORT WORTH, TEXAS

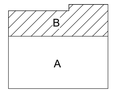
MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

ENLARGED MECHANICAL PLANS

Sheet reference number
D4-M-401
Sheet of



KEY PLAN

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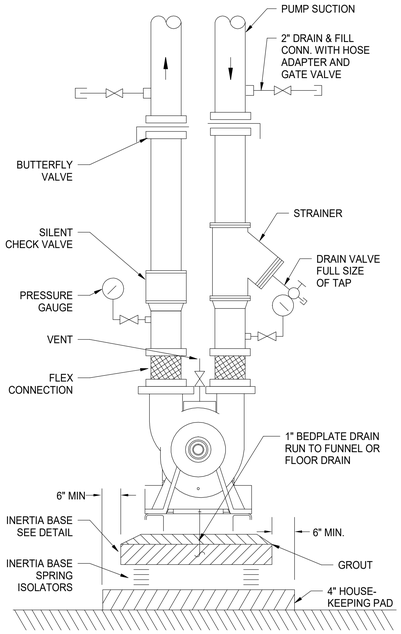
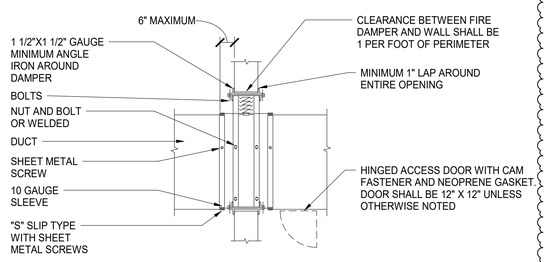
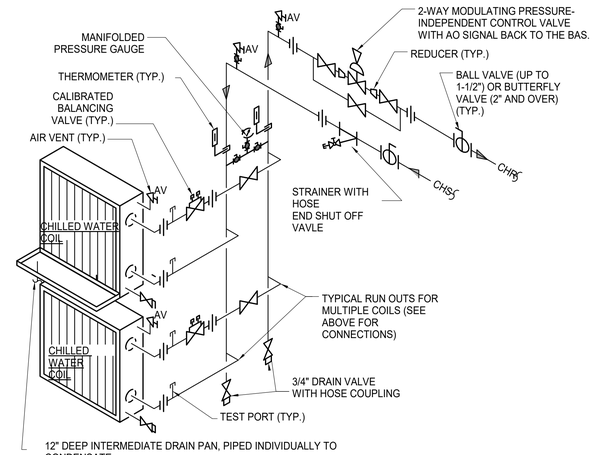


1 DOUBLE SUCTION HORIZONTAL SPLIT CASE PUMP
N.T.S.



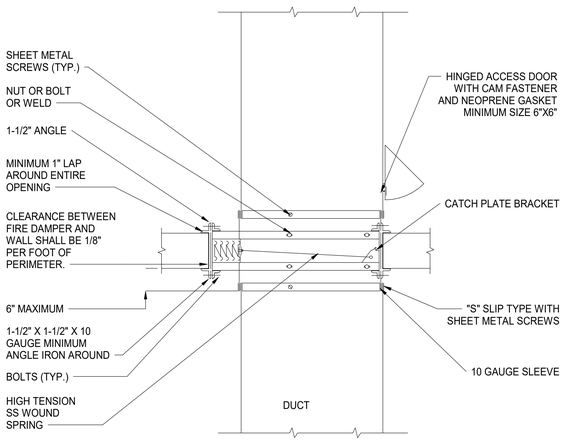
NOTE
1. PROVIDE FIRE DAMPER FOR ROUND DUCT OR USE TRANSITIONS FOR ROUND TO SQUARE DUCT.

2 FIRE DAMPER DETAIL
N.T.S.



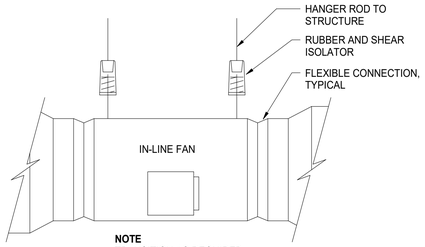
NOTES:
1. INSTALL PIPING SUCH THAT COIL PULL DOES NOT REQUIRE REMOVAL OF PIPING.
2. STACKED COILS SHOWN, BUT SINGLE COIL SIMILAR. INSTALL ALL COMPONENTS, BUT FOR ONE COIL.

3 ERV AND AHU STACKED WATER COIL DETAIL
N.T.S.



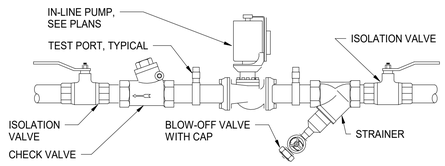
NOTES:
PROVIDE FIRE DAMPER FOR ROUND DUCT OR USE TRANSITIONS FOR ROUND TO SQUARE DUCT.

4 VERTICAL FIRE DAMPER DETAIL
N.T.S.



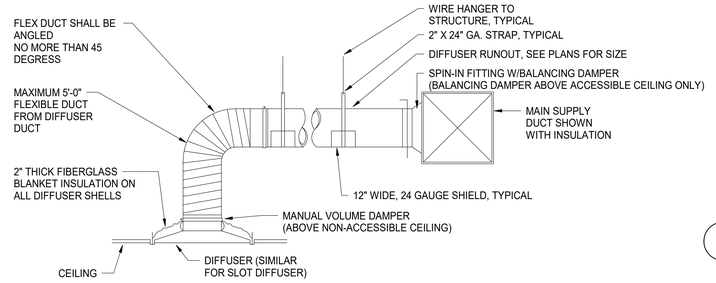
NOTE
TRANSITION AS REQUIRED

5 IN-LINE FAN DETAIL
N.T.S.



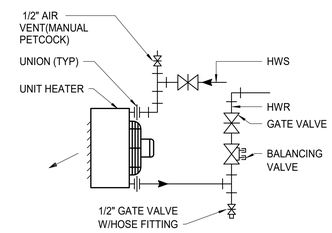
NOTE
ISOLATION VALVES ARE BALL VALVES (UP TO 1-1/2").
BUTTERFLY VALVES (2" AND OVER)

6 IN-LINE PUMP DETAIL
N.T.S.

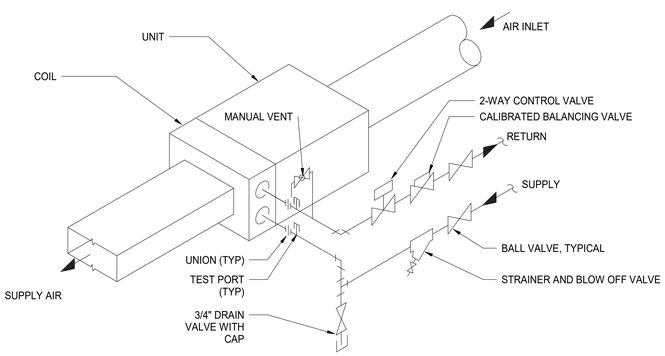


NOTE
1. PROVIDE SUPPORT ON ALL FLEX DUCT RUNOUTS.
2. PROVIDE BALANCING DAMPER ON ALL DUCT BRANCH CONNECTIONS.

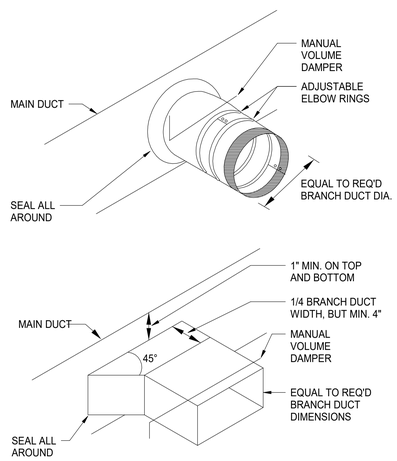
7 DUCT TAKE-OFF DETAIL
N.T.S.



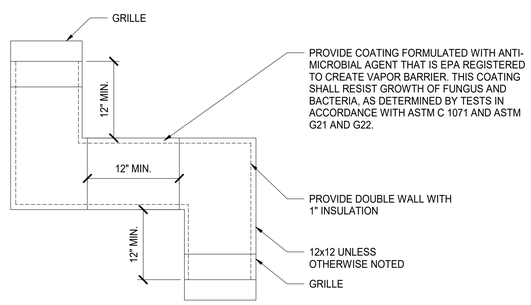
8 HORIZONTAL HOT WATER UNIT HEATER DETAIL
N.T.S.



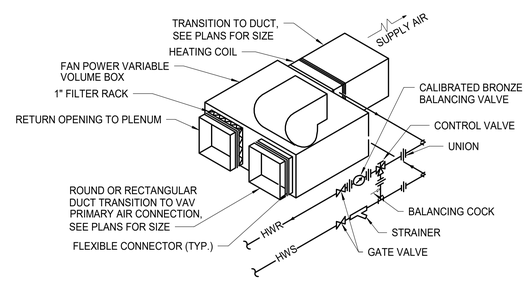
9 TYPICAL HYDRONIC 2-WAY COIL DETAIL
N.T.S.



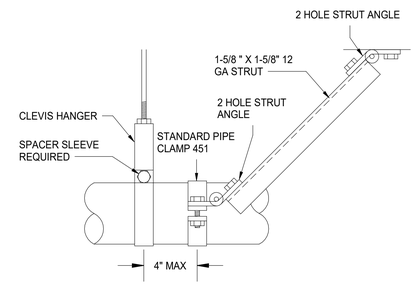
10 TYPICAL BRANCH TAKE-OFF FITTING
N.T.S.



11 EXHAUST TRANSFER DUCT DETAIL
N.T.S.



12 FAN POWERED VAV BOX DETAIL
N.T.S.



13 LONGITUDINAL PIPE BRACE FOR HYDRONIC SYSTEMS DETAIL
N.T.S.

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ
JULY 20, 2026

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HERNANDEZ
Date: MAY 2025
Solicitation No.: W9126G25RA020
Contract No.:
Rev.
Dwn by: M. TAYLOR
Reviewed by: J. SPOLDARO
Submitted by: C. LANGUM
File name:
Plot date: Version 2.0.0.0 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH 819 TAYLOR STREET FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS DINING CLASSROOM FACILITY (DCF4)
MPLS220527

MECHANICAL DETAILS

Sheet reference number
D4-M-501
Sheet of

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ENERGY RECOVERY UNIT SCHEDULE

PLAN MARK	LOCATION	AREA SERVED	SUPPLY FAN: TOTAL AIR FLOW (CFM)	FAN QTY	ESP (IN WG)	TSP (IN WG)	MOTOR (HP)	VOLT/PH/HZ	EXHAUST FAN: AIR FLOW (CFM)	FAN QTY	ESP (IN WG)	TSP (IN WG)	MOTOR (HP)	VOLT/PH/HZ
ERV-1	2ND FLR AREA B	DINING AND SERVING	18500	2	3	5.6	15	460/3/60	16370	2	2	3.6	7.5	460/3/60
ERV-2	ROOF (WEST)	CLASSROOM (WEST)	13,000	1	2	4.92	20	460/3/60	12,200	1	0.4	1.48	10	460/3/60
ERV-3	ROOF (EAST)	CLASSROOM (EAST)	13,000	1	2	4.92	20	460/3/60	12,200	1	0.4	1.48	10	460/3/60

PLAN MARK	COOLING COIL: SEN CAP (MBH)	TOTAL CAP (MBH)	EAT DB (DEG F)	EAT WB (DEG F)	LAT DB (DEG F)	LAT WB (DEG F)	MAX APD (IN WG)	FLOW (GPM)	EWT (DEG F)	LWT (DEG F)	MAX WPD (FT)	HEATING COIL: TOTAL CAP. (MBH)	EAT DB (DEG F)	LAT DB (DEG F)	MAX APD (IN WG)	FLOW (GPM)	EWT (DEG F)	LWT (DEG F)	MAX WPD (FT)
ERV-1	234	247	84.5	68	72.7	64	0.12	38	38	60	1.887	814	33.1	74	0.12	79	150	90	5.4
ERV-2	379.8	499.5	84.5	67	53.3	52.5	0.44	46	38	60	17.2	173.6	58.4	73	0.1	7	150	90	0.4
ERV-3	379.8	499.5	84.5	67	53.3	52.5	0.44	46	38	60	17.2	173.6	58.4	73	0.1	7	150	90	0.4

ENERGY RECOVERY UNIT SCHEDULE (CONTINUED)

PLAN MARK	SUPPLY AIR FLOW (CFM)	EXHAUST AIR FLOW (CFM)	SUMMER CAPACITY (MBH)	WINTER CAPACITY (MBH)	ENERGY RECOVERY WHEEL: SUPPLY: SUMMER EAT (DB/WB)	SUMMER LAT (DB/WB)	WINTER EAT (DB/WB)	WINTER LAT (DB/WB)	EXHAUST: SUMMER EAT (DB/WB)	WINTER EAT (DB/WB)	MAX APD (IN WG)	REMARKS
ERV-1	18500	16370	428	558	100/74	84.5/68	33.1/32	55.7/46.6	75/64	70/54	0.8	1 THRU 11, 14.
ERV-2	13,000	12,200	316.81	553.36	100.1/74.1	84.5/67	33.1/30	58.4/51	75/62	75/62	1.1	1 THRU 13.
ERV-3	13,000	12,200	316.81	553.36	100.1/74.1	84.5/67	33.1/30	58.4/51	75/62	75/62	1.1	1 THRU 13.

NOTE
1. UNIT IS FULLY CUSTOMIZABLE WITH SECTIONAL COMPONENTS WITH ACCESS DOORS. ALLOW FOR PLACEMENT OF SECTIONS WITH-IN SPACE.
2. PROVIDE VFD'S FOR EACH FAN, VERIFY FAN COUNT WITH MANUFACTURER. VFD'S SHALL BE LOCATED WITHIN THE UNIT AND ALL CODE REQUIRED CLEARANCES SHALL BE MAINTAINED.
3. UNIT OA ENTERING AIR CONDITIONS ARE 99 DEG F DB, 74 DEG F WB FOR SUMMER AND 33 DEG F DB FOR WINTER. EXHAUST ENTERING AIR CONDITIONS ARE 78 DEG F DB, 65 DEG F WB FOR SUMMER AND 72 DEG F DB, 53 DEG F WB FOR WINTER.
4. PROVIDE ELECTRICAL CONNECTIONS AS REQUIRED FOR ALL UNIT COMPONENTS, INCLUDING CONTROLS AND ELECTROSTATIC FILTRATION SYSTEM. PROVIDE 24 VOLT TRANSFORMERS FOR ELECTROSTATIC FILTRATION SYSTEM AND DDC CONTROLS.
5. PROVIDE WITH MERV-13 ELECTROSTATIC FILTER. PD (CLEAN) = 0.33; PD (DIRTY) = 0.70 FOR SUPPLY UPSTREAM OF HEAT EXCHANGER.
6. PROVIDE MERV 8 PRE-FILTERS MAX 0.33 INCH CLEAN AIR PRESSURE DROP AND 1 INCH DIRTY FILTER DROP UPSTREAM OF EXHAUST HEAT EXCHANGER.
7. PROVIDE FACE / BYPASS DAMPERS FOR HEAT EXCHANGER.
8. PROVIDE MARINE LIGHTS AND CONVENIENCE OUTLETS ON AN INDEPENDENT 120V AC CIRCUIT.
9. UNIT SHALL BE LOCATED TO MAINTAIN REQUIRED MAINTENANCE ACCESS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATION AND RE-DESIGN REQUIRED FOR UNITS DIFFERING FROM THE BASIS OF DESIGN.
10. COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS WITH ELECTRICAL CONTRACTOR, AND WEIGHT OF UNIT AND DISTRIBUTION OF WEIGHT WITH GENERAL CONTRACTOR.
11. REFER TO CONTROLS SHEET M610 FOR FURTHER UNIT DETAILS.
12. UNITS ARE TO BE MANUFACTURED FOR OUTDOOR INSTALLATIONS. UNITS WILL MOUNT TO STRUCTURAL CURBS, DIMENSIONAL INFORMATION AND INFORMATION FOR WEIGHT OF UNITS SHALL BE PROVIDED TO THE GENERAL CONTRACTOR FOR REVIEW.
13. UNIT TOTAL WEIGHT IS 5555 LBS. APPROXIMATE.
14. UNIT TOTAL WEIGHT IS 26,600 LBS. APPROXIMATE.

SHEET NOTES

1. SYSTEMS AND COMPONENTS USED TO PROVIDE INTERCONNECTING UTILITY AND CONTROLS FOR DCF4 WILL RESIDE IN THE EQUIPMENT BUILDING (EB). UTILITY LINES AND CONTROLS WILL SUPPLY AND CONNECT BACK TO AND FROM THE FACILITIES. THE BOILER SUPPLIED HOT WATER SUPPLY AND RETURN LINES, AND THE CHILLER SUPPLIED CHILLED WATER SUPPLY AND RETURN LINES, WILL BE CONNECTED FROM LINES WITH-IN THE UTILIDOR (AS NOTED ON THE DRAWINGS). UTILITY MONITORING WILL BE PROVIDED FROM THE SERVER IN BUILDING 5595. THE CONTRACTOR SHALL BE REQUIRED TO ENSURE ALL CONNECTIONS ARE MADE TO COMPLETE THE ADOPTION OF SERVICES.
2. COORDINATE ALL PLACEMENT OF EQUIPMENT.
3. ALL EQUIPMENT SHALL BE PROVIDED WITH ELECTRICAL CONNECTIONS AS REQUIRED. REFER TO ELECTRICAL DRAWINGS.

BLOWER COIL AND FAN COIL UNIT SCHEDULE

Z	LOCATION	SERVICE	TYPE	SUPPLY FAN: AIR FLOW (CFM)	ESP (IN WG)	MOTOR: MAX MOTOR (HP)	VOLT/PH/HZ	COOLING COIL: EAT DB/WB (DEG F)	LAT DB (DEG F)	MIN. TOTAL CAP. (MBH)	MIN. SEN. CAP.(MBH)	FLUID FLOW (GPM)	EWT (DEG F)	LWT (DEG F)	HEATING COIL: EAT DB (DEG F)	LAT DB (DEG F)	TOTAL CAP. (MBH)	FLUID FLOW (GPM)	EWT (DEG F)	LWT (DEG F)	AIR FILTER DATA: TYPE	CLEAN PD (IN WG)	MAX DIMS LxWxH (IN)	MAX WEIGHT (LBS)	REMARKS
BCU-D4-1A	DRY CLEANER 171	DRY CLEANER 171	HORIZONTAL	1560	.7	1	460/3/60	76/61	56	49.5	43	4.3	38	60	67	86.2	20	1	150	90	MERV 8	.22	34x40x14	315	2,4,13,14
BCU-D4-1B	DISPENSARY 134	DISPENSARY 134, EXAM 135, 136 & 137	HORIZONTAL	1380	.7	1	460/3/60	73/62	56	45.8	38.9	4.2	38	60	66	86.2	20	1	150	90	MERV8	.22	34x40x14	315	2,4,13,14
BCU-D4-1C	MECH 150	ELEC 151	HORIZONTAL	3500	.7	3	460/3/60	78/58	55	90.3	90.3	8.2	38	60	-	-	-	-	-	-	MERV 8	.22	34x40x14	315	2,4,13,14
BCU-D4-1D	SEATING 104A	WAREWASH 120	VERTICAL	1400	.7	1	460/3/60	78/67	55	70.2	41.3	6.3	38	60	69	86.2	26.2	1.3	150	90	MERV 8	.22	34x40x14	81	2,4,13,14
BCU-D4-1E	SEATING 101A	WAREWASH 127	HORIZONTAL	1400	.5	1	460/3/60	78/67	55	74.8	47	6.8	38	60	69	86.2	26.2	1.3	150	90	MERV 8	.22	48x44x28	81	2,4,13,14
BCU-D4-1F	MECH 150	MECH 150	HORIZONTAL	730	.354	.13	115/1/60	78/58	56.6	20.8	20.8	2	38	60	-	86.2	8	.5	150	90	MERV 8	.22	75x25x10	172	4,8,13,14
BCU-D4-1L	SEATING 101	COMM 133, ELEC 132	HORIZONTAL	1200	.5	1	460/3/60	79/67	53	40.4	29.2	3.7	38	60	-	-	-	-	-	-	MERV 8	.22	34x40x14	81	2,4,13
BCU-D4-1M	SEATING 104	COMM 112, ELEC 114	HORIZONTAL	1600	.5	1	460/3/60	79/67	53	47.1	37	4.3	38	60	-	-	-	-	-	-	MERV 8	.22	34x40x14	81	2,4,13
FCU-D4-1G	ELEV EQ 115	ELEV EQ 115	HORIZONTAL	700	.177	.13	115/1/60	80/61.6	52	17.34	17.34	1.6	38	60	-	-	-	-	-	-	MERV 8	.22	75x25x10	172	4,8,13
BCU-D4-2A	MECH 201C	CLASSROOM 201	VERTICAL	3100	0.70	1.5	460/3/60	76/63	55	92.2	68.4	8.4	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2B	MECH 201C	CLASSROOM 202	VERTICAL	3230	0.70	1.5	460/3/60	76/63	55	96.6	73.3	8.8	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2C	MECH 204C	CLASSROOM 203	VERTICAL	3100	0.70	1.5	460/3/60	76/63	55	92.6	68.7	8.4	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2D	MECH 204C	CLASSROOM 204	VERTICAL	3230	0.70	1.5	460/3/60	76/63	55	97.0	73.6	8.8	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2E	MECH 206C	CLASSROOM 205	VERTICAL	3100	0.70	1.5	460/3/60	76/63	55	92.2	68.4	8.4	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2F	MECH 206C	CLASSROOM 206	VERTICAL	3230	0.70	1.5	460/3/60	76/63	55	96.6	73.3	8.8	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2G	MECH 207B	CLASSROOM 207	VERTICAL	3100	0.70	1.5	460/3/60	76/63	55	92.6	68.7	8.4	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2H	MECH 207B	CLASSROOM 208	VERTICAL	3230	0.70	1.5	460/3/60	76/63	55	96.9	73.6	8.8	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-2J	MECH 228	ELEC 232, COMM 233	VERTICAL	1200	0.70	1.5	460/3/60	77/65	68	42	31.7	3.8	36	58	68		22.6	2.25	145		SEE NOTE 5	0.28	48x44x28	315	2,4,13
BCU-D4-2L	MECH 228	CORR / RR WEST	VERTICAL	2320	0.70	3	460/3/60	77/65	55	50.3	46.6	4.6	38	60	68	86.2	22.6	2.25	150	90	SEE NOTE 5	.22	48x44x28	315	4,9,13,14
BCU-D4-2M	MECH 220	ELEC. 213, COMM 212	VERTICAL	1200	0.70	1.5	460/3/60	78/66	55	44.9	33.7	4.1	38	60	-	-	-	-	-	-	SEE NOTE 5	0.28	48x44x28	315	4,9,13
BCU-D4-2N	MECH 220	CORR / RR WEST	VERTICAL	2185	0.70	3	460/3/60	77/65	55	49.3	46.5	4.5	38	60	68	86.2	22.6	2.25	150	90	SEE NOTE 5	.22	48x44x28	315	4,9,13,14
BCU-D4-3A	MECH 301C	CLASSROOM 301	VERTICAL	3200	0.70	1.5	460/3/60	81/64	55	115.9	91.6	10.5	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-3B	MECH 301C	CLASSROOM 302	VERTICAL	3340	0.70	1.5	460/3/60	81/64	55	120.3	96.5	10.9	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-3C	MECH 304C	CLASSROOM 303	VERTICAL	3200	0.70	1.5	460/3/60	81/64	55	115.9	91.6	10.5	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-3D	MECH 304C	CLASSROOM 304	VERTICAL	3340	0.70	1.5	460/3/60	81/64	55	120.3	96.5	10.9	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-3E	MECH 306C	CLASSROOM 305	VERTICAL	3200	0.70	1.5	460/3/60	81/64	55	115.9	91.6	10.5	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-3F	MECH 306C	CLASSROOM 306	VERTICAL	3340	0.70	1.5	460/3/60	81/64	55	120.3	96.5	10.9	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-3G	MECH 307C	CLASSROOM 307	VERTICAL	3200	0.70	1.5	460/3/60	81/64	55	115.9	91.6	10.5	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14
BCU-D4-3J	MECH 332	ELEC. 328, COMM 327	VERTICAL	1400	0.70	1.5	460/3/60	78/66	55	53.8	41.7	4.9	38	60	-	-	-	-	-	-	SEE NOTE 5	0.28	48x44x28	315	4,9,13
BCU-D4-3K	MECH 320	CORR / RR EAST	VERTICAL	2420	0.70	3	460/3/60	77/65	55	52.2	50.2	4.7	38	60	68	86.2	22.6	2.25	150	90	SEE NOTE 5	.22	48x44x28	315	4,9,13,14
BCU-D4-3L	MECH 332	CORR / RR WEST	VERTICAL	2750	0.70	3	460/3/60	78/65	66	60	56.2	5.5	36	58	67		23.0	2.15	145		SEE NOTE 5	0.28	48x44x28	315	4,9,13,14
BCU-D4-3M	MECH 320	ELEC. 313, COMM 312	VERTICAL	1400	0.70	1.5	460/3/60	78/66	55	48.7	39.2	4.4	38	60	-	-	-	-	-	-	SEE NOTE 5	0.28	48x44x28	315	4,9,13,14
BCU-D4-3N	MECH 307C	CLASSROOM 308	VERTICAL	3340	0.70	1.5	460/3/60	76/63	55	120.3	91.6	10.9	38	60	65.9	89.75	26.6	2.5	150	90	SEE NOTE 5	.22	48x66x22	315	1,3,4,6,9,13,14

