

# National Aeronautics and Space Administration

## ARMSTRONG FLIGHT RESEARCH CENTER

### PROJECT TITLE: REVITALIZE RADAR AND TELEMETRY TRACKING FACILITIES

100% FINAL DESIGN

### PROJECT TEAM

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#### CIVIL

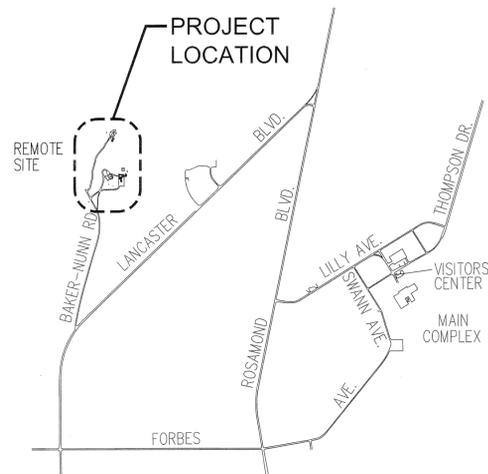
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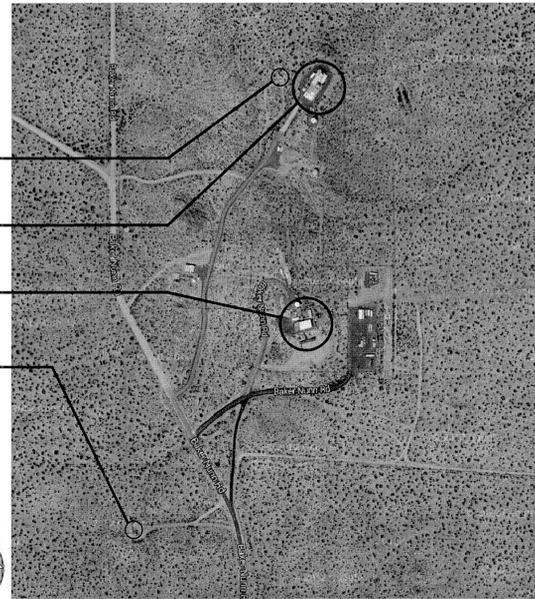


AREA PLAN  
NOT TO SCALE

#### PROJECT LOCATIONS

- PUMP HOUSE - BUILDING 4983  
SEE SHEET A10
- ATF BUILDING 4982  
SEE SHEET A2
- ATF BUILDING 4720  
SEE SHEET A5
- BORE SITE - BUILDING 4983  
SEE SHEET A10

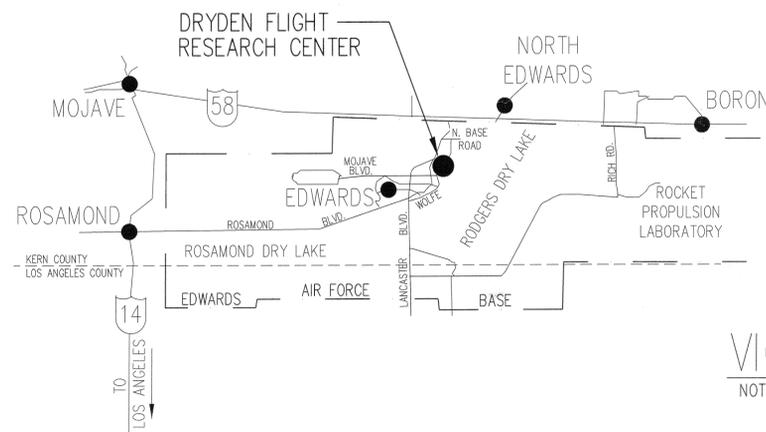
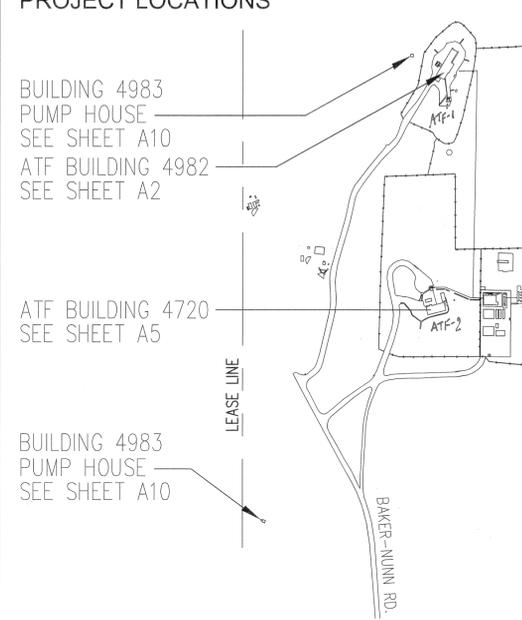
SITE PHOTO  
NOT TO SCALE



#### PROJECT LOCATIONS

- BUILDING 4983  
PUMP HOUSE  
SEE SHEET A10
- ATF BUILDING 4982  
SEE SHEET A2
- ATF BUILDING 4720  
SEE SHEET A5
- BUILDING 4983  
PUMP HOUSE  
SEE SHEET A10

REMOTE SITE PLAN  
NOT TO SCALE



VICINITY MAP  
NOT TO SCALE



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DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
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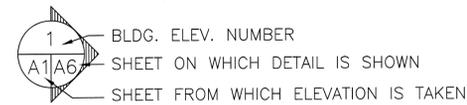
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ARMSTRONG FLIGHT RESEARCH CENTER EDWARDS, CA	APPROVALS      	DATE 7-10-15 2-10-15 1-27-15 1-27-15 3 Feb 15
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# ABBREVIATIONS

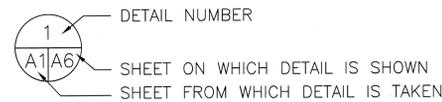
ACT	ACOUSTIC TILE
ACP	ACCESS PANEL
ACT	ASBESTOS COMPOSITION TILE
AFF	ABOVE FINISH FLOOR
ALUM	ALUMINUM
BD	BOARD
BLDG	BUILDING
CPT	CARPET
CEM	CEMENT
CH	CEILING HEIGHT
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CPOI	CONTRACTOR PROVIDED OWNER INSTALLED
CT	CERAMIC TILE
DWP	DRYWALL PAINTED
DR	DOOR
(E)	EXISTING
EM	ELASTOMERIC MEMBRANE
EN	ENAMEL
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EC	EXPOSED CONSTRUCTION
ECP	EXPOSED CONSTRUCTION PAINTED
EXTR	EXTRUDED
EXT	EXTERIOR
FBI	FEDERAL BUREAU OF INVESTIGATION
FC	FINISH CEILING
FD	FLOOR DRAIN
FF	FINISHED FLOOR
FIN	FINISH(ED)
FEC	FIRE EXTINGUISHER CABINET
FL	FLOOR
FW	FACE OF WALL
GALV	GALVANIZED
GL	GLASS
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
HC	HOLLOW CORE
HDW	HARDWARE
HM	HOLLOW METAL
HR	HOUR
HT	HEIGHT
HWD	HARDWOOD
INS	INSULATION
INT	INTERIOR
LAM	LAMINATE
MFR	MANUFACTURER
MFT	MINERAL FISSURED TILE
MIN	MINIMUM
MWP	MEMBRANE WATERPROOFING
NAT	NATURAL
(N)	NEW
NIC	NOT IN CONTRACT
OH	OVERHANG
OPCI	OWNER PROVIDED, CONTRACTOR INSTALLED
OPOI	OWNER PROVIDED, OWNER INSTALLED
PERF	PERFORATED
PL	PLASTER
P-LAM	PLASTIC LAMINATE
PNL	PANEL
PT	PAINT
PTN	PARTITION
PWD	PLYWOOD
QT	QUARRY TILE
RB	RUBBER BASE
RE	REFER TO
REIN	REINFORCING
RM	ROOM
SC	SOLID CORE
SIM	SIMILAR
ST	STEEL
SS	STAINLESS STEEL
SSD	SEE STRUCTURAL DRAWINGS
STRUCT	STRUCTURAL
SUSP	SUSPENDED
TBD	TO BE DETERMINED
TEL	TELEPHONE
THLD	THRESHOLD
TOS	TOP OF SLAB
UBC	UNIFORM BUILDING CODE
UG	UNDERGROUND UTILITY
TYP	TYPICAL
UC	UNDER CUT
UON	UNLESS OTHERWISE NOTED
VCT	VINYL COMPOSITION TILE
VIF	VERIFY IN FIELD
VWC	VINYL WALL COVERING
VYN	VINYL
WCO	WALL CLEAN OUT
WD	WOOD
WP	WEATHER PROOF
WR	WATER RESISTANT
WWF	WOVEN WIRE FABRIC

# SYMBOL LEGEND

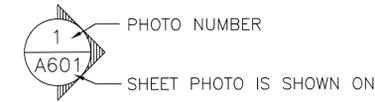
## EXTERIOR ELEVATION REFERENCES



## DETAIL REFERENCE



## PHOTO REFERENCE



# GENERAL NOTES

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES HAVING JURISDICTION.
- INSTALL ALL MANUFACTURED ITEMS, MATERIALS AND EQUIPMENT IN STRICT ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
- CONTRACTOR IS RESPONSIBLE FOR EXAMINING ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND CONFIRMING THAT WORK MAY BE CONSTRUCTED AS SHOWN BEFORE PROCEEDING WITH CONSTRUCTION. IF THERE ARE ANY QUESTIONS REGARDING THESE OR OTHER COORDINATION QUESTIONS, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE CONTRACTING OFFICER BEFORE PROCEEDING WITH WORK IN QUESTION.
- ALL WORK NOTED "N.I.C." OR "NOT IN CONTRACT" IS TO BE ACCOMPLISHED BY A CONTRACTOR OTHER THAN THE GENERAL CONTRACTOR AND IS NOT TO BE PART OF THE CONSTRUCTION AGREEMENT. THE GENERAL CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS AS REQUIRED.
- "TYPICAL" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION IS THE SAME OR REPRESENTATIVE FOR ALL SIMILAR CONDITIONS THROUGHOUT, UNLESS OTHERWISE NOTED.
- CONTRACTOR IS TO ERECT AND MAINTAIN TEMPORARY BRACING, BARRICADES, SIGNS, AND OTHER MEASURES AS NECESSARY TO PROTECT THE PUBLIC, WORKERS, OTHER PERSONS, AND ADJOINING PROPERTY FROM DAMAGE FROM DEMOLITION WORK, ALL IN ACCORDANCE WITH THE APPLICABLE CODES AND REGULATIONS. CONTRACTOR IS TO PROVIDE NOISE AND DUST ABATEMENT AS REQUIRED TO PREVENT DISTURBANCE AND NUISANCE TO ADJACENT PREMISES AND SURROUNDING AREAS. DEMOLITION AND REMOVAL WORK SHALL BE DONE IN A MANNER WHICH WILL MINIMIZE THE SPREAD OF DUST AND FLYING PARTICLES. REMOVED MATERIALS AND DEBRIS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF BASE IN A LEGAL MANNER.  
  
