GENERAL USE
WAREHOUSE BUILDING

BLDG XXXX TA-XX

LOCATION PLAN
NO SCALE PARTIAL TA-XX

LIST OF DRAWINGS

PROJECT DESIGN DATA	REVISION NUMBER	SHEET NUMBER	DISCIPLINE SHEET NUMBER	DRAWING TITLE
UPDATE AS REQUIRED	0	01	G-0001	TITLE SHEET
	0	02	G-0002	CODE ANALYSIS
	0	03	S-0001	STRUCTURAL GENERAL NOTES, ABBREVIATIONS AND LEGEND
CODES AND STANDARDS:---UPDATE AS NECESSARY	0	04	S-1000	FOUNDATION PLAN
INTERNATIONAL BUILDING CODE, IBC 2015 - NEW BUILDING	0	05	S-3000	FOUNDATION SECTIONS
LANL ENGINEERING STANDARDS MANUAL (ESM) STD-342-100.	0	06	S-5000	STRUCTURAL DETAILS
ESM CHAPTER 5, SECTION II, REV. 11, 03/24/2021.	0	07	S-7000	REINFORCING SCHEDULE
AMERICAN SOCIETY FOR CIVIL ENGINEERS, ASCE 7-10	0	08	A-0001	ABBREVIATIONS, LEGEND AND GENERAL NOTES
AMERICAN CONCRETE INSTITUTE, ACI 318-14	0	09	A-1050	FLOOR PLAN
AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AISC 360-10	0	10	A-7000	DETAILS AND SCHEDULES
ASHRAE 62.1, 2013	0	11	M-0001	SYMBOLS LEGEND
ASHRAE 90.1, 2013	0	12	M-1000	INSTALLATION PLAN
UNIFORM MECHANICAL CODE, 2015	0	13	M-3000	SECTIONS
NFPA 70 NATIONAL ELECTRICAL CODE 2017	0	14	M-7000	EQUIPMENT SCHEDULE
INTERNATIONAL ENERGY CONSERVATION CODE, 2015 (IECC)	0	15	E-0001	ELECTRICAL SYMBOLS LEGEND
	0	16	E-1000	ELECTRICAL SITE PLAN
PROJECT DESCRIPTION:----UPDATE AS NECESSARY	0	17	E-1001	ELECTRICAL POWER PLAN
	0	18	E-1002	ELECTRICAL LIGHTING PLAN
	0	19	E-5000	ELECTRICAL DETAILS
	0	20	E-6000	ELECTRICAL ONE LINE DIAGRAM
	0	21	E-7000	ELECTRICAL SCHEDULES
	0		C-0001	CIVIL ABBREVIATIONS, LEGEND, AND NOTES
	0		C-1000	OVERALL SITE PLAN
	0		C-1001	TURNING MOVEMENT ANALYSIS
	0		C-1002	GRADING AND DRAINAGE PLAN
	0		C-1003	UTILITY PLAN
	0		C-3000	DRIVEWAY, SIDEWALK AND SWALE SECTIONS
	0		C-5000	MISCELLANEOUS DETAILS
	0		C-5000	CIVIL MISCELLANEOUS DETAILS

INSTALL A 50'X80' WAREHOUSE FOR GENERAL USE AT TA-XX. THIS DESIGN PACKAGE INCLUDES STRUCTURAL FOUNDATION DESIGN, ARCHITECTURAL WALL AND DOOR REQUIREMENTS, MECHANICAL AND ELECTRICAL DESIGN. THE STEEL STRUCTURE WAS DESIGNED BY OTHERS (RIGID GLOBAL BUILDINGS (RGB, WAREHOUSE A, 50X80 W/ 18FT EAVE HEIGHT)) AND APPROVED FOR USE AT LANL. COORDINATE DOOR OPENINGS W/ RGB. THE CIVIL SITE DESIGN WILL BE PROVIDED IN A SEPARATE DESIGN PACKAGE.

DESIGN INPUT:------UPDATE AS NECESSARY
- MANAGEMENT LEVEL: ML-4
- RISK CATEGORY: RC-II
- SEISMIC DESIGN CATEGORY:
  - RGB BUILDING STRUCTURE: D
  - ALL SSC'S INSTALLED IN STRUCTURE: C

CIVIL DRAWINGS NOT INCLUDED IN EXAMPLE

REFERENCE DRAWINGS

XXXXXX- METAL BUILDING DRAWING PACKAGE

XXXXXXXXXXXXXXX - SALES NO. 71793, JOB NO. 157164, BUILDING D

EXAMPLE DESIGN

NOT FOR REPLICATION OR CONSTRUCTION

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LBO-DESIGN PACKAGE REVIEWER			
APPROVED FOR RELEASE			
SUBMITTED			
VERIFIED			
DESIGNED			
DRAWN	0	INITIAL ISSUE FOR DCF-XXXXXXXX	TBD
CLASSIFICATION UNCLASSIFIED	NO	REVISION DESCRIPTION	DATE

ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

TITLE SHEET

TA- XX BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET G-0001
01 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	XXXXXX-DWG-XX-XXXX-G-0001	0

CODE ANALYSIS:

CODE OF RECORD - INTERNATIONAL BUILDING CODE 2015

USE AND OCCUPANCY CLASSIFICATION - STORAGE: S-1 (MODERATE-HAZARD STORAGE) LIST OF STORAGE TYPE IS INCLUDING BUT NOT LIMITED TO THE LIST IN SECTION 311.2 IN THE IBC.

MATERIALS THAT CONSTITUTE A PHYSICAL OR HEALTH HAZARD IN QUANTITIES EXCESS OF THE MAXIMUM ALLOWABLE QUANTITY LIMITS FOR CONTROL AREAS SET FORTH IN TABLES 307.1 CANNOT BE STORED IN AN S-1 CLASSIFIED BUILDING.

MOTOR-VEHICLE-RELATED OCCUPANCIES - PER IBC 406 ADDITIONAL REQUIREMENTS WILL BE REQUIRED IF SPACE IS USED FOR MOTOR-VEHICLE REPAIR AND IS NOT TO BE PERFORMED WITHIN THIS BUILDING.

COMBUSTIBLE STORAGE - IN THE EVENT THAT STORAGE RACKS ARE PLACED, THE STORAGE SYSTEM AND MATERIAL STORED SHALL NOT EXCEED GREATER THAN 12 FEET IN HEIGHT. FOLLOW CHAPTER 32 OF THE IFC AND HIGH-PILED STORAGE PROVISIONS OF NFPA 13.

GENERAL BUILDING HEIGHTS AND AREAS - S-1, TYPE IIB CONSTRUCTION, NOT SPRINKLED IS LIMITED TO 17,500 SQ FT.

TYPE OF CONSTRUCTION (IBC TABLE 407.1.1) - TYPE IIB

MEANS OF EGRESS - (IBC CHAPTER 10)

OCCUPANT LOAD (FIRST FLOOR) (IBC TABLE 1004.1.1)

BLDG	AREA SQ FT	S-1 OCC. LOAD	OCCUPANT LOAD
XX-XXXX	4,000	300SF PER OCC	14

NUMBER OF EXITS -
MINIMUM NUMBER OF REQUIRED BLDG EXITS = 1 (IBC TABLE 1006.2.1)
NUMBER OF EXITS = 2

BUILDING SEPARATION REQUIREMENTS (NFPA 80A) -
BUILDING SEPARATION ANALYSIS BASED ON THE FOLLOWING PARAMETERS:
MAXIMUM ALLOWED COMBUSTIBLE LOAD: 7 PSF
RACK STORAGE OF COMBUSTIBLE ITEMS PROHIBITED

TA-XX-XXXX FIRE RATING = 0, MINIMUM BUILDING SEPARATION:

BLDG	MIN. SEPARATION FROM XX-XXXX
XX-XXXX	APPROXIMATELY 255 ± FT

FIRE PROTECTION -
FIRE ALARM NOT REQUIRED.

903.2.9 AN AUTOMATIC SPRINKLER SYSTEM IS NOT REQUIRED BASED ON THE BUILDING BEING LESS THAN 12,000 SQ FT, SINGLE STORY, LESS THAN 5,000 SQ FT OF COMMERCIAL MOTOR VEHICLE STORAGE, AND NOT USED FOR UPHOLSTERED FURNITURE OR MATTRESS.

PORTABLE FIRE EXTINGUISHERS, 10lb. A-B-C TYPE EXTINGUISHER REQUIRED:
2 PROVIDED - SEE PLAN FOR LOCATIONS.

EXIT ACCESS TRAVEL DISTANCES (AS AFFECTED BY THIS PROJECT) (IBC TABLE 1006.2.1)
MAX COMMON PATH OF TRAVEL (CPT) ALLOWED =100'
MAX TOTAL PATH OF TRAVEL (TPT) DISTANCE ALLOWED = 200'

	CPT ✖	TPT ◇
1	15'-0"	52'-0"
2	15'-0"	92'-0"

PLUMBING FIXTURES ON PROPOSED FLOOR PLAN : 0
PER 29021.3.2 A BATHROOM FACILITY IS LOCATED AT TA-XX-XXXX AND IS APPROXIMATELY 3,960 FEET FROM THE WAREHOUSE WHICH EXCEEDS THE 500 FEET LIMIT FROM THE PROPOSED BUILDING. A VARIANCE WILL BE REQUIRED TO MEET THE FIXTURE REQUIREMENTS. A 12" X 18" SIGN WILL BE PROVIDED OUT SIDE EACH MAN DOOR THAT READS "ATTENTION THIS FACILITY DOES NOT CONTAIN RESTROOMS" "NEAREST RESTROOM IS LOCATED IN TA16-0969"

EGRESS WIDTH -
MINIMUM WIDTHS OF EGRESS SYSTEM ELEMENTS EXIST IN CONFORMANCE WITH SECTION 1005 AND SECTION 1017 FOR FULLY SPRINKLED BUILDINGS:
DOORS: 32" CLEAR
CORRIDORS: NOT LESS THAN 44" WIDE

LIGHTNING PROTECTION REQUIREMENTS -
MINIMUM LIGHTNING PROTECTION REQUIREMENTS WERE CALCULATED IN ACCORDANCE WITH NFPA 780.
CALCULATED LIGHTNING STRIKE FREQUENCY FOR STORAGE BUILDING, ND=0.00075.
CALCULATED TOLERABLE LIGHTNING FREQUENCY, NC = 0.0120.
(CALCULATIONS BASED ON SQUARE FOOTAGE, CONTENTS, LOCATION AND OCCUPANCY)
SINCE ND < NC, LIGHTNING PROTECTION IS NOT REQUIRED.

ELECTRICAL REQUIREMENTS -
INSTALLATION OF LIGHTS AND ELECTRIC OVERHEAD DOOR OPERATOR WILL REQUIRE A POWER PANEL INSTALLED IN THE BUILDING.
PROVIDED CONDUITS CAST IN THE CONCRETE AT THE APPROXIMATE LOCATION OF ELECTRICAL PANEL.

PROVIDE A 4/0 BARE COPPER WIRE MECHANICALLY BONDED TO REINFORCING, AND CAST IN CONCRETE WITH MINIMUM 10 FOOT LENGTH OF WIRE STUBBING OUT OF CONCRETE FOR GROUNDING OF ELECTRICAL EQUIPMENT. LOCATE WIRE AT APPROXIMATE LOCATION OF ELECTRICAL PANEL, ADJACENT TO CONDUIT CAST IN CONCRETE.

VENTILATION REQUIREMENTS (IBC 1203) -
THE OPENABLE AREA OF THE OPENINGS TO THE OUTDOORS SHALL NOT BE LESS THAN 4% OF THE FLOOR AREA BEING VENTILATED.

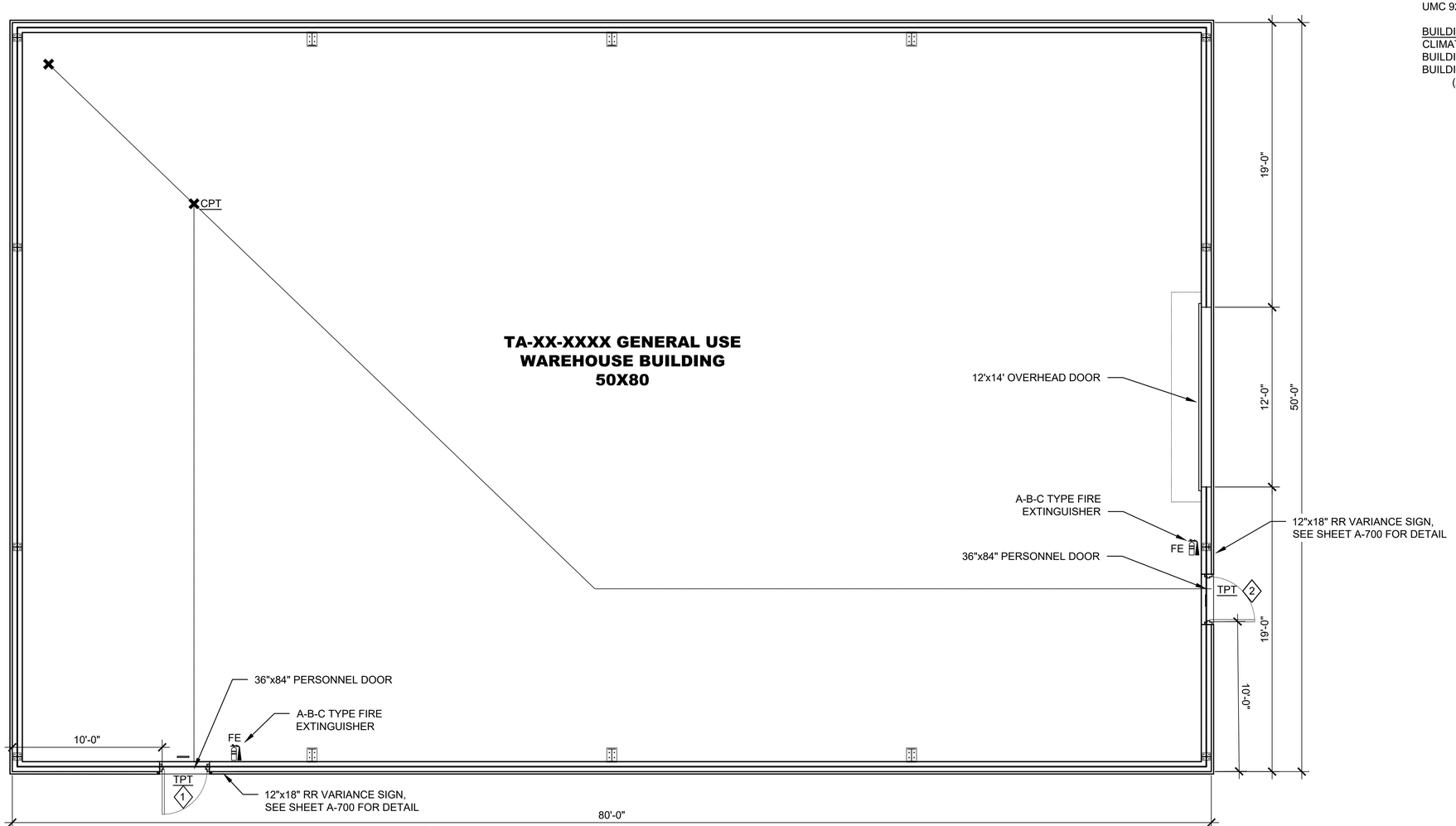
OPENABLE AREA REQUIRED	OPENABLE AREA PROVIDED
160 SF	210 SF

TEMPERATURE CONTROL (IBC 1204) -
SPACE HEATING SYSTEMS ARE NOT REQUIRED FOR BUILDINGS WITH GROUP S OCCUPANCIES.

LIGHTING REQUIREMENTS (IBC 1205) -
EVERY SPACE INTENDED FOR HUMAN OCCUPANCY SHALL BE PROVIDED WITH NATURAL LIGHTING OR ARTIFICIAL LIGHTING.
NATURAL LIGHTING: PROVIDE MINIMUM 320 SF (8% FLOOR AREA) OF EXTERIOR GLAZED AREA.
ARTIFICIAL LIGHTING: PROVIDE AN AVERAGE ILLUMINATION OF 10 FOOTCANDLES OVER THE AREA OF THE BUILDING AT A HEIGHT 30 INCHES ABOVE THE FLOOR LEVEL.

MECHANICAL REQUIREMENTS -
INFRARED HEATERS:
UMC 927.1 (2015)- SUPPORT
UMC 927.2 (2015)- SUSPENDED LOW-INTENSITY INFRARED TUBE HEATERS
UMC 927.3 (2015)- CLEARANCE
UMC 927.4 (2015)- COMBUSTION AND VENTILATION AIR

BUILDING ENVELOP REQUIREMENTS -
CLIMATE ZONE: 5B (LANL ESM)
BUILDING CLASSIFICATION: NONRESIDENTIAL CONDITIONED SPACE
BUILDING ENVELOPE REQUIREMENTS
(ASHRAE 2015 90.1, TABLE 5.5-5 & ICC 2015 TABLE C402.1.3):
- ROOFS: METAL BUILDING, R-19 + R-11 LS OR R-25 + R-8 LS.
- WALLS ABOVE GRADE: METAL BUILDING, R-13 + R-13
- SLAB-ON-GRADE FLOORS: UNHEATED SLAB, R-15 FOR 24" VERTICAL



STORAGE BUILDING LAYOUT
0' 1' 2' 4' 6' 8'
1/4"=1'-0"

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

CODE ANALYSIS

TA-x BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET G-0002
02 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxxx-DWG-xx-xxxx-G-0002	0

STRUCTURAL GENERAL NOTES

1. CODES AND STANDARDS:
   A. INTERNATIONAL BUILDING CODE, IBC 2015.
   B. AMERICAN SOCIETY OF CIVIL ENGINEERS, ASCE 7-10, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.
   C. AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AISC 360-10, SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.
   D. AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AISC 341, SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS.
   E. AMERICAN CONCRETE INSTITUTE, ACI 318-14, BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
   F. DOE-STD-1020-2012 NATURAL PHENOMENA HAZARDS DESIGN AND EVALUATION CRITERIA FOR DOE FACILITIES.
   G. LANL ENGINEERING STANDARD MANUAL (ESM), STD-342-100.