NOTE
1. UVC LAMPS SHALL BE CHANGED EVERY 12 MONTHS TO MAINTAIN INTENSITY LEVELS AND INACTIVATION RATE OF BACTERIA. LAMPS ARE FIELD INSTALLED EQUIPMENT.
2. HORIZONTAL FAN COIL PLACEMENT: PROVIDE WITH FOIL FACED INSULATION, ECM MOTORS CAPABLE OF SINGLE ZONE VAV OPERATION. DIMENSIONS ON DRAWINGS BASED ON BASIS OF DESIGN MANUFACTURER.
3. PROVIDE 120V TRANSFORMERS FOR UV STERILIZATION SYSTEM AND 24V TRANSFORMER FOR ELECTROSTATIC FILTRATION SYSTEM. THIS IS FIELD INSTALLED EQUIPMENT.
4. PROVIDE 2 WAY MODULATING CONTROL VALVE.
5. ELECTROSTATIC FILTER WITH OSCILLATING UVC LAMP. LAMP IS FIELD INSTALLED EQUIPMENT.
6. PROVIDE UV DOOR INTERLOCK WITH UVC SYSTEM. ONE FOR EACH DOOR WITH ACCESS TO UVC SECTION. INTERLOCK IS FIELD INSTALLED EQUIPMENT.
7. PROVIDE SECONDARY DRIP PAN UNDER UNIT.
8. HORIZONTAL CONCEALED CONFIGURATION, UNIT MUST MAINTAIN LEFT AND RIGHT PLACEMENT AS SHOW TO ALLOW FOR ACCESS FOR MAINTENANCE AND SERVICING.
9. VERTICAL CONFIGURATION, MAINTAIN THE LEFT AND RIGHT AND PLACEMENT AS SHOWN TO ALLOW FOR ACCESS FOR MAINTENANCE AND SERVICING.
10. THESE UNITS SHALL ONLY BE PROVIDED TO PREVENT FREEZING AND OVERHEATING CONDITIONS. TEMPERATURE SHALL BE SET FOR 85°F MAX IN SUMMER (COOLING) AND 50°F MIN IN WINTER (HEATING). SETTINGS SHALL BE ADJUSTABLE.
11. PROVIDE MODULATING 3 WAY VALVE.
12. COORDINATE ALL ELECTRICAL CHARACTERISTICS WITH ELECTRICAL CONTRACTOR AND WEIGHTS WITH GENERAL CONTRACTOR FOR WEIGHT AND UNIT WEIGHT DISTRIBUTION.
13. COOLING MININUM EFFICIENCY REQUIREMENT PER ASHRAE 90.1-2013 TABLE 6.8.1-2 IS 13.0 EER FOR A WATER TO AIR SYSTEM.
14. HEATING MINIMUM EFFICIENCY REQUIREMENT PER ASHRAE 90.1-2013 TABLE 6.8.1-2 IS 4.3 COP_H FOR WATER TO AIR SYSTEM.

AIR HANDLING UNIT SCHEDULE

PLAN MARK	LOCATION	AREA SERVED	SUPPLY FAN: SUPPLY AIRFLOW (CFM)	ESP (IN WG)	MOTOR (HP)/QTY	VOLT/PH/HZ	COOLING COIL DATA: EAT DB/WB (DEG F)	LAT DB (DEG F)	TOTAL CAP. (MBH)	SEN. CAP (MBH)	FLUID FLOW (GPM)	EWT (DEG F)	LWT (DEG F)	HEATING COIL DATA: HEAT DB (DEG F)	LAT DB (DEG F)	TOTAL CAP. (MBH)	FLUID–FLOW (GPM)	EWT (DEG F)	LWT (DEG F)	MAX WEIGHT (LBS)	REMARKS
AHU-D4-1	MECH 238	SERVING LINES	15,700	2.0	20	460/3/60	75/65	53	426	376	53	38	60	55	76	340	23	150	90	4,335	1-8
AHU-D4-2	MECH 238	KITCHEN HOOD (COOK AREA)	22,400	4	15/ 2	460/3/60	99/74	70	350	325	33	38	60	33	68	787	28	150	90	9,100	1-9
AHU-D4-3	MECH 239	DINING AREA	11,400	2.0	15	460/3/60	75/65	53	322	210	40	38	60	55	75	240	16	150	90	3,750	1-8
AHU-D4-4	MECH 239	KITCHEN (BOH)	4500	2.0	7.5	460/3/60	75/65	53	140	100	13	38	60	55	84	120	7	150	90	1,805	1-8

NOTE
1. CUSTOMIZABLE UNIT WITH SECTIONAL COMPONENTS WITH ACCESS DOORS.
2. PROVIDE WITH MERV 13 FILTER. PD (DIRTY) = 0.70.
3. PROVIDE WITH VFD.
4. PROVIDE ELECTRICAL CONNECTIONS AS REQUIRED. REFER TO ELECTRICAL DRAWINGS.
5. MAXIMUM CASING PANEL DEFLECTION OF L/240 AT +/- 8 IN WG.
6. PROVIDE LEAKAGE CALCULATIONS FOR UNITS BASED ON ASHRAE STANDARD 111 CLASS 6 CASING AT 1.25 x DESIGN ESP.
7. COORDINATE ALL ELECTRICAL CHARACTERISTICS WITH ELECTRICAL CONTRACTOR AND WEIGHTS WITH GENERAL CONTRACTOR FOR WIEGHT AND UNIT WEIGHT DISTRIBUTION.
8. COOLING MININUM EFFICIENCY REQUIREMENT PER ASHRAE 90.1-2013 TABLE 6.8.1-2 IS 13.0 EER FOR A WATER TO AIR SYSTEM.
9. UNIT IS 100% OUTSIDE AIR FOR USE TO SUPPLY KITCHEN HOODS.

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ
JULY 20, 2026

No.	Description	Date
1	REVISED IAW AM0002	JULY 2026

Designed by: D. HERNANDEZ
Date: MAY 2025
Rev.
Solicitation No.: W9126G25RA020
Contract No.:
Dwn by: M. TAYLOR
Reviewed by: J. SOLLARIO
Submitted by: C. LANGUM
File name:
PW date: mm/dd/yyyy
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CONVERT ALL NUMBERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPL5220527

MECHANICAL SCHEDULES

Sheet reference number
D4-M-601
Sheet of

Cover No.

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DIFFUSER, REGISTER AND GRILLE SCHEDULE

PLAN MARK	TYPE	MODULE SIZE	DAMPER	INLET SIZE	BASIS OF DESIGN	REMARKS
EG-1	PERFORATED FACE	24" x 24"	OBD	SEE DWGS	NOT APPLICABLE	1
EG-2	PERFORATED FACE	12" X 12"	OBD	SEE DWGS	NOT APPLICABLE	1
RG-1	PERFORATED FACE	24" x 24"	--	SEE DWGS	NOT APPLICABLE	1
RG-2	LINEAR SLOT	48" LONG	--	SEE DWGS	NOT APPLICABLE	1, 2
RG-3	DOUBLE DEFLECTION	36" L x 4" H	--	SEE DWGS	NOT APPLICABLE	1
RG-5	LOUVERED FACE	SEE DWGS	--	SEE DWGS	NOT APPLICABLE	1
SD-1	LOUVERED FACE	24" x 24"	OBD	SEE DWGS	NOT APPLICABLE	1
SD-2	LINEAR SLOT	48" LONG	--	SEE DWGS	NOT APPLICABLE	1, 2
SD-3	DOUBLE DEFLECTION	36" L x 4" H	OBD	SEE DWGS	NOT APPLICABLE	1
SD-4	LOUVERED FACE	12" X 12"	OBD	SEE DWGS	NOT APPLICABLE	1
SD-5	LOUVERED FACE	SEE DWGS	OBD	SEE DWGS	NOT APPLICABLE	1

NOTE

1. COORDINATE INSTALLATION TYPE WITH CEILING / WALL / STAIR TYPE AS SHOWN ON ARCHITECTURAL DWGS. CLASSROOM AIR DEVICES ON STAIRS SHALL HAVE ANODIZED DARK BRONZE COLOR.
2. PROVIDE 2-SLOT WITH 1" SLOT WIDTH, PROVIDE DAMPER ON MANUFACTURERS PLENUM BOX.

SINGLE DUCT VAV BOX SCHEDULE

PLAN MARK	SERVICE	PRIMARY AIR MAX. (CFM)	PRIMARY AIR MIN. (CFM)	PRIMARY AIR INLET SIZE (IN)	REMARKS
VAV-D4-1A	SERVING LINE 4	980	295	10	1,2
VAV-D4-1B	SERVING LINE 3	980	295	10	1,2
VAV-D4-1C	SERVING LINE 3	980	295	10	1,2
VAV-D4-1D	SERVING LINE 2	980	295	10	1,2
VAV-D4-1E	SERVING LINE 2	980	295	10	1,2
VAV-D4-1F	SERVING LINE 1	980	295	10	1,2
VAV-D4-2G	PREP 158	900	725	10	1,2
VAV-D4-2H	PREP 158	900	725	10	1,2
VAV-D4-2I	PRODUCTION 157	900	725	10	1,2
VAV-D4-4J	POTWASH 155	1200	1125	12	1,2
VAV-D4-4K	LOUNGE/RESTROOMS, 137/138	670	405	8	1,2
VAV-D4-4L	PREP 159/162/168	1600	1125	12	1,2
VAV-D4-4M	HALLWAY 157, 160	1100	725	10	1,2
VAV-D4-4N	STORAGE 143/144	600	405	8	1,2
VAV-D4-4O	DRY STORAGE 161	1600	1125	12	1,2
VAV-D4-4P	BEV RM/STORAGE, 168/169	200	150	6	1,2

NOTE

1. SINGLE DUCT TERMINAL UNIT.
2. COORDINATE PLACEMENT OF UNITS TO ALLOW FOR ACCESS TO PANELS.

AIR CURTAIN SCHEDULE

PLAN MARK	AREA SERVED	AIR FLOW (CFM)	L X W X H (INxINxIN)	ELECTRICAL HP	ELECTRICAL VOLT/PH/HZ	REMARKS
AD-D4-1	LOBBY 101	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-2	LOBBY 101	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-3	LOBBY 101	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-4	LOBBY 101	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-5	EXIT 119	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-6	ENTRY121	280	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-7	EXIT 122	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-8	EXIT 126	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-9	ENTRY 125	280	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-10	EXIT 124	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-11	ENTRY 148	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3
AD-D4-12	DRY STORAGE 161	1900	72x26x15.5	2 x 0.5	115/1/60	1,2,3

NOTE

1. PROVIDE UNIT WITH CLEANABLE FILTERS.
2. INSTALL BOTTOM OF UNIT FLUSH WITH CEILING.
3. DURABLE ALUMINUM CONSTRUCTION, WITH RUST PREVENTATIVE ELECTROSTATIC POWDER COATING.

HYDRONIC UNIT HEATER SCHEDULE

PLAN MARK	SERVICE AREA	TYPE	MINIMUM OUTPUT (MBH)	SUPPLY FAN AIR FLOW (CFM)	SUPPLY FAN MOTOR SIZE (WATT)	SUPPLY FAN VOLT/PH/HZ	HEATING FLOW (GPM)	HEATING EWT (DEG F)	HEATING FLUID-LWT (DEG F)	REMARKS
CUH-D4-1	STAIR A	VERTICAL	12.1	680	225	115/1/60	0.5	150	90	1,2,3,4
CUH-D4-2	STAIR D	VERTICAL	12.6	680	225	115/1/60	0.5	150	90	1,2,3,4
CUH-D4-3	EXIT 122	HORIZONTAL	2.1	140	60	115/1/60	0.5	150	90	1,2,3,4
CUH-D4-4	STAIR B	VERTICAL	12.0	680	225	115/1/60	0.5	150	90	1,2,3,4
CUH-D4-5	STAIR C	VERTICAL	12.8	680	225	115/1/60	0.5	150	90	1,2,3,4
CUH-D4-6	EXIT 124	HORIZONTAL	2.1	140	60	115/1/60	0.5	150	90	1,2,3,4

NOTE

1. CABINET HEATER STYLE FAN AND COIL UNIT.
2. COLOR TO BE SELECTED BY CONTRACTING OFFICER; TO BE A MANUFACTURER'S STANDARD COLOR FOR THE PRODUCT.
3. PROVIDE WITH INTEGRAL THERMOSTAT.
4. PROVIDED WITH FACTORY MOUNTED CONTROLS, COORDINATE ACCESS CLEARANCES FOR MAINTENANCE.

HEAT EXCHANGER SCHEDULE

PLAN MARK	LOCATION	SERVICE	HOT SIDE FLUID TYPE	HOT SIDE FLOW (GPM)	HOT SIDE EWT (DEG F)	HOT SIDE LWT (DEG F)	HOT SIDE WPD (PSI)	COLD SIDE FLUID TYPE	COLD SIDE FLOW (GPM)	COLD SIDE EWT (DEG F)	COLD SIDE LWT (DEG F)	COLD SIDE WPD (PSI)	MAX WEIGHT (LBS)
HX-D4-1	MECH ROOM	DOMESTIC HOT WATER	WATER	285	145	110	10	WATER	132	65	140	3	1415
HX-D4-2	MECH ROOM	DOMESTIC HOT WATER	WATER	285	145	110	10	WATER	132	65	140	3	1415

NOTE

1. GASKETTED PLATE AND FRAME HEAT EXCHANGER.
2. AHRI STANDARD 400 CERTIFICATION FOR LIQUID TO LIQUID HEAT EXCHANGERS.

EXPANSION TANK SCHEDULE

PLAN MARK	TANK TYPE	SYSTEM	ACCEPTANCE VOLUME (GAL)	REMARKS
CHET-D4-1	ASME PRE-CHARGED FULL ACCEPTANCE BLADDER TANK	CHILLED WATER	264	1
HET-D4-1	ASME PRE-CHARGED FULL ACCEPTANCE BLADDER TANK	HOT WATER	317	2

NOTE

1. PROVIDE CARBON STEEL SHELL, ASME SECTION VIII, DIVISION 1 CONSTRUCTION, BUTYL RUBBER BLADDER, SEISMIC RESTRAINTS. PROVIDE WITH 1.5 INCH NPT SYSTEM CONNECTION, 1.25 INCH DRAIN AND 0.302 INCH CHARGING VALVE CONNECTION.
2. PROVIDE CARBON STEEL SHELL, ASME SECTION VIII, DIVISION 1 CONSTRUCTION, BUTYL RUBBER BLADDER, SEISMIC RESTRAINTS. PROVIDE WITH 1 INCH NPT SYSTEM CONNECTION, 3/4 INCH DRAIN AND 0.302 INCH CHARGING VALVE CONNECTION.

FAN SCHEDULE

PLAN MARK	LOCATION	SERVICE	TYPE	DUTY	DRIVE	AIRFLOW (CFM)	ESP (IN. W.G.)	ELECTRICAL HP	ELECTRICAL VOLT/PH/HZ	FAN MOTOR CONTROL	REMARKS
EF-D4-1A	ROOF	PREP 159 - KITCHEN ITEM 77	CENTRIFUGAL UPBLAST	EXHAUST	BELT	5100	2.5	5	460/3/60	VFD	1,3,5,6
EF-D4-1B	ROOF	PREP 158 - KITCHEN ITEM 68	CENTRIFUGAL UPBLAST	EXHAUST	BELT	5100	2.5	5	460/3/60	VFD	1,3,5,6
EF-D4-1C	ROOF	PREP 158 - KITCHEN ITEM 63	CENTRIFUGAL UPBLAST	EXHAUST	BELT	5250	2.5	5	460/3/60	VFD	1,3,5,6
EF-D4-1D	ROOF	PRODUCTION 157 - KITCHEN ITEM 40	CENTRIFUGAL UPBLAST	EXHAUST	BELT	6130	2.5	5	460/3/60	VFD	1,3,5,6
EF-D4-1E	ROOF	POTWASH 155 - KITCHEN ITEMS 24, 33	CENTRIFUGAL UPBLAST	EXHAUST	BELT	1485	0.50	1/2	115/1/60	VFD	1,3,5,6
EF-D4-1F	ROOF	POTWASH 155 - KITCHEN ITEMS 26, 18	CENTRIFUGAL UPBLAST	EXHAUST	BELT	1220	0.50	1/4	115/1/60	VFD	1,3,5,6
EF-D4-1G	ROOF	WAREWASH	CENTRIFUGAL UPBLAST	EXHAUST	BELT	2350	0.50	3/4	460/3/60	VFD	1,3,5,6,7
EF-D4-1H	ROOF	WAREWASH	CENTRIFUGAL UPBLAST	EXHAUST	BELT	2350	0.50	3/4	460/3/60	VFD	1,3,5,6,7
EF-D4-1K	MECH 150	CRAWLSPACE VENTILATION	CENTRIFUGAL INLINE	EXHAUST	DIRECT	940	0.50	1/4	115/1/60	ECM	2,4
EF-D4-2B	MECH 239	ATTIC VENTILATION	CENTRIFUGAL INLINE	EXHAUST	DIRECT	150	0.25	1/6	115/1/60	ECM	2,4,8
EF-D4-3A	MECH 319	ATTIC VENTILATION	CENTRIFUGAL INLINE	EXHAUST	DIRECT	385	0.25	1/6	115/1/60	ECM	2,4,9

NOTE

1. ROOF MOUNTED FAN. PROVIDE PREMIUM EFFICIENCY MOTOR, VFD RATED WITH SHAFT GROUNDING PROTECTION, ROOF CURB AND CURB EXTENSION, GREASE TRAP, HEAT BAFFLE, BEARINGS WITH GREASE FITTINGS.
2. INLINE FAN UL 705 LISTED, VARIABLE SPEED ELECTRONICALLY COMMUTATED MOTOR, CORROSION RESISTANT FASTENERS.
3. MUST BE UL LISTED FOR GREASE EXHAUST. COORDINATE EXHAUST FAN AND ASSOCIATED CONTROLS WITH ACTUAL KITCHEN EXHAUST HOODS PART OF THE KITCHEN EQUIPMENT PACKAGE. FAN POINT OF DISCHARGE SHALL BE A MINIMUM OF 40" FROM ANY ROOF SURFACE (IN CONJUNCTION WITH NFPA 96 REQUIREMENTS).
4. PROVIDE WITH DUCT MOUNTED BACKDRAFT DAMPER.
5. PRODUCTS SHALL MEET THE SPECIFIED REQUIREMENTS AS SPECIFIED AND DOCUMENTED ON DRAWINGS AND SHALL BE SUBJECT TO ENGINEERING REVIEW BY THE APPROPRIATE OWNER REPRESENTATIVE.
6. KITCHEN/CONDENSATE HOOD SUPPLY & EXHAUST CFM TO MATCH SHEET D4-KA104.
7. ROOF UPBLAST TUBULAR CENTRIFUGAL FAN WITH WIND BAND, ACCESSIBLE MOTOR WITH HOUSING.
8. 10" x 10" WALL CAP WITH MESH ALLOY SCREEN.
9. 16" x 16" WALL CAP WITH MESH ALLOY SCREEN.