USE OF DUST SUPPRESSION DEVICES SUCH AS HEPA VACUUM WITH SHROUD ATTACHMENTS, VACUUMS THAT USE A CYCLONIC SEPARATOR, AND WET SUPPRESSION FOR ALL SAW CUTS IS MANDATORY, AND SHALL BE INCLUDED IN THE ACTIVITY HAZARD ANALYSIS. DRY-SWEEPING IS PROHIBITED. OPERATIONS ADJACENT TO AIR HANDLERS OR WITH THE POSSIBILITY OF CONTAMINATION WILL REQUIRE COORDINATION TO SHUT DOWN AND SEAL UNITS WITH THE CONTRACTING OFFICER.
- CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE JOB SITE PRIOR TO BIDDING AND START OF CONSTRUCTION. IF ANY DISCREPANCIES ARE FOUND, CONTRACTING OFFICER SHALL BE NOTIFIED FOR CLARIFICATION.
- THE CONTRACTOR IS RESPONSIBLE TO VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS SHOWN ON THE CONSTRUCTION DOCUMENTS BEFORE MANUFACTURING AND/OR FABRICATION OF ALL WORK. ANY WORK PROVIDED AND INSTALLED IN CONFLICT WITH THE CONSTRUCTION DOCUMENTS SHALL BE CORRECTED BY EACH CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACTING AGENCY.
- ALL SYMBOLS AND ABBREVIATIONS ARE CONSIDERED TO BE CONSTRUCTION STANDARDS. IF ANY CONTRACTOR HAS A QUESTION OR NEEDS CLARIFICATION, CONTRACTING AGENCY IS TO BE CONTACTED BEFORE WORK, MANUFACTURING AND/OR FABRICATION COMMENCES.
- DO NOT SCALE DRAWINGS; WRITTEN DIMENSIONS TAKE PRECEDENCE. LARGE SCALE DETAILS GOVERN OVER SMALL SCALE DETAILS.
- CONTRACTOR IS REQUIRED TO GET PERMITS FROM NASA SAFETY OFFICE AND PROVIDE CURRENT TRAINING CERTIFICATIONS PRIOR TO:
  - EXCAVATION AND DIGGING
  - OPEN FLAMES AND HOT WORK
  - CONFINED SPACE ENTRY
  - UTILITY OUTAGES/FACILITY CLOSURES
  - CRANE OPERATIONS
 SEE SPECIFICATION SECTION 01 35 14.11 40

# GENERAL NOTES (CONT.)

- SUBSTITUTIONS OF ANY ITEM, MATERIAL OR PRODUCT, INCLUDING ITEMS NOTED FOR SUBSTITUTION OF AN "APPROVED EQUAL", SHALL ONLY BE MADE WITH THE WRITTEN APPROVAL OF THE CONTRACTING OFFICER.
- THE PROJECT AREAS SHALL BE CLEARLY MARKED AT THE OUTER BOUNDARIES TO DEFINE THE WORK AREA. ALL WORKERS SHALL BE INSTRUCTED THAT THEIR ACTIVITIES MUST BE CONFINED TO LOCATIONS WITHIN THE FENCED, FLAGGED OR MARKED AREAS.
- PROTECTION OF BIOLOGICAL RESOURCES:  
  
OPEN EXCAVATIONS OF ANY KIND CREATED DURING THE PROJECT ACTIVITIES SHALL BE SECURED AT THE END OF EACH DAY BY BACKFILLING, PLACING A COVER OVER THE EXCAVATION, INSTALLING A TEMPORARY DESERT TORTOISE FENCE APPROVED BY THE NASA DRYDEN SAFETY OFFICE (CODE SH), AND/OR RAMPING EXCAVATIONS AT A 3:1 SLOPE.  
  
EXCAVATIONS LEFT UNSECURED DURING THE WORKDAY SHALL BE CHECKED THREE TIMES PER DAY (MORNING, MIDDAY, AND LATE AFTERNOON) FOR TRAPPED ANIMALS. IF ANY ANIMALS ARE FOUND IN AN EXCAVATION, IMMEDIATELY NOTIFY CODE SH AT EXTENSION 3863 OR 3976. ALL PROJECT PERSONNEL SHALL IMMEDIATELY REPORT SIGHTINGS OF DESERT TORTOISES OR DESERT TORTOISE BURROWS FOUND WITHIN THE PROJECT AREA TO 95 ABW/EM AT (661)277-1401.  
  
PROJECT PERSONNEL SHALL USE EXISTING ACCESS ROADS AND STAGING AREAS, AND FOLLOW FLAGGED ACCESS ROUTES THAT HAVE BEEN SURVEYED OR CLEARED OF DESERT TORTOISES.  
  
HABITAT DISTURBANCE SHALL BE CONTAINED TO PRE-DISTURBED AREAS AS MUCH AS POSSIBLE.  
  
ANY PIPES STORED WITHIN THE AREA SHALL BE CAPPED ON OPEN ENDS OR ELEVATED AT LEAST 12" ABOVE THE GROUND TO PREVENT ENTRY BY DESERT TORTOISES OR OTHER WILDLIFE.  
  
SPEED LIMITS ON DIRT ROADS WITHIN THE PROJECT AREA SHALL BE LESS THAN 20 MPH UNLESS OTHERWISE POSTED.  
  
ALL TRASH SHALL BE CONTAINED WITHIN RAVEN-PROOF (COVERED) CONTAINERS AND REMOVED FROM THE PROJECT SITE.  
  
NO PETS OR FIREARMS SHALL BE ALLOWED ON THE PROJECT SITE.  
  
BIRDS: IF POSSIBLE, DEMOLITION OF STRUCTURES SHOULD OCCUR OUTSIDE OF THE BIRD NESTING SEASON (FEBRUARY TO AUGUST). IF DEMOLITION OF STRUCTURES CANNOT OCCUR OUTSIDE OF THE NESTING SEASON AND AN ACTIVE NEST IS PRESENT, A DEPREDATION PERMIT FROM THE UNITED STATES FISH AND WILDLIFE SERVICE MUST BE OBTAINED PRIOR TO COMMENCEMENT OF ACTIVITIES. CONTACT THE CONTRACTING OFFICER IF AN ACTIVE BIRD NEST (NEST WITH EGGS, UNFLEDGED BIRDS, OR ADULT BIRDS OBSERVED IN THE NEST) IS FOUND WITHIN THE PROJECT AREA AND CANNOT BE AVOIDED.
- ALL UTILITY OUTAGES MUST BE SCHEDULED A MINIMUM OF 14 DAYS IN ADVANCE WITH THE CONTRACTING OFFICER. OUTAGES MUST BE SCHEDULED FOR AFTER NORMAL OPERATING HOURS, WEEKENDS, OR HOLIDAYS.

# CODE REFERENCES

- INTERNATIONAL BUILDING CODE (2012)
- NASA STANDARD 8719.1 (2008)
- NFPA 1 UNIFORM FIRE CODE (2012)
- NFPA 101 LIFE SAFETY CODE (2002)
- NFPA 70 NATIONAL ELECTRICAL CODE (2011)

# CONSTRUCTION SCOPE

THE PROJECT SHALL CONSIST OF:

REPLACEMENT OF ELECTRICAL DISTRIBUTION SYSTEMS, INCLUDING GENERATOR AND UPS SYSTEMS, AND INSTALLATION OF RELATED INFRASTRUCTURE AND EQUIPMENT ENCLOSURES AND PADS TO ENHANCE POWER RELIABILITY AT B4982 AND B4720.

REPLACEMENT AND PARTIAL RELOCATION OF BUILDING HVAC EQUIPMENT AT B4982 AND B4720, INCLUDING CRAC UNITS, AND PROVIDING DDC CONTROLS TO TIE INTO CAMPUS ENERGY MANAGEMENT SYSTEM.

PROVIDE MISCELLANEOUS INTERIOR IMPROVEMENTS ASSOCIATED WITH THE INSTALLATION OF ELECTRICAL AND MECHANICAL EQUIPMENT, INCLUDING SELECTIVE DEMOLITION, REPAIRS, PAINT, ROOFING, GRID CEILINGS AND INSULATION, AND OTHER WORK AS SHOWN IN THESE DRAWINGS.