2. DESIGN INPUTS:
   A. BUILDING CLASSIFICATION PER DOE-STD-1020: RISK CATEGORY II.
   B. DEAD LOADS: WEIGHT OF COMPONENTS.
   C. COLLATERAL LOAD: 10 PSF ON ROOF STRUCTURE.
   D. LIVE LOADS: FLOOR LOAD: 250 PSF
      VEHICLE AXLE LOAD: 21.6 KIPS
   E. ROOF LIVE LOAD: 20 PSF ON PRIMARY AND SECONDARY FRAMING.
   F. WIND LOAD:
      ULTIMATE DESIGN WIND SPEED: Vult (3 SEC. GUST) = 115 MPH
      WIND EXPOSURE: C
      DESIGN WIND PRESSURE FOR WALLS:
      COMPONENTS WIND PRESSURE: +14.0 PSF
      COMPONENTS WIND SUCTION: -15.4 PSF
      CLADDINGS WIND PRESSURE: +16.4 PSF
      CLADDINGS WIND SUCTION: -17.8 PSF
   G. SEISMIC PARAMETERS (RC-II STRUCTURE ELIGIBLE FOR SEISMIC DESIGN CATEGORY C, PER ESM CH.5, SECTION II, PARA. 1.6.A.2.) IN ACCORDANCE WITH LANL ESM, CHAPTER 5, SECTION II, REV 11 AND ASCE 7-10:
      SEISMIC DESIGN CATEGORY C (ELIGIBLE FOR SEISMIC DESIGN CATEGORY C PER ESM CH.5, SECTION II, PARA. 1.6.A.2.)
      SEISMIC IMPORTANCE FACTOR I = 1.0
      SITE CLASS D
      SPECTRAL RESPONSE ACCELERATION Sds= 0.49g
      SPECTRAL RESPONSE ACCELERATION Sd1= N/A
   H. SEE BUILDING MANUFACTURER'S (RIGID GLOBAL BUILDING, RGB SALES NO. 60279) ORIGINAL DRAWING AND CALCULATION FOR BUILDING STRUCTURE DESIGN INPUTS AND ANALYSIS (RGB STEEL STRUCTURE SEISMIC PARAMETERS ARE MORE STRINGENT DUE TO TIME OF APPROVAL AND REVISIONS MADE TO ESM CHAPTER 5).
   I. SEE LANL'S CALCULATION CAL-15-0699-767 FOR FOUNDATION DESIGN.

3. GENERAL CONSTRUCTION NOTES:
   A. FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS AFFECTING WORK BEFORE FABRICATION OF NEW COMPONENTS. REPORT ANY DISCREPANCIES TO THE LANL CONSTRUCTION INSPECTOR.
   B. EXECUTE ALL ACTIVITIES IN ACCORDANCE WITH THE CONSTRUCTION DESIGN AND DRAWING.
   C. KEEP WORK SITE IN A CONDITION ACCEPTABLE TO THE LANL CONSTRUCTION INSPECTOR.
   D. COORDINATE STRUCTURAL DRAWINGS WITH DRAWINGS OF OTHER DISCIPLINE. CHECK AND COORDINATE DIMENSIONS, CLEARANCES AND OTHER REQUIREMENTS WITH THE WORK OF OTHER TRADES.
   E. THE SUBCONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO LOCATE AND PROTECT UNDERGROUND OR CONCEALED CONDUITS, PLUMBING OR OTHER UTILITIES.

4. GEOTECHNICAL:
   A. TEST PITS WERE USED TO ESTABLISH SOIL COMPETENCY AND CLASSIFICATION.
   B. ALLOWABLE BEARING CAPACITY:
      SPREAD, CONTINUOUS FOOTING:
      BUILT ON TUFF: QALL = 7000 PSF
      BUILT ON COMPACTED SUBGRADE/ENGINEERED FILL: QALL = 3000 PSF
   C. FOUNDATION TO BE PLACED ENTIRELY ON INTACT TUFF ROCK OR ENTIRELY ON COMPACTED FILL.

5. SITE PREPARATION:
   A. SUBGRADE COMPACTION: EXPOSED SUBGRADES FOR FOOTINGS, FLOORS, PAVEMENTS, OTHER STRUCTURES, AND EXCAVATIONS SHOULD BE COMPACTED TO A DENSE, UNYIELDING STATE. ANY LOCALIZED ZONES OF LOOSE GRANULAR SOILS OBSERVED WITHIN A SUBGRADE SHOULD BE COMPACTED TO A DENSITY COMMENSURATE WITH THE SURROUNDING SOILS IN CONTRAST, ANY ORGANIC, SOFT, OR PUMPING SOILS OBSERVED WITHIN THE SUBGRADE SHOULD BE OVEREXCAVATED AND REPLACED WITH A SUITABLE COMPACTED, ENGINEERED FILL.
   B. COMPACTION CRITERIA: USING THE MODIFIED PROCTOR TEST (ASTM D1557) AS THE STANDARD, ALL SUBGRADES MATERIAL USED BENEATH THE FOUNDATION AND SLAB SHALL BE COMPACTED TO THE MINIMUM 95% MAX DRY DENSITY. IF NATIVE SOIL CANNOT MEET COMPACTION REQUIREMENTS, OVER EXCAVATE A MINIMUM OF 6" AND REPLACE WITH ENGINEERED FILL.
   C. SUBGRADE VERIFICATION AND COMPACTION TESTING: ALL ENGINEERED FILL SHOULD BE PLACED OVER UNYIELDING SUBGRADES. THE CONDITION OF ALL SUBGRADES SHOULD BE VERIFIED BY A QUALIFIED INSPECTOR BEFORE FILLING OR CONSTRUCTION BEGINS. IN ADDITION, FILL SOIL COMPACTION SHOULD BE VERIFIED BY MEANS OF IN-PLACE DENSITY TESTS PERFORMED DURING FILL PLACEMENT SO THE ADEQUACY OF THE SOIL COMPACTION EFFORTS MAY BE EVALUATED AS EARTHWORK PROGRESSES.
   D. ENGINEERED FILL: FILL REQUIRED TO RAISE THE BUILDING AREAS AND BACKFILL AROUND AND ABOVE STRUCTURES SHALL BE CLEAN MATERIAL, FREE OF VEGETATION, DEBRIS AND OTHER DELETERIOUS MATERIALS AND SHALL MEET THE REQUIREMENTS OUTLINED IN SPECIFICATION 31 2000.

6. REINFORCED CONCRETE: SEE SPECIFICATION 03 3001
   A. PERIMETER WALL FOOTING:
      MINIMUM COMPRESSIVE STRENGTH, F'C = 4500 PSI @ 28 DAYS
   B. INTERIOR SLAB: LATM MIX 21
      MINIMUM COMPRESSIVE STRENGTH, F'C = 4000 PSI @ 28 DAYS
   C. CASTING THE PERIMETER WALL AND INTERIOR SLAB MONOLITHICALLY WITH PERIMETER WALL CONCRETE SHALL BE PERMITTED.
   D. ALL EXPOSED EDGES OF CONCRETE SHALL HAVE A 1/4" RADIUS UNLESS NOTED OTHERWISE.

6. REINFORCING STEEL:
   A. ALL REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH THE CODE REQUIREMENTS.
   B. USE ASTM A615 GRADE 60 FOR ALL REINFORCING STEEL.
   C. ALL REINFORCING SHALL BE CONTINUOUS. STAGGER SPLICES WHERE POSSIBLE.
   D. REINFORCING STEEL SHALL NOT BE TACK WELDED. WELDING OF REINFORCING BARS SHALL BE PERMITTED WITH THE PRIOR APPROVAL OF EOR.
   E. COVER NOTED ON THE STRUCTURAL DETAILS IS TO THE NEAREST SURFACE OF THE REINFORCING STEEL.
   F. DOWEL BARS AND SPLICE BARS ARE SHOWN DIAGRAMMATICALLY ON THE INSIDE OR OUTSIDE OF THE BARS TO WHICH THEY ARE TIED. BARS MAY BE PLACED ON EITHER SIDE AS LONG AS COVER REQUIREMENTS ARE MET.

7. CAST-IN-PLACE ANCHORS:
   A. UNHEADED ANCHOR RODS: ASTM F 1554, GRADE 36.
   B. CONFIGURATION: STRAIGHT.
   C. FINISH: PLAIN.
   D. HEAVY-HEX NUTS TO BE ASTM A 563, GRADE A.
   E. FLAT WASHERS TO BE ASTM F 436, TYPE 1.
   F. PROVIDE DOUBLE NUT W/ FLAT WASHER BETWEEN AT EMBEDDED END.
   G. REFER TO RGB SHOP DRAWINGS FOR FINAL ANCHOR PLACEMENT.

8. STEEL ERECTION:
   A. SEE RGB ERECTION MANUAL PROVIDED W/ THE STEEL STRUCTURE AND PROJECT SPECIFICATION 13 3419. STEEL STRUCTURE TO BE ERECTED AND INSPECTED PER APPROVED RGB SHOP DRAWINGS.
   B. ERECT STRUCTURAL STEEL PER OSHA 29 CFR PART 1926, SUBPART R-STEEL ERECTION.
   C. SET STRUCTURAL STEEL ACCURATELY AND TO ELEVATIONS INDICATED AND ACCORDING TO AISC 360 AND AISC 303.
   D. UNLESS OTHERWISE INDICATED, NUTS ON CAST-IN-PLACE ANCHOR RODS SHALL BE SNUG-TIGHTENED WITHOUT USING AN IMPACT WRENCH. IN ADDITION, THE NUTS SHALL HAVE FULL THREAD ENGAGEMENT.
   E. BASEPLATES:
      - CLEAN BOTTOM SURFACE OF PLATES OF ALL DIRT, OIL, GREASE, AND OTHER FOREIGN MATERIAL THAT WOULD HINDER BOND BETWEEN METAL AND CONCRETE OR GROUT.
      - THE BEARING SURFACES OF CONCRETE SHALL BE CLEANED OF BOND-REDUCING MATERIALS, AND ROUGHENED PRIOR TO SETTING PLATES.
      - ALIGN, LEVEL AND MAINTAIN FINAL POSITIONING OF COMPONENTS TO BE GROUTED OR EMBEDDED.
      - SET PLATES FOR STRUCTURAL MEMBERS ON WEDGES, SHIMS, OR LEVELING NUTS AS REQUIRED.
      - SNUG-TIGHTEN ANCHOR RODS AFTER SUPPORTED MEMBERS HAVE BEEN POSITIONED AND PLUMBED. DO NOT REMOVE WEDGES OR SHIMS BUT, IF THEY PROTRUDE, CUT OFF FLUSH WITH EDGE OF PLATE BEFORE PACKING WITH GROUT.
      - GROUT BASEPLATES IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

9. ALL SPECIAL INSPECTIONS TO BE PERFORMED IN ACCORDANCE WITH STATEMENT OF SPECIAL INSPECTIONS.

LEGEND

8'-0"	DIMENSION LINE WITH WITNESS LINES AND DIMENSION
	CENTER LINE
	LEADER LINE
	FUTURE CONSTRUCTION
	EXISTING CONSTRUCTION
	NEW CONSTRUCTION
	BACKGROUND, NEW CONST.
	HIDDEN LINE
	MATCH LINE

ABBREVIATIONS

AFF	ABOVE FINISH FLOOR	EQ	EQUAL	OCEW	ON CENTER EACH WAY
ACI	AMERICAN CONCRETE INSTITUTE	EQUIP	EQUIPMENT	OPNG	OPENING
		EXST	EXISTING	OPP	OPPOSITE
ADH	ADHESIVE	EXP	EXPANSION	OD	OUTSIDE DIAMETER
ADJ	ADJACENT	EJ	EXPANSION JOINT	OF	OUTSIDE FACE
ALUM	ALUMINUM	EXT	EXTERIOR	PERIM	PERIMETER
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	FOC	FACE OF CONCRETE	PL	PLATE
		FOF	FACE OF FINISH	PT	POINT
AISI	AMERICAN IRON AND STEEL INSTITUTE	FOS	FACE OF STUD	PVC	POLYVINYLCHLORIDE
		FS	FAR SIDE	LBS	POUNDS
ANCH	ANCHOR	FT	FEET	PLF	POUNDS PER LINEAR FOOT
AB	ANCHOR BOLT	FV	FIELD VERIFY	PSF	POUNDS PER SQUARE FOOT
APPROX	APPROXIMATE	FIN	FINISH	PROJ	PROJECTION
ARCH	ARCHITECT ARCH	FF	FINISH FLOOR	QTY	QUANTITY
ASTM	AMERICAN SOCIETY TESTING MATERIALS	FG	FINISH GRADE	RAD	RADIUS
		FLG	FLANGE	REINF	REINFORCING
AWS	AMERICAN WELDING SOCIETY	FLR	FLOOR	REQD	REQUIRED
		FD	FLOOR DRAIN	REQMTS	REQUIREMENTS
BAL	BALANCE BAL	FTG	FOOTING	R	RISER
BB	BOND BEAM BB	FDN	FOUNDATION	RD	ROOF DRAIN
BM	BEAM	GA	GAGE	RO	ROUGH OPENING
BRG	BEARING	GALV	GALVANIZED	SCHED	SCHEDULE
BLK	BLOCK OR BLOCKING	GWB	GYPSUM WALLBOARD	SECT	SECTION
BOTT	BOTTOM	HAS	HEADED ANCHOR STUD	SHT	SHEET
BO	BOTTOM OF	HS	HIGH STRENGTH	SIM	SIMILAR
B/F	BOTTOM OF FOOTING	HORIZ	HORIZONTAL	SPA	SPACES
BFF	BELOW FINISH FLOOR	IAW	IN ACCORDANCE WITH	SPECS	SPECIFICATIONS
BLDG	BUILDING	IN	INCH	SQ	SQUARE
CIP	CAST-IN-PLACE	ID	INSIDE DIAMETER	SS	STAINLESS STEEL
CLG	CEILING	INSUL	INSULATION	STD	STANDARD
CTR	CENTER	INT	INTERIOR	STL	STEEL
CL	CENTERLINE	JST	JOIST	SDI	STEEL DECK INSTITUTE
CLR	CLEAR	KCJ	KEYED CONTROL JOINT	STIFF	STIFFENER
COL	COLUMN	K	KIP (1000 LBS)	STRUCT	STRUCTURAL
CONC	CONCRETE	KOBB	KNOCK OUT BOND BEAM	SYM	SYMMETRICAL
CONN	CONNECTION	LL	LIVE LOAD	TAN	TANGENT
CONST	CONSTRUCTION	LLBB	LONG LEG BACK TO BACK	THRU	THROUGH
CJ	CONSTRUCTION JOINT	LLV	LONG LEG VERTICAL	T&B	TOP AND BOTTOM
CONT	CONTINUOUS	LLH	LONG LEG HORIZONTAL	TO	TOP OF
CJ	CONTROL JOINT	LONG	LONGITUDINAL	TOB	TOP OF BEAM
DL	DEAD LOAD	MAINT	MAINTENANCE	TOC	TOP OF CONCRETE
DEG	DEGREE	MFR	MANUFACTURER	TOF	TOP OF FOOTING
DET	DETAIL	MK	MARK	TOGB	TOP OF GRADE BEAM
DIAG	DIAGONAL	MATL	MATERIAL	TOP	TOP OF PEDESTAL
DIA	DIAMETER	MAX	MAXIMUM	TOS	TOP OF STEEL
DIFF	DIFFERENCE	MSL	MEAN SEA LEVEL	TOW	TOP OF WALL
DP	DEEP	MECH	MECHANICAL	TRANS	TRANSVERSE
DWLS	DOWELS	MU	MECHANICAL UNIT	TYP	TYPICAL
DWG	DRAWING	MIN	MINIMUM	UBC	UNIFORM BUILDING CODE
EA	EACH	MISC	MISCELLANEOUS	UNO	UNLESS NOTED OTHERWISE
EF	EACH FACE	NIC	NOT IN CONTRACT	VERT	VERTICAL
EW	EACH WAY	NTS	NOT TO SCALE	WD	WIDE
EL	ELEVATION	NS	NEAR SIDE NS	WT	WEIGHT
ELEC	ELECTRICAL	N-S	NORTH / SOUTH	WWF	WELDED WIRE FABRIC
EMBD	EMBEDMENT	NO	NUMBER	W/	WITH
ENGR	ENGINEER	OC	ON CENTER	W/O	WITHOUT
				WP	WORK POINT

EXAMPLE DESIGN

NOT FOR REPLICATION OR CONSTRUCTION

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DESIGNED			
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CLASSIFICATION UNCLASSIFIED	NO	REVISION DESCRIPTION	DATE

ENGINEERING SERVICES

GENERAL USE WAREHOUSE

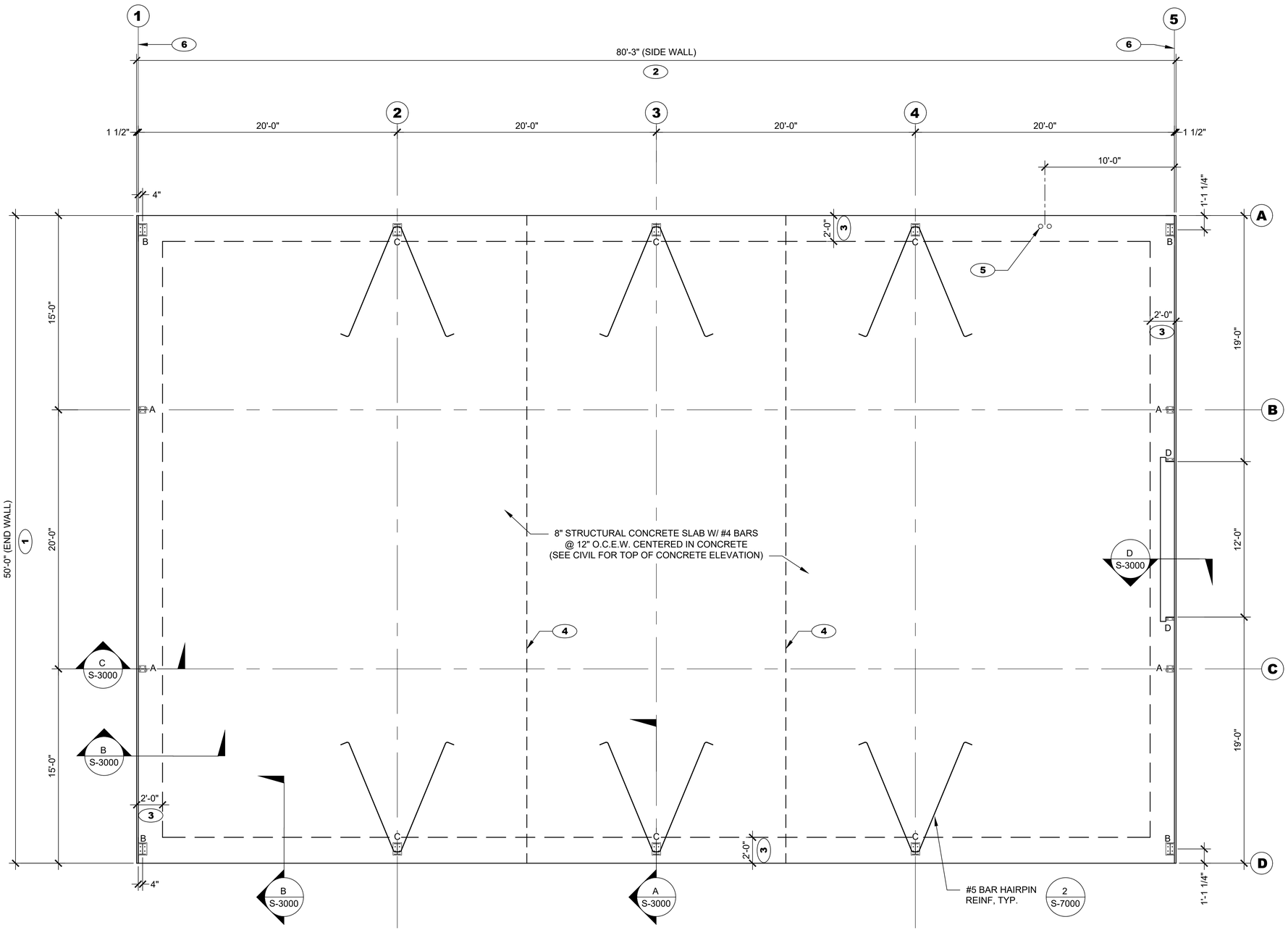
STRUCTURAL GENERAL NOTES, ABBREVIATIONS AND LEGEND

TA- xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET S-0001
03 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-S-0001	0



FOUNDATION PLAN

1/4" = 1'-0"

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.
2. SEE RGB DRAWINGS FOR COLUMN BASE PLATE AND CIP ANCHOR LAYOUT.
3. PROVIDE CONTRACTION JOINTS IAW 03 3001 SPECIFICATION.