FAN POWERED VAV BOX SCHEDULE

WT	PLAN MARK	TYPE	SERVICE	PRIMARY AIR MAX (CFM)	PRIMARY AIR MIN (CFM)	PRIMARY AIR INLET SIZE	FAN SECTION AIR FLOW (CFM)	FAN SECTION S.P. (IN WG)	FAN SECTION MOTOR (HP)	FAN SECTION VOLT/PH/HZ	HEATING COIL HEATING (CFM)	HEATING COIL FLOW (GPM)	HEATING COIL LAT DB (DEG F)	REMARKS
1	FPVAV-D4-1A	SERIES	AHU - D4 -1 - SEATING 101A	2165	650	14	450	.3	3/4	115/1/60	1100	1.8	85	1,2,3,4
1	FPVAV-D4-1B	SERIES	AHU - D4 - 1 - SEATING 101B	2880	865	16	920	.3	3/4	115/1/60	1785	1	85	1,2,3,4
1	FPVAV-D4-1C	SERIES	AHU - D4 - 1 - SEATING 102B	2880	865	16	920	.3	3/4	115/1/60	1785	1	85	1,2,3,4
1	FPVAV-D4-1D	SERIES	AHU - D4 - 1 - SEATING 102A	2165	650	14	450	.3	3/4	115/1/60	1100	1.8	85	1,2,3,4
3	FPVAV-D4-1E	SERIES	AHU-D4-3 - RESTROOM 128/129	385	115	8	970	.3	1/3	115/1/60	1085	0.8	85	1,2,3,4
3	FPVAV-D4-1F	SERIES	AHU-D4-3 -SEATING 101 WEST	1830	550	16	590	.3	3/4	115/1/60	1140	2	85	1,2,3,4
3	FPVAV-D4-1G	SERIES	AHU-D4-3 - SEATING 101 FRONT	1200	360	12	780	.3	1/3	115/1/60	1140	1	85	1,2,3,4
3	FPVAV-D4-1H	SERIES	AHU-D4-3 - SEATING 101 EAST	1830	550	16	590	.3	3/4	115/1/60	1140	2	85	1,2,3,4
3	FPVAV-D4-1I-E	SERIES	AHU-D4-3 - LOBBY - EAST	1770	530	16	610	.3	3/4	115/1/60	1140	1.2	85	1,2,3,4
3	FPVAV-D4-1I-W	SERIES	AHU-D4-3 - LOBBY - WEST	1770	530	16	610	.3	3/4	115/1/60	1140	1.2	85	1,2,3,4
3	FPVAV-D4-1J	SERIES	AHU-D4-3 - SEATING 102 WEST	1830	550	16	590	.3	3/4	115/1/60	1140	2	85	1,2,3,4
3	FPVAV-D4-1K	SERIES	AHU-D4-3 - SEATING 102 FRONT	1200	360	12	780	.3	1/3	115/1/60	1140	1	85	1,2,3,4
3	FPVAV-D4-1L	SERIES	AHU-D4-3 - SEATING 102 EAST	1830	550	16	590	.3	3/4	115/1/60	1140	2	85	1,2,3,4
3	FPVAV-D4-1M	SERIES	AHU-D4-3 - RESTROOM 117/118	385	85	8	1075	.3	1/3	115/1/60	1060	0.8	85	1,2,3,4

NOTE

1. DIGITAL CONTROL SERIES FAN POWERED TERMINAL UNIT.
2. COORDINATE LEFT OR RIGHT HAND ORIENTATION FOR ACCESS TO UNITS, MAINTAIN 36" CLEARANCE TO ACCESS PANEL.
3. PROVIDE WITH ECM MOTORS.
4. HEATING COIL CAPACITY AND FLOW BASED ON 150 EWTAND 90 LWT

PUMP SCHEDULE

PLAN MARK	LOCATION	CAPACITY (GPM)	TOT. HEAD (FT)	MOTOR RPM	MOTOR HP	VOLT/PH/HZ	SPEED CONTROL	REMARKS
CHWP-D4-1	MECH RM 149	540	100	1760	25	460/3/60	VFD	1,2,5
CHWP-D4-2	MECH RM 149	540	100	1760	25	460/3/60	VFD	1,2,5
HWP-D4-4	MECH RM 149	531	70	1160	15	460/3/60	VFD	3,4,5
HWP-D4-6	MECH RM 149	531	70	1160	15	460/3/60	VFD	3,4,5

NOTE

1. PROVIDE DOUBLE SUCTION PUMP WITH SHAFT GROUNDING RINGS, GALVANIZED DRIP PAN, HEAVY DUTY MAINTENANCE FREE BEARINGS, HEAVY DUTY GROUTLESS BASEPLATE, ANSI/OSHA COUPLING GUARD, ISO 1940-1:2003 IMPELLER BALANCE, PREMIUM EFFICIENCY MOTORS RATED FOR VFD OPERATION.
2. PUMP SHALL BE SPLIT CASE, TOP SUCTION/TOP DISCHARGE. PROVIDE ECCENTRIC REDUCER.
3. PROVIDE DOUBLE SUCTION PUMP WITH SHAFT GROUNDING RINGS, GALVANIZED DRIP PAN, HEAVY DUTY MAINTENANCE FREE BEARINGS, HEAVY DUTY GROUTLESS BASEPLATE, ANSI/OSHA COUPLING GUARD, ISO 1940-1:2003 IMPELLER BALANCE, PREMIUM EFFICIENCY MOTORS RATED FOR VFD OPERATION.
4. PUMP SHALL BE SPLIT CASE, TOP SUCTION/TOP DISCHARGE.
5. PUMPS SHALL BE MOUNTED ON HOUSEKEEPING BASE WITH SPRING ISOLATION.

LOUVER SCHEDULE

PLAN MARK	SERVICE	AIRFLOW (CFM)	MAX. VELOCITY (FPM)	DIMENSIONS (W(IN) x H(IN))	REMARKS
L-D4-1	AHUD4-2 OA INTAKE	16000	680	80 X 84	1,2,4
L-D4-2	ERV-1 INTAKE	24,000	1030	80 X 84	1,2,4
L-D4-3	ERV -1 EXHAUST	21,240	900	118 X 58	2,3,4
L-D4-4	CRAWLSPACE EXHAUST	940	550	24 X 18	1,2,4

NOTE

1. HIGH PERFORMANCE (57% FREE AREA) ARCHITECTURAL LOUVER. PROVIDE PLENUM BEHIND DAMPER. DUCTS SHALL CONNECT TO PLENUM. SHUTOFF DAMPERS ARE PROVIDED IN PACKAGED AFMS IN DUCT.
2. COORDINATE EXACT SIZE, LOCATION, AND COLOR WITH ARCHITECTURAL DRAWINGS.
3. PROVIDE WITH BIRD SCREEN, MINIMUM 0.5 INCH INSULATION, GALVANIZED ROOF CURB AND MOTORIZED SHUTOFF DAMPERS.
4. COORDINATE OPENINGS WITH SELECTED EQUIPMENT, AND MAINTAIN CLEARANCE AND SAFETY SPACING FROM ROOF EDGES FOR ROOF MOUNTS, AND MAINTAIN CLEARANCE FOR ANY INTAKE AIR AND EXHAUSTS.

DUCT PRESSURE CLASS

SYSTEM	PRESSURE (IN. W.G.)	SEAL CLASS
MUA SUPPLY	2	A
MULTIZONE AHU SUPPLY	3	A
VAV AHU SUPPLY	3	A
ALL OTHER SUPPLY	2	A
EXHAUST TO MUA	-4	A
DRYER EXHAUST	-3	A
ALL OTHER RETURN AND EXHAUST	-2	A

NOTE

SMACNA NOTATION:

1. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS.
2. WHERE NO PRESSURE CLASSES ARE NOTED A 1 IN. WG (250 Pa) PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THE SMACNA STANDARDS, REGARDLESS OF VELOCITY IN THE DUCT.
3. EXCEPTION - WHEN THE DUCT IS VARIABLE VOLUME: ALL VARIABLE VOLUME DUCT UPSTREAM OF VAV BOXES HAS A 2 IN. WG (500 Pa) BASIS OF COMPLIANCE WHEN NOT SPECIFIED.
4. DUCT LEAKAGE CLASS TO BE 2 FOR ROUND/OVAL DUCT AND 4 FOR ALL RECTANGULAR DUCT.
5. TEST IN ACCORDANCE WITH SPECIFICATIONS AND THE PROCEDURES IN SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL.

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ

JULY 20, 2026

No.	Description	Date	Action	O.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: D. HERNANDEZ
Date: MAY 2025
Rev.
Drawn by: M. TAYLOR
Solicitation No.: W9126G25RA020
Contract No.
Reviewed by: D. HERNANDEZ
Submitted by: D. HERNANDEZ
Approved by: C. LANGUM
File name:
Plot date: 7/20/2026
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPL S220527

MECHANICAL SCHEDULES

Sheet reference number
D4-M-602
Sheet of

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PLUMBING ABBREVIATIONS

ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AMPS	AMPERES
AS	AIR SEPARATOR
AWS	AUTOMATIC WATER SOFTENER
B	BOILER
BB	BASEBOARD
BD	BUILDING DRAIN
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
C	COMMON
CA	COMPRESSED AIR
CA (OF)	COMPRESSED AIR OIL FREE
CD	CONDENSATE DRAIN
CIRC	CIRCULATING
CO	CLEANOUT
CP	CIRCULATING PUMP
CV	CONDENSATE DRAIN VENT
CW	DOMESTIC COLD WATER
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREES
DEG F	DEGREES FAHRENHEIT
DF	DIESEL FUEL
DHW	DOMESTIC HOT WATER
DI	DIONIZED WATER
DN	DOWN
DWH	DOMESTIC HOT WATER HEATER
DXE	DOMESTIC HOT WATER HEAT EXCHANGER
EA	EACH
ET	EXPANSION TANK
F	FAHRENHEIT
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FM	FORCE MAIN
FPM	FEET PER MINUTE
G	NATURAL GAS
GA	GAUGE
GAS	GASOLINE
GCO	GRADE CLEANOUT
GR	GREASE WASTE
HB	HOSE BIBB
HD	HUB DRAIN
HW	DOMESTIC HOT WATER
HWC	DOMESTIC HOT WATER, CIRCULATING
Hz	HERTZ
I.E.	INVERT ELEVATION
kPA	KILOPASCALS
kW	KILOWATT
LCO	LINE CLEANOUT
MA	MEDICAL AIR
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MIN	MINIMUM
N	NITROGEN
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
O2	OXYGEN
OD	OVER FLOW DRAIN
P	PUMP
PD	PRESSURE DROP
PH	PHASE
PRV	PRESSURE REDUCING VALVE
RD	ROOF DRAIN
RH	RADIANT HEAT
RO	REVERSE OSMOSIS
RPBFP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
S.P.	STATIC PRESSURE
SD	STORM DRAIN
SP	SUMP PUMP
SS	SANITARY SEWER
STD	STANDARD
SW	SOFT WATER
TDH	TOTAL DYNAMIC HEAD
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
V	SANITARY VENT
VA	VACUUM
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
W	WASTE
WC	WATER COLUMN
WCO	WALL CLEANOUT
WG	WATER GUAGE
WH	WALL HYDRANT
WHA	WATER HAMMER ARRESTER

PLUMBING LEGEND

PIPING

- VALVE, SEE SPECIFICATIONS FOR VALVE TYPE
- CHECK VALVE
- TWO WAY CONTROL VALVE
- THREE WAY CONTROL VALVE
- BALANCING VALVE
- SOLENOID CONTROL VALVE
- PRESSURE REDUCING VALVE
- STRAINER
- STRAINER WITH VALVE AND HOSE CONNECTION
- FLEXIBLE CONNECTION
- TEST PLUG
- PRESSURE GAUGE
- MANUAL AIR VENT
- PIPE BREAK
- PIPE SLOPE
- DIRECTION OF FLOW
- PIPE UP
- PIPE DOWN
- PIPE T DOWN
- PIPE T UP
- PIPE CAP
- UNION
- REDUCER
- PIPE ANCHOR
- PIPE GUIDE
- THERMOMETER OR SIGHT GLASS
- FLOW METER
- FLOOR SINK
- FLOOR DRAIN
- FLOOR CLEANOUT
- HOSE BIBB AND WALL HYDRANT
- LINE CLEANOUT
- WALL CLEANOUT
- AQUASTAT SENSOR
- WATER METER

PIPING

- CW — DOMESTIC COLD WATER <80 PSI
- CWHP — DOMESTIC COLD WATER 90 PSI
- CD — CONDENSATE DRAIN
- G — NATURAL GAS
- HW — DOMESTIC HOT WATER
- HW 140F — DOMESTIC HOT WATER 140F
- GW — GREASE WASTE
- GW — GREASE WASTE BELOW GRADE
- HWC — DOMESTIC HOT WATER CIRCULATION
- NCW — NON-POTABLE COLD WATER
- OD — OVER FLOW DRAIN
- RD — ROOF DRAIN
- RD — ROOF DRAIN UNDER GROUND
- SD — STORM DRAIN
- SS — SANITARY SEWER
- SS — SANITARY SEWER BELOW GRADE
- V — SANITARY VENT

GENERAL SYMBOLS

DWH-1 EQUIPMENT DESIGNATION

P-1 PLUMBING FIXTURE DESIGNATION

KEYNOTE

(XX) REFERS TO KITCHEN EQUIPMENT SCHEDULED ON D4-KA102. SEE PLUMBING PLANS FOR PIPING INFORMATION. SEE KITCHEN PLANS FOR ALL OTHER EQUIPMENT INFORMATION.

PLUMBING GENERAL NOTES

1. SOME ABBREVIATIONS AND SYMBOLS SHOWN ON THIS SHEET MAY NOT BE USED IN THIS DRAWING SET.
2. ALL PLUMBING WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE 2018 INTERNATIONAL PLUMBING CODE WITH AMENDMENTS AND ALL APPLICABLE LOCAL CODE AND ORDINANCES.
3. UNLESS OTHERWISE NOTED SANITARY AND DRAINAGE PIPING SHALL BE SLOPED AT A MINIMUM OF 1% UNLESS OTHERWISE PREVENTED BY CODE.
4. TOPS OF ALL FLOOR FIXTURES AND CLEANOUTS SHALL BE SET FLUSH WITH FINISHED FLOOR.
5. PROVIDE SHOCK ABSORBERS SIZED AND PLACED PER PDI SPECIFICATIONS ON ALL DOMESTIC WATER LINES SERVING FIXTURES, PRV STATIONS AND OTHER INSTALLATIONS WITH QUICK CLOSING VALVES. INSTALL PER MANUFACTURER REQUIREMENTS.
6. CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL PLUMBING EQUIPMENT WITH THE ELECTRICAL DRAWINGS AND THE ELECTRICAL CONTRACTOR, AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN THEREIN.
7. ALL PLUMBING EQUIPMENT, PIPING, INSULATION, ETC. INSTALLED IN HVAC PLENUM SPACES SHALL MEET CODE REQUIREMENTS FOR SMOKE AND COMBUSTIBILITY.
8. ALL PIPE PENETRATIONS OF FIRE AND/OR SMOKE RATED ASSEMBLIES SHALL BE FIRE STOPPED AS REQUIRED TO RESTORE ASSEMBLY TO ORIGINAL INTEGRITY. FIRE BARRIER PRODUCTS SHALL BE PER SPECIFICATIONS.
9. ALL PACKAGED AND SKID MOUNTED EQUIPMENT SHALL BE SUPPLIED AND INSTALLED WITH THE NECESSARY TRIM, PIPING, VALVES AND FITTINGS, ETC TO INSURE PROPERLY FUNCTIONING EQUIPMENT. ANY DETAILS OR DRAWINGS OF PACKAGED EQUIPMENT ARE SCHEMATIC AND PROVIDE INTENT FOR BIDDING PURPOSES AND ARE NOT FULLY DETAILED MANUFACTURER DRAWINGS.
10. PROVIDE SHUTOFF VALVES IN ALL DOMESTIC WATER PIPING SYSTEM BRANCHES IN WHICH BRANCH PIPING SERVES TWO OR MORE FIXTURES.
11. UNLESS OTHERWISE NOTED, ALL PIPING IS OVERHEAD, TIGHT TO UNDERSIDE OF SLAB, WITH SPACE FOR INSULATION IF REQUIRED.
12. INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
13. WHERE DOMESTIC COLD AND HOT WATER PIPING DROPS INTO A PIPE CHASE, THE SIZE SHOWN FOR THE PIPE DROPS SHALL BE USED TO THE LAST FIXTURE UNLESS OTHERWISE NOTED.
14. ALL PIPING SHALL GRADE TO LOW POINTS. PROVIDE HOSE END DRAIN VALVES AT THE BOTTOM OF ALL RISERS AND LOW POINTS.
15. UNIONS AND/OR FLANGES SHALL BE INSTALLED AT EACH PIECE OF EQUIPMENT, IN BYPASSES, AND IN LONG PIPING RUNS (100 FEET OR MORE) TO PERMIT DISASSEMBLY FOR ALTERATION AND REPAIRS.
16. ALL VALVES SHALL BE ADJUSTED FOR SMOOTH AND EASY OPERATION.
17. ALL VALVES (EXCEPT CONTROL VALVES) AND STRAINERS SHALL BE FULL SIZE OF PIPE BEFORE REDUCING SIZE TO MAKE CONNECTIONS TO EQUIPMENT AND CONTROLS.
18. PROVIDE CHAINWHEEL OPERATORS FOR ALL VALVES IN EQUIPMENT ROOMS MOUNTED GREATER THAN 7'-0" ABOVE FLOOR LEVEL; CHAIN SHALL EXTEND TO 7'-0" ABOVE FLOOR LEVEL.
19. PROVIDE ALL PLUMBING FIXTURES AND EQUIPMENT WITH ACCESSIBLE STOPS.
20. PROVIDE CLEANOUTS IN SANITARY AND STORM DRAINAGE SYSTEMS AT ENDS OF RUNS, AT CHANGES IN DIRECTION, NEAR THE BASE OF STACKS, EVERY 50 FEET IN HORIZONTAL RUNS AND ELSEWHERE AS INDICATED AND AS REQUIRED BY INTERNATIONAL PLUMBING CODE.
21. ALL CLEANOUTS SHALL BE FULL SIZE OF PIPE FOR PIPE SIZES 6 INCHES AND SMALLER AND SHALL BE 4 INCHES FOR PIPE SIZES LARGER THAN 6 INCHES.
22. ALL BALANCING VALVES AND BUTTERFLY VALVES SHALL BE PROVIDED WITH POSITION INDICATORS AND MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS).
23. ALL VALVES SHALL BE INSTALLED SO THAT VALVE REMAINS IN SERVICE WHEN EQUIPMENT OR PIPING ON EQUIPMENT SIDE OF VALVE IS REMOVED.
24. ALL PIPING WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE GOVERNMENT WHETHER OR NOT SHOWN ON DRAWINGS PER FIELD CONDITIONS. GENERAL CONTRACTOR MUST DECONFLICT PIPING RUNS WITH STRUCTURAL ELEMENTS.
25. PROVIDE FLEXIBLE CONNECTIONS IN ALL PIPING SYSTEMS CONNECTED TO PUMPS AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AS CLOSE TO THE EQUIPMENT AS POSSIBLE OR AS INDICATED ON THE DRAWINGS.
26. COORDINATE ALL ROUGH-IN PIPING, FLOOR DRAIN, AND FLOOR SINK LOCATION AND CLEARANCES WITH MECHANICAL EQUIPMENT OR FIXTURES PROVIDED BY MECHANICAL CONTRACTOR REGARDELSS OF LOCATION SHOWN ON DRAWINGS. THE BASIS OF DESIGN EQUIPMENT OR FIXTURES IS NOT NECESSARILY THE ITEMS PURCHASED.
27. ALL PIPE SUPPORTS SHALL BE PROVIDED PER THE REQUIREMENTS OF THE INTERNATIONAL PLUMBING CODE HANGER SPACING TABLE AND MSS SP-58 REQUIREMENTS

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ
JULY 20, 2026

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: K. McGLOTHLIN
Date: MAY 2025
Rev.
Dwn by: K. McGLOTHLIN
Solicitation No.: W9126G26RA030
Reviewed by: D. HERNANDEZ
Contract No.
Submitted by: D. HERNANDEZ
Approved by: C. LANGUM
File name:
Plot date: / version:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI-S220527

PLUMBING LEGEND, ABBREVIATIONS AND GENERAL NOTES

Sheet reference number
D4-P-001
Sheet of

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PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	DESCRIPTION	COMMENTS
P-1	WATER CLOSET, WALL MOUNTED	WALL HUNG, 1.28 GPF, 1-1/2" TOP SPUD, VITREOUS CHINA, ELONGATED RIM, FLUSH VALVE TOILET, WHITE OPEN FRONT SEAT W/O COVER	RIM HEIGHT 15" AFF
---	WATER CLOSET FLUSH VALVE	1.28 GPF, LEVER OPERATED EXPOSED MANUAL FLUSH VALVE FOR WALL MOUNTED, 1-1/2" TOP SPUD TOILETS, ADA COMPLIANT NON-HOLD OPEN HANDLE, NO EXTERNAL VOLUME ADJTMENT, RUBBER DIAPHRAGM W/ DUAL FIXED BYPASS	
P-2	WATER CLOSET, WALL MOUNTED ADA	WALL HUNG, 1.28 GPF, 1-1/2" TOP SPUD, VITREOUS CHINA, ELONGATED RIM, FLUSH VALVE TOILET, WHITE OPEN FRONT SEAT W/O COVER	RIM HEIGHT 17" AFF
---	WATER CLOSET FLUSH VALVE	1.28 GPF, LEVER OPERATED EXPOSED MANUAL FLUSH VALVE FOR WALL MOUNTED, 1-1/2" TOP SPUD TOILETS, ADA COMPLIANT NON-HOLD OPEN HANDLE, NO EXTERNAL VOLUME ADJTMENT, RUBBER DIAPHRAGM W/ DUAL FIXED BYPASS	
P-3	URINAL, WALL MOUNTED	0.125 GPF, WHITE VITREOUS CHINA URINAL WITH WASHDOWN FLUSHING ACTION, 3/4" TOP SPUD	RIM HEIGHT 24" AFF
---		0.125 GPF, MANUAL FLUSH VALVE FOR 3/4" TOP SPUD URINALS, ADA COMPLIANT NON-HOLD OPEN HANDLE, FIXED METERING BYPASS, NO EXTERNAL VOLUMN ADJUSTMENT, RUBBER DIAPHRAGM WITH DUAL FILTERED FIXED BYPASS	
P-4	URINAL, WALL MOUNTED ADA	0.125 GPF, WHITE VITREOUS CHINA URINAL WITH WASHDOWN FLUSHING ACTION, 3/4" TOP SPUD. MOUNT RIM 17" AFF	RIM HEIGHT 17" AFF
---		0.125 GPF, MANUAL FLUSH VALVE FOR 3/4" TOP SPUD URINALS, ADA COMPLIANT NON-HOLD OPEN HANDLE, FIXED METERING BYPASS, NO EXTERNAL VOLUMN ADJUSTMENT, RUBBER DIAPHRAGM WITH DUAL FILTERED FIXED BYPASS	
P-5	LAVATORY, WALL MOUNTED	WHITE VITREOUS CHINA LAVATORY, 4" ON CENTER FAUCET HOLES, 20" x 18-1/4", ABS UNDER SINK PIPING SKIRT	RIM HEIGHT 34" AFF
---	LAVATORY FAUCET	SINGLE HOLE ELECTRONIC SENSOR OPERATED FAUCET, 0.5 GPM VANDAL PROOF NON-AERATING SPRAY, BRASS CONSTRUCTION WITH CHROME FINISH, THERMOSTATIC MIXING VALVE SET TO PROVIDE 110F WATER, FAUCET HOLE COVER PLATE	
P-6	EXAM ROOM SINK - COUNTER MOUNTED	18 GAUGE, TYPE 304 STAINLESS STEEL SINK, TOP MOUNT, 19" x 19" WITH SINGLE 7-1/2" DEEP BOWL. SINGLE FAUCET HOLE, INTEGRAL MIXING VALVE SET TO 110F WATER.	COUNTER MOUNTED
---	SINK FAUCET	DECK MOUNTED SINGLE HOLE, SENSOR OPERATED, 0.5 GPM NON-AERATING SPRAY OUTLET, 5-1/4" GOOSENECK SPOUT	
P-7	MOP SINK	FLOOR MOUNTED, MOLDED STONE MOP SERVICE BASIN, 24" x 24" x 10"	FLOOR MOUNTED
---	SINK FAUCET	CHROME PLATED BRASS MOP BASIN FAUCET, VACUUM BREAKER, PAIL HOOK, WALL BRACE AND 3/4" HOSE THREAD	36" AFF
P-8	ELECTRIC WATER COOLER	WALL MOUNTED, BI-LEVEL, BARRIER-FREE STAINLESS STEEL WATER COOLER, 8.0 GPH WATER AT 50F, 18 GAUGE TYPE 304 STAINLESS STEEL BODY, ANTI-MICROBIAL SAFETY BUBBLER	ADA RIM HEIGHT 33 1/2" AFF
P-9	CANTEEN FILL STATION	WALL MOUNTED, RECESSED WATER BOTTLE FILLING STATION, 8 GPH AMBIENT WATER, 18 GAUGE TYPE 300 STAINLESS STEEL AND ABS CONSTRUCTION, NO-TOUCH ACTIVATION, 20 SECOND SHUT-OFF TIMER	RIM HEIGHT 27" AFF
EEW-1	EMERGENCY EYE WASH W/MIXING VALVE	WALL MOUNTED EYE WASH WITH FLIP TOP DUST COVERS. WALL MOUNTED TEMPERATURE AND PRESSURE BALLANCED MIXING VALVES WITH COLD WATER BYPASS	
HB	HOSE BIBB	CHROME FINISH ANTI-SIPHON WALL FAUCET WITH INTEGRAL VACUUM BREAKER, LOOSE TEE KEY OPERATION	18" AFF
WH	WALL HYDRANT	CHROME AUTOMATIC DRAINING FREEZELESS WALL HYDRANT WITH INTEGRAL ANTI-SIPHON VACUUM BREAKER, LOOSE TEE KEY OPERATION	18" AFF
FD-1	FLOOR DRAIN	ROUND FLOOR DRAIN WITH CAST IRON BODY WITH ADJUSTABLE COLLAR, POLLISHED NICKEL BRONZE STRAINER, VANDAL-PROOF SECURED TOP	
FD-2	FLOOR DRAIN	4" X 12" RECTANGULAR FLOOR DRAIN WITH CAST IRON BODY WITH ADJUSTABLE COLLAR, TYPE J NICKEL BRONZE STRAINER, VANDAL-PROOF SECURED TOP	
FD-3	FLOOR DRAIN	ROUND FLOOR DRAIN WTIH CAST IRON BODY WITH ADJUSTABLE COLLAR , TYPE I POLISHED NICLE BRONZE STRAINER WITH MIN 1' RIM ABOVE STRAINER, VANDAL-PROOF SECURED TOP	
FS-1	FLOOR SINK	12' X 12' X 8" DEEP FLOOR SINK, 304 STAINLESS STEEL BODY, NON-TILT LOOSE GRATE WITH ANTI-SPLACH INTERIOR DOME STRAINER	
TD-1	TRENCH DRAIN	48" X 6" WIDE PRE-SLOPED TRENCH DRAIN SYSTEM, STABILIZED POLYPROPYLENE CHANNELS WITH 4" NO-HUB BOTTOM OUTLET, REINFORCED SLOTTED STAINLESS STEEL CLASS E GRATE	
RD-1	ROOF DRAIN	15" DIAMETER MAIN ROOF DRAIN WITH LOW SILHOUETTE DOME, CAST RON BODY, MEMBERAIN AND FLASHING CLAMP, GRAVEL GUARD	
RD-2	ROOF OVERFLOW DRAIN	15" DIAMETER ROOF DRAIN AND 15" OVERFLOW DRAIN WITH COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD, DOUBLE DECK PLATE AND LOW SILHOUETTE DOMES	