# CONSTRUCTION OPTIONS

- THE CONTRACTOR SHALL ISSUE THE BID WITH THE FOLLOWING ITEMS INCLUDED AS DISTINCT, SEPARATE BID OPTIONS. NO OTHER SEPARATION OF OPTIONS OR ALLOWANCE ITEMS IS TO BE INCLUDED IN THE BID. SEE ENTIRE SET FOR LOCATION AND DESCRIPTION OF BID OPTIONS.
- OPTION 1 - REPLACE ROOF AT BUILDING 4982, SEE SHEET A4
  - OPTION 2 - REPLACE BORE SITE BUILDING WITH NEW PREFABRICATED METAL BUILDING, SEE DETAILS 2 AND 4 ON SHEET A10
  - OPTION 3 - REMOVE AND REPLACE (E) TANK IN PUMP BUILDING AT BUILDING 4720, REMOVE AND REPLACE ROOF TO FACILITATE TANK REPLACEMENT SEE SHEETS A5, A6 AND P6
  - OPTION 4A - UPGRADE TWO 100 KVA UPS UNITS AT B4892 FROM 35 MINUTES TO 55 MINUTES, SEE SHEET E5
  - OPTION 4B - UPGRADE THREE 30 KVA UPS UNITS AT B4720 FROM 36 MINUTES TO 53 MINUTES AND ONE 50 KVA UNIT FROM 18 TO 28 MINUTES. SEE SHEET E8
  - OPTION 5 - REPLACE (E) FLUORESCENT LIGHTS WITH LED LIGHTING IN BUILDING 4720 AND BUILDING 4982 SEE SHEETS A3, A6, E4 AND E9
  - OPTION 6 - REPLACE (E) PUMP, TANK, AND EQUIPMENT ENCLOSURE AT B4983, SEE DETAILS 1 & 3 ON SHEET A10, SHEET P5 AND E12
  - OPTION 7 - REMOVE AND REPLACE (E) TANK AT BUILDING 4982 - SEE SHEETS A2, A3 AND P3

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	2/24/14	D	100% DESIGN						7-10-15		
	10/27/13	C	60% DEVELOPED DESIGN							2-10-15	
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								DATE PRINTED	5/9/14		
								DRAWN BY	DRM	EDM-1728	
								SCALE	AS NOTED	TRADE	
								FILE NAME	T2	SHEET No. 2 of 48	

EXISTING CONDITIONS LEGEND

	HORIZONTAL/VERTICAL CONTROL
	LIGHT POLE
	POWER POLE
	TRAFFIC SIGNAL
	SIGN
	STAND PIPE
	MANHOLE
	SEWER MANHOLE
	WATER HANDHOLE
	VALVE WELL
	POST INDICATOR VALVE
	FIRE HYDRANT
	DRAIN INLET
	CATCH BASIN
	TELEPHONE BOOTH
	FLAG POLE
	TREE
	SPOT GRADE
	INVERT ELEVATION
	PRESSURE REDUCING VALVE ASSY
	BACKFLOW PREVENTION ASSEMBLY
	PAINTED CROSSWALK
	PAINTED STOP LINE
	CANOPY/PATIO
	STRUCTURE OR BUILDING AND NUMBER
	FENCE
	MASONRY WALL
	RETAINING WALL
	CURB/GUTTER
	ASPHALT SURFACE
	DIRT SURFACE
	CONCRETE SURFACE
	GUARDRAIL
	TREE LINE
	INDEX CONTOUR (5' INTERVALS)
	INTERMEDIATE CONTOUR (1' INTERVALS)
	APPROXIMATE CONTOUR
	HEADWALL
	ELECTRICAL LINE-UNDERGROUND
	ELECTRICAL LINE-OVERHEAD
	FUEL LINE
	TELECOMMUNICATIONS
	SANITARY SEWER LINE
	SANITARY SEWER FORCE MAIN LINE
	POTABLE WATER LINE
	NATURAL GAS
	NON-POTABLE WATER LINE USED EXCLUSIVELY FOR FIRE SUPPRESSION SYSTEMS AND FIRE HYDRANTS.
	ABANDONED GAS
	ABANDONED FUEL

ABBREVIATIONS

A	ANGLE	N	NORTH, NORTHINGS
AA	ABANDONED COMP AIR	NAD	NORTH AMERICAN DATUM
AB	ABANDONED	NAVD	NORTH AMERICAN VERTICAL DATUM
ACP	ASBESTOS CEMENT PIPE	NAVFAC	NAVAL FACILITIES
AC	ASPHALTIC CONCRETE	N.I.C.	NOT IN CONTRACT
AG	ABANDONED GAS	NPW	NON-POTABLE WATER
ARV	AIR RELEASE VACUUM ASSY	NF	NOT FOUND
AS	ABANDONED SEWER	NS	NEAR SIDE
ASPH	ASPHALT	NO.#	NUMBER
ASSY	ASSEMBLY	O/C	ON CENTER
AVE.	AVENUE	OD	OUTSIDE DIAMETER
AW	ABANDONED WATER	OH, O/H	OVER HEAD
A/G	ABOVE GROUND	OPNG	OPENING
B	BELL	OS&Y, OSY	OUTSIDE STEM & YOKE
BC	BEGIN CURVE	P	POLE
BFP	BACKFLOW PREVENTER	PCC	PORTLAND CEMENT CONCRETE
BLDG	BUILDING	PE	PLAIN END
B/G	BELOW GROUND	PE	POLYETHYLENE
BOT	BOTTOM	PIV	POST INDICATOR VALVE
BOV	BLOW-OFF VALVE ASSY	PL	PLATE
CB	CATCH BASIN	POC	POINT OF CONNECTION
CICB	CURB INLET CATCH BASIN	PNL	PANEL
CI	CAST IRON	PRV	PRESSURE REDUCING VALVE
CL	CLASS, CENTER LINE	PSF	POUNDS PER SQUARE FOOT
CLR	CLEAR	PSI	POUNDS PER SQUARE INCH
CMU	CONCRETE MASONRY UNIT	PT	POST
CO	CLEANOUT	PWO	PUBLIC WORKS OFFICE
COM	COMMUNICATIONS	PP	POWER POLE
COMP	COMPRESSED	PVC	POLYVINYL CHLORIDE
COND	CONDUIT	PVMT	PAVEMENT
CONT	CONTINUOUS	R	RADIUS
CONC	CONCRETE	RD.	ROAD
CONN	CONNECT, CONNECTION	RED.	REDUCER
CPLG	COUPLING	REF	REFERENCE
C&G	CURB/GUTTER	REINF	REINFORCED
C	CENTER LINE	REQD	REQUIRED
DET	DETAIL	RJ	RESTRAINED JOINT
DBL	DOUBLE	RJ	REDUCED PRESSURE BACKFLOW PREVENTER
DIA, Ø	DIAMETER	S/C	CONC. LINED/COATED STEEL PIPE
DI	DUCTILE IRON	SS	SANITARY SEWER
D.I.P., DIP	DUCTILE IRON PIPE	SCH	SCHEDULE
DWG.	DRAWING	S	SIGN, SLOPE
E	EAST, EASTINGS, ELECTRIC	SFM	SEWER FORCE MAIN
EQ	EQUAL	SIM	SIMILAR
EA	EACH	SMH	SEWER MANHOLE
EC	END CURVE	SQ	SQUARE
EIC	ENGINEER IN CHARGE	SST	STAINLESS STEEL
EL	ELEVATION	ST.	STREET
ELEC	ELECTRICAL	STA	STATION
EMH	ELECTRICAL MANHOLE	STL	STEEL
ETC	ETCETERA	SP	STANDPIPE
EW	EACH WAY	TAP.	TAPPING
EXP	EXPANSION	TB	TOP OF BERM
EXST	EXISTING	TD	TRENCH DRAIN
FH	FIRE HYDRANT	TEL.	TELEPHONE
FLG	FLANGE	TG	TOP OF GRATE
FIN.	FINISH	TMH	TELEPHONE MANHOLE
FL	FLOOR	TP	TOP OF PAVEMENT
FF	FINISHED FLOOR	TYP	TYPICAL
FO	FIBER OPTIC	T&B	TOP AND BOTTOM
FS	FAR SIDE	U/G	UNDERGROUND
FT	FEET	UL	UNDERWRITERS LABORATORIES
FW	FIRE WATER	UNK	UNKNOWN
GAL	GALLON	U.O.N.	UNLESS OTHERWISE NOTED
GALV	GALVANIZED	UTIL	UTILITY
GB	GRADE BREAK	V	VALVE
GP	GUARD POST	VCP, V.C.P.	VITRIFIED CLAY PIPE
GR	GUARD RAIL	VERT	VERTICAL
GIS	GEOGRAPHICAL INFORMATION SYSTEM	VLT	VAULT
GPM	GALLONS PER MINUTE	W	WATER, WIDE, WIDTH
GPS	GEOGRAPHICAL POSITIONING SYSTEM	WH	WATER HANDHOLE
GR	GRADE	WLS	WELDED STEEL
GUT.	GUTTER	W/±	WITH PLUS OR MINUS
GV	GATE VALVE	Δ	DELTA
H	HIGH, HEIGHT		
HH	HANDHOLE		
HDPE	HIGH DENSITY POLYETHYLENE		
HDWL	HEADWALL		
HORIZ	HORIZONTAL		
HTHW	HIGH TEMPERATURE HOT WATER		
HWY	HIGHWAY		
I.D.	INTERIOR DIMENSION		
IE	INVERT ELEVATION		
INV	INVERT		
IRR	IRRIGATION		
L	ARC LENGTH, LENGTH		
LA	LANDSCAPED AREA		
MAX	MAXIMUM		
MIN	MINIMUM		
MH	MANHOLE		
MFR	MANUFACTURER		

HORIZONTAL AND VERTICAL CONTROL

**MONUMENT #1:**

CONCRETE MONUMENT AT CORNER OF WALKER AVE AND THOMPSON DR (NAD 27)

NORTHERN 528,183.086'  
EASTERN 2,033,650.182'  
ELEVATION 2,292.15'

**MONUMENT #2:**

CONCRETE MONUMENT NEAR CORNER OF MCKAY AVE AND THOMPSON DR (NAD 27)

NORTHERN 528,601.559'  
EASTERN 2,034,416.916'  
ELEVATION 2,280.85'

**MONUMENT #3:**

CONCRETE MONUMENT AT CORNER OF WALKER AVE AND LILLY AVE (NAD 27)

NORTHERN 528,717.766'  
EASTERN 2,033,320.393'  
ELEVATION 2,305.56'

GENERAL NOTES

- 1) CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITIES THAT CROSS NEW CONC EQUIPMENT PADS OR NEW CONDUIT / DUCT BANK / WATER LINE RUNS BEFORE ORDERING ANY CONSTRUCTION MATERIALS. CONTRACTOR SHALL IDENTIFY AND RECORD TOP & BOTTOM ELEVATIONS AND HORIZONTAL COORDINATES OF ALL EXISTING UTILITIES AT EACH CROSSING ON ASBUILTS. CONTRACTOR SHALL NOTIFY CONTRACTING OFFICER OF ANY POSSIBLE CONFLICTS. ALL POTENTIAL CONFLICTS SHALL BE RESOLVED BEFORE THE CONTRACTOR IS ALLOW TO ORDER ANY CONSTRUCTION MATERIALS.
- 2) CONTRACTOR SHALL RECORD TOP & BOTTOM ELEVATIONS AND HORIZONTAL COORDINATES OF ALL NEW CONDUIT / DUCT BANK / WATER LINES AT THE POINT OF CONNECTIONS AND ALL ROUTING CHANGE IN DIRECTIONS ON ASBUILTS. CONTRACTOR SHALL RECORD ELEVATIONS AND HORIZONTAL COORDINATES OF ALL NEW VALVES (TOP OF WELL) AND FIRE HYDRANTS (TOP OF PAD) ON ASBUILTS.
- 3) SOIL AND DIGGING CONDITIONS THROUGHOUT THE PROJECT AREA INCLUDE HARD MATERIALS AND ROCK. CONTRACTOR SHALL INCORPORATE ALL HARD MATERIAL AND ROCK EXCAVATION INTO THE BID. NO CHANGE ORDERS WILL BE AWARDED FOR HARD MATERIAL AND ROCK EXCAVATION. BLASTING WILL NOT BE PERMITTED.
- 4) CONTRACTOR SHALL REPLACE ALL PAVEMENT STRIPING REMOVED DURING UTILITY TRENCHING. ALL NEW PAVEMENT STRIPING SHALL MATCH EXISTING.
- 5) CONTRACTOR SHALL TEST ANY EXISTING PAVEMENT PAINT STRIPING FOR LEAD BEFORE REMOVAL AND DISPOSAL. CONTRACTOR SHALL NOTIFY THE CONTRACTING OFFICER IF SIGNIFICANT AMOUNTS OF LEAD ARE DETECTED IN THE PAVEMENT PAINT STRIPING.