KEYED NOTES:

1. DIMENSION IS OUT-TO-OUT OF THE CONCRETE FOUNDATION AND STEEL STRUCTURE.
2. DIMENSION IS OUT-TO-OUT OF THE CONCRETE FOUNDATION.
3. PERIMETER WALL FOOTING.
4. OPTIONAL CONSTRUCTION JOINT CENTERED BETWEEN COLUMN LINES. ALL REINFORCING TO BE CONTINUOUS AT CONSTRUCTION JOINTS.
5. ELECTRICAL CONDUIT CAST IN PLACE, SEE ELECTRICAL.
6. GRID TO OUTSIDE FACE OF STEEL STRUCTURE.

BASEPLATE LEGEND	
DESIGNATION	REFERENCE DETAIL
A	1/S-5000
B	2/S-5000
C	3/S-5000
D	4/S-5000

EXAMPLE DESIGN

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DESIGNED			
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ENGINEERING SERVICES

GENERAL USE WAREHOUSE

FOUNDATION PLAN

TA- xx

BLDG xxxx

Los Alamos NATIONAL LABORATORY

PO Box 1663
Los Alamos, New Mexico 87545

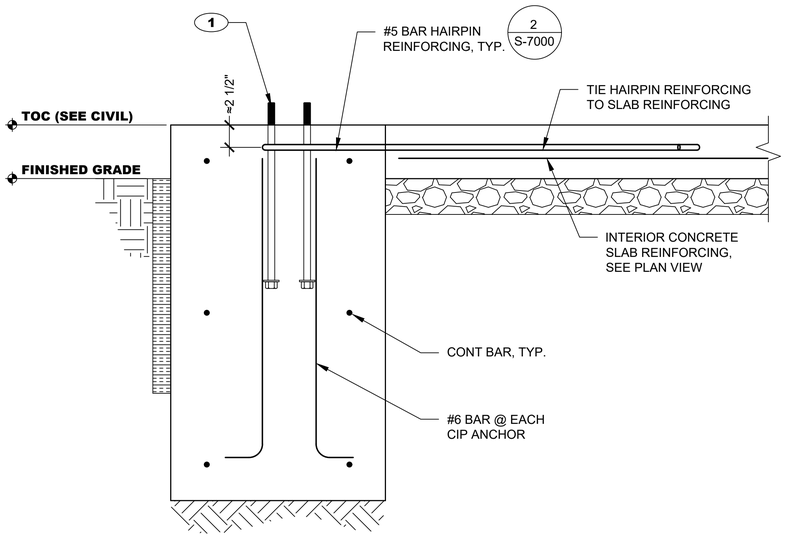
SHEET S-1000

04 OF 21

PROJECT ID: XXXXX

DRAWING NO: Cxxxxx-DWG-xx-xxxx-S-1000

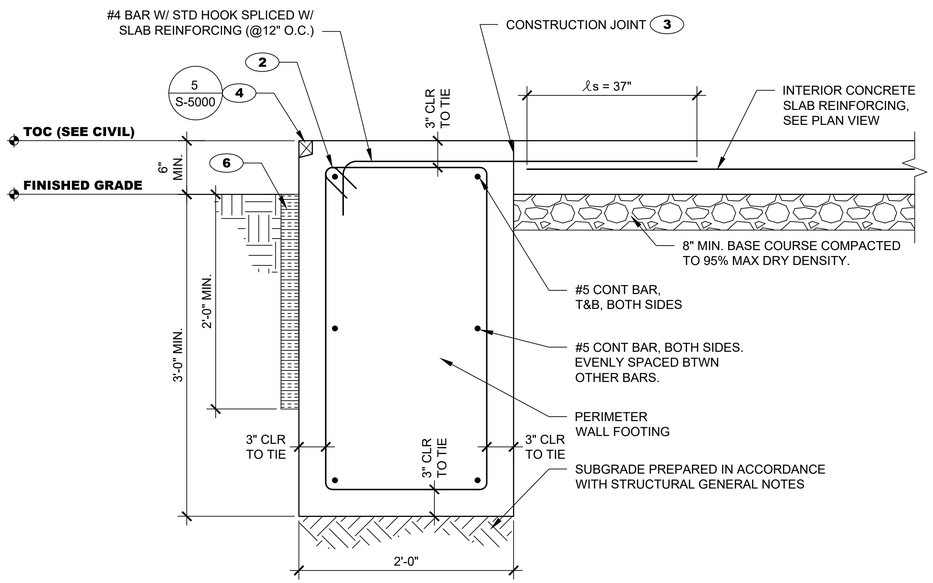
REV: 0



NOTE: NOT ALL REINFORCING SHOWN FOR CLARITY.
SEE SECTION B/S-3000 FOR ADDITIONAL DETAIL.

A S-1000 **SIDE WALL COLUMN BASE PLATE**

SCALE: 0 3" 6" 9" 12" 1'
1 1/2" = 1'-0"



B S-1000 **PERIMETER WALL FOOTING, TYPICAL**

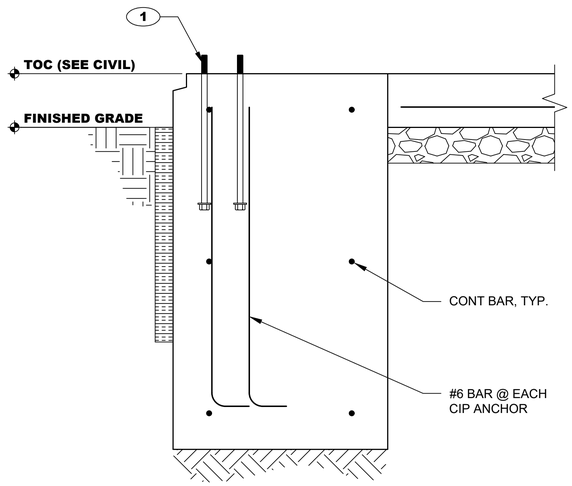
SCALE: 0 3" 6" 9" 12" 1'
1 1/2" = 1'-0"

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.

KEYED NOTES:

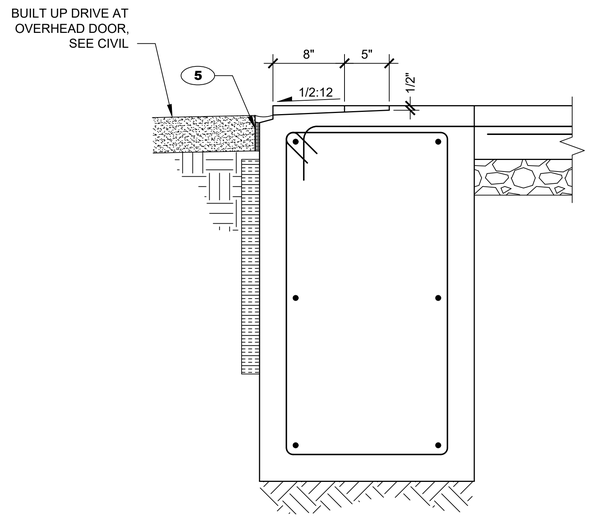
1. CAST-IN-PLACE ANCHOR BOLTS (ANCHOR BOLTS ARE NOT GFE). SEE S-5000 FOR LOCATION, DIAMETER, SPACING, AND THREAD PROJECTION.
2. #3 TIES @ 12" O.C. ALTERNATE HOOK POSITION OF EACH SUCCESSIVE TIE.
3. SUBSTITUTION OF CONSTRUCTION JOINT WITH MONOLITHIC PLACEMENT OF CONCRETE IS ACCEPTABLE. HOOK INTERIOR CONCRETE SLAB REINFORCING BARS INTO PERIMETER WALL FOOTING W/ STANDARD HOOK.
4. SIDING RELIEF, OMIT AT SIDE WALLS.
5. PROVIDE 1/2" EXPANSION JOINT FILLER AT ASPHALT TO CONCRETE TRANSITION FROM BOTTOM OF ASPHALT TO WITHIN 1/4" TOP OF ASPHALT. COVER W/ JOINT SEALANT COMPOUND.
6. RIGID INSULATION RATED FOR BELOW GRADE USAGE. MINIMUM R-10.



NOTE: NOT ALL REINFORCING SHOWN FOR CLARITY.
SEE SECTION B/S-3000 FOR ADDITIONAL DETAIL.

C S-1000 **ENDWALL COLUMN BASE PLATE**

SCALE: 0 3" 6" 9" 12" 1'
1 1/2" = 1'-0"



D S-1000 **OVERHEAD DOOR OPENING**

SCALE: 0 3" 6" 9" 12" 1'
1 1/2" = 1'-0"

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE

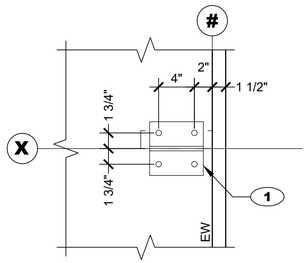
FOUNDATION SECTIONS

TA- xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET **S-3000**
05 OF **21**

PROJECT ID **XXXXX**
DRAWING NO **Cxxxxx-DWG-xx-xxxx-S-3000**
REV **0**

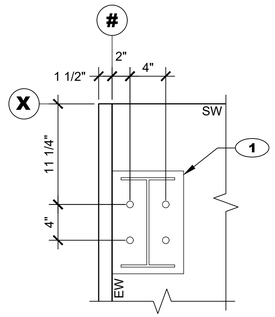


5/8" DIA X 18" CIP ANCHOR BOLTS
MIN. THREAD PROTECTION = 3 1/2"

BASE PLATE A

1 / S-1000 **END WALL DETAIL**

SCALE: NONE

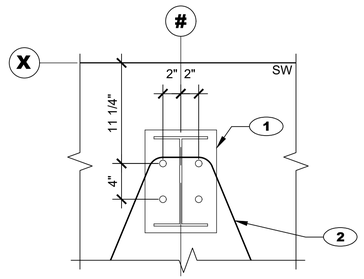


3/4" DIA X 18" CIP ANCHOR BOLTS
MIN. THREAD PROTECTION = 4"

BASE PLATE B

2 / S-1000 **CORNER DETAIL**

SCALE: NONE

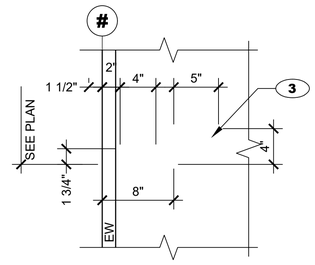


3/4" DIA X 18" CIP ANCHOR BOLTS
MIN. THREAD PROTECTION = 4"

BASE PLATE C

3 / S-1000 **SIDE WALL DETAIL**

SCALE: NONE

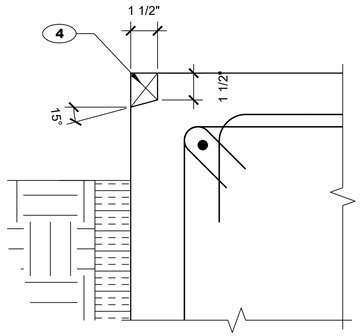


5/8" DIA X 18" CIP ANCHOR BOLTS
MIN. THREAD PROTECTION = 3 1/2"

BASE PLATE D

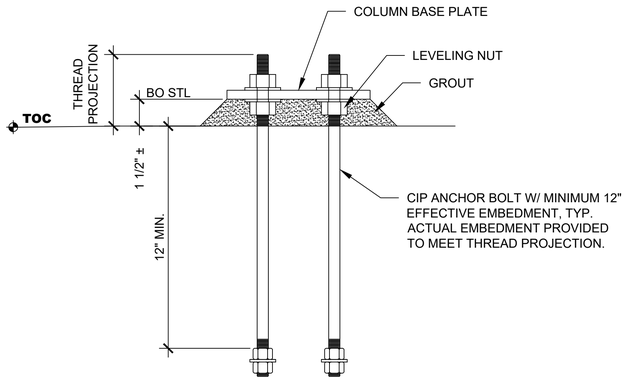
4 / S-1000 **OPENING DETAIL**

SCALE: NONE



5 / S-3000 **END WALL CONCRETE DETAIL**

SCALE: NONE



6 / S-5000 **BASE PLATE LEVELING DETAIL**

SCALE: NONE

GENERAL NOTES:

1. SW AND EW DENOTES SIDE WALL AND END WALL, RESPECTIVELY.
2. CAST-IN-PLACE ANCHORS ARE NOT GFE.

KEYED NOTES:

1. COLUMN BASE PLATE. ALL COLUMN BASE PLATES TO HAVE THE SAME ELEVATION. SEE DETAIL 6/S-5000 FOR BASE PLATE LEVELING DETAIL.
2. HAIRPIN REINFORCING, SEE DETAIL 2/S-7000.
3. RECESSED CONCRETE TO RECEIVE OVERHEAD DOOR. SEE SECTION D/S-3000.
4. BEVELED 2X4 FOR CONCRETE BLOCKOUT @ END WALLS.

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE

STRUCTURAL DETAILS

TA-xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET **S-5000**
06 OF **21**

PROJECT ID **XXXXX**

DRAWING NO **Cxxxxxx-DWG-xx-xxxx-S-5000**

REV **0**

REINFORCING DEVELOPMENT AND SPLICE LENGTHS (in)

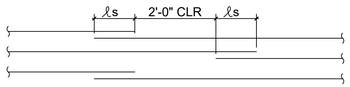
CONCRETE COMPONENT	REINFORCING LOCATION	BAR SIZE			
		#4		#5	
		ℓd	ℓs	ℓd	ℓs
INTERIOR SLAB (f'c = 4000 psi)	ALL BARS	12	16	-	-
PERIMETER WALL FOOTING (f'c = 4500 PSI)	BOTTOM BARS	-	-	14	18
	TOP BARS	-	-	18	23

NOTES:

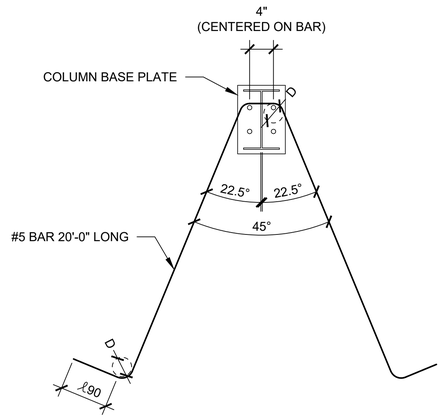
1. ℓd = DEVELOPMENT LENGTH

ℓs = LAP SPLICE LENGTH

2. ALL SPLICE LENGTHS ARE CLASS B SPLICES.
3. WHEN SPLICING BARS ARE DIFFERENT SIZE, USE LAP SPLICE LENGTH OF LARGER BARS, U.N.O.
4. TOP BARS ARE THOSE BARS WITH GREATER THAN 12 INCHES OF FRESH CONCRETE PLACED BELOW HORIZONTAL REINFORCEMENT.
5. STAGGER SPLICES AS



1 / – **REINFORCING DEVELOPMENT & SPLICE LENGTHS**
SCALE: NONE



2 / S-5000 **HAIRPIN BAR DETAIL**
SCALE: NONE

GENERAL NOTES:

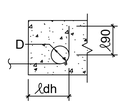
1. SUBSTITUTION OF HIGHER STRENGTH CONCRETE WILL YIELD CONSERVATIVE BAR DIMENSIONS.