NOTES:

1. FIXTURES, FLOOR DRAINS AND CLEANOUTS WILL BE BAA (BUY AMERICA ACT) COMPLIANT.

PLUMBING FIXTURE CONNECTION SCHEDULE

MARK	DESCRIPTION	SANITARY	VENT	COLD WATER	HOT WATER
P-1, P-2	WATER CLOSETS, WALL MOUNTED	4"	2"	1"	---
P-3, P-4	URINALS	3"	1-1/2"	3/4"	---
P-5	LAVATORIES, WALL MOUNTED	1-1/2"	1-1/2"	1/2"	1/2"
P-6	EXAM ROOM SINK	1-1/2"	1-1/4"	1/2"	1/2"
P-7	MOP SINKS	3"	2"	1/2"	1/2"
P-8	ELECTRIC WATER COOLER	1-1/4"	1-1/4"	1/2"	---
P-9	CANTEEN FILL STATION	1-1/2"	1-1/2"	1/2"	---
HB	HOSE BIBB	---	---	1/2"	---
WH	WALL HYDRANT	---	---	1/2"	---

WATER HAMMER ARRESTOR SCHEDULE

MARK	FIXTURE UNIT CAPACITY	PIPE SIZE	REMARKS
WHA-1	1 THRU 11	3/4"	PROVIDE ACCESS PANEL
WHA-2	12 THRU 32	1"	PROVIDE ACCESS PANEL
WHA-3	33 THRU 60	1"	PROVIDE ACCESS PANEL
WHA-4	61 THRU 113	1"	PROVIDE ACCESS PANEL

NOTE: SIZE AND INSTALL WHA PER LATEST REVISION OF PDI-WH 201 STANDARD

PUMP SCHEDULE

MARK	SERVICE	CAPACITY (GPM)	TOT. HEAD (FT)	MOTOR RPM	MOTOR BHP	VOLT/PH/HZ	SUMP DIAMETER	SUMP DEPTH	REMARKS
CP-D4-01	DOMESTIC HOT WATER CIRCULATOR	26	65	3300	1/8	115 / 1 / 60			
SP-D4-01	ELEVATOR SUMP PUMP	50	8	3450	1/2	115 / 1 / 60	3' - 0"	3' - 0"	SUBMERSIBLE SUMP PUMP. INSTALL OIL MONITORING SYSTEM PER MANUFACTURER'S RECOMMENDATION
SP-D4-02	CRAWL SPACE SEWAGE EJECTOR	120	15	1150	1.0 EACH	115 / 1 / 60	3' - 0"	8' - 0"	SUBMERSIBLE DUPLEX SUMP PUMP, HIGH WATER ALARM
SP-D4-03	A7 UTILIDOR PIT DRAINAGE	30	15	1750	3/4 EACH	115 / 1 / 60	3' - 0"	4' - 0"	SUBMERSIBLE DUPLEX SUMP PUMP, HIGH WATER ALARM
SP-D4-04	CRAWL SPACE SEWAGE EJECTOR	120	15	1150	1.0 EACH	115 / 1 / 60	3' - 0"	8' - 0"	SUBMERSIBLE DUPLEX SUMP PUMP, HIGH WATER ALARM
SP-D4-05	A8 UTILIDOR PIT DRAINAGE	30	15	17	3/4 EACH	115 / 1 / 60	3' - 0"	4' - 0"	SUBMERSIBLE DUPLEX SUMP PUMP, HIGH WATER ALARM
SP-D4-06	CRAWL SPACE CONDENSATE DRAIN PUMP	30	12	1750	3/4 EACH	115 / 1 / 60	3' - 0"	3' - 0"	SUBMERSIBLE DUPLEX SUMP PUMP, HIGH WATER ALARM

NOTES:

1. SUMP PUMPS, AND SEWAGE PUMPS ARE DUPLEX MODELS WITH REDUNDANT CAPACITY AND ALTERNATING CONTROLLERS. CONTROLLERS SHALL PROVIDE AUTOMATIC FAILOVER AND RUNTIME BALANCING. COORDINATE POWER CIRCUIT REQUIREMENTS FOR PUMPS AND CONTROLLERS.
2. ALL PUMP CONTROLLERS SHALL BE BACNET COMPATIBLE AND HAVE COMMUNICATION WITH EMCS SYSTEM

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ

JULY 20, 2026

No.	Description	Date	Action	O.O. No.
1	REVISED IAW AN0002	JULY 2026		

Designed by: K. McGLOTHLIN
Date: MAY 2025
Rev:
Dwn by: K. McGLOTHLIN
Solicitation No.: W9126G25RA020
Contract No.
Reviewed by: D. HERNANDEZ, C. SCHEFFLER, C. LANGUM
File name:
Plot date: 7/20/26 2:55:30 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

PLUMBING SCHEDULES

Sheet reference number

D4-P-601

Sheet of

Cont No.

7/20/2026 2:55:30 PM

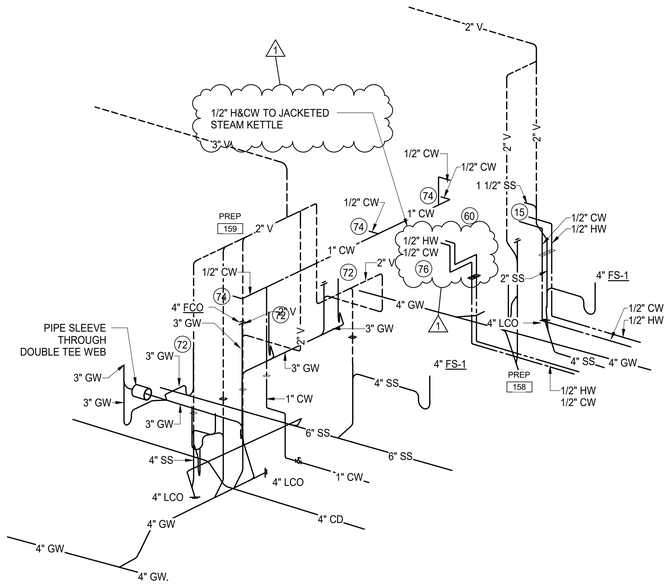
SHEET NOTES

1. SYMBOL (XX) REFERS TO KITCHEN EQUIPMENT SHEDULED ON D4-KA101A, D4-KA103A. SEE KITCHEN PLANS FOR ALL OTHER EQUIPMENT INFORMATION.

US Army Corps of Engineers
Fort Worth District

GEORGIA REGISTERED No. 027885 PROFESSIONAL ENGINEER DESIDERIO HERNANDEZ

JULY 20, 2026



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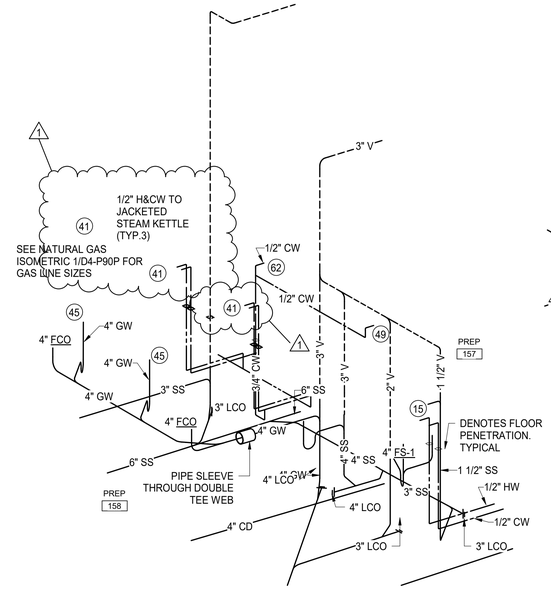

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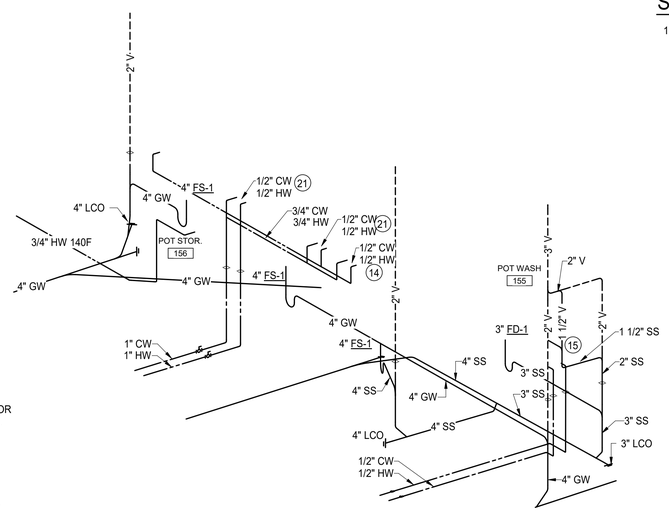

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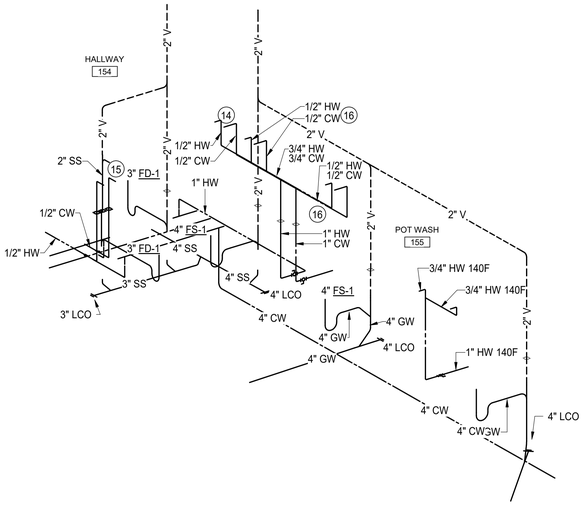

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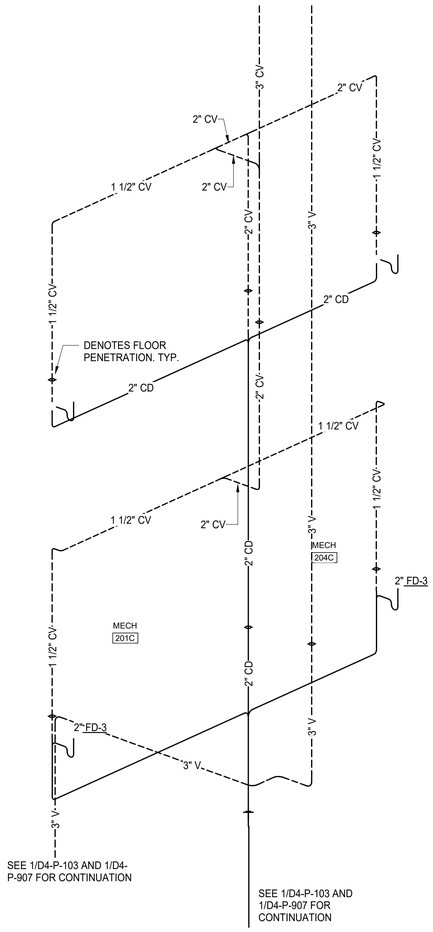

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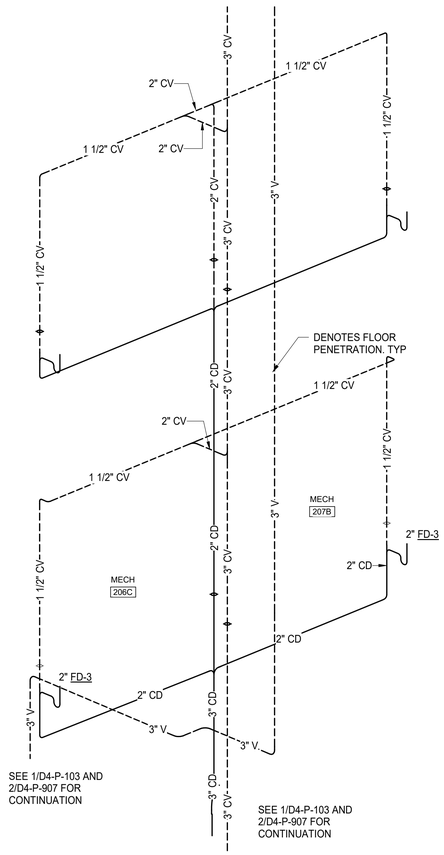


6 PLUMBING ISOMETRIC
N.T.S.

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Designed by: K. McGLOTHLIN
Date: MAY 2025
Rev.
Dwn by: K. McGLOTHLIN
Solicitation No.: W9126G26RA030
Reviewed by: D. HERNANDEZ
Contract No.
Submitted by: C. LANSUM
File name:
Plot date: 7/20/2026 2:55:30 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

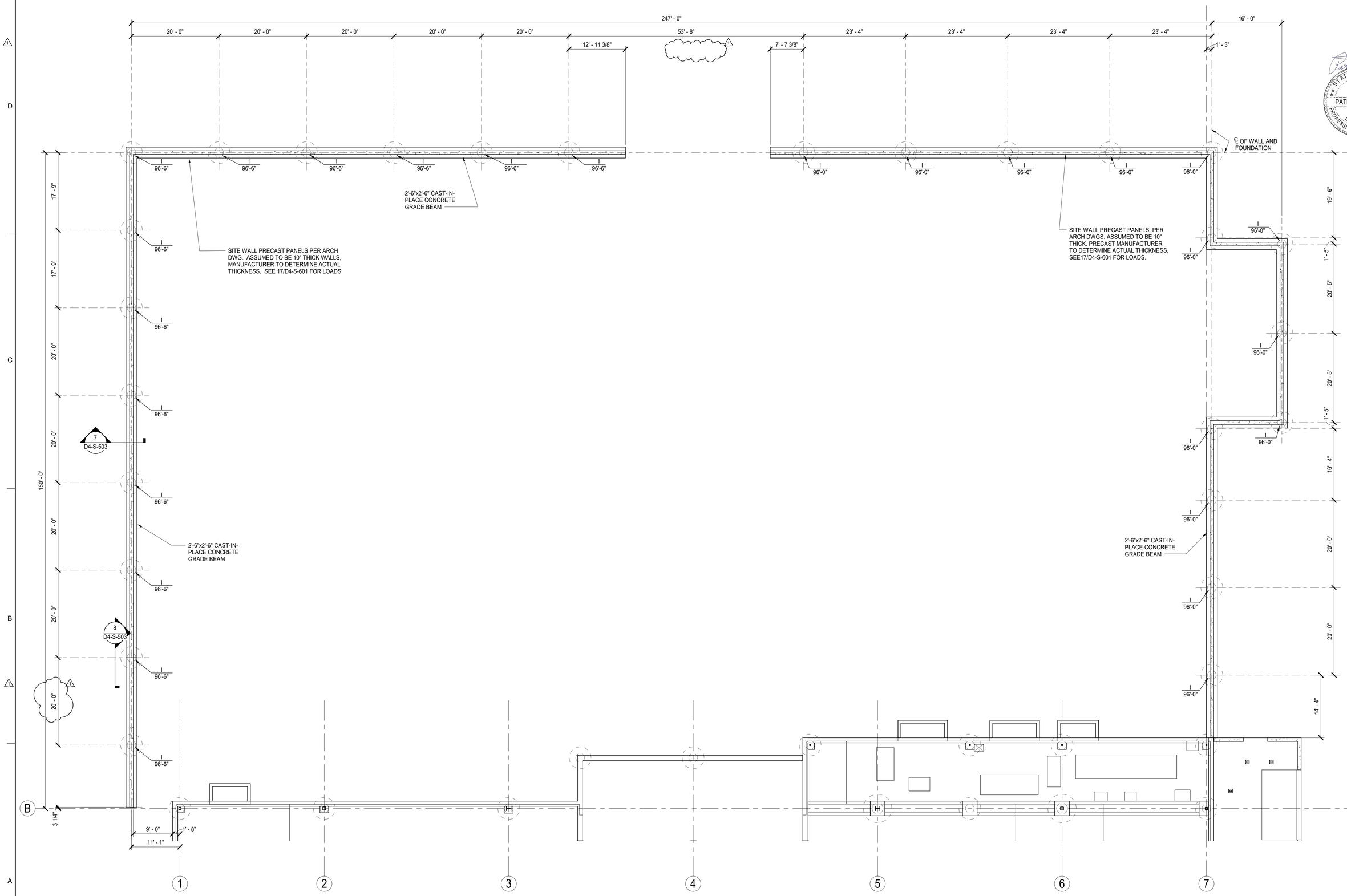
JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX , WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPL5220527

PLUMBING ISOMETRICS

Sheet reference number
D4-P-908
Sheet of

Cont No.

7/20/2026 2:55:30 PM



1 LOADING DOCK SCREEN WALL PLAN

1/8" = 1'-0"

8 6 4 2 0 8 16

PLAN NORTH

LEGEND

II — PIER TYPE

96'-3" — TOP OF PIER ELEVATION

SHEET NOTES

1. FOR DRILLED PIER DETAIL AND TYPE, SEE DETAIL 11/D4-S-501.
2. CONTRACTOR SHALL VERIFY AND COORDINATE TOP OF PIER ELEVATIONS.
3. FOR TYPICAL DETAILS NOT REFERENCED, SEE SHEET D4-S-501, AND D4-S-502.
4. COORDINATE WITH ARCHITECTURAL DWGS.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
PATRICK FINLEY
110906
LICENSED PROFESSIONAL ENGINEER
07/21/26

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: P. FINLEY
Date: MAY 2025
Rev.
Solicitation No.: W9126G25RA020
Own by: M. LOWE
Contract No.:
Reviewed by: A. VIRTSLER
Scale: 1:1
Submitted by: C. LANGUM
Plot date: 7/13/2026 2:58:31 PM
File name:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH 819 TAYLOR STREET FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
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MPLS220527

LOADING DOCK SCREEN WALL PLAN

Sheet reference number

D4-S-103

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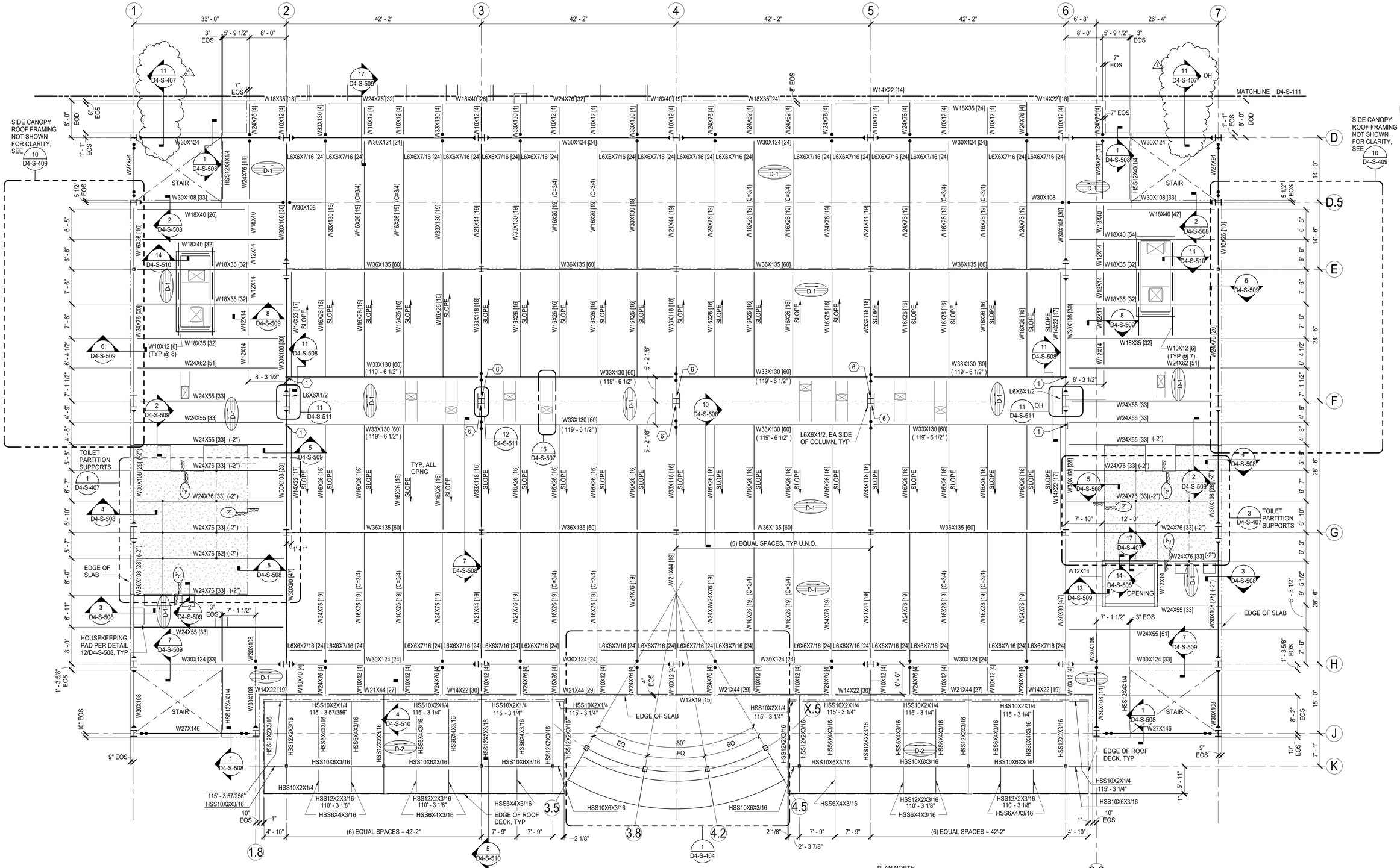


1 SECOND FLOOR FRAMING PLAN - AREA A
1/8" = 1'-0"

LEGEND

- INDICATES SIDEPLATE MOMENT CONNECTION, PER D4-S-003, D4-S-004, D4-S-522, D4-S-523 AND D4-S-524.
- INDICATES PERPENDICULAR MOMENT CONNECTION TO SIDEPLATE, PER 6/D4-S-522.
- INDICATES BEAM TO BEAM MOMENT CONNECTION, PER 11/D4-S-509 AND 12/D4-S-509.
- (C = 3/4) INDICATES BEAM CAMBER.
- "X" INDICATES STEP IN TOP OF SLAB ELEVATION.
- (-2") INDICATES TOP OF STEEL ELEVATION RELATIVE TO TYPICAL TOP OF STEEL ELEVATION AT A GIVEN LEVEL
- D-1 INDICATES SPAN DIRECTION OF 2" - 18GA COMPOSITE DECK W/ 3 1/2" CONCRETE TOPPING, TOTAL THICKNESS "T" = 5 1/2" PER DETAIL 4/D4-S-507.
- D-2 INDICATES SPAN DIRECTION OF 1 1/2" BP - 20/20GA (HAT/PAN) CELLULAR DECK PER DETAIL 11/D4-S-531.
- 1 INDICATES HSS3x3x1/4 POST PER DETAIL 11/D4-S-521.
- 6 INDICATES BEAM TO COLUMN CONNECTION WITH DOUBLE ROW OF BOLTS PER DETAIL 1/D4-S-521.
- [18] INDICATES NUMBER OF STUDS PER 3/D4-S-507. STUDS EQUALLY SPACED.