JB YOUNG & ASSOCIATES  
CONSULTANT ENGINEERS  
11440 RIVERSIDE DRIVE, SUITE M  
LAKESIDE, CA 92040  
619-448-9424

DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
6/21/13	B	30% PRELIMINARY DESIGN		
12/21/12	A	15% CONCEPT DESIGN		

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ARMSTRONG FLIGHT RESEARCH CENTER  
EDWARDS, CA

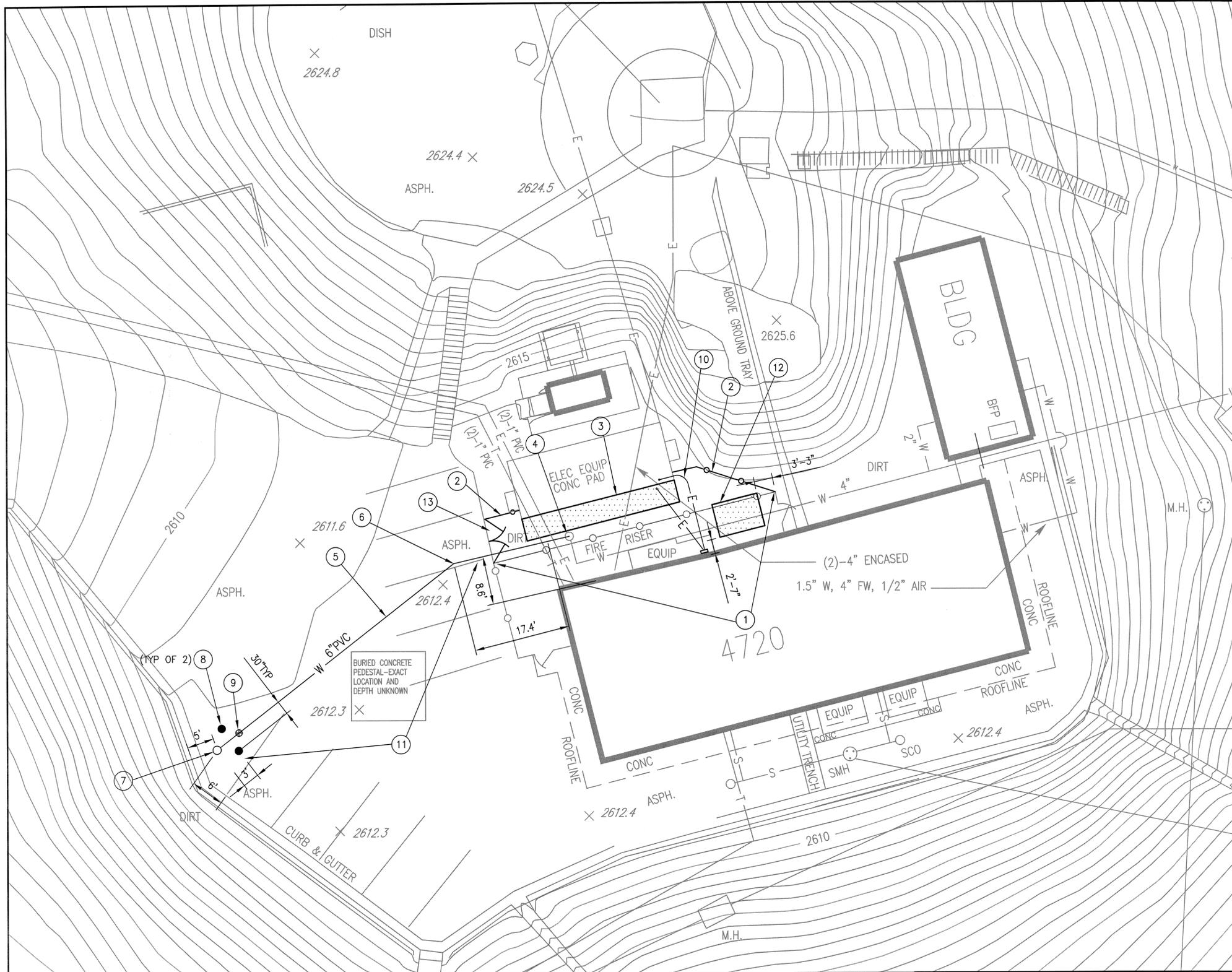
**APPROVALS**

APPROVALS	DATE
Chief Facilities Engineering & Asset Mgmt. Office	7-10-15
Project Registrar/Customs	7-10-15
Facilities Project Manager	1-27-15
Chief, Office of Production Services	1-28-15
Chief - Safety, Health and Environmental Office	1-27-15
Chief, Information Office	3 Feb 15

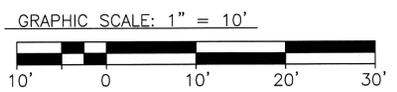
**DRAWING TITLE**  
CIVIL NOTES AND LEGEND

**PROJECT TITLE**  
REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

DATE STRD: 5/9/14  
DATE PRINTD: 5/9/14  
DRAWN BY: JFB  
SCALE: AS NOTED  
FILE NAME: C-1  
SHEET No. 3 of 48  
EDM-1728



- XX NOTES:
- 1) REMOVE AND DISPOSE OF 6-FOOT TALL CHAIN LINK FENCING, HARDWARE MESH, TENSION WIRE, BRACING, POSTS, AND CONCRETE FOUNDATIONS.
  - 2) INSTALL NEW CHAIN LINK FENCING, SEE DETAIL 1  
C-5
  - 3) INSTALL NEW EXPANDED CONCRETE EQUIPMENT PAD, SEE DETAIL 1  
C-4
  - 4) REMOVE AND DISPOSE OF PIPE RISER AND SINGLE PORT FIRE HYDRANT. INSTALL NEW 4" 90° DI BEND, 4"x6" DI PIPE REDUCER AND THRUST BLOCK, SEE DETAIL 2  
C-4
  - 5) INSTALL NEW 6" PVC WATER PIPE, SEE UTILITY TRENCH DETAIL 3  
C-4
  - 6) INSTALL NEW 6" 22.5' DI PIPE BEND AND CONCRETE THRUST BLOCK, SEE DETAIL 2  
C-4
  - 7) INSTALL NEW FIRE HYDRANT, SEE DETAIL 5  
C-4
  - 8) INSTALL NEW 4" GUARD POST, SEE DETAIL 4  
C-4
  - 9) INSTALL NEW 6" GATE VALVE, SEE DETAIL 5  
C-4
  - 10) INSTALL NEW ELECTRICAL CONDUIT (TYP), SEE DETAIL 6  
C-5
  - 11) SAWCUT, REMOVE, DISPOSE, AND REPLACE ASPHALT CONCRETE PAVEMENT, SEE DETAIL 3  
C-4
  - 12) INSTALL NEW CONCRETE EQUIPMENT PAD, SEE DETAIL 2  
C-5
  - 13) INSTALL 8' WIDE CHAIN LINK GATE, SEE DETAIL 5  
C-5



JBY #1306-4  
**JB YOUNG & ASSOCIATES**  
 CONSULTANT ENGINEERS  
 11440 RIVERSIDE DRIVE, SUITE M  
 LAKEVIEW, CA 92040  
 619-448-9424

DATE	SYM	REVISION	BY
5/9/14	E	FINAL DESIGN	
2/24/14	D	100% FINAL DESIGN	
10/27/13	C	60% DEVELOPED DESIGN	
6/21/13	B	30% PRELIMINARY DESIGN	
12/21/12	A	15% CONCEPT DESIGN	

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 ARMSTRONG FLIGHT RESEARCH CENTER  
 EDWARDS, CA

**DRAWING TITLE**  
 CIVIL SITE PLAN - BLDG 4720

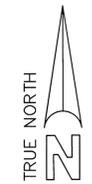
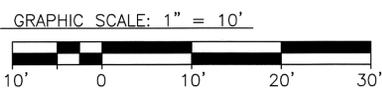
**PROJECT TITLE**  
 REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief Facilities Engineering & Asset Mgmt. Office <i>Don Gandy</i>	7-10-15
Project Registrar/Customer <i>J.P. Dehner</i>	7-10-15
Facilities Project Manager <i>Stefan Nishan</i>	1-27-15
Chief, Office of Prospective Services <i>[Signature]</i>	1-28-15
Chief, Safety, Health and Environmental Office <i>[Signature]</i>	1-27-15
Facilities Information Officer <i>[Signature]</i>	3-2-15
DATE STRITD	DATE PRINTD
	5/9/14
DRAWN BY	JFB
SCALE	AS NOTED
TRADE	EDM-1728
FILE NAME	C-2
SHEET No.	4 of 48



XX NOTES:

- 1) INSTALL NEW CONCRETE EQUIPMENT PAD, SEE DETAIL 2/C-5
- 2) INSTALL NEW 4" GUARD POST 36" CLEAR OF NEW EQUIPMENT, SEE DETAIL 4/C-4
- 3) SAWCUT, REMOVE, AND DISPOSE OF ASPHALT PAVEMENT, AS REQUIRED, TO INSTALL NEW CONCRETE PAD.
- 4) REMOVE AND DISPOSE OF CONCRETE GUARD POST AND CONC FOUNDATION. IMPORT SELECT FILL AND FILL IN HOLE.
- 5) REPAIR ASPHALT PAVEMENT, SEE DETAIL 3/C-5
- 6) INSTALL NEW EXPANDED CONCRETE EQUIPMENT PAD, SEE DETAIL 1/C-4
- 7) REMOVE, SALVAGE, AND RE-INSTALL EXISTING CHAIN LINK FENCING, BARB WIRE, AND HARDWARE TO MATCH EXISTING, AS REQUIRED, TO INSTALL NEW CONCRETE PADS. REMOVE, DISPOSE, AND REPLACE METAL POSTS AND CONCRETE FOUNDATIONS TO MATCH EXISTING, AS REQUIRED, TO INSTALL NEW CONCRETE PADS.
- 8) INSTALL NEW ELECTRICAL CONDUIT (TYP), SEE DETAIL 6/C-5
- 9) SAWCUT, REMOVE, DISPOSE, AND REPLACE ASPHALT CONCRETE PAVEMENT, SEE DETAIL 6/C-5



**JB YOUNG & ASSOCIATES**  
 CONSULTANT ENGINEERS  
 11440 RIVERSIDE DRIVE, SUITE M  
 LAKESIDE, CA 92040  
 619-448-9424

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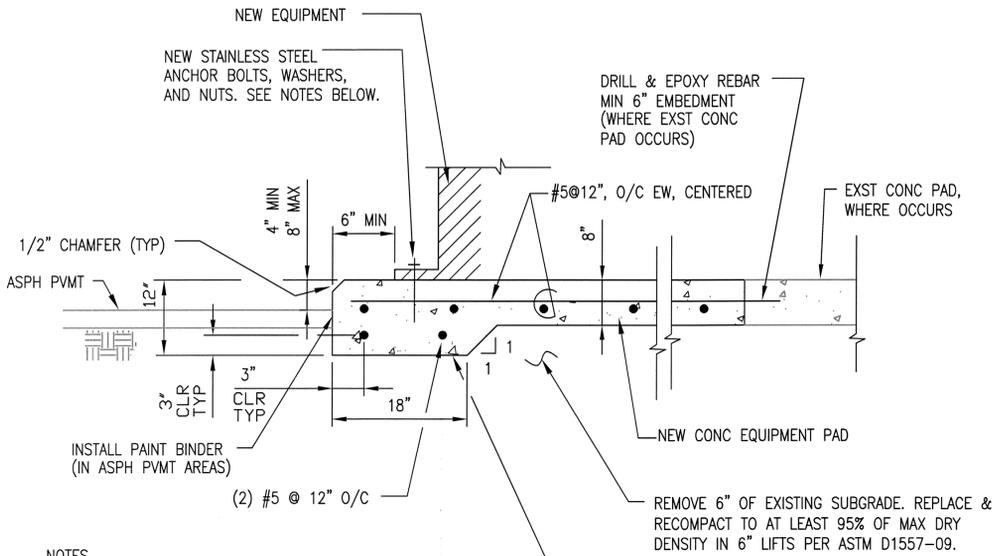
**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 ARMSTRONG FLIGHT RESEARCH CENTER  
 EDWARDS, CA

**DRAWING TITLE**  
 CIVIL SITE PLAN - BLDG 4982

**PROJECT TITLE**  
 REVITALIZE RADAR AND TELEMETRY  
 TRACKING INFRASTRUCTURE

APPROVALS		DATE
Chief/Facilities Engineering & Asset Mgmt. Office	<i>[Signature]</i>	7-10-15
Project Registrar/Designer	<i>[Signature]</i>	2-10-15
Facilities Project Manager	<i>[Signature]</i>	1-27-15
Chief, Office of Protective Services	<i>[Signature]</i>	1-28-15
Chief - Safety, Health and Environmental Office	<i>[Signature]</i>	1-27-15
SEPP Chief Information Officer	<i>[Signature]</i>	8 Feb 15

DATE STRID: \_\_\_\_\_ DATE PRINTD: 5/9/14  
 DRAWN BY: JFB  
 SCALE: AS NOTED TRADE SH. No. EDM-1728  
 FILE NAME: C-3 SHEET No. 5 of 48



- NOTES**
- CONTRACTOR HAS THE OPTION TO DRILL & EPOXY OR EMBED THE ANCHOR BOLTS. SEE EPOXY ANCHOR NOTES.
  - CONTRACTOR SHALL PROVIDE SEISMIC ANCHOR BOLT STRUCTURAL CALCULATIONS, STAMPED BY A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER, TO CONTRACTING OFFICER.

**EXPANDED EQUIPMENT PAD**

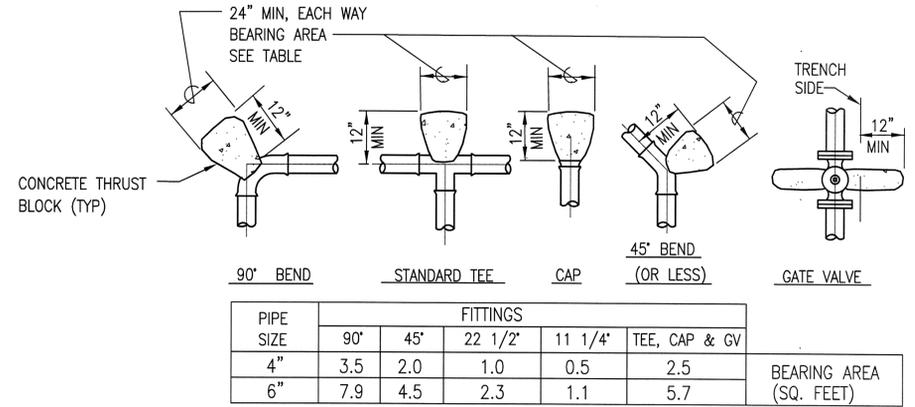
**DETAIL 1**  
NO SCALE  
C-4

**EPOXY ANCHORS NOTES**

- EPOXY FOR EPOXY ANCHORS SHALL BE SET-XP EPOXY BY "SIMPSON STRONG-TIE" (ICC ER ESR-2508)
- ANCHORS USED FOR EPOXY ANCHORS SHALL BE CARBON STEEL CONFORMING TO ASTM A-307 THREADED RODS U.N.O. SIZE AND EMBEDMENT SHALL BE AS INDICATED ON PLANS.
- ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH THE EPOXY MANUFACTURER'S RECOMMENDATIONS AND THE CURRENT ICBO REPORT.
- DRILLED HOLES SHALL BE CLEANED OF DUST AND ANY DEBRIS USING NYLON BRUSH AND COMPRESSED AIR. OIL, SCALE, AND RUST SHALL BE REMOVED FROM THREADED RODS PRIOR TO INSTALLATION.
- UNLESS NOTED OTHERWISE IN THE PLANS, EPOXY ANCHORS SHALL HAVE THE FOLLOWING MINIMUM EMBEDMENT

BAR SIZE	MINIMUM EMBEDMENT *
#3	3 1/2"
#4 OR 1/2"φ	4 1/4"
#5 OR 5/8"φ	5 1/2"
#6 OR 3/4"φ	6 3/4"

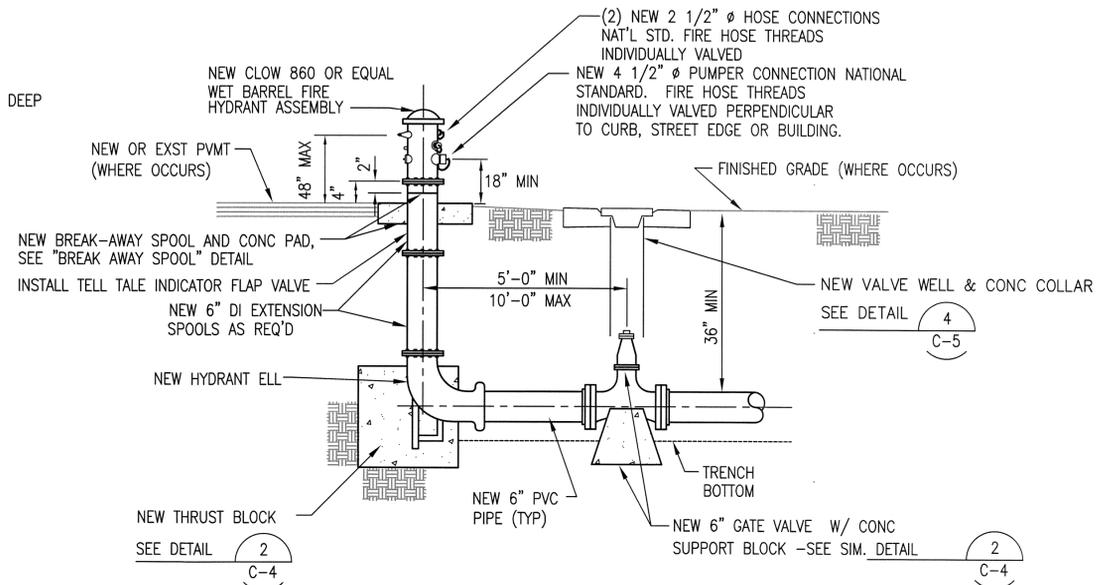
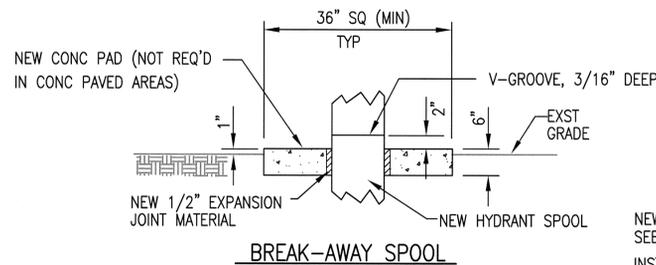
\* UNLESS NOTED OR DETAILED



- NOTES:**
- MAX. ALLOWABLE SOIL PRESSURE (MASP) = 1000 PSF
  - DESIGN OPERATING PRESSURE (DOP) = 120 PSI
  - DESIGN TEST PRESSURE (DTP) = 200 PSI
  - CONCRETE THRUST BLOCKS SHALL NOT INFRINGE ON VALVE OPERATORS, BOLTS, ETC.
  - ALL THRUST BLOCK BEARING AREAS SHALL BE CARRIED TO UNDISTURBED SOIL.