DEVELOPMENT OF STANDARD HOOKS (in)

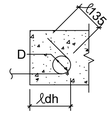
BAR PROPERTIES	BAR SIZE		
	#4	#5	#6
HOOK DEVELOPMENT LENGTH, ℓdh	9	11	13
INSIDE BEND DIAMETER, D	3	3-3/4	4-1/2
90° HOOK STRAIGHT EXTENSION LENGTH, ℓ90	6	8	9
180° HOOK STRAIGHT EXTENSION LENGTH, ℓ180	2-1/2	2-1/2	3
DEVELOPMENT LENGTH, ℓdt	9	11	13
CLEAR SPACING, s	2	2-1/2	3

NOTES:

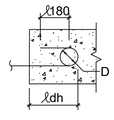
1. 90° HOOK DIMENSIONS:



2. 135° HOOK DIMENSIONS:



3. 180° HOOK DIMENSION:



3 / – **HOOKED BAR DEVELOPMENT LENGTHS**
SCALE: NONE

DEVELOPMENT OF STANDARD HOOKS FOR STIRRUPS, TIES, AND HOOPS (in)

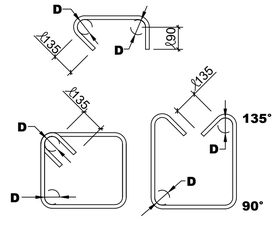
HOOK PROPERIES	BAR SIZE		
	#3	#4	#5
INSIDE BEND DIAMETER, D	1-1/2	2	2-1/2
90° HOOK STRAIGHT EXTENSION LENGTH, ℓ90	3	3	3-3/4
135° HOOK STRAIGHT EXTENSION LENGTH, ℓ135	3	3	3-3/4
180° HOOK STRAIGHT EXTENSION LENGTH, ℓ180	2-1/2	2-1/2	2-1/2

BENDS

NOTE:

1. **DO NOT FIELD BEND REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE.**

STIRRUPS, TIES & HOOPS



4 / – **HOOKS & BENDS**
SCALE: NONE

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE

REINFORCING SCHEDULE

TA- xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

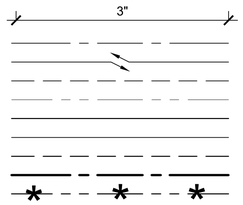
SHEET **S-7000**
07 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-S-7000	0

ABBREVIATIONS (NOT ALL SYMBOLS WILL APPLY TO THIS PROJECT)

AAC	AUTOCLAVED AERATED CONCRETE	JB	JUNCTION BOX
AB	ANCHOR BOLT		
AC	ASPHALTIC CONCRETE	KO	KNOCKOUT
AC	AIR CONDITIONING	KPL	KICKPLATE
ACOUS TILE	ACOUSTICAL TILE		
ADJ	ADJUSTABLE	LAV	LAVATORY
AFF	ABOVE FINISHED FLOOR	LPT	LOW POINT
AL	ALUMINUM		
ANOD	ANODIZED	MATL	MATERIAL
@	AT	MAX	MAXIMUM
		MECH	MECHANICAL
BD	BOARD	MET	METAL
BLDG	BUILDING	MFG	MANUFACTURING
BLKG	BLOCKING	MFR	MANUFACTURER
BM	BEAM	MIN	MINIMUM
BOT	BOTTOM		
BU	BUILT-UP	NIC	NOT IN CONTRACT
		NTS	NOT TO SCALE
CAB	CABINET		
CEM	CEMENT	OC	ON CENTER
CER	CERAMIC	OD	OUTSIDE DIAMETER
CH BD	CHALKBOARD	OPNG	OPENING
CHAN	CHANNEL	OPP	OPPOSITE
CI	CAST IRON		
CJ	CONSTRUCTION JOINT	PA	PUBLIC ADDRESS
CL OR C L	CENTER LINE	PB	PANIC BAR
CLG	CEILING	PHS	PHILLIPS HEAD SCREW
CLR	CLEAR	PL OR P	PLATE
CMU	CONCRETE MASONRY UNIT	PL	PROPERTY LINE
COL	COLUMN	PLAM	PLASTIC LAMINATE
CONC	CONCRETE	PLAS	PLASTER
CONN	CONNECTION	PLYWD	PLYWOOD
CONSTR	CONSTRUCTION	PNL	PANEL
CONT	CONTINUOUS	POL	POLISHED
CONTR	CONTRACTOR	PTD	PAPER TOWEL DISPENSER
CR	CARD READER	PTR	PAPER TOWEL RECEPTACLE
CSK	COUNTER SUNK	PVC	POLYVINYL CHLORIDE
CW	COLD WATER		
		R	RISERS
DET	DETAIL	RA	RETURN AIR
DF	DRINKING FOUNTAIN	RAD	RADIUS
DIM	DIMENSION	RCP	REFLECTED CEILING PLAN
DS	DOWNSPOUT	RD	ROOF DRAIN
DWG	DRAWING	REC	RECESSED
Ø OR DIA	DIAMETER	REINF	REINFORCE(D)(ING)(MENT)
		RESIL	RESILIENT
EL	ELEVATION	RM	ROOM
ELEC	ELECTRICAL	RND	ROUND
ELEV	ELEVATOR	RO	ROUGH OPENING
ENCL	ENCLOSURE	RWL	RAIN WATER LEADER
EP	ELECTRIC PANEL		
EQ	EQUAL	SC	SOLID CORE
EWC	ELECTRIC WATER COOLER	SCD	SEAT COVER DISPENSER
EWH	ELECTRIC WATER HEATER	SECT	SECTION
EXH	EXHAUST	SHT	SHEET(ING)
EXP JT	EXPANSION JOINT	SHTHG	SHEATHING
EXST	EXISTING	SHV	SHELVES(ING)
EXT	EXTERIOR	SIM	SIMILAR
		SK	SINK
FD	FLOOR DRAIN	SM	SHEET METAL
FDN	FOUNDATION	SND	SANITARY NAPKIN DISPENSER
FEC	FIRE EXTINGUISHER CABINET	SPEC	SPECIFICATION
FEXT	FIRE EXTINGUISHER	SQ	SQUARE
FGL	FIBERGLASS	SQ FT	SQUARE FOOT/FEET
FHC	FIRE HOSE CABINET	SSK	SERVICE SINK
FHY	FIRE HYDRANT	STD	STANDARD
FIN	FINISH	STL	STEEL
FIN FLR	FINISH FLOOR	STOR	STORAGE
FLR	FLOOR(ING)	STRUCT	STRUCTURAL
FLR SK	FLOOR SINK	SST	STAINLESS STEEL
FOC	FACE OF CONCRETE	SUSP	SUSPENDED
FOF	FACE OF FINISH	SUSP CLG	SUSPENDED CEILING
FOM	FACE OF MASONRY		
FOS	FACE OF STUDS	T	TREAD
FTG	FOOTING	TD	TOWEL DISPENSER
FV	FIELD VERIFY	TD/R	TOWEL DISPENSER/RECEPTACLE
		TEL	TELEPHONE
GA	GAUGE	TPH	TOILET PAPER HOLDER
GALV	GALVANIZED	TSL	TOP OF SLAB
GALVI	GALVANIZED IRON	TYP	TYPICAL
GND	GROUND	T&G	TONGUE AND GROOVE
GR	GRAD(E)(ING)		
GTV	GATE VALVE	UON	UNLESS OTHERWISE NOTED
GYP BD	GYPSUM BOARD	UR	URINAL
		VERT	VERTICAL
HC	HOSE CABINET	VIF	VERIFY IN FIELD
HDR	HEADER		
HDWD	HARDWOOD	W/	WITH
HDWE	HARDWARE	WD	WOOD
HGT	GEIGHT	WP	WORKING POINT
HM	HOLLOW METAL	WR	WATER RESISTANT/WASTE RECEPTACLE
HORIZ	HORIZONTAL	WS	WEATHER STRIPPING
HPT	HIGH POINT	WSCT	WAINSCOT
HR	HOUR	WWF	WELDED WIRE FABRIC
HTG	HEATING		
HW	HOT WATER		
ID	INSIDE DIAMETER		
INSUL	INSULATION		
INTR	INTERIOR		
INV	INVERT		

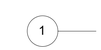
LEGEND (NOT ALL SYMBOLS WILL APPLY TO THIS PROJECT)



DIMENSION LINE WITH WITNESS LINES AND DIMENSION
CENTER LINE
LEADER LINE
FUTURE CONSTRUCTION
EXISITNG CONSTRUCTION
NEW CONSTRUCTION & REVISION CLOUD
BACKGROUND, NEW CONSTRUCTION
HIDDEN LINE
MATCH LINE
EXISTING TO BE REMOVED

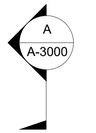
ROOM NAME AND NUMBER (NTS)

DOOR NUMBER (NTS)



COLUMN GRID W/ CENTERLINE

SECTION CUT



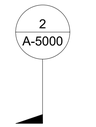
SECTION LETTER
SHEET NUMBER WHERE SECTION IS DRAWN

ARROW INDICATES DIRECTION OF CUT

DETAIL CALLOUT

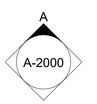
DETAIL NUMBER
SHEET NUMBER WHERE DETAIL IS DRAWN

DETAIL CUT (NS)



DETAIL NUMBER
SHEET NUMBER WHERE DETAIL IS DRAWING

ARROW INDICATES DIRECTION OF CUT



ELEVATION LETTER ON SIDE OF VIEW

ELEVATION CALLOUT

SHEET NUMBER WHERE ELEVATION IS DRAWN

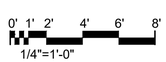
KEYED NOTE INDICATION

FINISH ELEVATION INDICATOR

NORTH ARROW

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

DRAWING TITLE
SCALE OF DRAWING



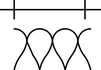
GRAPHIC SCALE OF DRAWING

DEMOLITION

EQUIPMENT NUMBER

NEW WALL

SUSPENDED ACOUSTIC CEILING



INSULATION

GENERAL NOTES:

1. ALL ARCHITECTURAL WORK TO BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ABBREVIATIONS, LEGEND AND GENERAL NOTES

TA- xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET A-0001
08 OF 21

PROJECT ID: XXXXX
DRAWING NO: Cxxxxx-DWG-xx-xxxx-A-0001
REV: 0

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.

LEGEND

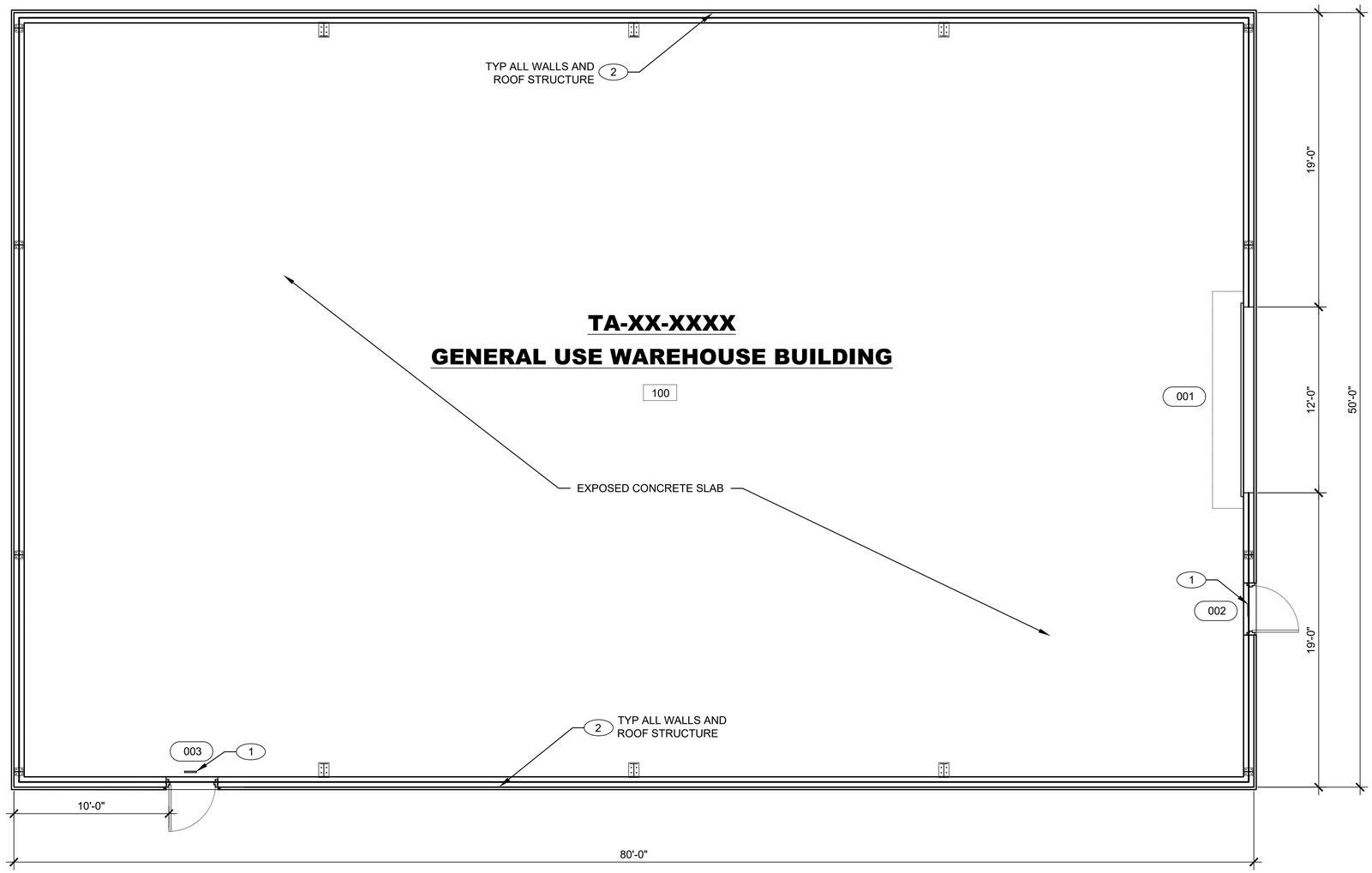
100 ROOM NUMBER

001 DOOR NUMBER

KEYED NOTES:

1 EXIT SIGN ABOVE DOOR, SEE ELECTRICAL.

2 PROVIDE BUILDING INSULATION PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. SEE G-0002 FOR BUILDING ENVELOPE REQUIREMENTS AND PROJECT SPECIFICATION 07 2100 FOR INSULATION REQUIREMENTS.



FLOOR PLAN

0' 1' 2' 4' 6' 8'

1/4"=1'-0"

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

FLOOR PLAN

TA- xx BLDG xxxx

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PO Box 1663
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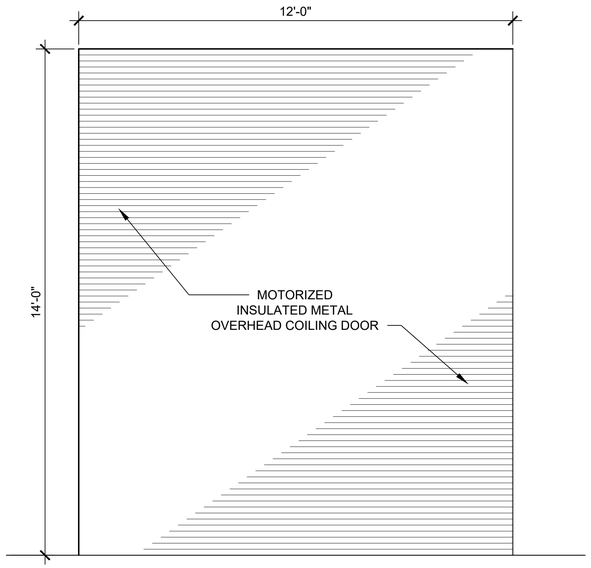
SHEET A-1050

09 OF 21

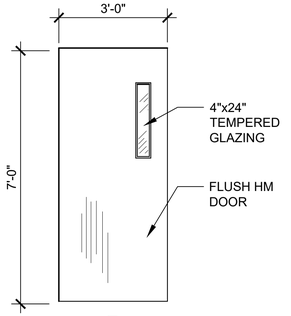
PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-A-1050	0

DOOR SCHEDULE

NO.	DOOR ELEV	SIZE W X H X THK	FRAME		MATERIALS		DETAIL			HARDWARE SETS	FIRE RATING	REMARKS
			TYPE	THROAT	DOORS	FRAMES	HEAD	JAMB	SILL			
001	A	12'-0" X 14'-0" X STD	*	*	MTL	MTL	*	*	*	*	NONE	* MANUFACTURER'S STANDARD
002	B	3'-0" X 7'-0" X 1 3/4"	1	5-1/2"	HM	HM	1/7000	1/7000	1/7000	1	NONE	LEFT HAND REVERSE BEVEL
003	B	3'-0" X 7'-0" X 1 3/4"	1	5-1/2"	HM	HM	1/7000	1/7000	1/7000	1	NONE	LEFT HAND REVERSE BEVEL



A

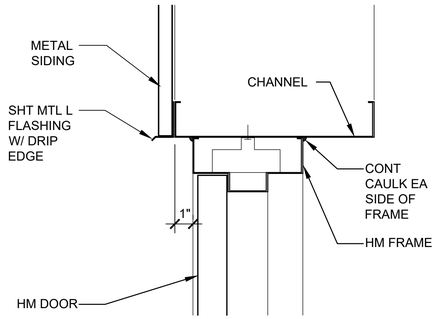


B

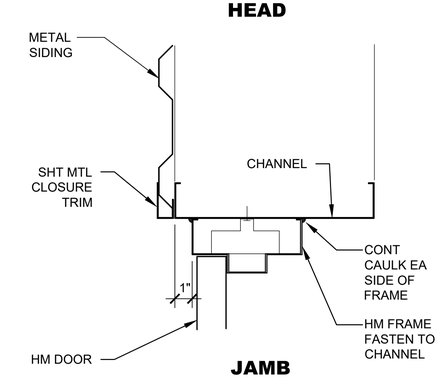
DOOR TYPES

2' 1' 0 1' 2'

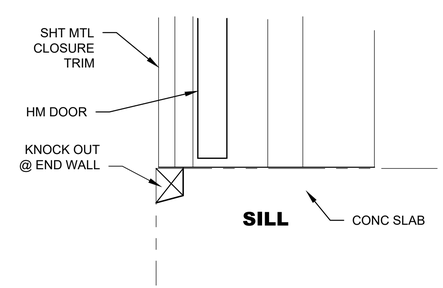
1/2"=1'-0"



HEAD



JAMB

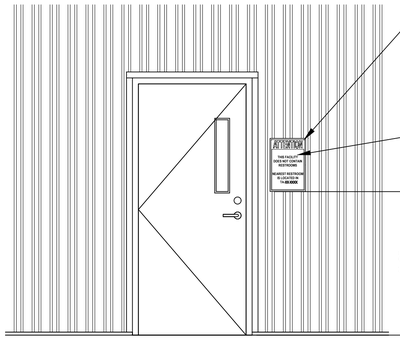


SILL

1 / A-7000

DOOR DETAILS

SCALE: NONE

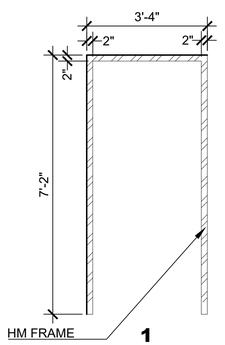


LOCATE SIGN AT EACH OF THE MAN DOOR, TYPICAL.
SIGN REQUIRED TO MEET VARIANCE REQUIREMENTS.