SHEET NOTES

1. FOR TYP. DETAILS NOT REFERENCED, SEE SHEET D4-S-507, D4-S-521 AND D4-S-531.
2. ELEVATIONS PER ARCH.
3. COORDINATE w/ ARCHITECTURAL DRAWINGS.
4. ALL BEAMS EQUALLY SPACED U.N.O.
5. MEMBERS WITHOUT HEADED STUDS CALLED OUT SHALL HAVE 3/4" DIA. HEADED STUDS AT 24" O.C. TYP.
6. (XX'-XX") INDICATES TOP OF STEEL ELEVATION. TOP OF STEEL ELEVATION = (115'-6 1/2") U.N.O.
7. FOR SIDE PLATE FRAME ELEVATION, SEE SHEETS D4-S-211 AND D4-S-212.

KEY PLAN

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
PATRICK FINLEY
110906
LICENSED PROFESSIONAL ENGINEER
07/20/26

No.	Description	Date	Action
1	REVISED IAW AM0002	JULY 2026	

D.O. No.

Rev.

Date: MAY 2025
Solicitation No.: W9126G26RA020
Contract No.:
File name:
Print date: 7/10/2026 2:00:07 PM
Print scale: 1:1

Designed by: P. FINLEY
Dwn by: M. LOWE
Reviewed by: K. VERSCHUREN
Submitted by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH ATTN: CESWF-PE-D FORT WORTH, TEXAS

MERRICK

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

SECOND FLOOR FRAMING PLAN - AREA A

Sheet reference number
D4-S-110
Sheet of

Cover No.

7/10/2026 2:00:07 PM

SHEET NOTES

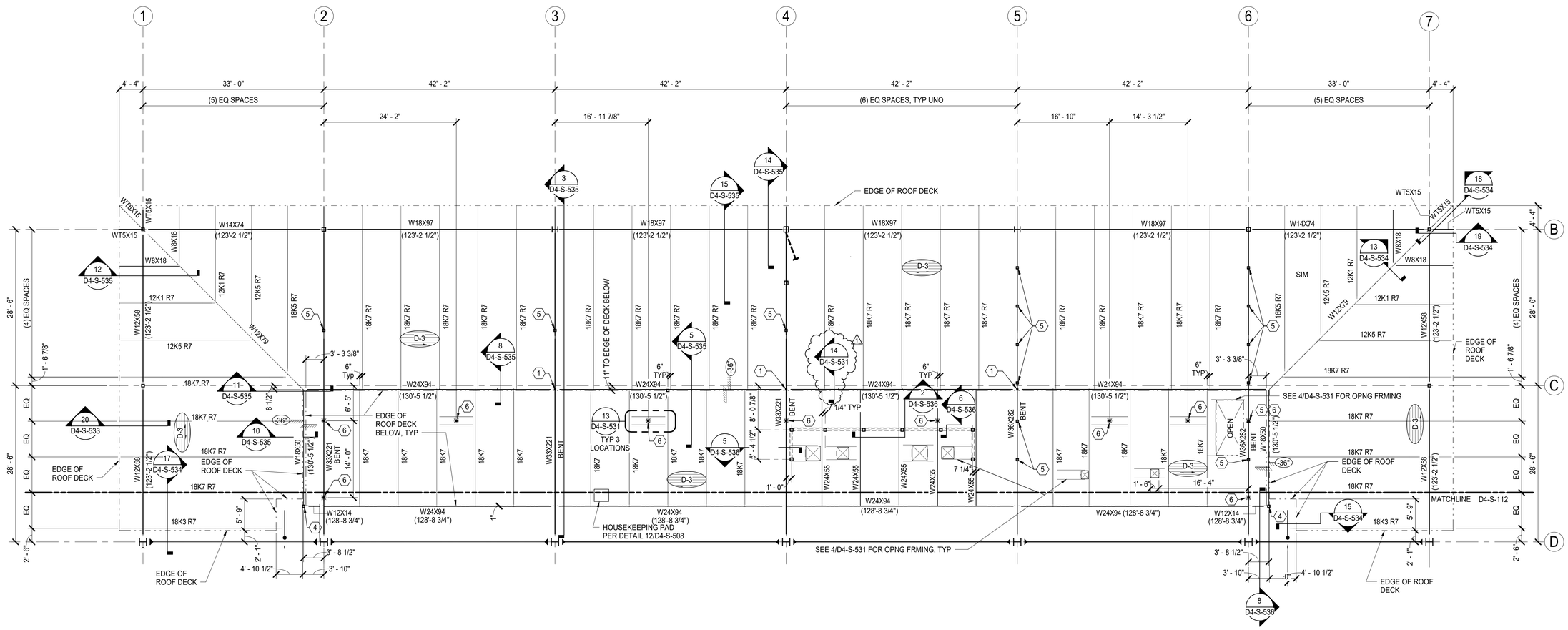
1. FOR TYP. DETAILS NOT REFERENCED, SEE SHEET D4-S-507, D4-S-521 AND D4-S-531.
2. ELEVATIONS PER ARCH.
3. COORDINATE w/ ARCHITECTURAL DRAWINGS.
4. ALL JOIST/BEAMS EQUALLY SPACED U.N.O.
5. (XX'-XX") INDICATES TOP OF STEEL ELEVATION.
6. JOIST MANUFACTURER SHALL PROVIDE BRIDGING AS REQUIRED BY SJI TO ADEQUATELY BRACE JOISTS.
7. JOIST SEATS PER 12/D4-S-531 FOR THIS SHEET ONLY.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
PATRICK FINLEY
110906
LICENSED PROFESSIONAL ENGINEER
07/21/26

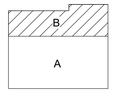
LEGEND

D-3	INDICATES SPAN DIRECTION OF 1 1/2" - 18GA ROOF DECK, PER DETAIL 1/D4-S-531.
	INDICATES BEAM TO BEAM MOMENT CONNECTION, PER 11/D4-S-509.
(C = 3/4")	INDICATES BEAM CAMBER.
R10	INDICATES JOIST TOP CHORD EXTENSION TYPE.
4	INDICATES HSS5x5x3/8 POST PER DETAIL 8/D4-S-536.
5	INDICATES HSS5x5x3/8 POST PER DETAIL 7/D4-S-535.
18K7	INDICATES JOIST DESIGN DESIGNATION.
	INDICATES VERTICAL DIAGONAL BRACING.
	INDICATES EDGE OF ROOF DECK.
6	INDICATES FALL PROTECTION BOLLARD SUPPORTS. PLACE BOLLARDS AT CENTER OF SUPPORT. CONTRACTOR TO COORDINATE WITH FALL PROTECTION PROVIDER.



1 LOW ROOF FRAMING PLAN - AREA B
1/8" = 1'-0"

PLAN NORTH



KEY PLAN

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: P. FINLEY
Dwn by: M. LOVE
Reviewed by: K. WEGNER
Submitted by: C. LANGUM
Date: MAY 2025
Solicitation No.: W912QR24A200
Contract No.:
Rev:
File name:
Plot date: 7/13/2026 3:00:29 PM
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

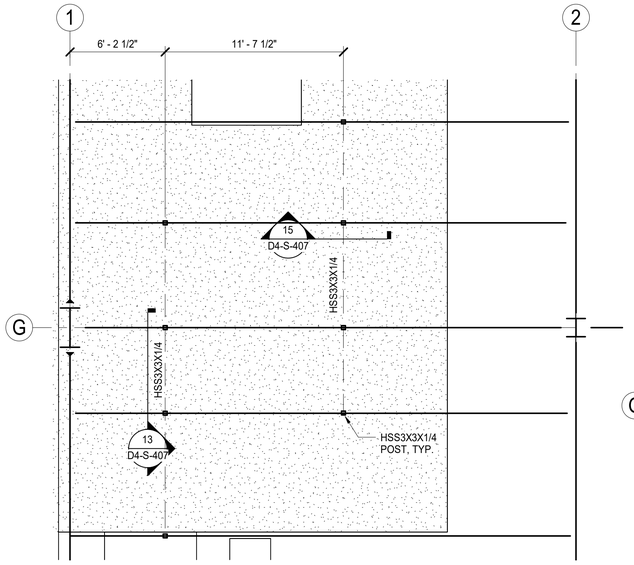
IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

LOW ROOF FRAMING PLAN - AREA B

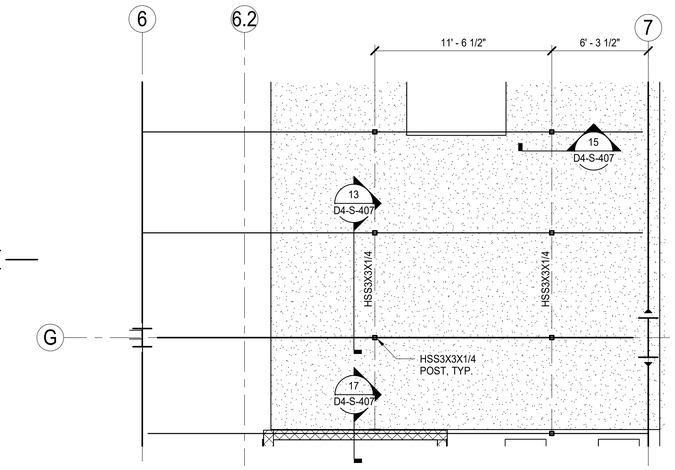
Sheet reference number
D4-S-113
Sheet of

Grid No.

7/13/2026 3:00:29 PM



1 ENLARGED GROUND AND 2ND FLOOR TOILET PARTITION SUPPORT PLAN
1/4" = 1'-0"



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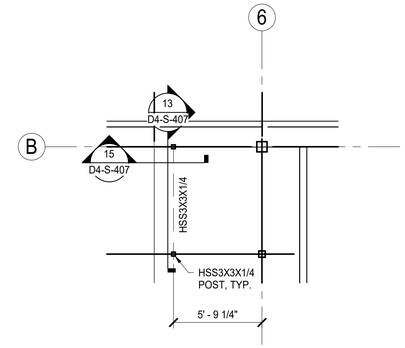
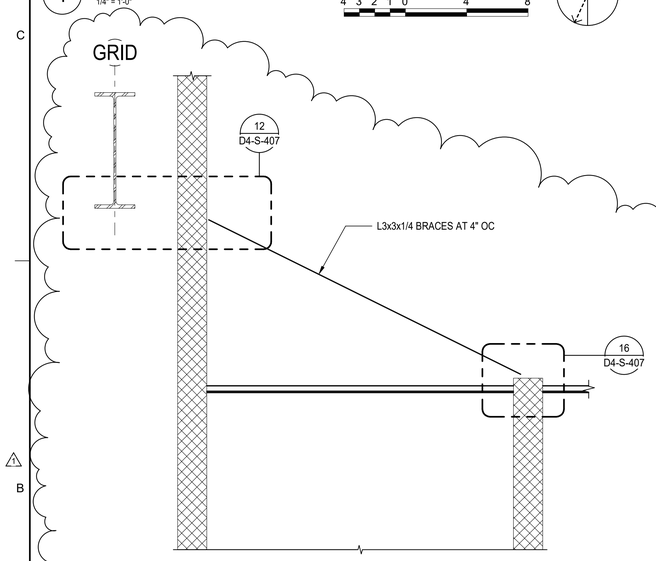
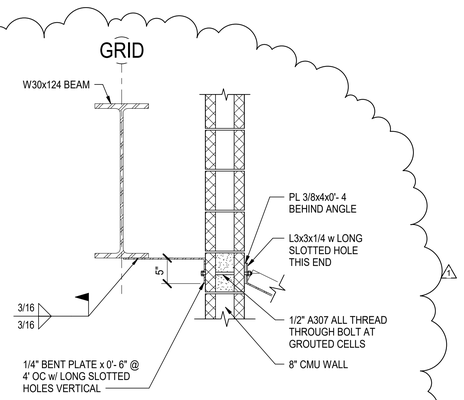
1/4" = 1'-0"



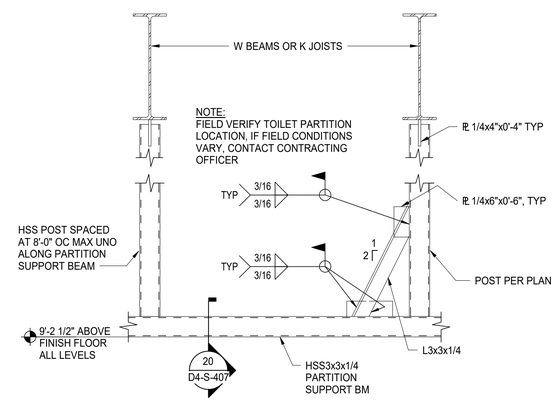
4 ENLARGED GROUND FLOOR TOILET PARTITION SUPPORT PLAN
1/4" = 1'-0"



11 SECTION



12 BRACED CMU WALL TO BEAM



13 HANGING TOILET PARTITION SUPPORT ELEVATION
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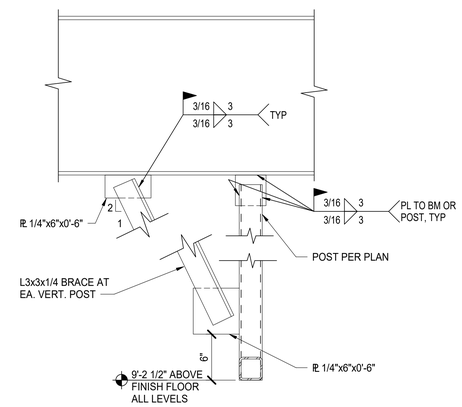

15 HANGING TOILET PARTITION SUPPORT BRACING
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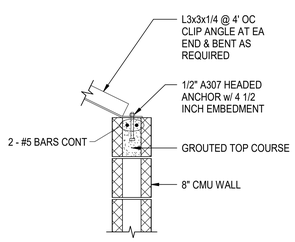
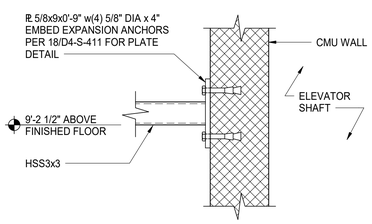
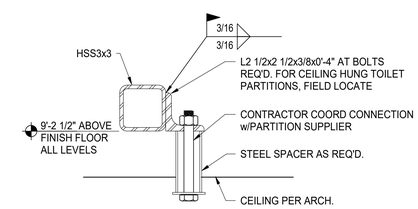


16 TOP BRACED CMU WALL



17 HANGING TOILET PARTITION SUPPORT TO CMU WALL
N.T.S.



20 HANGING TOILET PARTITION PANEL CONN
N.T.S.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
PATRICK FINLEY
110906
LICENSED PROFESSIONAL ENGINEER
07/20/26

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Rev.

Date: MAY 2025
Solicitation No.: W9126G25RA020
Contract No.:
File name:
Plot date: 7/10/2026 1:59:05 PM
Plot scale: 1:1

Designed by: P. FINLEY
Dwn by: M. LOWE
Reviewed by: J. VITSKUCER
Submitted by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CONTRACT DIVISION
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (IDCF4)
MPLS220527

ENLARGED TOILET PARTITION SUPPORTS

Sheet reference number
D4-S-407
Sheet of

Cont No.

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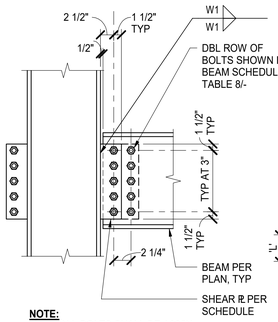
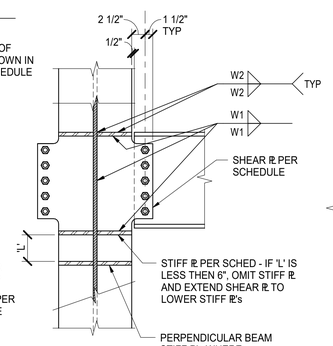
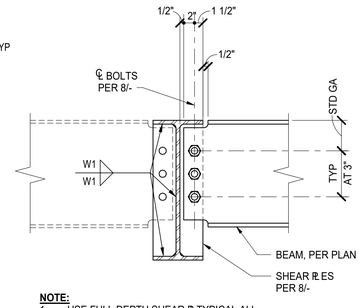




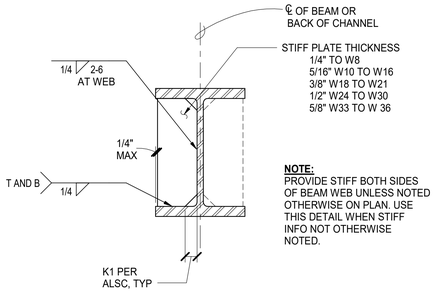
NOTE:
1. ALL BOLTS SHALL BE A325N.
2. WHERE MOMENT FRAME STIFFENERS OCCUR THEY SHALL TAKE PRECEDENCE OVER STIFF PLATES SHOWN IN THIS DETAIL
3. SEE 8/D4-S-521 FOR BEAM SCHEDULE.

1 BEAM TO COLUMN CONNECTION
N.T.S.



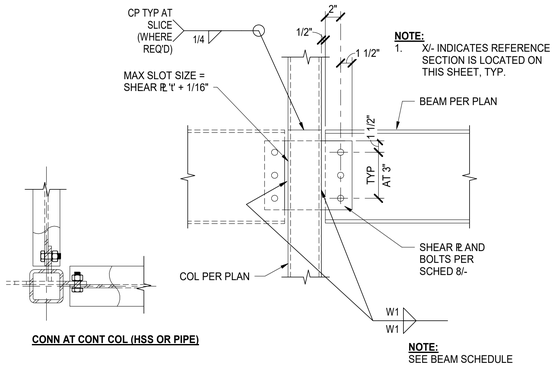
NOTE:
1. USE FULL DEPTH SHEAR ⅊ TYPICAL ALL BM TO BM CONNECTIONS.
2. PER 8/- FOR ADDITIONAL INFORMATION.

2 BEAM TO BEAM CONNECTION
N.T.S.



NOTE:
PROVIDE STIFF BOTH SIDES OF BEAM WEB UNLESS NOTED OTHERWISE ON PLAN. USE THIS DETAIL WHEN STIFF INFO NOT OTHERWISE NOTED.

3 STD STIFFENERS
N.T.S.

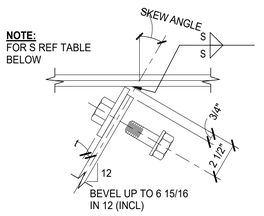


CONN AT CONT COL (HSS OR PIPE)

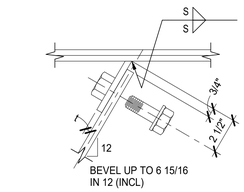
NOTE:
1. X/- INDICATES REFERENCE SECTION IS LOCATED ON THIS SHEET, TYP.

NOTE:
SEE BEAM SCHEDULE

4 W TO HSS CONNCECTION
N.T.S.



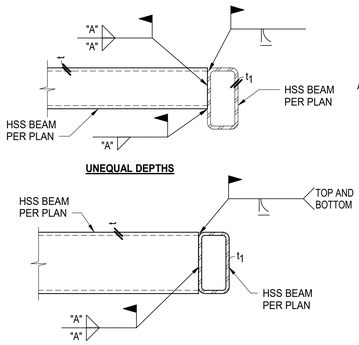
TYP SKEWED CONN (TYPE WP1)



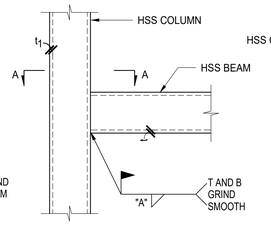
ALTERNATE SKEWED CONN (TYPE WP2)

NOTE
1. S - INDICATES WELD SIZE SHOWN ON 8/-
2. USE STANDARD HEX HEAD BOLTS WHERE FIT-UP DOES NOT ALLOW USE OF TENSION CONTROL BOLTS.