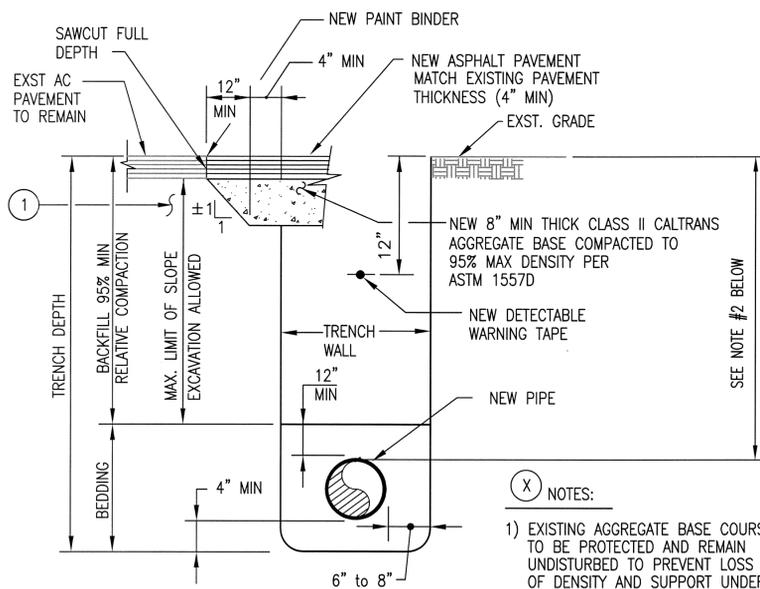
**HORIZONTAL BEND THRUST BLOCK TABLE AND DETAILS**

**DETAIL 2**  
NO SCALE  
C-4



**NEW FIRE HYDRANT ASSEMBLY**

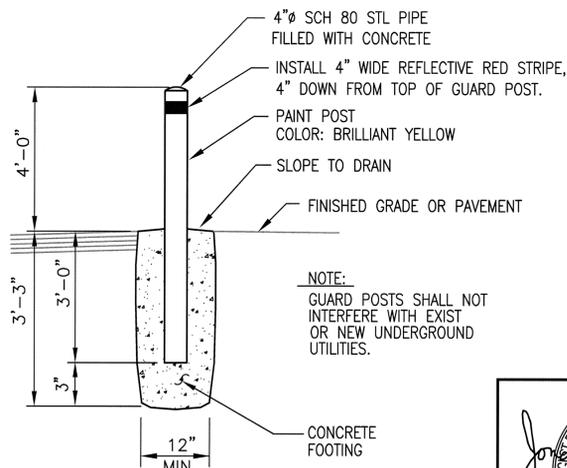
**DETAIL 5**  
NO SCALE  
C-4



- NOTES:**
- EXISTING AGGREGATE BASE COURSE TO BE PROTECTED AND REMAIN UNDISTURBED TO PREVENT LOSS OF DENSITY AND SUPPORT UNDER EXISTING BITUMINOUS PAVEMENT.
  - MIN DEPTH = 36" FOR NEW 6" φ TO 3" φ WATER MAINS.

**TYPICAL WATER UTILITY TRENCH**

**DETAIL 3**  
NO SCALE  
C-4



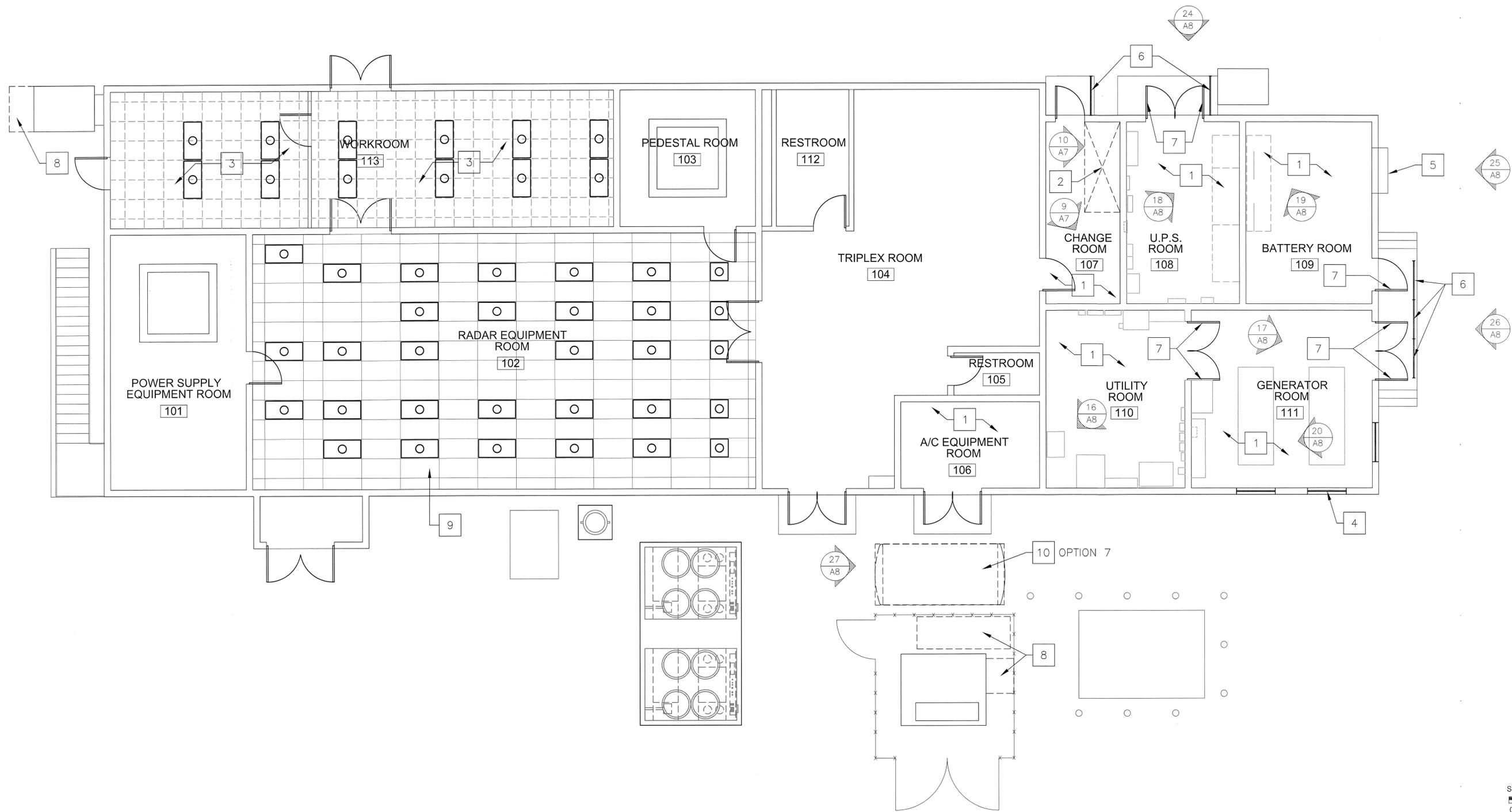
**NOTE:**  
GUARD POSTS SHALL NOT INTERFERE WITH EXIST OR NEW UNDERGROUND UTILITIES.

**GUARD POST**

**DETAIL 4**  
NO SCALE  
C-4

<p>JB YOUNG &amp; ASSOCIATES CONSULTANT ENGINEERS 11440 RIVERSIDE DRIVE, SUITE M LAKESIDE, CA 92040 619-448-9424</p>	5/9/14	E	FINAL DESIGN	<p>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ARMSTRONG FLIGHT RESEARCH CENTER EDWARDS, CA</p>	<p><b>APPROVALS</b></p> <p>Chief, Facilities Engineering &amp; Asset Mgmt. Office <i>[Signature]</i> 7-10-15</p> <p>Project Regulator/Customer <i>[Signature]</i> 2-10-15</p> <p>Facilities Project Manager <i>[Signature]</i> 1-27-15</p> <p>Chief, Office of Protective Services <i>[Signature]</i> 1-28-15</p> <p>Chief of Safety, Health and Environmental Office <i>[Signature]</i> 1-27-15</p> <p>Project Information Officer <i>[Signature]</i> 3-2-15</p>	DATE
	2/24/14	D	100% FINAL DESIGN			DATE
10/27/13	C	60% DEVELOPED DESIGN	DATE			
6/21/13	B	30% PRELIMINARY DESIGN	DATE			
12/21/12	A	15% CONCEPT DESIGN	DATE			
DATE	SYM	REVISION	BY			A'PD
<p><b>DRAWING TITLE</b></p> <p>CIVIL DETAILS</p>					<p>DATE STRD</p> <p>DATE PRNTD 5/9/14</p>	
<p><b>PROJECT TITLE</b></p> <p>REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE</p>					<p>DRAWN BY JFB</p> <p>SCALE AS NOTED</p> <p>TRADE SH. No.</p> <p>FILE NAME C-4</p> <p>EDM-1728</p> <p>SHEET No. 6 of 48</p>	





**KEYNOTES**

- |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 REMOVE MECHANICAL, PLUMBING OR ELECTRICAL EQUIPMENT AS INDICATED ON SHEETS M4, P2 AND E2.</p> <p>2 REMOVE SHOWER ENCLOSURE AND WATER HEATER IN ROOM 107. SEE P2</p> <p>3 2 X 2 GRID CEILING TO BE REMOVED AND DISPOSED OF FOR REPLACEMENT OF DUCTWORK.</p> | <p>4 DEMOLISH SHEET METAL BARRIER IN (E) MASONRY OPENING AND PREP FOR (N) LOUVER</p> <p>5 DEMOLISH HVAC DUCT HOOD AT EXTERIOR WALL APPROX. 54" X 16" V.I.F.</p> <p>6 REMOVE (E) PLYWOOD PANEL FROM (E) METAL FRAME</p> <p>7 REMOVE (E) DOOR HARDWARE FOR REPLACEMENT</p> | <p>8 REMOVE AC PAVEMENT AND PREPARE FOR (N) EQUIPMENT SLAB. SEE CIVIL DRAWINGS.</p> <p>9 EXISTING CEILING CONFIGURATION SHOWN IN ROOM 102. SEE SHEETS E2 AND E4 FOR WORK IN THIS AREA.</p> <p>10 REMOVE (E) 2000 GALLON TANK - SEE SHEET P2 (TANK REMOVAL AND REPLACEMENT IS BID OPTION 7)</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**DEMOLITION PLAN 4982**