RR VARIANCE SIGN

2' 1' 0 1' 2'

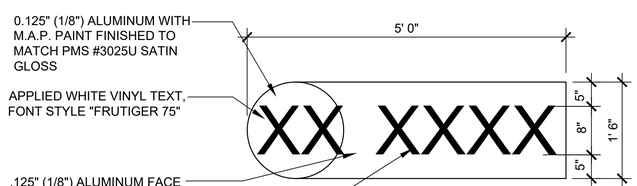
1/2"=1'-0"



1

DOOR FRAME TYPE

2' 1' 0 1' 2'



LOCATE BLDG IDENTIFICATION SIGN ON
SIDE OF BUILD VISIBLE BY VEHICLE ACCESS
APPROXIMATELY 10'-0" ABOVE GRADE.

BLDG MOUNTED IDENTIFICATION SIGN

SCALE: NONE

EXAMPLE DESIGN

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LB PA RE			
AF FO			
SU			
VE			
DESIGNED			
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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

DOOR SCHEDULE AND DETAILS

TA- xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
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SHEET A-7000

10 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-A-7000	0

MECHANICAL SYMBOLS LEGEND

ABBREVIATIONS

A

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE

B

BDD	BACK DRAFT DAMPER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BHP	BRAKE HORSEPOWER
BTUH	BTU PER HOUR

C

CONT.	CONTINUATION
CFM	CUBIC FEET PER MINUTE

E

ENT	ENTERING
EXH	EXHAUST

F

°F	DEGREES FAHRENHEIT
FT.	FEET
FPM	FEET PER MINUTE
FLEX	FLEXIBLE

G

GFE	GOVERNMENT FURNISHED EQUIPMENT

H

HP	HORSEPOWER
HUE	HEATING UNIT, ELECTRIC
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HZ	HERTZ

I

IN	INCHES

K

KW	KILOWATT

M

MERV	MINIMUM EFFICIENCY REPORTING VALUE

N

NA	NOT APPLICABLE
NO.	NUMBER (QUANTITY)

O

OBD	OPPOSED BLADE DAMPER
OA	OUTSIDE AIR

P

POC	POINT OF CONNECTION TO EXISTING
POR	POINT OF REMOVAL FROM EXISTING
PSIG	POUNDS PER SQUARE INCH GAGE
PRV	PRESSURE REDUCING VALVE

Q

QTY	QUANTITY

R

RLA	RELIEF AIR
RA	RETURN AIR
RPM	REVOLUTIONS PER MINUTE

S

SA	SUPPLY AIR
SD	SMOKE DETECTOR
SP	STATIC PRESSURE (INCHES OF WATER)
STR	SUBCONTRACT TECHNICAL REPRESENTATIVE

T

TYP.	TYPICAL

V

VEL	VELOCITY
V	VOLTS
VAC	VOLTS, ALTERNATING CURRENT
VD	VOLUME DAMPER

EQUIPMENT CODE LISTING

FANS

FE	EXHAUST AIR FAN
FRA	RETURN AIR FAN
FS	SUPPLY AIR FAN

FILTERS (AIR)

FAC	CLEANABLE AIR FILTER (PERMANENT TYPE)
FAR	REPLACEMENT AIR FILTER

HEATERS

HUG	HEATER, UNIT, GAS
HUE	HEATER, UNIT, ELECTRIC
HUI	RADIANT (INFRARED) HEATER

PIPING SYMBOLS

——LPNG—— LOW PRESSURE NATURAL GAS

PIPING SYMBOLS

SYMBOL	DESCRIPTION
	BALL VALVE
	CHECK VALVE
	DIAPHRAGM VALVE
	GATE VALVE
	GLOBE VALVE
	PLUG VALVE COCK
	PRESSURE REDUCING VALVE
	RELIEF OR SAFETY VALVE
S	SOLENOID VALVE
	CAP
	AUTOMATIC AIR VENT
	MANUAL AIR VENT
	EXPANSION JOINT
	PIPE ANCHOR
	PRESSURE GAUGE WITH VALVE
	STRAINER
	STRAINER W/BLOW-OFF VALVE
	TEST PLUG (PRESS/TEMP)
T	TEMP GAUGE WITH VALVE
	CAP OR PLUG
	FLEXIBLE MECHANICAL COUPLING
	RIGID MECHANICAL COUPLING
	ELBOW - TURNED UP
	ELBOW - TURNED DOWN
	FLANGE CONNECTION
	REDUCER - CONCENTRIC
	REDUCER - ECCENTRIC - BOTTOM OF PIPE LEVEL
	REDUCER - ECCENTRIC - TOP OF PIPE LEVEL
	TEE - OUTLET UP
	TEE - OUTLET DOWN
	UNION
	END OF PIPE
	DIRECTION OF FLOW
	PITCH PIPING DOWN

EQUIPMENT SYMBOLS

3 — DIAMOND SYMBOL INDICATES EQUIPMENT NUMBER REFERS TO SPECIFIC EQUIPMENT IDENTIFIED IN EQUIPMENT SCHEDULE

1 — ELLIPSE SYMBOL INDICATES A KEYED NOTE THE NUMBER REFERS TO A SPECIFIC NOTE LISTED IN THE KEYED NOTE LIST

DUCT SMOKE DETECTOR

POR — POINT OF REMOVAL BETWEEN CURRENT WORK AND EXISTING

POC — POINT OF CONNECTION BETWEEN CURRENT WORK AND EXISTING

EXISTING EQUIPMENT TO BE REMOVED

EXISTING EQUIPMENT TO REMAIN

EXISTING PIPING TO BE REMOVED

EXISTING PIPING TO REMAIN

GENERAL NOTES

1. THE FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED. ALL DUCT SIZES SHOWN ON DRAWINGS ARE NET INSIDE DIMENSIONS.
2. COORDINATE ALL DUCTWORK AND HVAC PIPING WITH PLUMBING PIPING, FIRE PROTECTION PIPING, STRUCTURAL AND ELECTRICAL SYSTEMS AND PROVIDE NECESSARY OFFSETS TO AVOID CONFLICTS AND TO MAINTAIN EQUIPMENT ACCESS AND SERVICEABILITY.
3. FURNISH ALL NECESSARY STRUCTURES, INSERTS, SLEEVES AND HANGING DEVICES FOR INSTALLATION OF MECHANICAL EQUIPMENT, DUCTWORK AND PIPING, ETC.
4. PROVIDE ALL NECESSARY MISCELLANEOUS ANGLES, CHANNELS, UNISTRUT AND SUPPORT AS REQUIRED TO ADEQUATELY SUPPORT THE MECHANICAL PIPING, DUCTWORK, AND EQUIPMENT IN A MANNER THAT DOES NOT OVERLOAD THE BUILDING STRUCTURAL SYSTEM.
5. PROVIDE CLEARANCE BELOW ALL MECHANICAL ITEMS REQUIRING MAINTENANCE. THESE MECHANICAL ITEMS INCLUDE TERMINAL HEATING COILS, BALANCING DAMPERS, AND VARIABLE AIR VOLUME VALVES.
6. ALL DISCIPLINES (ELECTRICAL, FIRE PROTECTION, PIPING, PLUMBING, SHEET METAL) WILL COORDINATE INSTALLATION OF THEIR DISCIPLINE SO AS NOT TO INHIBIT ACCESS TO EQUIPMENT REQUIRING MAINTENANCE.

***ALL ABBREVIATIONS / SYMBOLS SHOWN ARE NOT NECESSARILY USED**

MECHANICAL SPECIFICATIONS & SUBMITTALS

*NOTE: THIS TABLE IS FOR REFERENCE ONLY.
FOR MORE INFORMATION SEE SPECIFICATIONS, SUBMITTAL LOG, AND TEST AND INSPECTION PLAN

SPECIFICATIONS	SUBMITTALS
22 0554 IDENTIFICATION FOR PLUMBING, HVAC, AND FIRE PIPING AND EQUIPMENT	NONE
23 3400 HVAC FANS	SEE SECTIONS 1.5 & 1.6 OF SPEC
23 8239 UNIT HEATERS	SEE SECTIONS 1.4 & 1.5 OF SPEC

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

SYMBOLS LEGEND

TA xx — BLDG xxxx

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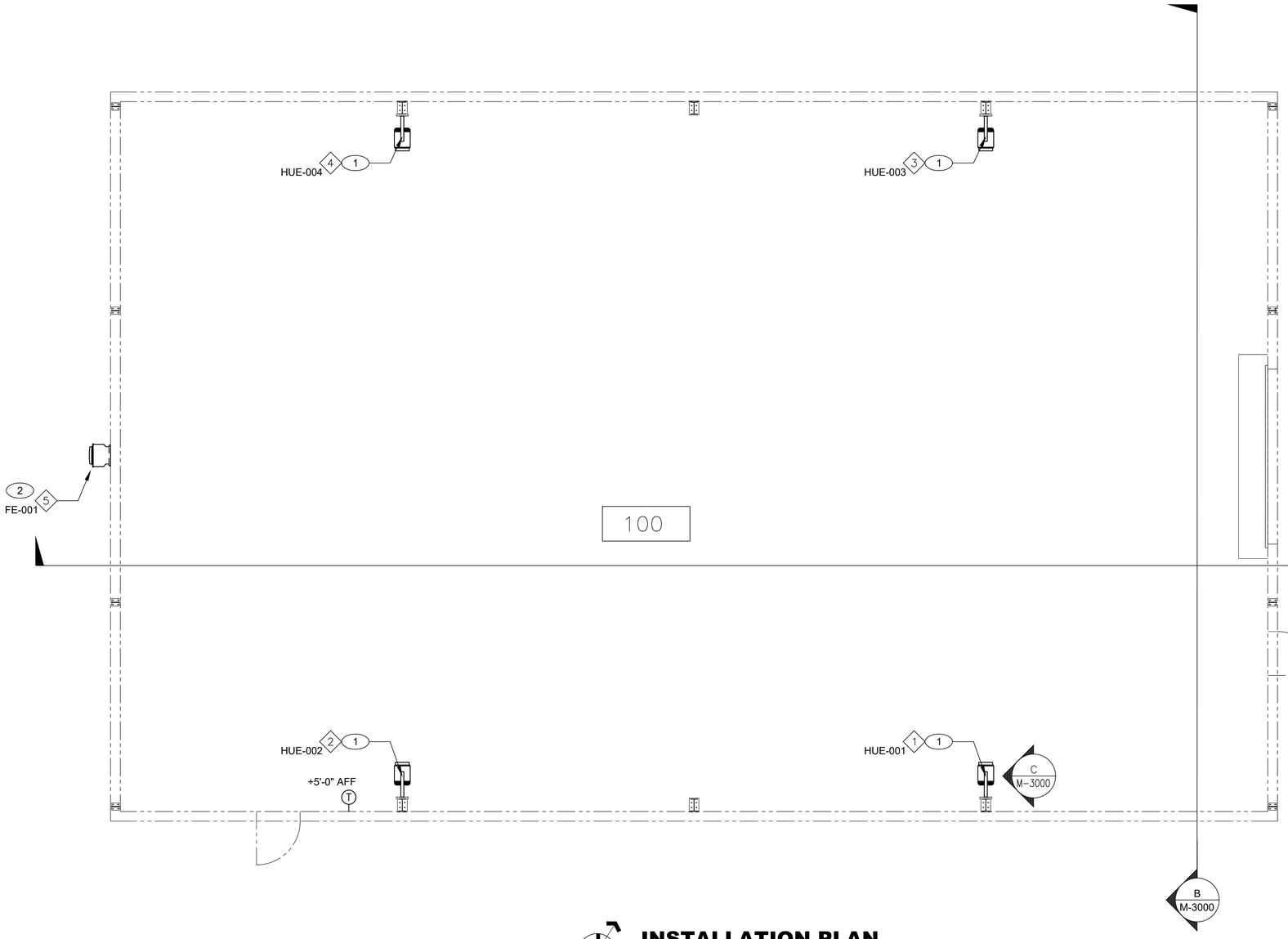
SHEET M-0001
11 OF 21

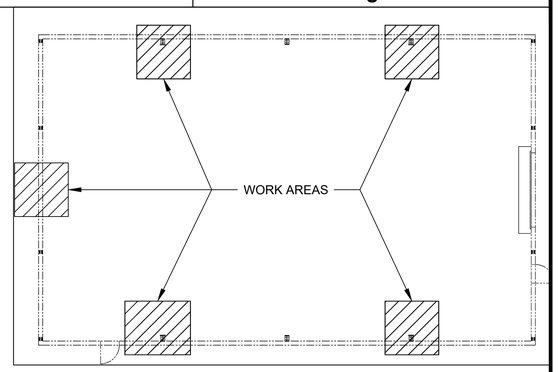
PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-M-0001	0



INSTALLATION PLAN

0' 1' 2' 4' 6' 8'

1/4"=1'-0"



KEY PLAN

SCALE: NONE

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.
2. FIELD VERIFY ALL DIMENSIONS PRIOR TO INSTALLATION.

KEYED NOTES:

(1) INSTALL HUE UNIT HEATERS WITH OPTIONAL WALL MOUNT BRACKET PER IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS AND SECTION C/M-3000. TIE ALL HEATERS TO SINGLE THERMOSTAT SHOWN.

(2) INSTALL FE-001 BELOW HUI-001 WITH OPTIONAL MANUFACTURER SUPPLIED WALL BRACKET PER MANUFACTURER INSTRUCTIONS

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

INSTALLATION PLAN

TAxx

BLDG xxxx

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PO Box 1663
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SHEET M-1000

12 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-M-1000	0

A M-1000 **NORTH SECTION**

0' 1' 2' 4' 6' 8'

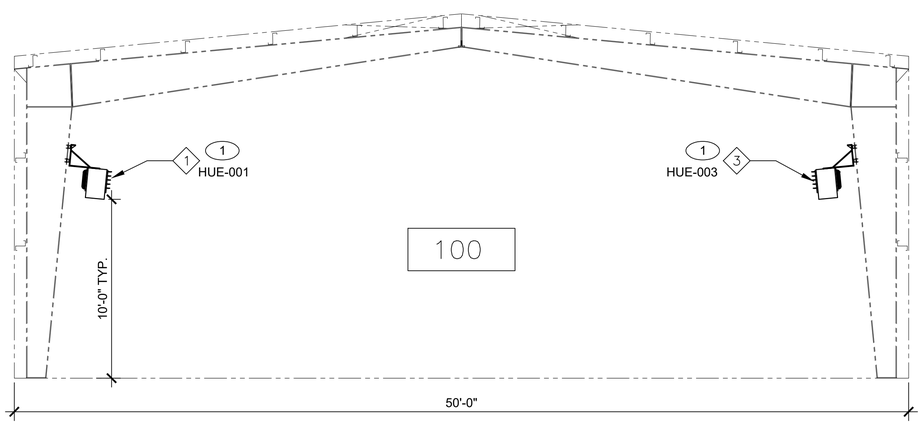
1/4"=1'-0"

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.
2. FIELD VERIFY ALL DIMENSIONS PRIOR TO INSTALLATION.

KEYED NOTES:

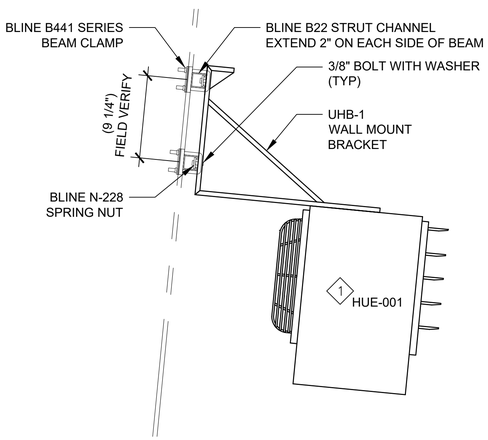
(1) INSTALL HUE UNIT HEATERS WITH OPTIONAL WALL MOUNT BRACKET PER IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS AND SECTION C/M-3000.