VALUES OF S FOR TYPE WP1 SKEWED CONNECTION								
PL THICKNESS t, IN		1/4	5/16	3/8	7/16	1/2	5/8	3/4
BEVEL	UP TO 1 3/8	S	S	S+1/16	S+1/16	S+1/16	S+1/8	S+1/8
	OVER 1 5/8 TO 2 1/8	S+1/16	S+1/16	S+1/16	S+1/16	S+1/8	S+1/8	S+1/8
	OVER 2 1/8 TO 3 1/4	S+1/16	S+1/8	S+1/8	S+1/8	S+1/8		
	OVER 3 1/4 TO 4 3/8	S+1/8	S+1/8	S+1/8				
	OVER 4 3/8 TO 5 5/8	S+1/8	S+1/8					
	OVER 5 5/8 TO 6 15/16	S+1/8						

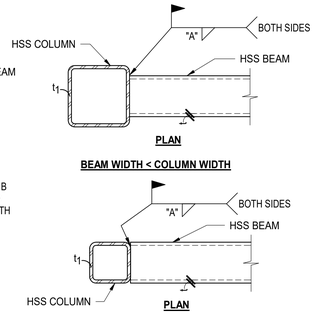


HSS BEAM TO HSS BEAM



HSS BEAM TO HSS COLUMN

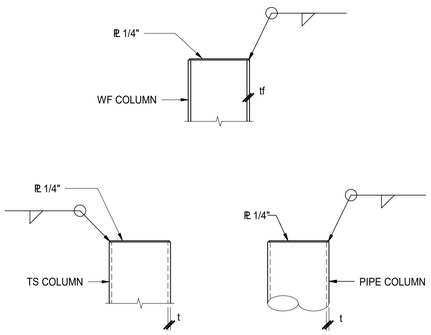
"A" WELD = (1.5) TIMES THE LARGEST TUBE THICKNESS "t" OR "t_1" UNO



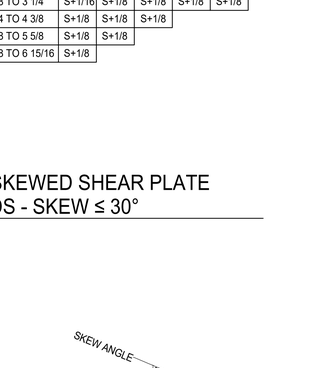
7 HSS TO HSS CONNECTIONS
N.T.S.

BEAM SCHEDULE, U.N.O.							
BEAM	BOLT SIZE	NO BOLTS	SHEAR PLATE	STIFF PLATE	STIFF		S
					W1	W2	
W6, 8, 10, C10	7/8" DIA	2	1/4"	3/8"	1/4"	3/16"	3/16"
W12	7/8" DIA	3	1/4"	3/8"	1/4"	3/16"	3/16"
W14	7/8" DIA	3	5/16"	3/8"	5/16"	1/4"	1/4"
W16	7/8" DIA	4	5/16"	3/8"	5/16"	1/4"	1/4"
W18	7/8" DIA	4	3/8"	3/8"	5/16"	1/4"	5/16"
W21	7/8" DIA	5	3/8"	3/8"	5/16"	1/4"	5/16"
W24	7/8" DIA	6	3/8"	1/2"	5/16"	5/16"	5/16"
W27	7/8" DIA	7	3/8"	1/2"	5/16"	5/16"	5/16"
W30	7/8" DIA	8	3/8"	1/2"	5/16"	5/16"	5/16"
W33	7/8" DIA	9	3/8"	1/2"	5/16"	5/16"	5/16"

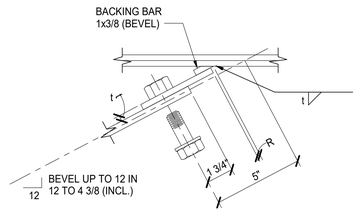
8 BEAM SCHEDULE
N.T.S.



9 CAP PLATE
N.T.S.



TYPE WP3 SKEWED CONN.

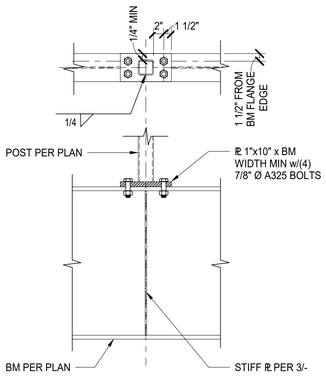


R= 1/8 FOR BEVELS 4 3/8 IN 12 TO 6 15/16 IN 12 (INCL.)
R= 3/16 FOR BEVELS OVER 6 15/16 IN 12 TO 12 IN 12 (INCL.)

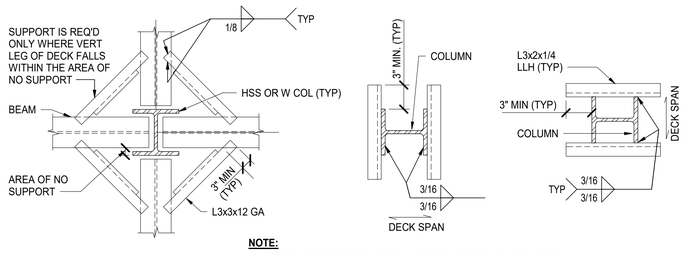
TYPE WP4 SKEWED CONN.

NOTE
1. USE STANDARD HEX HEAD BOLTS WHERE FIT-UP DOES NOT ALLOW USE OF TENSION CONTROL BOLTS.
2. PER 10/- FOR ADDITIONAL INFORMATION.

10 TYP SKEWED SHEAR PLATE WELDS - SKEW ≤ 30°
N.T.S.

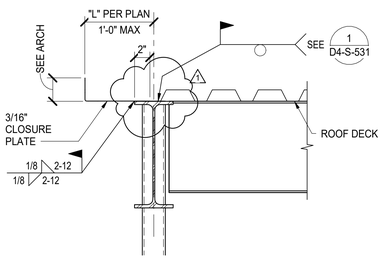


11 HSS COLUMN TO BEAM
1" = 1'-0"

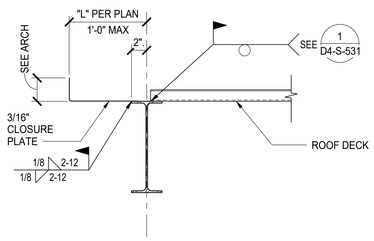


NOTE:
1. FOR COMPOSITE STEEL DECK WITH CONCRETE CONTRACTOR MAY DELETE ANGLES, SHORE AS REQ'D DURING CONCRETE PLACEMENT.
2. PROVIDE ANGLES AS REQ'D WHERE BEAMS DO NOT FRAME TO COLUMNS CONTRACTOR TO PROVIDE 16 GA SHEET METAL TO FILL COL CAVITY AS REQ'D WHERE BEAMS OCCUR ON 2 SIDES OR SEE DETAIL.

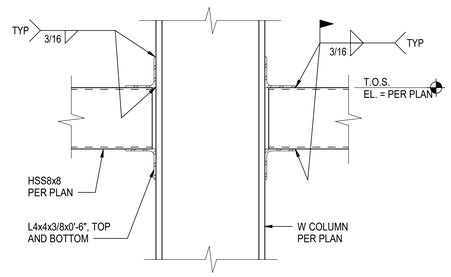
13 METAL DECK TO COLUMN
N.T.S.



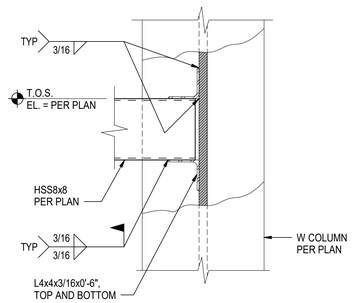
16 EDGE AT ROOF DECK PARALLEL TO BEAM
1 1/2" = 1'-0"



17 EDGE AT ROOF-DECK PERP TO BEAM
1 1/2" = 1'-0"



18 HSS TO W COLUMN FLANGE
1 1/2" = 1'-0"



19 HSS TO W COLUMN WEB
1 1/2" = 1'-0"

20 TYP SKEWED SHEAR PLATE WELDS - SKEW ≥ 30°
N.T.S.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
PATRICK FINLEY
110906
LICENSED PROFESSIONAL ENGINEER
07/20/26

NO.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Rev.
Date: MAY 2025
Solicitation No.: W9126G25RA020
Contract No.:
File name:
Plot date: 7/10/2026 2:01:04 PM
Plot scale: 1:1
Designed by: P. FINLEY
Dwn by: M. LOWE
Reviewed by: K. VITSKO-EER
Approved by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

TYPICAL STEEL FRAMING DETAILS

Sheet reference number
D4-S-521
Sheet of

Cont No.

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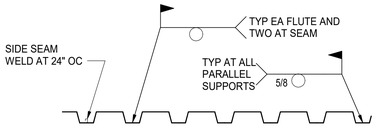
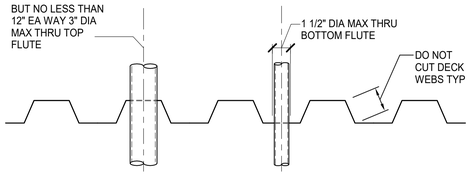


MIN. ROOF DECK PROPERTIES

TYPE 'B'	TYPE 'B'
1 1/2"x20 GA	1 1/2"x18 GA
GALV METAL DECKING	GALV METAL DECKING
I = 0.201 IN^4	I = 0.289 IN^4
+S = 0.234 IN^3	+S = 0.318 IN^3
-S = 0.247 IN^3	-S = 0.327 IN^3
q = 692 #/FT AT 6'	q = 683 #/FT AT 8'

NOTE
1. MINIMUM DECK END SUPPORT SHALL BE 2".

1 METAL ROOF DECK
N.T.S.

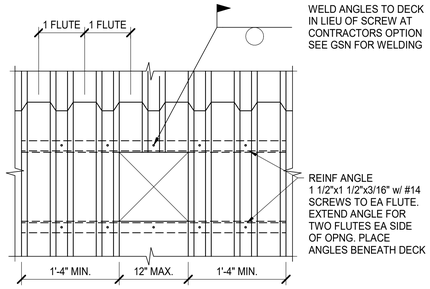


SECTION C-C

IF OPENINGS ARE CLOSER OR LARGER THAN SHOWN PROVIDE FRAMING AS NOTED IN 3/-.

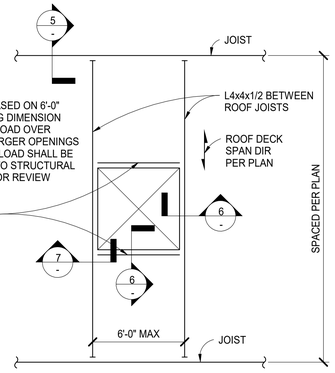
TYPICAL UNREINF OPENING

2 TYP OPNG NON-COMP DECK
N.T.S.



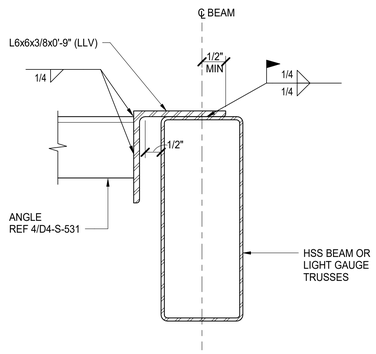
NOTE:
1. REINFORCING ANGLES NOT REQUIRED AT OPENINGS LESS THAN 6" OR WHEN ONE DECK FLUTE IS CUT.
2. USE AT OPENINGS UP TO 12" WIDE WHEN NO MORE THAN TWO DECK FLUTES HAVE BEEN CUT. DECK SHALL BE CONTINUOUS OVER MINIMUM OF ONE ADJACENT SPAN
3. FOR LARGE OPENINGS IN METAL DECK SEE DETAIL 4/-.

3 METAL ROOF DECK SMALL OPENING
N.T.S.



NOTE:
DESIGN IS BASED ON 6'-0" MAX OPENING DIMENSION AND A 600lb LOAD OVER OPENING. LARGER OPENINGS OR HEAVIER LOAD SHALL BE SUBMITTED TO STRUCTURAL ENGINEER FOR REVIEW

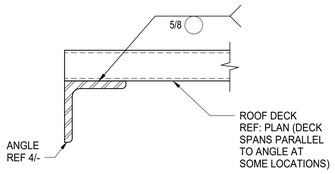
4 TYP FRAMING MECH OPENING
N.T.S.



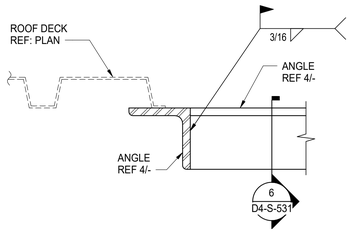
5 ANGLE SUPPORT TO HSS SUPPORT
N.T.S.

US Army Corps of Engineers
Fort Worth District

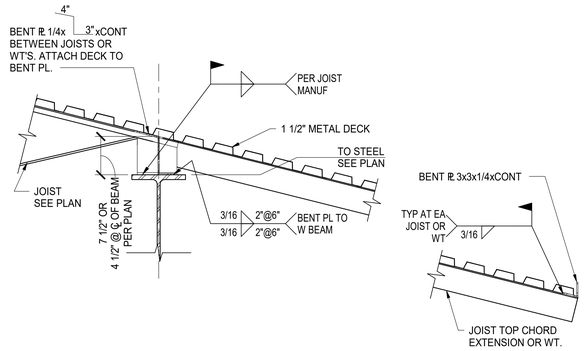
STATE OF TEXAS
PATRICK FINLEY
110906
LICENSED
PROFESSIONAL ENGINEER
07/21/26



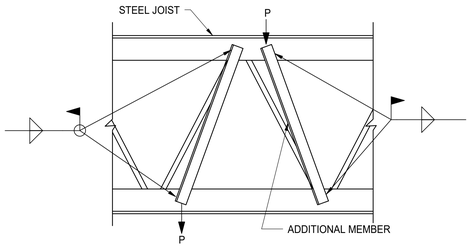
6 DECK TO ANGLE
N.T.S.



7 ANGLE SUPPORT TO ANGLE SUPPORT
N.T.S.



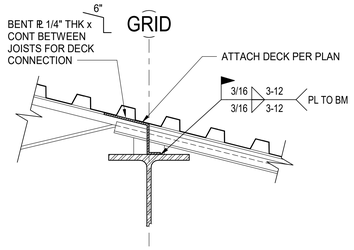
8 TYPICAL SHEAR CONNECTOR & EDGE ANGLE DETAIL
N.T.S.



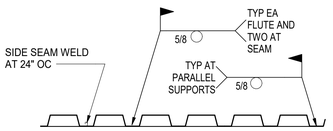
P = 60# WITHOUT ADDITIONAL MEMBER

COORDINATE ADDITIONAL MEMBER REQUIREMENTS WITH JOIST MANUFACTURER.

9 TYP. JOIST REINFORCING AT POINT LOADS
N.T.S.



10 SECTION
N.T.S.

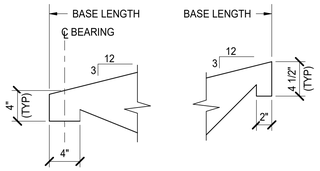


MIN ROOF DECK PROPERTIES

TYPE 'BP'
1 1/2"x20/20 GA.
GALV METAL DECKING
I = 0.357 IN^4
+S = 0.301 IN^3
-S = 0.394 IN^3

NOTE:
1. MINIMUM DECK END SUPPORT SHALL BE 2".

11 CELLULAR DECK
N.T.S.



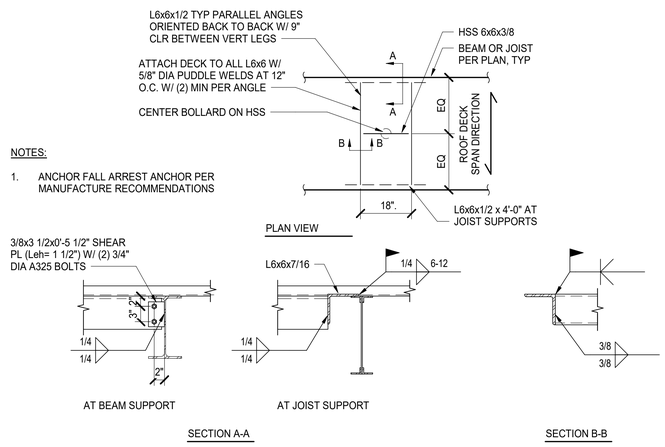
LOW END HIGH END

K AND KCS SERIES

NOTE: TO JOIST SUPPLIER

1. JOIST SEAT DEPTH SHALL BE AS SHOWN UNLESS NOTED OTHERWISE ON DRAWINGS.
2. EXTENDED END ON JOIST SHALL BE AS SHOWN ON DRAWINGS.
3. WHERE JOIST SITS ON TOP OF SIDE PLATE CONNECTION ADJUST SEAT TO ACCOMMODATE SIDE PLATES COVER PLATE THICKNESS

12 BAR JOIST SEAT DIAGRAM
N.T.S.

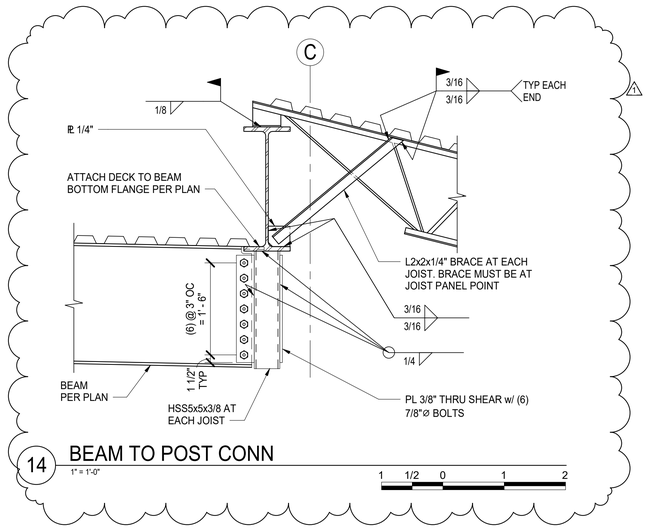


SECTION A-A

NOTES:

1. ANCHOR FALL ARREST ANCHOR PER MANUFACTURE RECOMMENDATIONS

13 FALL ARREST SUPPORT DETAILS
N.T.S.



14 BEAM TO POST CONN
1" = 1'-0"

1 1/2 0 1 2

No.	Description	Date	Action	D.O. No.
1	REVISED IAW AM0002	JULY 2026		

Rev.

Date: MAY 2025
Solicitation No.: W9126G26RA020
Contract No.:
File name:
Plot date: 7/13/2026 3:01:03 PM
Plot scale: 1:1

Designed by: P. FINLEY
Dwn by: M. LOWE
Reviewed by: J. LITSLEITER
Submitted by: C. LANGUM

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX, WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220927

STEEL DETAILS

Sheet reference number
D4-S-531
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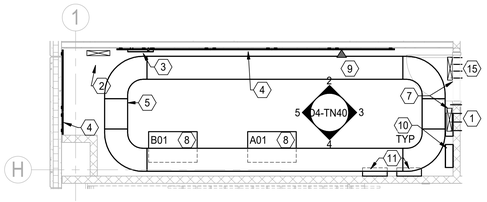
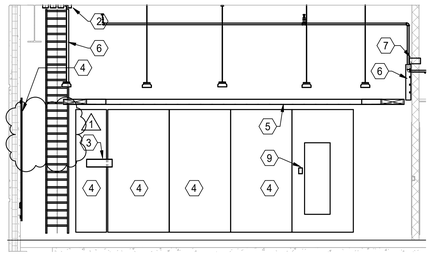


1 ENLARGED PLAN - FIRST FLOOR COMM. ROOM 137
1/4" = 1'-0"

PLAN NORTH



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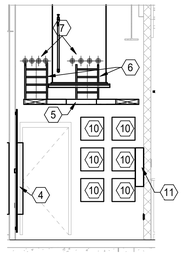

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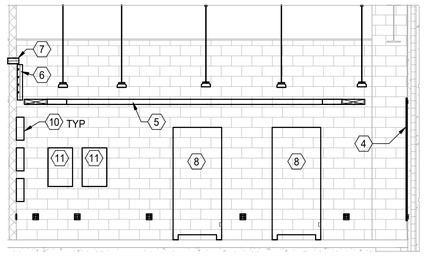

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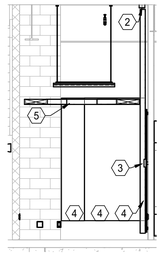
1/4" = 1'-0"



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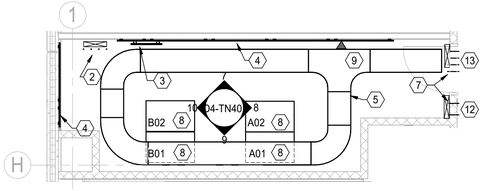

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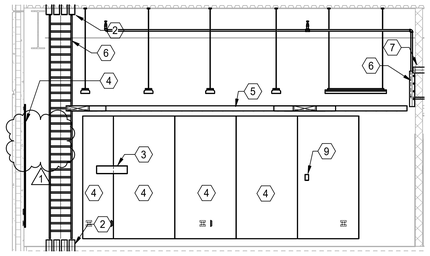
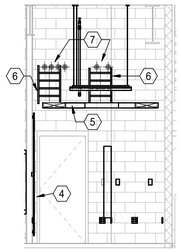
PLAN NORTH



7 NORTH VIEW ELEVATION RM 233
1/4" = 1'-0"



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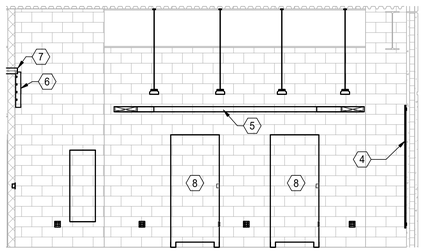
1/4" = 1'-0"



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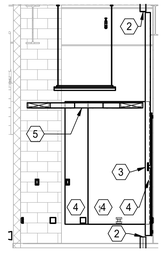

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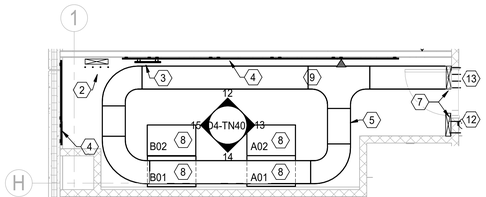

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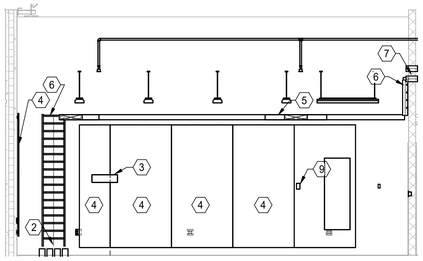
1/4" = 1'-0"

PLAN NORTH



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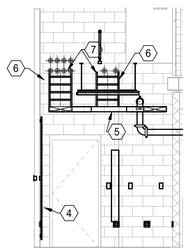
1/4" = 1'-0"



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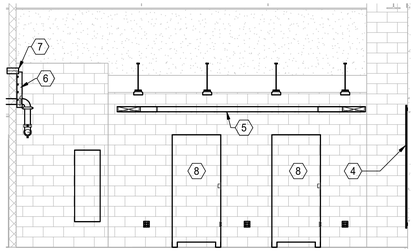
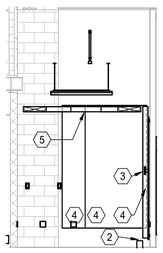
1/4" = 1'-0"



14 SOUTH VIEW ELEVATION RM 327
1/4" = 1'-0"



15 WEST VIEW ELEVATION RM 327
1/4" = 1'-0"

SHEET NOTES

1. REFER TO SHEET D4-E-001 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. REFER TO SHEETS D4-TN601 THROUGH D4-TN603 FOR TELECOMMUNICATION SYSTEM RISER DIAGRAMS.
3. REFER TO SHEET D4-TN604 FOR CCTV SYSTEM RISER DIAGRAM.
4. REFER TO SHEET D4-TN605 FOR SECURITY SYSTEM RISER DIAGRAM.
5. REFER TO SHEET D4-TN604 FOR CATV SYSTEM RISER DIAGRAM.
6. ALL CONDUIT AND BOXES SHALL BE CONCEALED WITHIN WALLS (INCLUDING PRECAST PANELS) AND ABOVE CEILINGS.
7. COORDINATE FINAL TELECOM EQUIPMENT AND RACK LAYOUT WITH 502nd COMMUNICATION SQUADRON POC PRIOR TO START OF SHOP DRAWINGS. CABINETS SHALL MAINTAIN 36" CLEARANCE AT FRONT AND REAR.
8. FOR ALL CONDUIT PENETRATIONS, PROVIDE SLEEVE, SMOKE SEAL AND FIRE STOP PER SPECIFICATIONS.