SCALE: 3/16" = 1'-0" 1



**DEVELOPMENT ONE, INC.**  
 1611 East Fourth Street, Suite 250  
 Santa Ana, California 92701  
 J. Bruce Camino, Architect, AIA, NCARB  
 (714) 689-0298  
 (714) 648-0197 FAX

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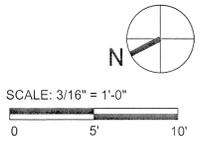
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
 ARMSTRONG FLIGHT RESEARCH CENTER  
 EDWARDS, CA

DRAWING TITLE  
 BUILDING 4982 DEMOLITION PLAN

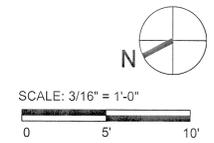
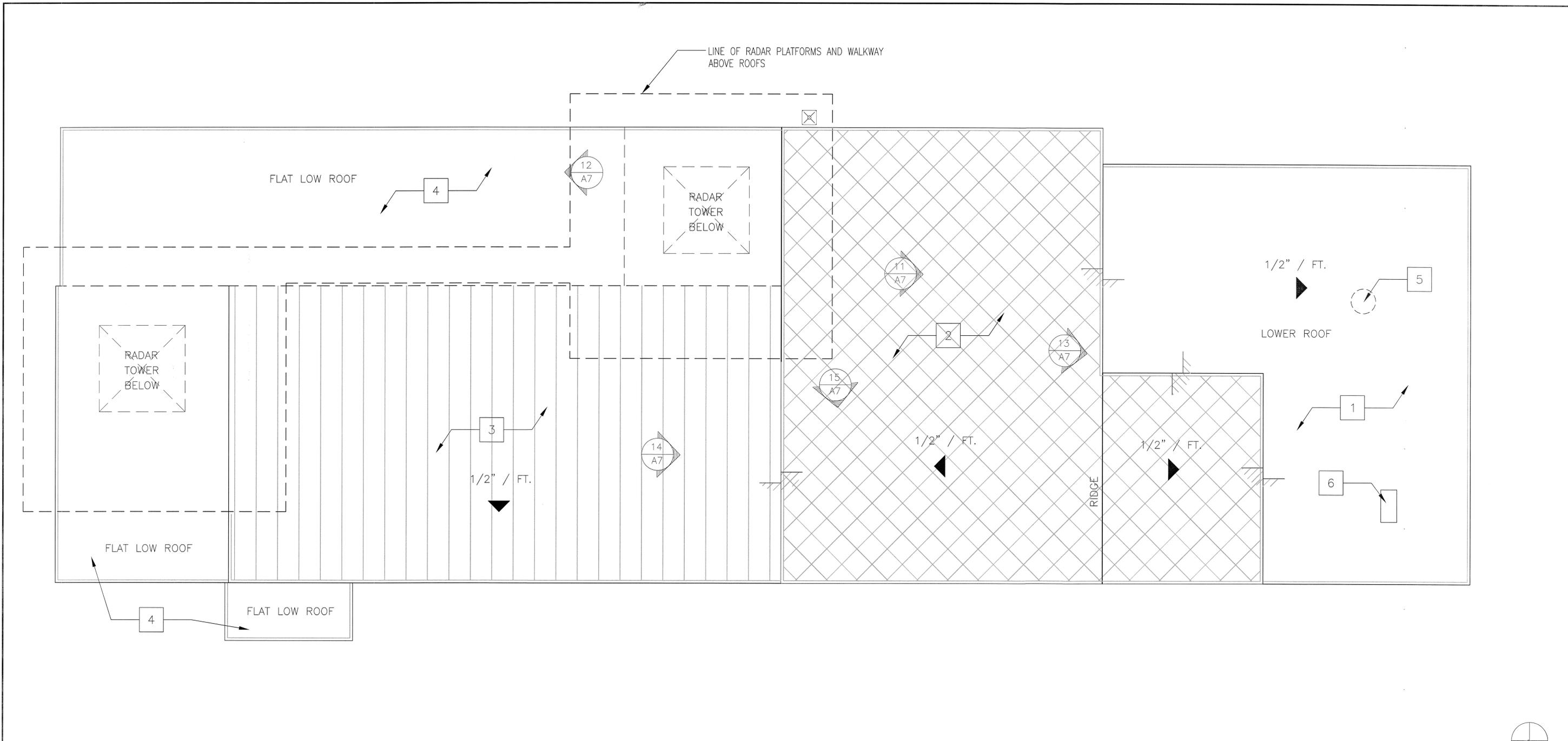
PROJECT TITLE  
 REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	7-10-15
Project Registrar/Contract	2-10-15
Facilities Project Manager	1-27-15
Chief, Office of Protective Services	1-28-15
Chief - Safety, Health and Environmental Office	1-27-15
Design Information Office	3Feb15

DATE STRD	DATE PRINTD	5/9/14
DRAWN BY	DRM	EDM-1728
SCALE	AS NOTED	
FILE NAME	A2	SHEET No. 8 of 48







**KEYNOTES**

- 1** ROOF AREA 1 - REMOVE EXISTING INSULATED PANEL ROOF AND SHEATHING. INSTALL NEW SHEATHING, INSULATION (R-30) AND TPO MEMBRANE ROOF. PROVIDE NEW ACCESSORIES AND FLASHING. (BID OPTION 1)

**2** ROOF AREA 2 - REMOVE BUILT-UP ROOF AND INSULATION OVER CONCRETE DECK. INSTALL NEW INSULATION (R-30) AND TPO MEMBRANE ROOF. PROVIDE NEW ACCESSORIES AND FLASHING. (BID OPTION 1)

**3** ROOF AREA 3 - INSTALL NEW INSULATION (R-30) AND TPO MEMBRANE ROOF OVER EXISTING INSULATED METAL PANEL ROOF. PROVIDE NEW ACCESSORIES AND FLASHING. (BID OPTION 1)
- 4** MISCELLANEOUS FLAT ROOF AREAS - REMOVE EXISTING ROOF AND SHEATHING. INSTALL NEW SHEATHING AND INSULATION (R-30) AND NEW MEMBRANE ROOF. (BID OPTION 1)

**5** IF BID OPTION 1 IS NOT EXERCISED, PATCH (E) ROOF WHERE EXHAUST DUCT IS REMOVED. MATCH EXISTING ROOF CONSTRUCTION

**6** INSTALL (N) EXHAUST MUFFLER FOR (N) GENERATOR. SHOW MUFFLER ON GENERATOR SYSTEM SHOP DRAWINGS, INCLUDING ANCHORAGE AND ROOF PENETRATION. SEE SHEETS M5 AND E4 FOR GENERATOR.

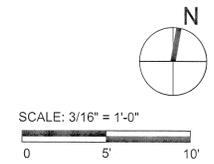
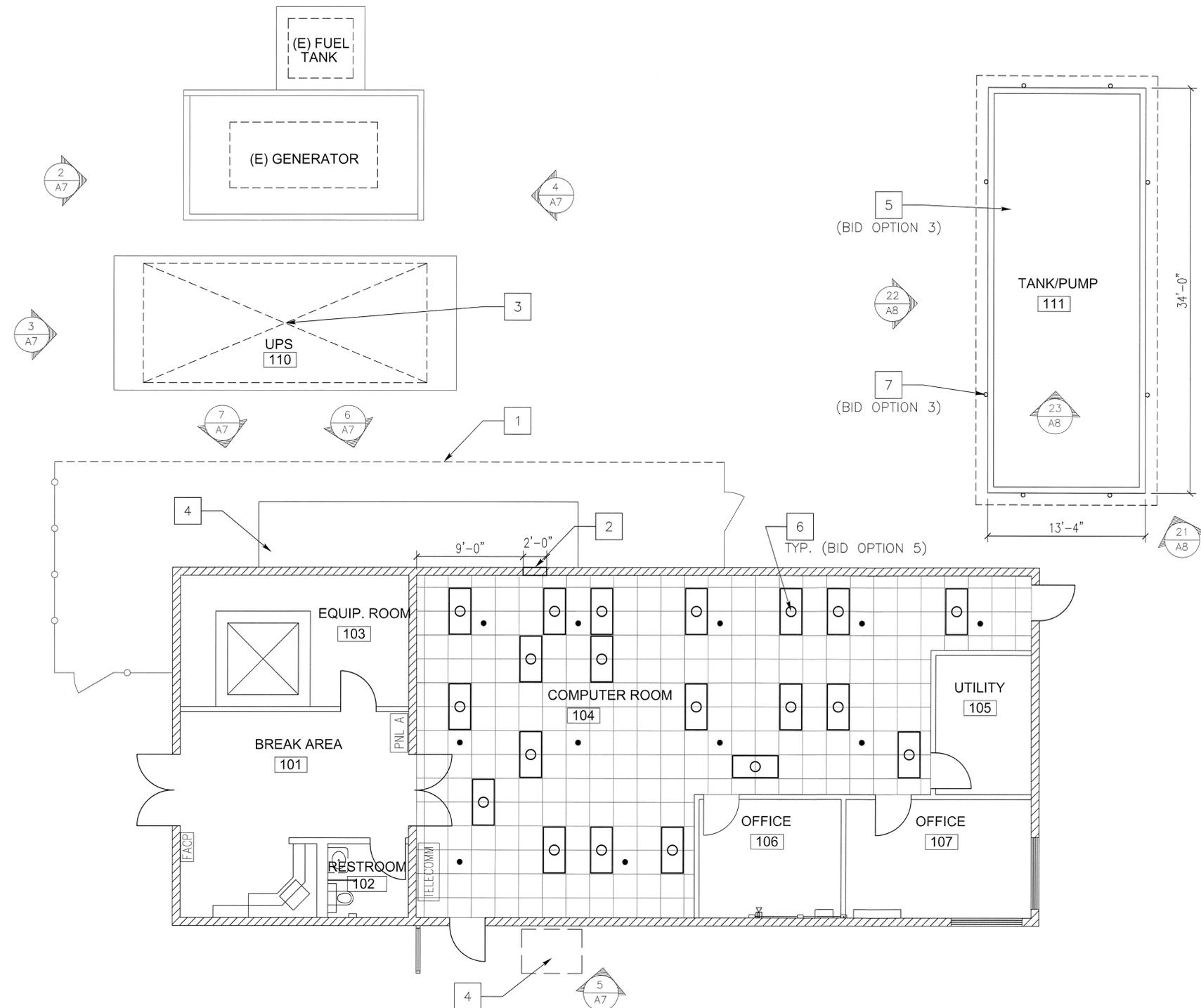
NOTE: BID OPTION 1 ROOF REPLACEMENT IS A DEFERRED DESIGN SUBMITTAL. BASIS OF DESIGN ROOFING IS CONTINUOUS POLYVINYL-CHLORIDE (PVC) MEMBRANE ROOF OVER 5" (R-30) CONTINUOUS RIGID INSULATION BOARD AND 1/2" ROOF PROTECTION BOARD. ROOFING SHALL BE CONTINUOUS UNDER (E) WALKWAY.