B M-1000 **WEST SECTION**

0' 1' 2' 4' 6' 8'

1/4"=1'-0"



C M-1000 **HEATER MOUNTING TYP.**

4" 0 6" 1'

1 1/2"=1'-0"

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

SECTIONS

TA xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
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SHEET M-3000

13 OF 21

PROJECT ID XXXXX

DRAWING NO Cxxxxxx-DWG-xx-xxxxx-M-3000

REV 0

MECHANICAL EQUIPMENT SCHEDULE

ITEM NO.	LOCATION	QTY	DESCRIPTION	MFG & MODEL	REQUIRED ACCESSORIES
1 2 3 4	100	4	**HUE-001, HUE-002, HUE-003, HUE-004, ELECTRIC UNIT HEATERS** NOMINAL CAPACITY 7.5 KW, 25,600 BTU/H AIRFLOW 575 CFM AIR THROW 36 FEET DIMENSIONS 13"W X 18.8"D X 20"H WEIGHT 41 LBS ELECTRICAL 208V / 1PH / 60HZ / 36.1A	MFG: TPI CORP MODEL: UH SERIES, F1FUH07CA1	WALL MOUNTED SINGLE STAGE TSTAT: RK120EAA (ONE TO CONTROL 4 HEATERS) WALL MOUNT BRACKET: UHB-1 (ONE PER HEATER)
5	100	1	**FE-001, EXHAUST FAN** DAMPER SIZE 8" X 8" REQ. WALL OPENING 10.5" X 10.5" MOTOR VARI-GREEN, DIRECT DRIVE VG-1/10 (1/10 HP) NOMINAL AIRFLOW 411 CFM @ 0.0" SP 379 CFM @ 0.1" SP RPM 1725 AIRFLOW SET POINT BALANCE TO 300 CFM WITH ALL DOORS CLOSED DIMENSIONS 19.7" DIA X 13.5" L WEIGHT 31 LBS ELECTRICAL 277 V / 1PH / 60HZ / 1/10HP	MFG: GREENHECK MODEL: CUE, SIZE 070, VARI-GREEN	SIZE 070 WALL BRACKET AND HARDWARE KIT

EQUIPMENT SIZING JUSTIFICATION

HEATERS	PER CALCULATION CAL-18-53-MULTI-0541, A CALCULATION FOR A WAREHOUSE BUILDING (53-1348) OF THE SAME CONSTRUCTION AND DIMENSIONS, THE WAREHOUSE BUILDING REQUIRES APPROXIMATELY 100MBH (ABOUT 30KW) OF HEATING. THE SELECTED HEATERS, ARE ABLE TO MEET/EXCEED THIS REQUIREMENT.
VENTILATION FAN FE-001	PER ASHRAE 62.1, TABLE 6.2.2.1, WAREHOUSE BUILDINGS REQUIRE 0.06 CFM PER SQFT AND 5 CFM PER OCCUPANT. GIVEN THAT THE WAREHOUSE BUILDING IS 4000 SQFT AND WILL TYPICALLY HAVE LESS THAN 6 PEOPLE WORKING INSIDE AT A TIME (NO PERMANENT OCCUPANTS), THE SPACE REQUIRES 300 CFM OF OF OUTDOOR AIR WHEN OCCUPIED. THE SELECTED EXHAUST FAN IS ABLE TO MEET/EXCEED THIS REQUIREMENT

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

EQUIPMENT SCHEDULE

TA xx BLDG xxxx

Los Alamos NATIONAL LABORATORY

PO Box 1663
Los Alamos, New Mexico 87545

SHEET M-7000

14 OF 21

PROJECT ID XXXXX

DRAWING NO Cxxxxx-DWG-xx-xxxx-M-7000

REV 0

ELECTRICAL SYMBOLS LEGEND

(NOT ALL SYMBOLS WILL APPLY TO THIS PROJECT)

SYMBOL	DESCRIPTION
	EXISTING ABOVE FINISHED GRADE
	REMOVE
	NEW WORK
	HIDDEN OR BURIED
	HOMERUN CONDUIT
	GROUND
	PHASE
	SWITCHED
	NEUTRAL
	ISOLATED GROUND
	FLEXIBLE CONDUIT
	CONDUIT CAP
480V 600A	BUSWAY WITH DESCRIPTION
G 6 X 24	GROUNDING CONDUCTOR
	CABLE TRAY WITH DESCRIPTION
J	CEILING JUNCTION BOX
J	WALL JUNCTION BOX
	DUPLEX RECEPTACLE OUTLET
	SINGLE RECEPTACLE OUTLET
	DOUBLE DUPLEX RECEPTACLE OUTLET
GFCI	GROUND FAULT CIRCUIT INTERUPTER DUPLEX OUTLET
	SPLIT WIRED DUPLEX RECEPTACLE
A	SPECIAL PURPOSE OUTLET - USE SUBSCRIPT TO IDENTIFY TYPE IN SPECS
A	FLOOR RECEPTACLE OUTLET USE SUBSCRIPT TO IDENTIFY TYPE IN SPECS
	RECEPTACLE RACEWAY
$a	SINGLE POLE SWITCH - USE SUBSCRIPT TO DESIGNATE CONTROL OF PARTICULAR OUTLETS
$3	THREE-WAY SWITCH
$4	FOUR-WAY SWITCH
$K	KEY OPERATED SWITCH
M	OCCUPANCY SENSING SWITCH
P	PHOTOCELL
A 1,b	LUMINAIRE A=FIXTURE TYPE 1=CIRCUIT NUMBER b=SWITCH CONTROLLING FIXTURE
	STRIP LUMINAIRE
	WALL MOUNTED LUMINAIRE
	CEILING MOUNTED LUMINAIRE
	WALL MOUNTED LUMINAIRE
	EMERGENCY LUMINAIRE
	LIGHT POLE WITH LUMINAIRE
	EMERGENCY LIGHTING UNIT
	CEILING MOUNTED EXIT SIGN - ARROW AS INDICATED
	TWO FACED EXIT SIGN
	WALL MOUNTED EXIT SIGN
	SWITCHBOARD, POWER PANELBOARD
LP-XX	LIGHTING PANELBOARD

SYMBOL	DESCRIPTION
T	TRANSFORMER
30	NON-FUSIBLE SAFETY SWITCH (NUMBER INDICATES SWITCH SIZE)
F 40/60	FUSED SAFETY SWITCH (NUMBERS INDICATE FUSE/SWITCH SIZES)
2 20	COMBINATION MAGNETIC STARTER AND CIRCUIT BREAKER 2 - INDICATES NEMA STARTER SIZE 20 - INDICATES CIRCUIT BREAKER TRIP
2	MAGNETIC STARTER
ASD	ADJUSTABLE SPEED DRIVE
3	MOTOR (NUMBER INDICATES HP)
S	CEILING SPEAKER
S	WALL SPEAKER
1000/1600	DRAWOUT CIRCUIT BREAKER (TRIP / FRAME)
300/400	CIRCUIT BREAKER (TRIP / FRAME)
7/MCP	MOTOR CIRCUIT PROTECTOR
30/MCP 2	MOTOR CONTROL CENTER STARTER UNIT
	FUSE
	GROUND
G	GENERATOR
3000/5 3	CURRENT TRANSFORMER (NUMBERS INDICATE RATIO AND QUANTITY)
3	POTENTIAL TRANSFORMER (NUMBER INDICATES QUANTITY)
AS	AMMETER SWITCH
VS	VOLTMETER SWITCH
V	VOLTMETER
A	AMMETER
KW	KILOWATT METER
N E L	TRANSFER SWITCH
K 1	KEY INTERLOCK #1
	BATTERY
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
	PROTECTIVE RELAY, SOLENOID COIL
	THERMAL OVERLOAD
	CONNECTION
	CROSS, NO CONNECTION
	SURGE ARRESTOR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	CAPACITOR
CR 1	CONTROL RELAY #1
	BUS PLUG CIRCUIT BREAKER
T	THERMOSTAT

SYMBOL	DESCRIPTION
3	ELECTRICAL EQUIPMENT DESIGNATION (SEE SCHEDULE)
5	MECHANICAL EQUIPMENT DESIGNATION (SEE SCHEDULE)
100/3	DISCONNECT SWITCH
600	MEDIUM VOLTAGE DRAWOUT CIRCUIT BREAKER
480V 500 KVA 208Y/120V	TRANSFORMER (DELTA-WYE CONN.)
	SHIELDED TRANSFORMER
7	NAMEPLATE DESIGNATION (SEE SCHEDULE)

ABBREVIATIONS

A	AMPS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AWG	AMERICAN WIRE GUAGE
C OR COND	CONDUIT
EGC	EQUIPMENT GROUNDING CONDUCTOR
EMT	ELECTRICAL METALLIC TUBING
EPO	EMERGENCY POWER OFF
FLA	FULL LOAD AMPS
GFCI	GROUND FAULT CURRENT INTERRUPTER
HP	HORSEPOWER
IMC	INTERMEDIATE METAL CONDUIT
KVA	KILOVOLT AMPS
KW	KILOWATT
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NEC	NATIONAL ELECTRIC CODE
P	POLE
Ø OR PH	PHASE
PVC	POLYVINYL CHLORIDE
RMC	RIGID METAL CONDUIT
SWBD	SWITCHBOARD
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLTAGE
VAV	VARIABLE AIR VOLUME
W	WIRE
W/	WITH
WP	WEATHERPROOF

EXAMPLE DESIGN

NOT FOR REPLICATION OR CONSTRUCTION

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ELECTRICAL SYMBOLS LEGEND

TA- xx BLDG xxxx

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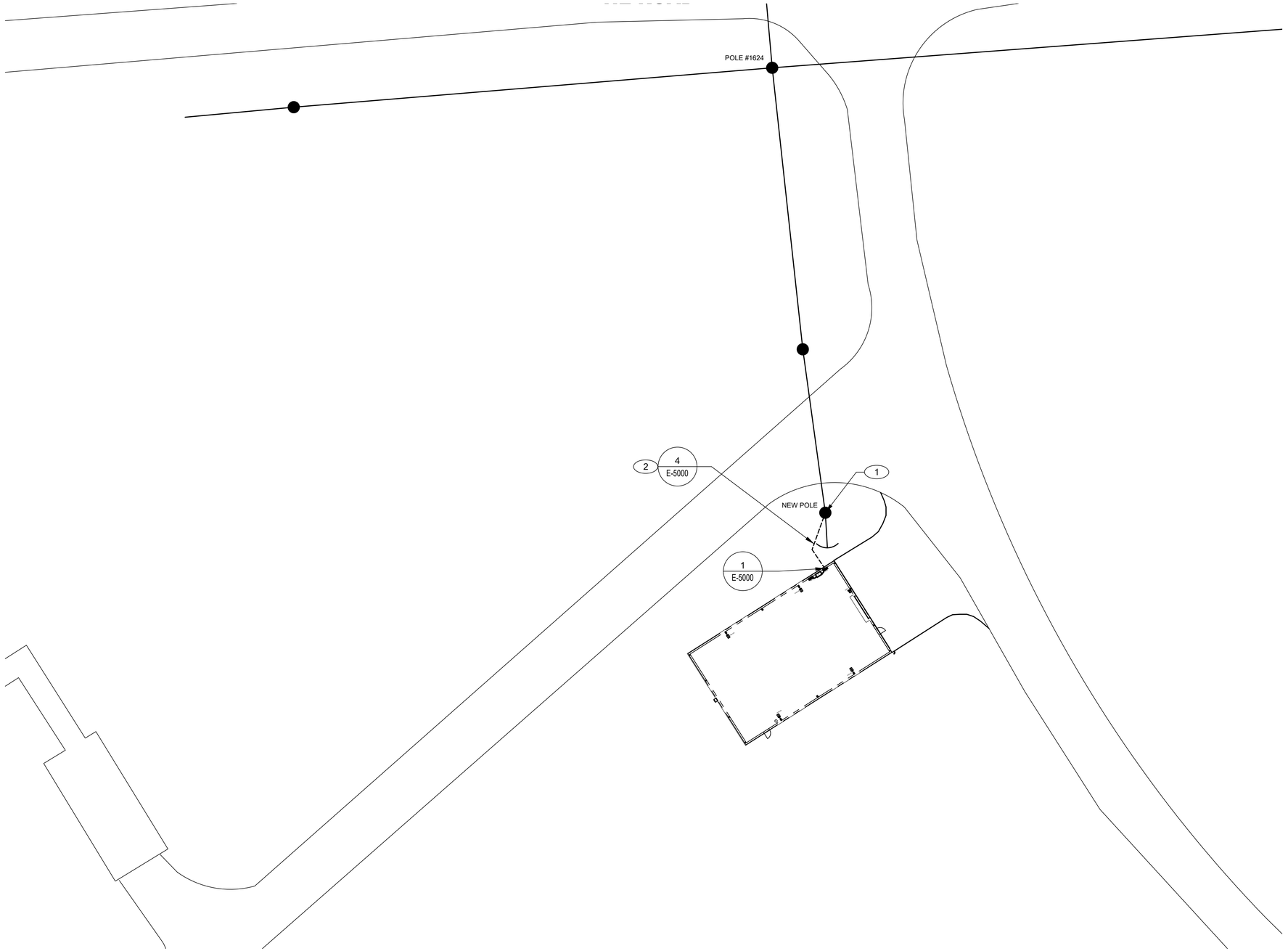
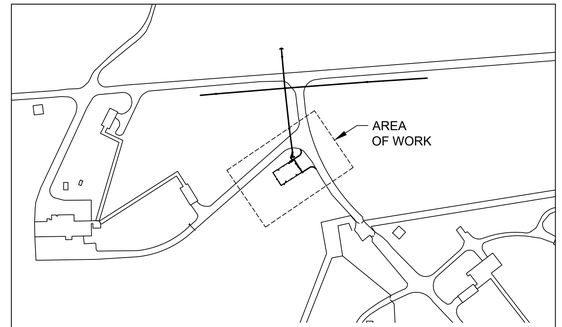
SHEET E-0001

15 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-E-0001	0



ELECTRICAL SITE PLAN
SCALE: NONE



KEY PLAN
SCALE: NONE

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.

KEYED NOTES:

(1) NEW UTILITY POLE PROVIDED BY LANL UTILITIES. TRANSFORMERS, LINE SIDE CONDUCTORS, AND UTILITY SWITCH PROVIDED BY LANL UTILITIES.

(2) PROVIDE CONDUCTORS AND CONDUIT AT LOAD SIDE OF UTILITY SWITCH ALL THE WAY TO PP-A. RE: E-5000 & E-6000

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ELECTRICAL SITE PLAN

TA- xx | BLDG xxxx

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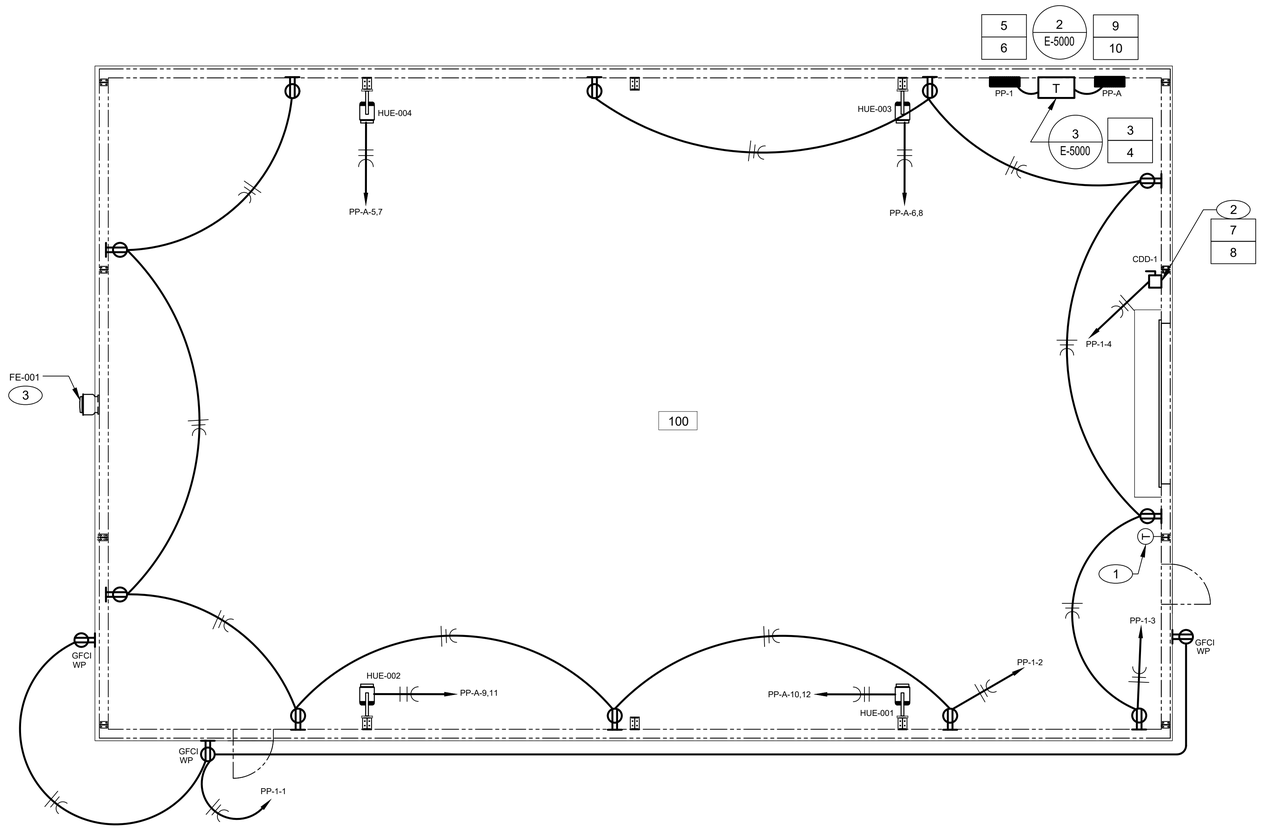
SHEET E-1000
16 OF 21

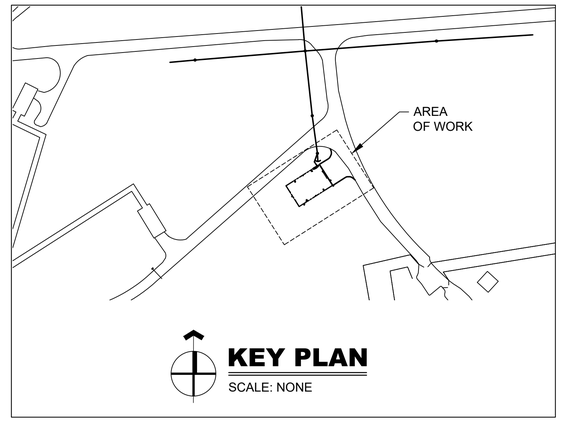
PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxxx-DWG-xx-xxxx-E-1000	0



POWER PLAN

8' 4' 0 4 8'

3/16"=1'-0"



KEY PLAN

SCALE: NONE

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.
2. CENTER TO CENTER DISTANCE BETWEEN ANY TWO CONSECUTIVE RECEPTACLES SHALL BE NO MORE THAN 25 FT.
3. LOCATE RECEPTACLES 18 INCHES ABOVE FINISHED FLOOR.
4. ALL RECEPTACLES ARE NEMA 5-20R, UNLESS NOTED OTHERWISE.

KEYED NOTES:

(1) FIELD ROUTE 3/4" RACEWAY THERMOSTAT TO THERMOSTAT TERMINAL ON HEATER. CONDUCTORS AND FINAL CONNECTION BY OTHERS.

(2) DISCONNECT FOR CONNECTION TO ROLLING DOOR. COORDINATE WITH DOOR MANUFACTURER. USE 30A NON FUSED DISCONNECT.