KEYNOTES

1. PROVIDE (4) 4" EMT CONDUITS FROM COMM ROOM ON SAME FLOOR. PROVIDE BUSHINGS AT CONDUIT ENDS.
2. PROVIDE (4) 4" EMT CONDUITS BETWEEN VERTICALLY STACKED COMMUNICATIONS ROOMS.
3. PROVIDE SECONDARY BONDING BUSBAR (SBB), LOCATED AT 5'-0" AFF.
4. PROVIDE FIRE RESISTANT 4' x 8' x 3/4" PLYWOOD BACKBOARD. BOTTOM OF BOARD AT 6" AFF.
5. PROVIDE 18"W x 6"D LADDER TYPE CABLE TRAY AT 9'-0" AFF.
6. PROVIDE 18"W x 6"D VERTICAL LADDER TYPE CABLE TRAY.
7. PROVIDE THROUGH-WALL FIRE STOPPING ASSEMBLY FOR COMMUNICATIONS CABLING. REFER TO DETAIL 4/D4-TN501.
8. PROVIDE COMMUNICATIONS RACK. REFER TO D4-TN601 THROUGH D4-TN603 FOR ADDITIONAL INFORMATION.
9. PROVIDE FACEPLATE TO ACCEPT/SUPPORT WALL MOUNTED TELEPHONE.
10. PROVIDE ACCESS CONTROL SYSTEM DOOR CONTROLLER MODULES WITH CONDUIT ROUTING TO SECURITY SYSTEM ENCLOSURE.
11. PROVIDE SECURITY SYSTEM ENCLOSURE.
12. PROVIDE (2) 4" EMT CONDUITS BETWEEN COMM ROOMS ON SAME FLOOR. PROVIDE BUSHING AT CONDUIT ENDS.
13. PROVIDE (8) 4" EMT CONDUITS BETWEEN COMM ROOM AND HALLWAY. PROVIDE BUSHING AT CONDUIT ENDS.
14. NOT USED.
15. PROVIDE (4) 4" EMT CONDUITS BETWEEN COMM ROOM AND HALLWAY. PROVIDE BUSHING AT CONDUIT ENDS.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
Bicsi
KEITH BRAUN
BICSI ID # 204581
EXPIRES 12-31-26
JUL 16 2026
RCDD

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Dwn by: J. CHAMPION
Solicitation No.: W9126G25RA020
Reviewed by: K. BENNETT
Contract No.: W9126G26RA028
Approved by: C. LANGUM
File name:
Plot date: 7/16/2026 13:10:38
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
CORPS OF ENGINEERS
FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI-S220527

ENLARGED TELECOMMUNICATIONS ROOM PLANS AND ELEVATIONS

Sheet reference number
D4-TN401
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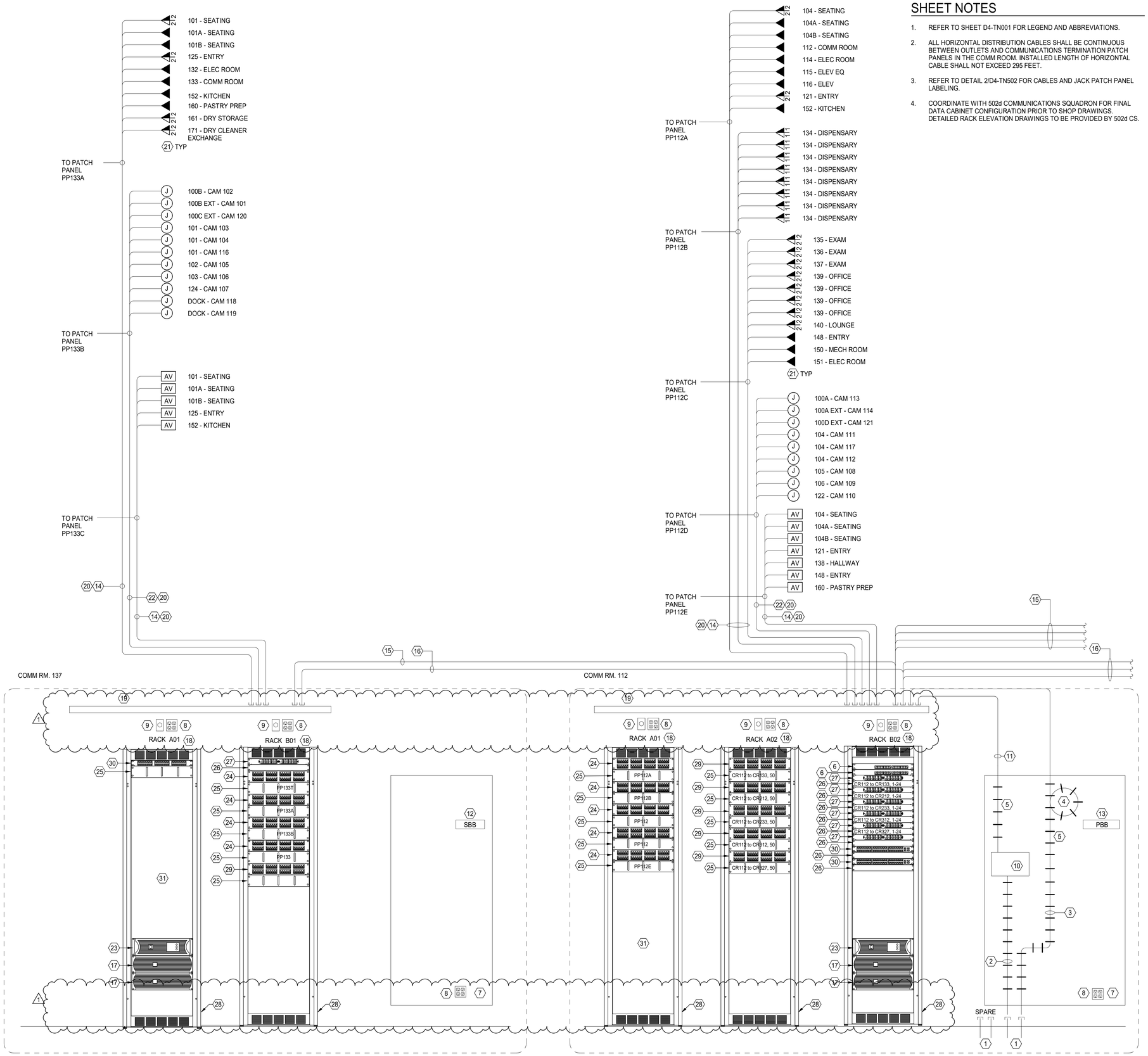

1 FIRST FLOOR TELECOMMUNICATION SYSTEM RISER DIAGRAM

N.T.S.

SHEET NOTES

1. REFER TO SHEET D4-TN001 FOR LEGEND AND ABBREVIATIONS.
2. ALL HORIZONTAL DISTRIBUTION CABLES SHALL BE CONTINUOUS BETWEEN OUTLETS AND COMMUNICATIONS TERMINATION PATCH PANELS IN THE COMM ROOM. INSTALLED LENGTH OF HORIZONTAL CABLE SHALL NOT EXCEED 295 FEET.
3. REFER TO DETAIL 2/D4-TN502 FOR CABLES AND JACK PATCH PANEL LABELING.
4. COORDINATE WITH 502d COMMUNICATIONS SQUADRON FOR FINAL DATA CABINET CONFIGURATION PRIOR TO SHOP DRAWINGS. DETAILED RACK ELEVATION DRAWINGS TO BE PROVIDED BY 502d CS.

KEYNOTES

1. PROVIDE OUTSIDE PLANT CABLE ENTRANCE. STUB UP CONDUIT 6" AFF. REFER TO DRAWING D4-TS101 FOR OUSTIDE PLANT CABLE CONTINUATION. PROVIDE CAPPED SPARE CONDUITS AS INDICATED.
2. PROVIDE 100 PAIR OUTSIDE PLANT COPPER CABLING. TERMINATE ON PROTECTCIVE ENTRANCE TERMINAL (PET) BLOCKS.
3. PROVIDE 24 STRAND OUTSIDE PLANT SINGLE MODE FIBER OPTIC CABLING. TERMINATE ON RACK MOUNTED FIBER OPTIC PATCH PANEL.
4. PROVIDE 20' FIBER OPTIC SERVICE LOOP.
5. PROVIDE LOOM ANCHORS FOR COPPER AND FIBER OPTIC CABLING AT 12" O.C.
6. PROVIDE 1RU, 24 PORT OSP FIBER OPTIC PATCH PANEL WITH 24 'LC' CONNECTORS FOR SM FIBER ICX 6610-24F. PROVIDE SERVICE LOOP TRAY.
7. PROVIDE 4'x8' PLYWOOD BACKBOARDS WITH INTUMESCENT PAINT. DO NOT PAINT OVER FIRE STAMP. REFER TO ENLARGED TELECOMMUNICATIONS ROOM PLANS FOR LOCATIONS.
8. PROVIDE DOUBLE DUPLEX. REFER TO POWER PLANS FOR LOCATIONS.
9. PROVIDE 120V/1PHASE, 30 AMP TWIST LOCK RECEPTACLE. REFER TO POWER PLANS FOR LOCATIONS.
10. PROVIDE 100 PAIR COPPER CABLE PROTECTIVE ENTRANCE TERMINAL (PET) BLOCKS WITH 110 INPUT AND 110 OUTPUT CONNECTORS. LOCATE ON PLYWOOD BACKBOARD. PROVIDE #6 GROUND CONDUCTOR FROM PET BLOCKS TO TMGB.
11. PROVIDE 100-PAIR COPPER BACKBONE CABLE. TERMINATE ON RACK MOUNTED PATCH PANELS. BACKBONE CABLE PAIRS 24/25 AND 49/50 WILL TERMINATE AT PORTS 24 AND 48 RESPECTIVELY. BACKBONE CABLE PAIRS 74/75 AND 99/100 WILL TERMINATE AT PORTS 72 AND 96 RESPECTIVELY.
12. PROVIDE SBB. REFER TO DETAILS 5, 6 / D4-TN502. REFER TO D4-EG601 FOR GROUNDING CONDUCTOR SIZING AND ROUTING.
13. PROVIDE PBB. REFER TO DETAILS 5, 6 / D4-TN502. REFER TO D4-EG601 FOR GROUNDING CONDUCTOR SIZING AND ROUTING.
14. PROVIDE MULTIPLE 4-PAIR, CAT-6, 24 AWG SOLID Cu, TWISTED PAIR CABLING FROM COMM RACK PATCH PANEL TO EACH COMMUNICATION JACK. ROUTE ALL CABLING CONCEALED IN CONDUIT OR, IF IN CEILING SPACE, IN CABLE TRAY AS INDICATED ON PLANS. PROVIDE PLENUM RATED CABLE. PROVIDE ACCESS PANELS AS REQUIRED FOR ACCESS TO CABLE TRAY AND PULL BOXES ABOVE HARD CEILING.
15. PROVIDE 12 STRAND MULTI MODE FIBER OPTIC BACKBONE CABLING FROM TELECOMMUNICATIONS ROOM 112 TO EACH TELECOMMUNICATIONS ROOM. ROUTE CABLING IN CONDUIT AND CABLE TRAY. PROVIDE PLENUM RATED CABLE. REFER TO DETAIL 1 / D4-TN604 FOR TELECOMMUNICATIONS BACKBONE SYSTEM RISER DIAGRAM.
16. PROVIDE 50 PAIR COPPER BACKBONE CABLING FROM TELECOMMUNICATIONS ROOM 112 TO EACH TELECOM-MUNICATIONS ROOM. ROUTE CABLING IN CONDUIT AND CABLE TRAY. PROVIDE PLENUM RATED CABLE. REFER TO DETAIL 1 / D4-TN604 FOR TELECOMMUNICATIONS BACKBONE SYSTEM RISER DIAGRAM.
17. GFGI RACK MOUNTED UPS BATTERY BACK-UP.
18. DATA CABINETS, 24"W X 42"D X HEIGHT PER MANUFACTURER SHALL BE FLOOR MOUNTED ENCLOSURES WITH SIDE PANELS, METAL MESH OR VENTED LOCKABLE FRONT AND REAR DOORS WITH IDENTICAL KEYS, WITH 2-EACH 10" FANS MOUNTED AT TOP OF THE CABINET AND DEPTH ADJUSTABLE FRONT AND REAR MOUNTING RAILS. HORIZONTAL CABLE MANAGEMENT DEVICES SHALL BE INTEGRAL TO THE CABINETS. ONE 19" RACK MOUNTED POWER STRIP WITH 12 OUTLETS WITH SURGE PROTECTION, A GROUND BUS BAR WITH A #6 AWG GROUND CABLE CONNECTED TO THE MASTER GROUND BUSBAR. LOCKABLE DATA CABINETS SHALL BE RITTAL, BLACK-BOX OR 502nd CS APPROVED EQUIVALENT .
19. PROVIDE LADDER TYPE CABLE TRAY AS INDICATED ON PLANS. PROVIDE CABLE DOWN SHOW SUPPORTS AS REQUIRED TO PROTECT CABLE FROM DAMAGE AND CONTROL BEND RADII.
20. WHEN IN CONDUIT, PROVIDE CONDUIT AND SECURE TO CABLE TRAY. PROVIDE INSULATED BUSHINGS. REFER TO DETAIL 2 / D4-TN501.
21. PROVIDE MODULAR TELEPHONE AND DATA JACK WALL PLATE. REFER TO DETAIL 1 / D4-TN501.
22. PROVIDE CAT-6 CABLING FROM RACK MOUNTED PATCH PANEL TO SECURITY CAMERA J-BOX. REFER TO DETAILS 4, 5 / D4-TN604.
23. GFGI RACK MOUNTED UNINTERRUPTIBLE POWER SUPPLY (UPS), SIZE PER GOVERNMENT AT 2200 kVA.
24. PROVIDE 2RU 48 PORT, CAT-6, TYPE 568B WIRING, RACK MOUNTED PATCH PANEL.
25. PROVIDE 2RU CABLE MANAGEMENT PANEL.
26. PROVIDE 1RU CABLE MANAGEMENT PANEL.
27. PROVIDE 1RU 24 PORT FIBER OPTIC PATCH PANEL WITH 'LC' STYLE CONNECTORS.
28. PROVIDE 6" WIDE VERTICAL CABLE MANAGEMENT WITH COVER.
29. PROVIDE 2RU 48 PORT, CAT-6, TYPE 568B WIRING, RACK MOUNTED PATCH PANEL DEDICATED FOR COPPER BACKBONE CABLING.
30. GFGI 48 PORT NETWORK SWITCH.
31. RACK SPACE RESERVED FOR GFGI IP BASED SECURITY VIDEO EQUIPMENT AND ACCESS CONTROL EQUIPMENT.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
Bicsi
BICSI ID # 204581
EXPIRES 12-31-26
JUL 16 2026
RCDD

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev:
Dwn by: J. CHAMPION
Solicitation No.: W9126G25RA0002
Reviewed by: K. BRADLEY
Contract No.:
Approved by: C. LANDUM
File name:
Plot date: Friday 7/16/26
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH 819 TAYLOR STREET FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

IBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI:S220527

FIRST FLOOR
TELECOMMUNICATIONS RISER DIAGRAM

Sheet reference number
D4-TN601

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Grid No.

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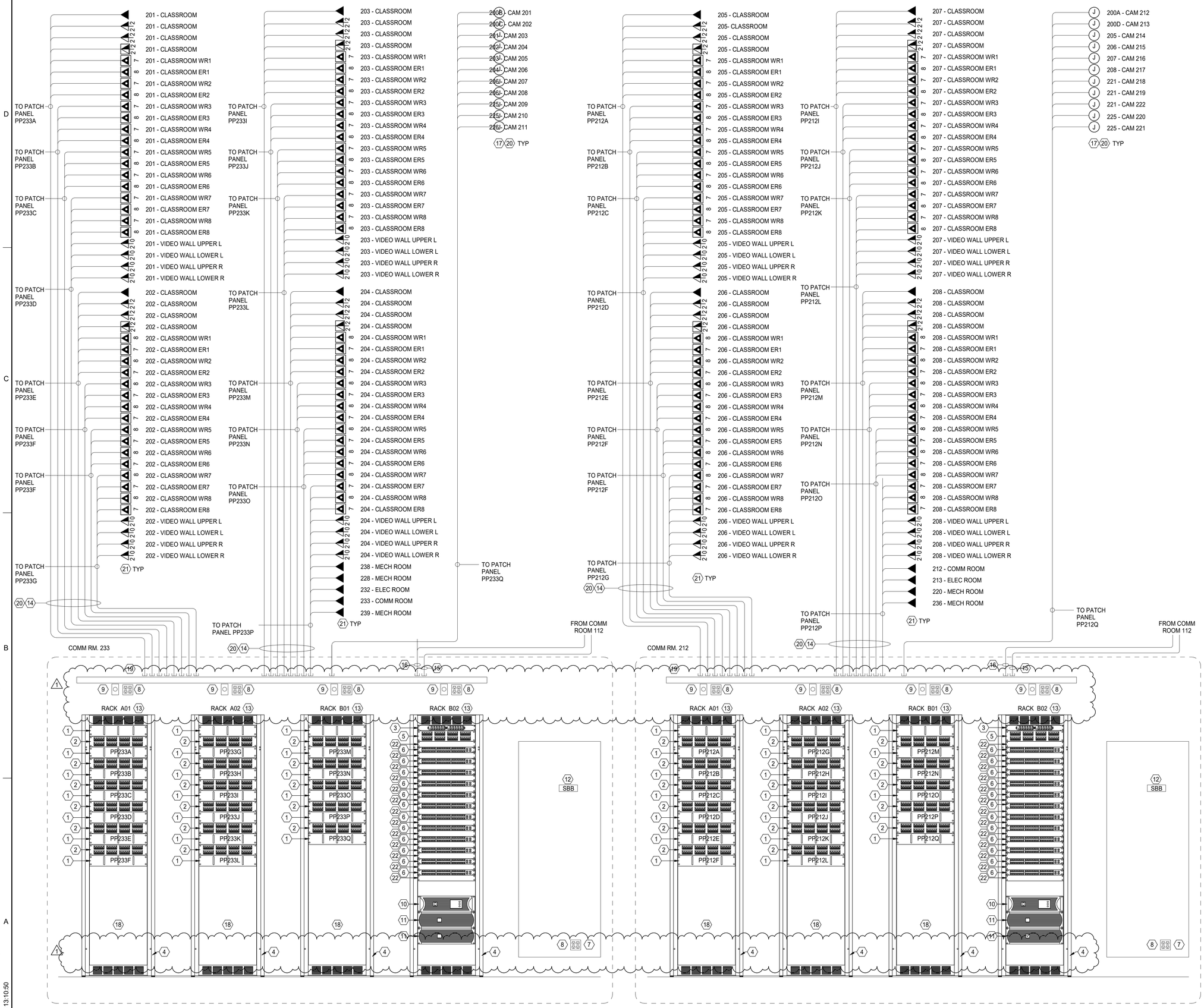

1 SECOND FLOOR TELECOMMUNICATION RISER DIAGRAM

N.T.S.

SHEET NOTES

1. REFER TO SHEET D4-TN001 FOR LEGEND AND ABBREVIATIONS.
2. ALL HORIZONTAL DISTRIBUTION CABLES SHALL BE CONTINUOUS BETWEEN OUTLETS AND COMMUNICATIONS TERMINATION PATCH PANELS IN THE COMM. ROOM. INSTALLED LENGTH OF HORIZONTAL CABLE SHALL NOT EXCEED 295 FEET.
3. REFER TO DETAIL 2/D4-TN502 FOR CABLES AND JACK LABELING.
4. COORDINATE WITH 502d COMMUNICATION SQUADRON POC FOR FINAL DATA CABINET CONFIGURATION PRIOR TO SHOP DRAWINGS. DETAILED RACK ELEVATION DRAWINGS TO BE PROVIDED BY 502d CS.