(3) POWER FE-001 FROM SWITCHED SIDE OF PP-A-1 SO FAN TURNS ON WITH LIGHTS.

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ELECTRICAL POWER PLAN

TA-xx BLDG xxxx

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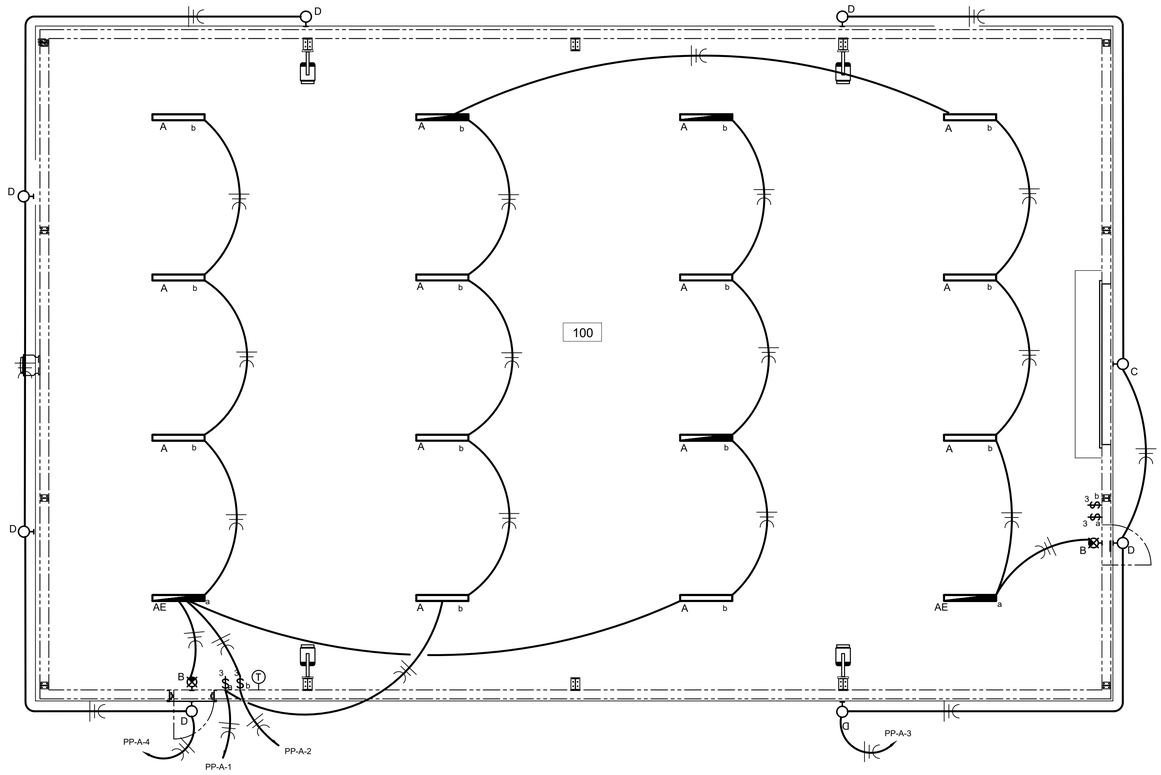
SHEET **E-1001**

17 OF **21**

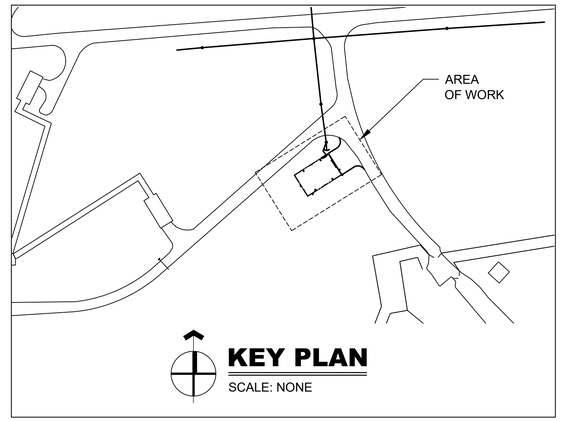
PROJECT ID	DRAWING NO	REV
XXXXX	C5xxxx-DWG-xx-xxxx-E-1001	0



LIGHTING PLAN

8' 4' 0 4 8'

3/16"=1'-0"



KEY PLAN

SCALE: NONE

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY.
2. ALL CIRCUITS ARE 2-#12 AND 1-#12 EGC IN 3/4 INCH RACEWAY, UNLESS NOTED OTHERWISE.
3. CENTER MOUNT EXIT LIGHTS 1 FT ABOVE DOOR WAYS.
4. EXIT SIGNS AND EGRESS LIGHTING ARE NOT SWITCHED.
5. LOCATE INTERIOR LIGHTS 16 FT AFF.

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ELECTRICAL LIGHTING PLAN

TA- xx BLDG xxxx

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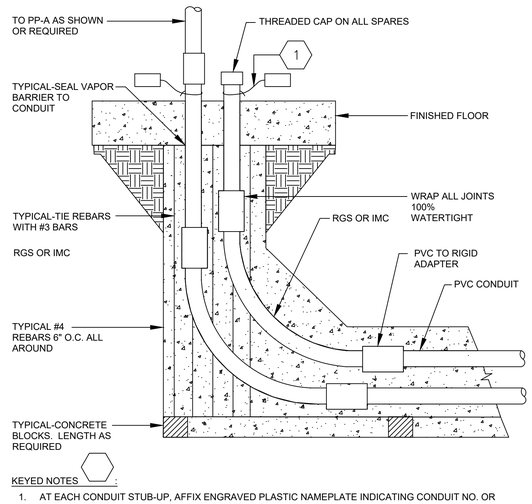
SHEET **E-1002**

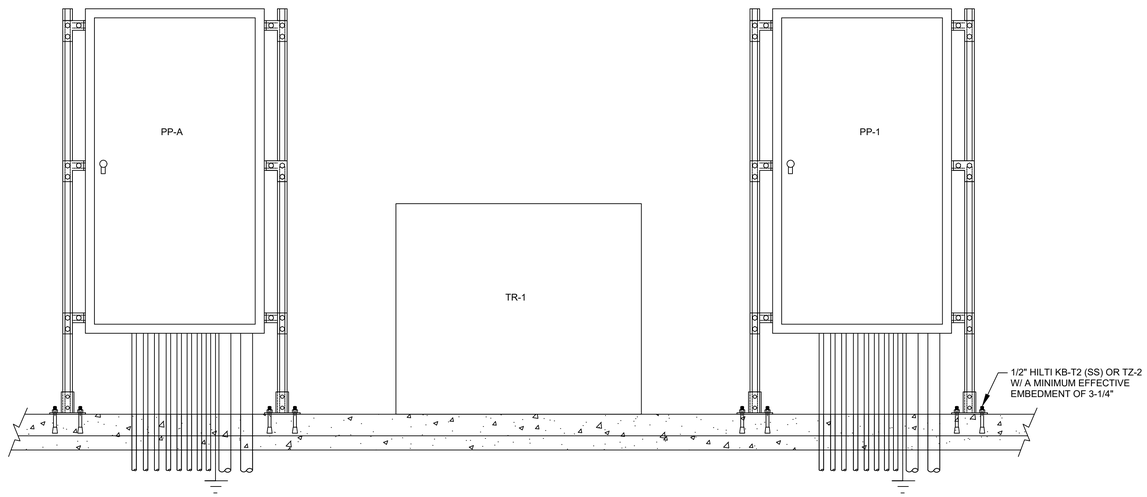
18 OF **21**

PROJECT ID	DRAWING NO	REV
XXXXX	C5xxxx-DWG-xx-xxxx-E-1002	0



1 E-1000 CONDUIT STUB-UP INSIDE BUILDING

SCALE: NONE



4 E-1001 **PANEL AND TRANSFORMER DETAIL**

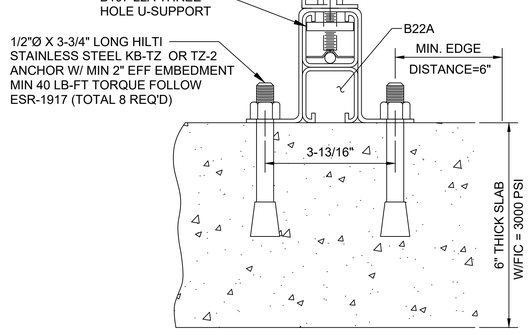
SCALE: NONE

GENERAL CONSTRUCTION NOTES:

1. FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS AFFECTING WORK BEFORE FABRICATION OF NEW COMPONENTS. REPORT ANY DISCREPANCIES TO THE LANL CONSTRUCTION INSPECTOR.
2. EXECUTE ALL ACTIVITIES IN ACCORDANCE WITH THE CONSTRUCTION DRAWING AND SPECIFICATIONS.
3. KEEP WORK SITE IN A NEAT AND ORDERLY CONDITION AND AT PROJECT COMPLETION REMOVE ALL WASTE. LEAVE WORK SITE IN A CONDITION ACCEPTABLE TO THE LANL CONSTRUCTION INSPECTOR.
4. SUBGRADE THAT WILL BE DISTURBED FROM CONCRETE SLAB SHALL BE COMPACTED WITH BASE COURSE PER LANL MASTER SPEC 31 2000 EARTH MOVING.

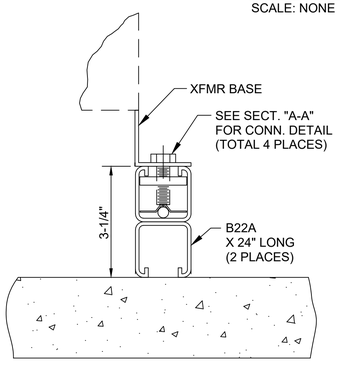
POST-INSTALLED ANCHORS;

1. PROVIDE HILTI STAINLESS STEEL KWIK BOLT TZ OR TZ-2 POST-INSTALLED ANCHORS.
2. POST-INSTALLED ANCHORS PER LANL MASTER SPEC(S) FOR NORMAL CONFIDENCE POST-INSTALLED ANCHORS.
3. DRILL HOLES, EMBEDMENT DEPTH AND INSTALL ANCHORS TO MINIMUM INSTALLATION TORQUE OF 40 FT-LB, FOR 1/2"Ø ANCHORS, IN ACCORDANCE WITH THE ICC REPORT ESR-1917 AND MANUFACTURER'S INSTALLATION GUIDELINES.
4. ESTABLISH THE REBAR PATTERN (GPR) AROUND CONCRETE ANCHORS TO PROVIDE A MINIMUM OF 1-1/2 INCHES CLEAR TO AVOID CONFLICT WITH EXISTING REINFORCING WHEN INSTALLING POST INSTALLED ANCHORS.
5. PROVIDE MINIMUM OF 6" EDGE DISTANCE IN EACH DIRECTION TO ANY CONCRETE EDGE OR ANY JOINT IN FLOOR SLAB.
6. MINIMUM SPACING BETWEEN ANY TWO ADJUSANT ANCHORS TO BE 3.75".
7. EXISTING SLAB ON GRADE IS 6" THICK AND COMPRESSIVE STRENGTH IS 3000 PSI.
8. ALL SPECIAL INSPECTION FOR POST INSTALLED ANCHORS SHALL BE COMPLETED PER THE STATEMENT OF SPECIAL INSPECTION.



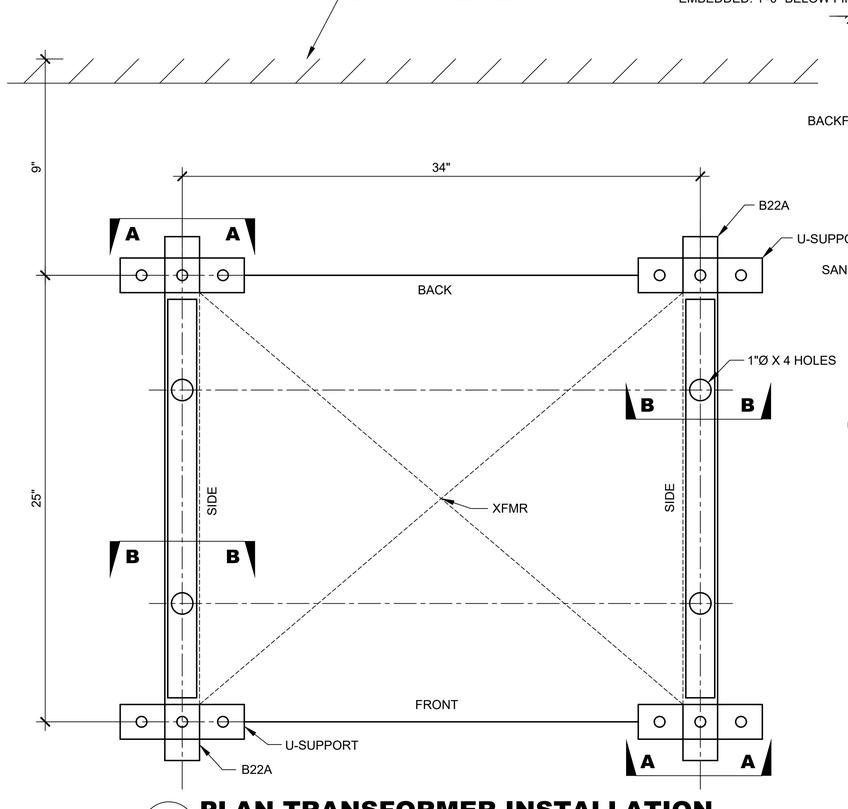
SECTION "A-A"

SCALE: NONE



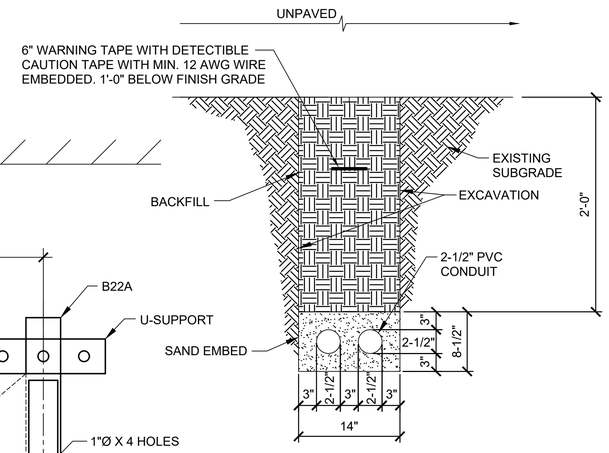
SECTION "B-B"

SCALE: NONE



3 E-1001 **PLAN TRANSFORMER INSTALLATION**

SCALE: NONE



4 E-1000 **TWO-WAY DUCTBANK - UNPAVED**

SCALE: NONE

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ELECTRICAL DETAILS

TA- xx BLDG xxxx

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

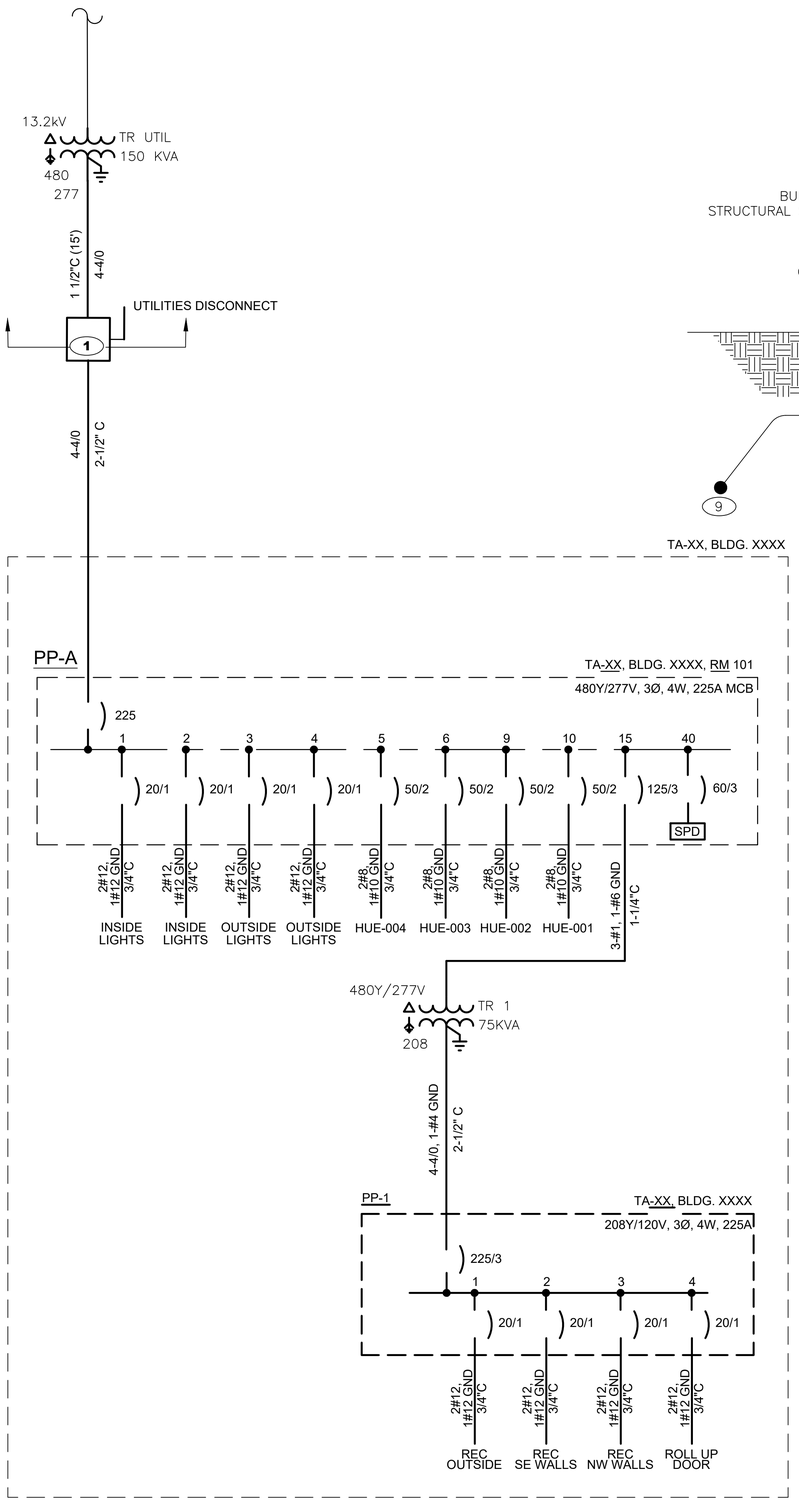
SHEET E-5000

19 OF 21

PROJECT ID: XXXXX

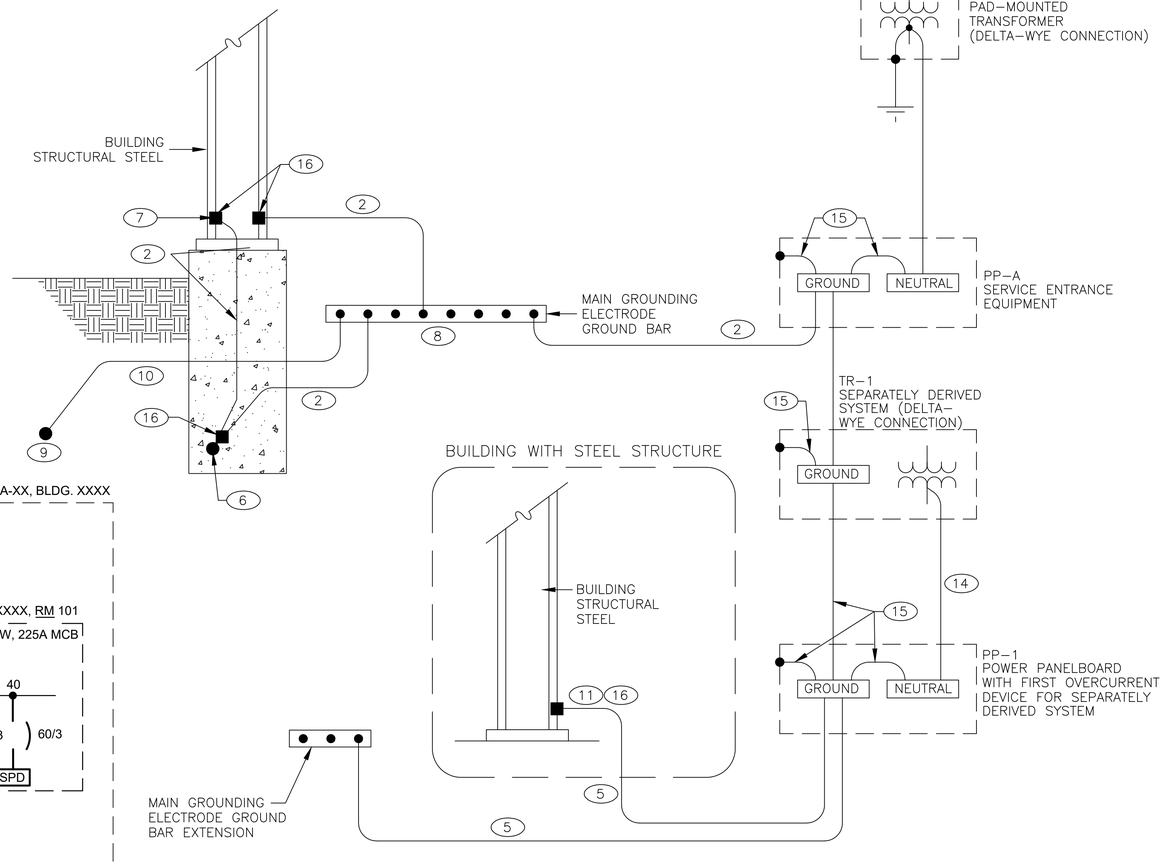
DRAWING NO: Cxxxxx-DWG-xx-xxxx-E-5000

REV: 0



ELECTRICAL ONE LINE DIAGRAM

NO SCALE



GROUNDING SYSTEM DIAGRAM

SCALE: NONE

GENERAL NOTES

1. SEE ONE-LINE FOR GROUND CONDUCTOR SIZES.
2. CONDUCTOR SIZES SHOWN ARE MINIMUM AND MAY BE LARGER THAN THE MINIMUM SIZES REQUIRED BY NEC.
3. INSTALL GROUNDING CONNECTIONS TO BUILDING STRUCTURE AT LOCATIONS THAT ARE VISIBLE AND ACCESSIBLE FOR INSPECTION, MAINTENANCE, AND TESTING.
4. INSTALL AN INSULATED THROAT GROUNDING BUSHING ON EACH METALLIC SERVICE ENTRANCE CONDUIT. BOND TO GROUND BUS USING CONDUCTOR THAT IS SIZED BASED ON NEC TABLE 250.66 USING THE SERVICE PHASE CONDUCTOR SIZE.
5. INSTALL AN INSULATED THROAT GROUNDING BUSHING ON EACH METALLIC FEEDER CONDUIT. BOND TO GROUND BUS USING CONDUCTOR THAT IS SIZED BASED ON NEC TABLE 250.122 USING THE FEEDER CIRCUIT OVERCURRENT DEVICE SIZE OR THE SEPARATELY DERIVED SYSTEM OVERCURRENT DEVICE SIZE.

KEYED NOTES

1. PROVIDED BY LANL UTILITIES.
2. INSTALL GROUNDING ELECTRODE CONDUCTOR, SIZED BASED ON NEC TABLE 250.66 USING THE SERVICE PHASE CONDUCTOR SIZE, BUT NOT SMALLER THAN 4 AWG.
3. NOT USED.
4. NOT USED.
5. INSTALL GROUNDING ELECTRODE CONDUCTOR THAT IS SIZED BASED ON NEC TABLE 250.66 USING THE SEPARATELY DERIVED SYSTEM PHASE CONDUCTOR SIZE.
6. INSTALL A CONCRETE-ENCASED MAIN GROUNDING ELECTRODE IN THE BUILDING FOUNDATION AROUND THE ENTIRE PERIMETER OF THE BUILDING. LOCATE ELECTRODE IN THE BOTTOM ONE-THIRD OF THE FOUNDATION WITH AT LEAST 3 INCHES OF CONCRETE COVER. USE EITHER OF THE FOLLOWING MATERIALS FOR THE ELECTRODE:
   BARE COPPER CABLE NOT SMALLER THAN THE GROUNDING ELECTRODE CONDUCTOR REQUIRED BY THE NEC AND NOT SMALLER THAN 4 AWG.
   BARE OR GALVANIZED REBARS THAT ARE MADE ELECTRICALLY CONTINUOUS USING COPPER JUMPERS NOT SMALLER THAN THE NEC REQUIRED GROUNDING ELECTRODE CONDUCTOR AND NOT SMALLER THAN 4 AWG. USE REINFORCING BARS NOT SMALLER THAN THE FOLLOWING BASED ON THE TOTAL LENGTH OF THE INTERCONNECTED AND PARALLELED REBARS:

TOTAL LENGTH	MINIMUM REBAR SIZE
112 FT	1 3/8" (#11 BAR)
150 FT	1" (#8 BAR)
192 FT	3/4" (#6 BAR)
223 FT	5/8" (#5 BAR)
268 FT	1/2" (#4 BAR)

7. BOND EACH PERIMETER STRUCTURAL STEEL COLUMN TO THE CONCRETE-ENCASED MAIN GROUNDING ELECTRODE. USE COMPRESSION CONNECTORS THAT MEET IEEE 837 REQUIREMENTS OR USE EXOTHERMIC WELDS.
8. INSTALL A "MAIN GROUND ELECTRODE GROUND BAR" FOR SINGLE POINT GROUNDING. LOCATE AT AN ACCESSIBLE AND VISIBLE POINT NEAR THE SERVICE ENTRANCE EQUIPMENT. MAKE CONNECTIONS TO THE GROUND BAR USING TWO-HOLE COMPRESSION SPADE LUGS THAT MEET IEEE 837 REQUIREMENTS. LABEL EACH CONNECTION TO THE GROUND BAR.
9. NOT USED.
10. NOT USED.
11. USE THE "MAIN GROUNDING ELECTRODE GROUND BAR" INSTEAD OF BUILDING STRUCTURAL STEEL IF THE FIRST OVERCURRENT DEVICE FOR THE SEPARATELY DERIVED SYSTEM IS WITHIN 50 FEET OF THE "MAIN GROUNDING ELECTRODE GROUND BAR".
12. NOT USED.
13. NOT USED.
14. INSTALL GROUNDED (NEUTRAL) CONDUCTOR THAT IS NOT LESS THAN THE PHASE CONDUCTOR AMPACITY. IF HIGH-HARMONICS ARE PRESENT MAKE NEUTRAL AMPACITY 200% OF THE PHASE CONDUCTOR.
15. INSTALL BONDING CONDUCTOR THAT IS SIZED BASED ON NEC TABLE 250.66 USING THE SERVICE OR SEPARATELY-DERIVED SYSTEM PHASE CONDUCTOR SIZE.
16. INSTALL IRREVERSIBLE COMPRESSION CONNECTOR WITH TAMPER-PROOF HARDWARE OR INSTALL EXOTHERMIC WELD.

EXAMPLE DESIGN

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ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ELECTRICAL ONE-LINE DIAGRAM

TA- xx BLDG xxxx

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PO Box 1663
Los Alamos, New Mexico 87545

SHEET E-6000
20 OF 21

PROJECT ID	DRAWING NO	REV
XXXXX	Cxxxx-DWG-xx-xxxx-E-6000	0

LUMINAIRE SCHEDULE

ITEM NO.	MANUFACTURER AND DESCRIPTION	CATALOG NUMBER
A	LITHONIA LIGHTING LED MSL SERIES 4' LED PENDENT MOUNTED	MSL 8000LM SBL MVOLT EZ1 40K 90CRI WH
AE	LITHONIA LIGHTING LED MSL SERIES 4' LED WITH EMERGENCY BATTERY PACK PENDENT MOUNTED	MSL 8000LM SBL MVOLT EZ1 40K 90CRI E7W WH
B	LITHONIA LIGHTING LED EXIT SIGN	LHQM LED R SD
C	KAXW LED WALL LUMINAIRE WITH AMBIENT LIGHT SENSOR	KAXW LED P2 30K R3 MVOLT PIR BSW DDBXD
D	D-SERIES SIZE 2 LED WALL LUMINAIRE WITH PHOTOCELL	DSXW2 LED 20C 700 AMBPC TFTM MVOLT BBW PE BSW DDBXD

ARC FLASH WARNING LABEL SCHEDULE

ITEM NO.	FLASH HAZARD BOUNDARY IN	SHORT CIRCUIT CURRENT AVAILABLE kA	SYSTEM VOLTAGE	SHOCK HAZARD WARNING	LIMITED APPROACH BOUNDARY	RESTRICTED APPROACH BOUNDARY	WORKING DISTANCE (IN)	INCIDENT ENERGY (CAL/CM^2)
PP-A	18	<10KA	480V		42 IN	12 IN	18IN	1.22
PP-1	N/A	<10KA	208V	SHOCK HAZARD ONLY	42 IN	12 IN	18IN	N/A

NAMEPLATE SCHEDULE

SYMBOL	DESIGNATION	QTY.	TYPE
1	"NOT USED"		
2	"NOT USED"		
3	XX XXXX TR-1	1	CODE TAG
4	SERVED BY: PP-A SERVES: PP-1 LOCATION: RM 100 VOLTAGE: 480V/208V	1	NAMEPLATE
5	XX XXXX PP-1	1	CODE TAG
6	SERVED BY: TR-1 LOCATION: ROOM 100 VOLTAGE: 208Y/120V	1	NAMEPLATE
7	XX XXXX CDD-1	1	CODE TAG
8	SERVED BY: LP-1 SERVES: ROLLING DOOR LOCATION: ROOM 100 VOLTAGE: 208Y/120V	1	NAMEPLATE
9	XX XXXX PP-A	1	CODE TAG
10	SERVED BY: UTILITY DISCONNECT LOCATION: ROOM 100 VOLTAGE: 480Y/277V	1	NAMEPLATE

PP-A — MAINS: 225 — 7/14/2021
VOLTAGE: **480/277** — REV:0
SERVED BY: UTILITY XFMR — FAULT CURRENT AVAILABLE: **10KA**
LOCATION: TA — MOUNTING: **S**

SERVES	C/B	CONT	RCPT	PWR	NON-C	CKT	PHASE	CKT	CONT	RCPT	PWR	NON-C	C/B	SERVES
INSIDE LIGHTS/FE-001	20/1					1	A	2					20/1	**INSIDE LIGHTS**
OUTSIDE LIGHTS	20/1					3	B	4					20/1	**OUTSIDE LIGHTS**
HUE-004	50/2			3750		5	C	6			3750		50/2	**HUE-003**
	~			3750		7	A	8			3750		~	~
HUE-002	50/2			3750		9	B	10			3750		50/2	**HUE-001**
	~			3750		11	C	12			3750		~	~
~	~			21000		13	A	14						SPACE
TR-1 (PP-1)	100/3			21000		15	B	16						SPACE
~	~			21000		17	C	18						SPACE
SPACE						19	A	20						SPACE
SPACE						21	B	22						SPACE
SPACE						23	C	24						SPACE
SPACE						25	A	26						SPACE
SPACE						27	B	28						SPACE
SPACE						29	C	30						SPACE
SPACE						31	A	32						SPACE
SPACE						33	B	34						SPACE
SPACE						35	C	36						SPACE
SPACE						37	A	38					~	~
SPACE						39	B	40					60/3	**SPD**
SPACE						41	C	42					~	~

TOTAL CONNECTED PHASE VOLT AMPS: A: 28500 B: 28500 C: 36000

CONNECTED LOAD:		ESTIMATE DEMAND LOAD		FEEDER SELECTION LOAD	
CONTINUOUS LOAD(CONT):	0 VA	CONTINUOUS LOAD@100%:	0 VA	CONTINUOUS LOAD@125%:	0 VA
RECEPTACLE LOAD(RCPT):	0 VA	RECEPT LOAD PER NEC 220-44:	0 VA	RECEPT LOAD PER NEC 220-44:	0 VA
NON-CONTINUOUS LOAD(PWR):	93000 VA	NON-CONTINUOUS LOAD@100%	93000 VA	NON CONTINUOUS LOAD@100%:	93000 VA
NON-COINCIDENT LOAD(NON-C):	0 VA			FUTURE LOAD GROWTH CAPACITY:	18600 VA
TOTAL CONNECTED LOAD:	93000 VA	**ESTIMATE DEMAND LOAD:**	93000 VA	**FEEDER DESIGN LOAD:**	111600 VA
	111.91 AMPS		111.913 AMPS	**REV: 2 Date:12/16/2011**	134.2960289 AMPS

PP-1 — MAINS: 225 — DATE: 7/14/21
VOLTAGE: **208/120** — REV: 0
SERVED BY: PP-A via TR-1 — FAULT CURRENT AVAILABLE: **10KA**
LOCATION: TA- — MOUNTING: **S**

SERVES	C/B	CONT	RCPT	PWR	NON-C	CKT	PHASE	CKT	CONT	RCPT	PWR	NON-C	C/B	SERVES
REC OUTSIDE	20/1		720			1	A	2		1080			20/1	**REC SE Walls**
REC NW Walls	20/1		1080			3	B	4			600		20/1	**ROLL UP DOOR**
SPARE	20/1					5	C	6					20/1	SPARE
SPARE	20/1					7	A	8					20/1	SPARE
SPACE						9	B	10						SPACE
SPACE						11	C	12						SPACE
SPACE						13	A	14						SPACE
SPACE						15	B	16						SPACE
SPACE						17	C	18						SPACE
SPACE						19	A	20						SPACE
SPACE						21	B	22						SPACE
SPACE						23	C	24						SPACE
SPACE						25	A	26						SPACE
SPACE						27	B	28						SPACE
SPACE						29	C	30						SPACE
SPACE						31	A	32						SPACE
SPACE						33	B	34						SPACE
SPACE						35	C	36						SPACE
SPACE						37	A	38						SPACE
SPACE						39	B	40						SPACE
SPACE						41	C	42						SPACE

TOTAL CONNECTED PHASE VOLT AMPS: A: 1800 B: 1680 C: 0

CONNECTED LOAD:		ESTIMATE DEMAND LOAD		FEEDER SELECTION LOAD	
CONTINUOUS LOAD(CONT):	0 VA	CONTINUOUS LOAD@100%:	0 VA	CONTINUOUS LOAD@125%:	0 VA
RECEPTACLE LOAD(RCPT):	2880 VA	RECEPT LOAD PER NEC 220-44:	2880 VA	RECEPT LOAD PER NEC 220-44:	2880 VA
NON-CONTINUOUS LOAD(PWR):	600 VA	NON-CONTINUOUS LOAD@100%	600 VA	NON CONTINUOUS LOAD@100%:	600 VA
NON-COINCIDENT LOAD(NON-C):	0 VA			FUTURE LOAD GROWTH CAPACITY:	696 VA
TOTAL CONNECTED LOAD:	3480 VA	**ESTIMATE DEMAND LOAD:**	3480 VA	**FEEDER DESIGN LOAD:**	4176 VA
	9.6667 AMPS		9.667 AMPS	**REV: 2 Date:12/16/2011**	11.6 AMPS

EXAMPLE DESIGN

NOT FOR REPLICATION OR CONSTRUCTION

This design is being made available to illustrate a package that met expectations (e.g., completeness, quality, formality, professionalism).

Please note that, while the package was acceptable when issued, one should not assume that all aspects of it would be acceptable today. Expectations change with time, including required codes and standards, title blocks, and other matters.

LBO-DESIGN PACKAGE REVIEWER			
APPROVED FOR RELEASE			
SUBMITTED			
VERIFIED			
DESIGNED			
DRAWN	0	INITIAL ISSUE FOR DCF-xxxxxxxx	TBD
CLASSIFICATION: UNCLASSIFIED	NO	REVISION DESCRIPTION	DATE

ENGINEERING SERVICES

GENERAL USE WAREHOUSE BUILDING

ELECTRICAL SCHEDULES

TA- xx — BLDG xxxx

Los Alamos NATIONAL LABORATORY
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Los Alamos, New Mexico 87545

SHEET **E-7000**
21 OF **21**

PROJECT ID **XXXXX**
DRAWING NO **Cxxxxx-DWG-xx-xxxx-E-7000**
REV **0**