KEYNOTES

1. PROVIDE 2RU CABLE MANAGEMENT PANEL.
2. PROVIDE 48 PORT, CAT-6, TYPE 568B WIRING, RACK MOUNTED PATCH PANEL.
3. PROVIDE 1RU 24 PORT FIBER OPTIC PATCH PANEL WITH 'LC' STYLE CONNECTORS.
4. PROVIDE 6" WIDE VERTICAL CABLE MANAGEMENT WITH COVER.
5. PROVIDE 2RU 48 PORT, CAT-6, TYPE 568B WIRING, RACK MOUNTED PATCH PANEL ICX 6610-48P DEDICATED FOR COPPER BACKBONE CABLING.
6. GFGI NETWORK SWITCH.
7. PROVIDE 4'x8' PLYWOOD BACKBOARDS WITH INTUMESCENT PAINT. DO NOT PAINT OVER FIRE STAMP. REFER TO ENLARGED TELECOMMUNICATIONS ROOM PLANS FOR LOCATIONS.
8. PROVIDE DOUBLE DUPLEX. REFER TO POWER PLANS FOR LOCATIONS.
9. PROVIDE 120V/1PHASE, 30 AMP TWIST LOCK RECEPTACLE.
10. GFGI RACK MOUNTED UNINTERRUPTIBLE POWER SUPPLY (UPS), SIZE PER GOVERNMENT AT 2200 kVA.
11. GFGI RACK MOUNTED UPS BATTERY BACK-UP.
12. PROVIDE SBB. REFER TO DETAILS 5, 6 / D4-TN502. REFER TO D4-EG601 FOR GROUNDING CONDUCTOR SIZING AND ROUTING.
13. DATA CABINETS, 24"W X 42"D X HEIGHT PER MANUFACTURER SHALL BE FLOOR MOUNTED ENCLOSURES WITH SIDE PANELS, METAL MESH OR VENTED LOCKABLE FRONT AND REAR DOORS WITH IDENTICAL KEYS, WITH 2-EACH 10" FANS MOUNTED AT TOP OF THE CABINET AND DEPTH ADJUSTABLE FRONT AND REAR MOUNTING RAILS. HORIZONTAL CABLE MANAGEMENT DEVICES SHALL BE INTEGRAL TO THE CABINETS. ONE 19" RACK MOUNTED POWER STRIP WITH 12 OUTLETS WITH SURGE PROTECTION, A GROUND BUS BAR WITH A #6 AWG GROUND CABLE CONNECTED TO THE MASTER GROUND BUSBAR. LOCKABLE DATA CABINETS SHALL BE RITTAL, BLACK-BOX OR 502nd CS APPROVED EQUIVALENT .
14. PROVIDE MULTIPLE 4-PAIR, CAT-6, 24 AWG SOLID Cu, TWISTED PAIR CABLING FROM COMM RACK PATCH PANEL TO EACH COMMUNICATION JACK. ROUTE ALL CABLING CONCEALED IN CONDUIT OR, IF IN CEILING SPACE, IN CABLE TRAY AS INDICATED ON PLANS. PROVIDE PLENUM RATED CABLE. PROVIDE ACCESS PANELS AS REQUIRED FOR ACCESS TO CABLE TRAY AND PULL BOXES ABOVE HARD CEILING.
15. PROVIDE 12 STRAND MULTI MODE FIBER OPTIC BACKBONE CABLING FROM TELECOMMUNICATIONS ROOM 112 TO EACH TELECOMMUNICATIONS ROOM. ROUTE CABLING IN CONDUIT AND CABLE TRAY. PROVIDE PLENUM RATED CABLE. REFER TO DETAIL 1 / D4-TN604 FOR TELECOMMUNICATIONS BACKBONE SYSTEM RISER DIAGRAM.
16. PROVIDE 50 PAIR COPPER BACKBONE CABLING FROM TELECOMMUNICATIONS ROOM 112 TO EACH TELECOMMUNICATIONS ROOM. ROUTE CABLING IN CONDUIT AND CABLE TRAY. PROVIDE PLENUM RATED CABLE. REFER TO DETAIL 1 / D4-TN604 FOR TELECOMMUNICATIONS BACKBONE SYSTEM RISER DIAGRAM.
17. PROVIDE CAT-6 CABLING FROM RACK MOUNTED PATCH PANEL TO SECURITY CAMERA J-BOX. REFER TO DETAILS 4, 5 / D4-TN604.
18. RACK SPACE RESERVED FOR GFGI IP BASED SECURITY VIDEO EQUIPMENT.
19. PROVIDE LADDER TYPE CABLE TRAY AS INDICATED ON PLANS. CABLE TRAY SHALL BE MINIMUM 6" DEEP AND MINIMUM 12" WIDE. IN TELECOMMUNICATION ROOMS, MOUNT TRAYS A MINIMUM 6" ABOVE TELECOMMUNICATIONS RACKS. PROVIDE CABLE DOWN SHOW SUPPORTS AS REQUIRED TO PROTECT CABLE FROM DAMAGE AND CONTROL BEND RADII.
20. WHEN IN CONDUIT, PROVIDE CONDUIT AND SECURE TO CABLE TRAY. PROVIDE INSULATED BUSHINGS. REFER TO DETAIL 2 / D4-TN501.
21. PROVIDE MODULAR TELEPHONE AND DATA JACK WALL PLATE. REFER TO DETAIL 1 / D4-TN501.
22. PROVIDE 1RU CABLE MANAGEMENT PANEL.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
Bicsi
BICSI ID # 204581
EXPIRES 12-31-26
JUL 16 2026
RCDD

No.	Description	D.O. No.	Action	Date
1	REVISED IAW A0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Drawn by: J. CHAMPION
Solicitation No.: W9126G25RA020
Reviewed by: K. STARKS / D. HARRINGTON
Contract No.:
Approved by: C. LANGUM
File name:
Print date: 7/16/2026 13:10:50
Print scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPLS220527

SECOND FLOOR
TELECOMMUNICATIONS RISER DIAGRAM

Sheet reference number
D4-TN602
Sheet of

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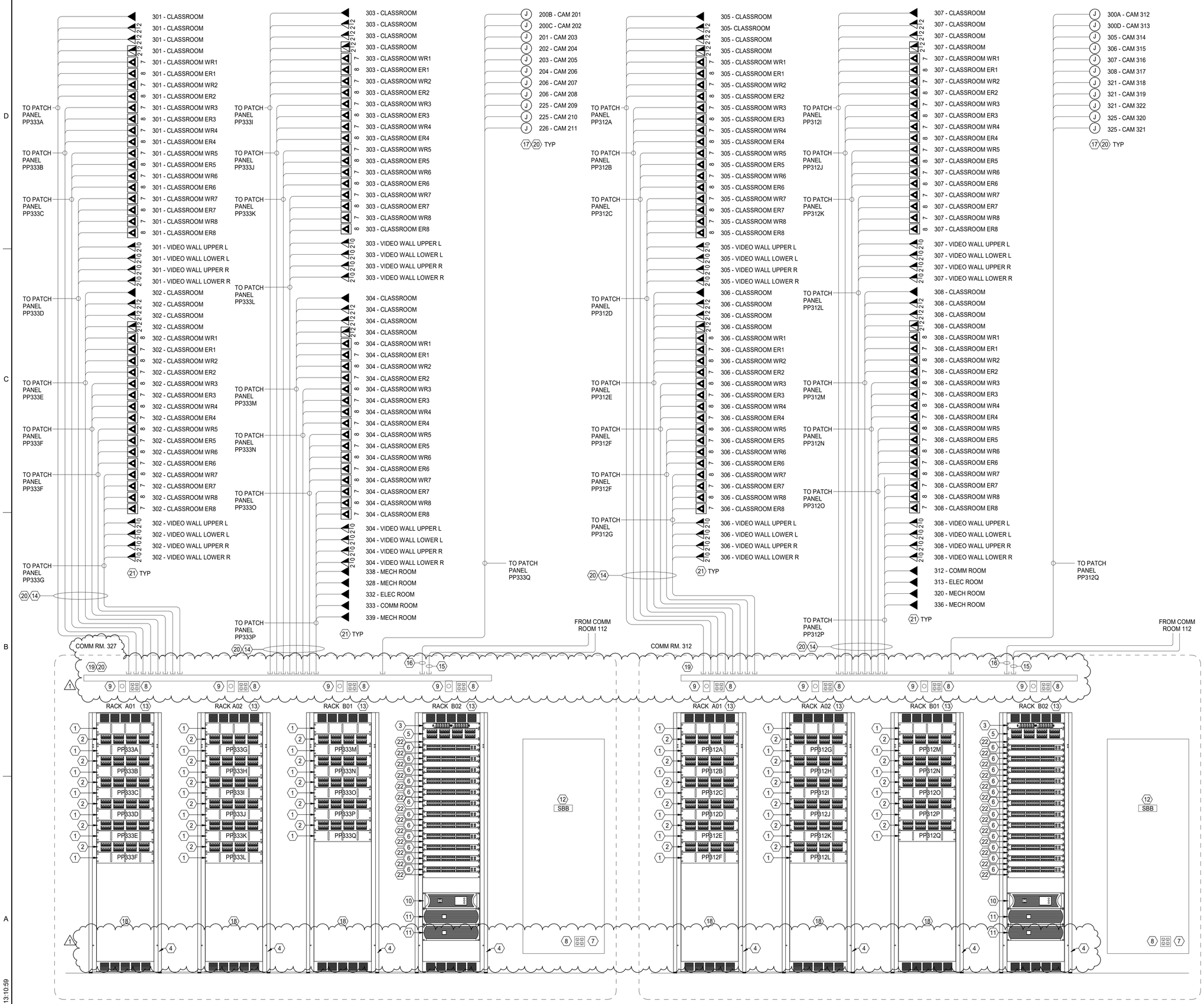

1 THIRD FLOOR TELECOMMUNICATION RISER DIAGRAM

N.T.S.

SHEET NOTES

1. REFER TO SHEET D4-TN001 FOR LEGEND AND ABBREVIATIONS.
2. ALL HORIZONTAL DISTRIBUTION CABLES SHALL BE CONTINUOUS BETWEEN OUTLETS AND COMMUNICATIONS TERMINATION PATCH PANELS IN THE COMM. ROOM. INSTALLED LENGTH OF HORIZONTAL CABLE SHALL NOT EXCEED 295 FEET.
3. REFER TO DETAIL 2/D4-TN502 FOR CABLES AND JACK LABELING.
4. COORDINATE WITH 502d COMMUNICATION SQUADRON POC FOR FINAL DATA CABINET CONFIGURATION PRIOR TO SHOP DRAWINGS. DETAILED RACK ELEVATION DRAWINGS TO BE PROVIDED BY 502d CS.

KEYNOTES

1. PROVIDE 2RU CABLE MANAGEMENT PANEL.
2. PROVIDE 48 PORT, CAT-6, TYPE 568B WIRING, RACK MOUNTED PATCH PANEL.
3. PROVIDE 1RU 24 PORT FIBER OPTIC PATCH PANEL WITH 'LC' STYLE CONNECTORS.
4. PROVIDE 6" WIDE VERTICAL CABLE MANAGEMENT WITH COVER.
5. PROVIDE 2RU 48 PORT, CAT-6, TYPE 568B WIRING, RACK MOUNTED PATCH PANEL ICX 6610-48P DEDICATED FOR COPPER BACKBONE CABLING.
6. GFGI NETWORK SWITCH.
7. PROVIDE 4'x8' PLYWOOD BACKBOARDS WITH INTUMESCENT PAINT. DO NOT PAINT OVER FIRE STAMP. REFER TO ENLARGED TELECOMMUNICATIONS ROOM PLANS FOR LOCATIONS.
8. PROVIDE DOUBLE DUPLEX. REFER TO POWER PLANS FOR LOCATIONS.
9. PROVIDE 120V/1PHASE, 30 AMP TWIST LOCK RECEPTACLE.
10. GFGI RACK MOUNTED UNINTERRUPTIBLE POWER SUPPLY (UPS), SIZE PER GOVERNMENT AT 2200 kVA.
11. GFGI RACK MOUNTED UPS BATTERY BACK-UP.
12. PROVIDE SBB. REFER TO DETAILS 5, 6 / D4-TN502. REFER TO D4-EG601 FOR GROUNDING CONDUCTOR SIZING AND ROUTING.
13. DATA CABINETS, 24"W X 42"D X HEIGHT PER MANUFACTURER SHALL BE FLOOR MOUNTED ENCLOSURES WITH SIDE PANELS, METAL MESH OR VENTED LOCKABLE FRONT AND REAR DOORS WITH IDENTICAL KEYS, WITH 2-EACH 10" FANS MOUNTED AT TOP OF THE CABINET AND DEPTH ADJUSTABLE FRONT AND REAR MOUNTING RAILS. HORIZONTAL CABLE MANAGEMENT DEVICES SHALL BE INTEGRAL TO THE CABINETS. ONE 19" RACK MOUNTED POWER STRIP WITH 12 OUTLETS WITH SURGE PROTECTION, A GROUND BUS BAR WITH A #6 AWG GROUND CABLE CONNECTED TO THE MASTER GROUND BUSBAR. LOCKABLE DATA CABINETS SHALL BE RITTAL, BLACK-BOX OR 502nd CS APPROVED EQUIVALENT .
14. PROVIDE MULTIPLE 4-PAIR, CAT-6, 24 AWG SOLID Cu, TWISTED PAIR CABLING FROM COMM RACK PATCH PANEL TO EACH COMMUNICATION JACK. ROUTE ALL CABLING CONCEALED IN CONDUIT OR, IF IN CEILING SPACE, IN CABLE TRAY AS INDICATED ON PLANS. PROVIDE PLENUM RATED CABLE. PROVIDE ACCESS PANELS AS REQUIRED FOR ACCESS TO CABLE TRAY AND PULL BOXES ABOVE HARD CEILING.
15. PROVIDE 12 STRAND MULTI MODE FIBER OPTIC BACKBONE CABLING FROM TELECOMMUNICATIONS ROOM 112 TO EACH TELECOMMUNICATIONS ROOM. ROUTE CABLING IN CONDUIT AND CABLE TRAY. PROVIDE PLENUM RATED CABLE. REFER TO DETAIL 1 / D4-TN604 FOR TELECOMMUNICATIONS BACKBONE SYSTEM RISER DIAGRAM.
16. PROVIDE 50 PAIR COPPER BACKBONE CABLING FROM TELECOMMUNICATIONS ROOM 112 TO EACH TELECOMMUNICATIONS ROOM. ROUTE CABLING IN CONDUIT AND CABLE TRAY. PROVIDE PLENUM RATED CABLE. REFER TO DETAIL 1 / D4-TN604 FOR TELECOMMUNICATIONS BACKBONE SYSTEM RISER DIAGRAM.
17. PROVIDE CAT-6 CABLING FROM RACK MOUNTED PATCH PANEL TO SECURITY CAMERA J-BOX. REFER TO DETAILS 4, 5 / D4-TN604.
18. RACK SPACE RESERVED FOR GFGI IP BASED SECURITY VIDEO EQUIPMENT.
19. PROVIDE LADDER TYPE CABLE TRAY AS INDICATED ON PLANS. CABLE TRAY SHALL BE MINIMUM 6" DEEP AND MINIMUM 12" WIDE. IN TELECOMMUNICATION ROOMS, MOUNT TRAYS A MINIMUM 6" ABOVE TELECOMMUNICATIONS RACKS. PROVIDE CABLE DOWN SHOW SUPPORTS AS REQUIRED TO PROTECT CABLE FROM DAMAGE AND CONTROL BEND RADII.
20. WHEN IN CONDUIT, PROVIDE CONDUIT AND SECURE TO CABLE TRAY. PROVIDE INSULATED BUSHINGS. REFER TO DETAIL 2 / D4-TN501.
21. PROVIDE MODULAR TELEPHONE AND DATA JACK WALL PLATE. REFER TO DETAIL 1 / D4-TN501.
22. PROVIDE 1RU CABLE MANAGEMENT PANEL.

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
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BICSI ID # 204581
EXPIRES 12-31-26
JUL 16 2026
RCDD

No.	Description	D.O. No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Rev.
Own by: J. CHAMPION
Solicitation No. W912GG25RA020
Contract No.
Reviewed by: K. SCHWEIZER
Approved by: C. LANGUM
File name:
Plot date: Friday, July 17, 2026
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

MERRICK®

DRAWING NUMBER: LA 20-0003

JBSA - LACKLAND AFB, TEXAS
AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY (DCF4)
MPI-S20527

THIRD FLOOR
TELECOMMUNICATIONS RISER DIAGRAM

Sheet reference number
D4-TN603

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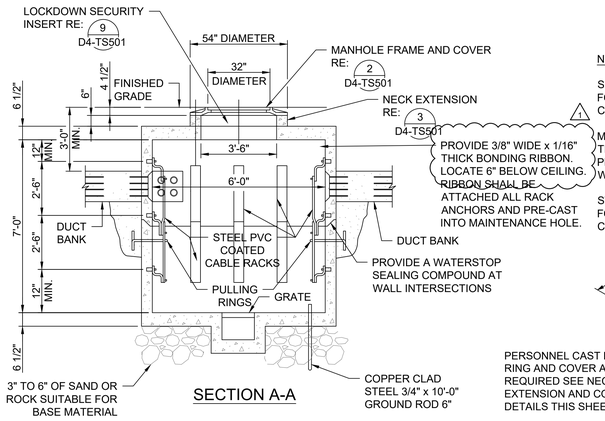


SECTION A-A

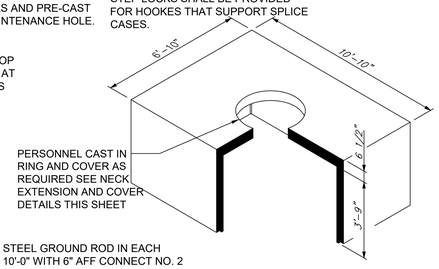
NOTE:

SEE COMMUNICATION SITE PLANS FOR NUMBER AND SIZE OF COMMUNICATION DUCTS.

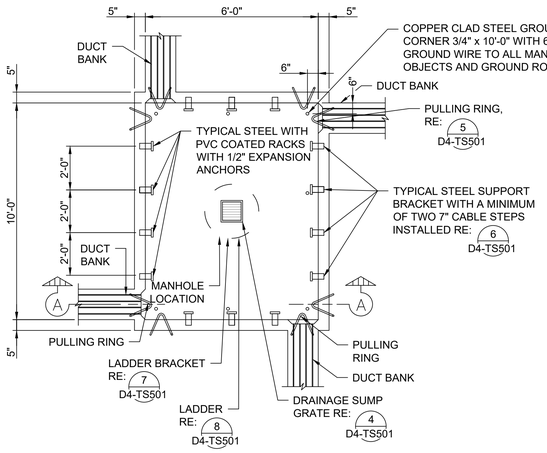
MANHOLE SHALL BE PROVIDED WITH THIN-WALLED KNOCK-OUT FOR PLANNED AND FUTURE DUCT BANKS. WINDOWS ARE NOT ALLOWED.

PROVIDE 3/8" WIDE x 1/16" THICK BONDING RIBBON. LOCATE 6" BELOW CEILING. RIBBON SHALL BE ATTACHED ALL RACK ANCHORS AND PRE-CAST INTO MAINTENANCE HOLE.

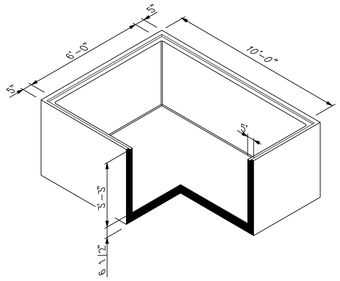
STEP LOCKS SHALL BE PROVIDED FOR HOOKES THAT SUPPORT SPLICE CASES.



TOP SECTION



PLAN VIEW

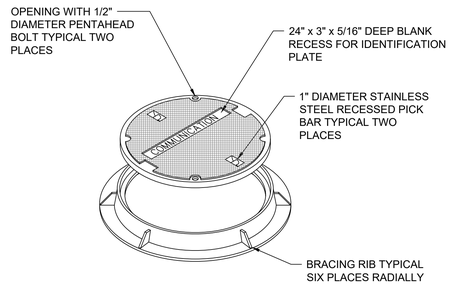


BOTTOM SECTION

ISOMETRIC VIEW

1 PRECAST COMMUNICATIONS MANHOLE TYPE A DETAILS - (10' x 6' x 7')

NO SCALE



NOTE:

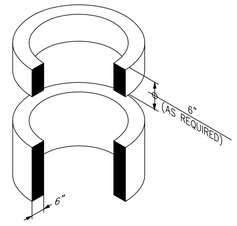
1. COVER SHALL BE SUITABLE FOR AASHTO H-20 WHEEL LOADING.
2. GROUND ALL METALLIC OBJECTS TO GROUND ROD.

2 MANHOLE FRAME AND COVER

NO SCALE

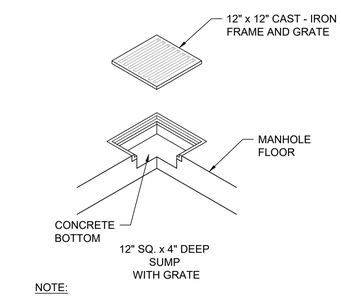
NOTE:

ALL CONCRETE SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF 4,500 PSI. REINFORCING STEEL SHALL COMPLY WITH ASTM A615 GRADE 60, A706 GRADE 60 OR A497 GRADE 70. BAR BENDING AND PLACEMENT SHALL COMPLY WITH THE LATEST ACI STANDARDS.



3 NECK EXTENSION DETAIL

NO SCALE

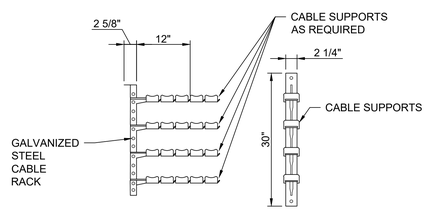


NOTE:

GROUND ALL METALLIC OBJECTS TO GROUND ROD.

4 SUMP GRATE CUTOUT DETAIL

NO SCALE



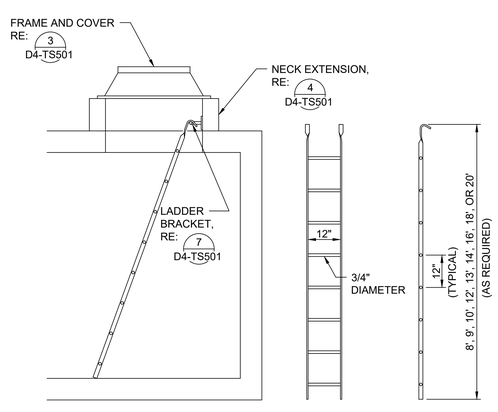
SIDE VIEW FRONT VIEW

NOTE:

GROUND ALL METALLIC OBJECTS TO GROUND ROD OR RIBBON.

6 CABLE SUPPORT BRACKET DETAIL

NO SCALE

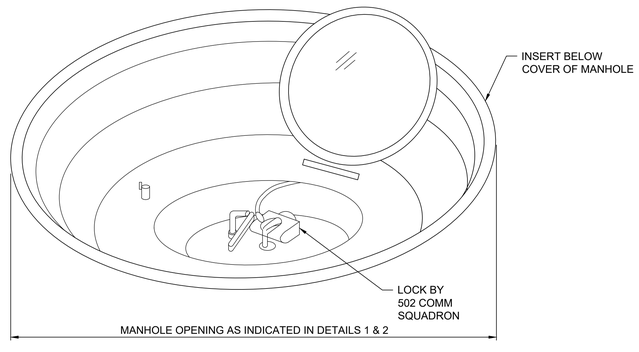


NOTE:

1. ALL FABRICATED STEEL SHALL COMPLY WITH ASTM A 36 Fy = 36,000 PSI THE UNIT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.
2. GROUND ALL METALLIC OBJECTS TO GROUND ROD.

8 MANHOLE LADDER DETAIL

NO SCALE



9 LOCKDOWN SECURITY DEVICE

NO SCALE

US Army Corps of Engineers
Fort Worth District

STATE OF TEXAS
DANIEL P. HARRINGTON
113569
LICENSED
PROFESSIONAL ENGINEER

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DANIEL P. HARRINGTON P.E. 113569 ON 16 JUL 2026

REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
Bicsi
Keith Bailey
BICSI ID # 204581
EXPIRES 12-31-26
JUL 20 2026
RCDD

No.	Description	D.O.No.	Action	Date
1	REVISED IAW AM0002			JULY 2026

Designed by: D. HARRINGTON
Date: MAY 2025
Solicitation No.: W9126G25RA020
Contract No.:
Rev.
Drawn by: L. SMITH
Reviewed by: K. JOHNSON
Approved by: C. LANGUM
File name:
Plot date:
Plot scale: 1:1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS
FORT WORTH, TEXAS

MERRICK®

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AIRMEN TRAINING COMPLEX - WEST CAMPUS
DINING CLASSROOM FACILITY 4 (DCF4)
MPL5220527

COMMUNICATIONS MANHOLE DETAILS

Sheet reference number
D4-TS501
Sheet of