AS PART OF BID, CONTRACTOR SHALL DESIGN A SINGLE, COMPLETE ROOF SYSTEM FOR USE ON THE PROJECT INCLUDING THE FOLLOWING CRITERIA: SINGLE POINT OF CONTACT 20 YEAR WARRANTY, 120 MPH, EXPOSURE 'D' WIND RESISTANCE, MECHANICALLY FASTENED, SHOP DRAWINGS, CALCULATIONS, TECHNICAL DATA, AND DETAILS FOR EACH TRANSITION, PENETRATION AND EDGE CONDITION IN PROJECT.

SHOP DRAWINGS MUST BE APPROVED BY CONTRACTING OFFICER PRIOR TO DEMOLITION, PROCUREMENT OR ANY ROOF WORK.

NOTE: SEE DETAILS 5, 8, 10 & 13 ON SHEET A9 FOR TYPICAL ROOF CONDITIONS

<b>ROOF PLAN 4982</b>		SCALE: 3/16" = 1'-0"	1																														
 <b>DEVELOPMENT ONE, INC.</b> 1611 East Fourth Street, Suite 250 Santa Ana, California 92701 J. Bruce Camp, Architect, AIA, NCARB (714) 689-0298 (714) 648-0197 FAX		 <b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> ARMSTRONG FLIGHT RESEARCH CENTER EDWARDS, CA	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">APPROVALS</th> <th>DATE</th> </tr> <tr> <td><i>David L. Root</i></td> <td>Chief Facilities Engineering &amp; Asset Mgmt. Office</td> <td>7-10-15</td> </tr> <tr> <td><i>J. A. Cochran</i></td> <td>Project Director/Contractor</td> <td>7-10-15</td> </tr> <tr> <td><i>Stacyl Wilson</i></td> <td>Facilities Project Manager</td> <td>1-27-15</td> </tr> <tr> <td><i>K. A. [Signature]</i></td> <td>Chief, Office of Facilities Services</td> <td>1-28-15</td> </tr> <tr> <td><i>[Signature]</i></td> <td>Chief - Support, Health, Safety &amp; Environmental Office</td> <td>1-27-15</td> </tr> <tr> <td><i>[Signature]</i></td> <td>Facilities Information Officer</td> <td>3 Feb 15</td> </tr> </table>	APPROVALS		DATE	<i>David L. Root</i>	Chief Facilities Engineering & Asset Mgmt. Office	7-10-15	<i>J. A. Cochran</i>	Project Director/Contractor	7-10-15	<i>Stacyl Wilson</i>	Facilities Project Manager	1-27-15	<i>K. A. [Signature]</i>	Chief, Office of Facilities Services	1-28-15	<i>[Signature]</i>	Chief - Support, Health, Safety & Environmental Office	1-27-15	<i>[Signature]</i>	Facilities Information Officer	3 Feb 15									
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<i>Stacyl Wilson</i>	Facilities Project Manager	1-27-15																															
<i>K. A. [Signature]</i>	Chief, Office of Facilities Services	1-28-15																															
<i>[Signature]</i>	Chief - Support, Health, Safety & Environmental Office	1-27-15																															
<i>[Signature]</i>	Facilities Information Officer	3 Feb 15																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>DATE</th> <th>SYM</th> <th>REVISION</th> <th>BY</th> <th>A'PD</th> </tr> <tr> <td>5/9/14</td> <td>E</td> <td>FINAL DESIGN</td> <td></td> <td></td> </tr> <tr> <td>2/24/14</td> <td>D</td> <td>100% DESIGN</td> <td></td> <td></td> </tr> <tr> <td>10/27/13</td> <td>C</td> <td>60% DEVELOPED DESIGN</td> <td></td> <td></td> </tr> <tr> <td>6/21/13</td> <td>B</td> <td>30% PRELIMINARY DESIGN</td> <td></td> <td></td> </tr> <tr> <td>12/21/12</td> <td>A</td> <td>15% CONCEPT DESIGN</td> <td></td> <td></td> </tr> </table>		DATE	SYM	REVISION	BY	A'PD	5/9/14	E	FINAL DESIGN			2/24/14	D	100% DESIGN			10/27/13	C	60% DEVELOPED DESIGN			6/21/13	B	30% PRELIMINARY DESIGN			12/21/12	A	15% CONCEPT DESIGN			DRAWING TITLE <b>BUILDING 4982 ROOF PLAN</b>  PROJECT TITLE <b>REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE</b>	
DATE	SYM	REVISION	BY	A'PD																													
5/9/14	E	FINAL DESIGN																															
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		DATE STRID	DATE PRIND																														
		SCALE	TRADE																														
		AS NOTED	EDM-1728																														
		FILE NAME	SHEET No. 10 of 48																														



DEMOLITION PLAN B4720 1

KEYNOTES

- 1 REMOVE SECTION OF (E) FENCE TO ACCOMMODATE (N) EQUIPMENT PAD. SEE SHEET C-2.
- 2 (N) 24" X 18" OPENING IN MASONRY (E) WALL FOR (N) MECHANICAL DUCT. BOTTOM OF OPENING AT 10'-8" A.F.F.
- 3 DEMOLISH AND REMOVE (E) UPS BUILDING
- 4 REMOVE MECHANICAL, PLUMBING OR ELECTRICAL EQUIPMENT AS INDICATED ON SHEETS M2, P6 AND E6.
- 5 REMOVE (E) ROOF AND TANK AT ACCESSORY BUILDING AT B4720 SITE FOR REPLACEMENT OF TANK SEE SHEET P6. SEE DETAIL 24/A8 (BID OPTION 3)
- 6 REMOVE (E) FLUORESCENT LIGHT FIXTURES FOR REPLACEMENT WITH LED FIXTURES (BID OPTION 5)
- 7 DETACH AND PROTECT ALL ANTENNAS AND ROOF ACCESSORIES FOR RE-INSTALLATION FOLLOWING ROOF REPLACEMENT (BID OPTION 3)



**DEVELOPMENT ONE, INC.**  
1611 East Fourth Street, Suite 250  
Santa Ana, California 92701  
J. Bruce Camino, Architect, AIA, NCARB  
(714) 689-0298  
(714) 648-0197 FAX

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
ARMSTRONG FLIGHT RESEARCH CENTER  
EDWARDS, CA

DRAWING TITLE  
BUILDING 4720 DEMOLITION PLAN

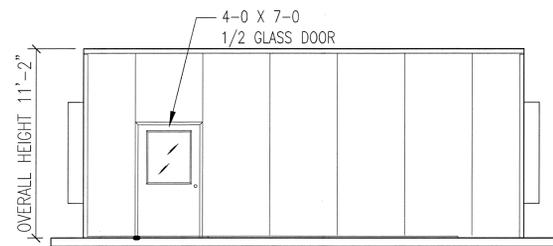
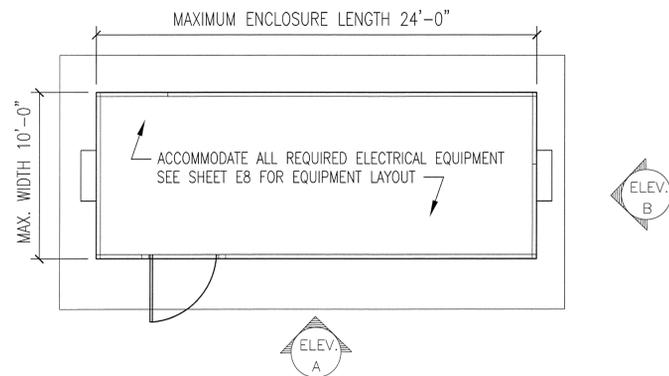
PROJECT TITLE  
REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	7-10-15
Project Engineer/Contractor	2-10-15
Facilities Project Manager	1-27-15
Chief, Office of Technology Services	1-28-15
Chief - Safety, Health and Environmental Office	1-27-15
ISPC Chief Information Officer	3 Feb 15

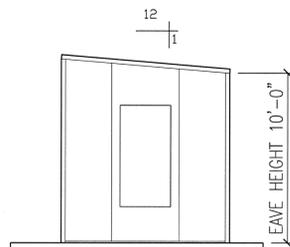
DATE STRD: 5/9/14 DATE PRINTD: 5/9/14

DRAWN BY: DDM TRADE: EDM-1728

SCALE: AS NOTED SH. No. A5 SHEET No. 11 of 48



ELEVATION A



ELEVATION B

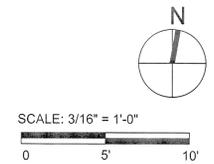
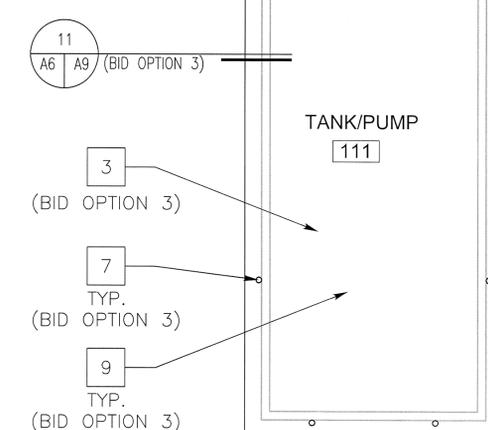
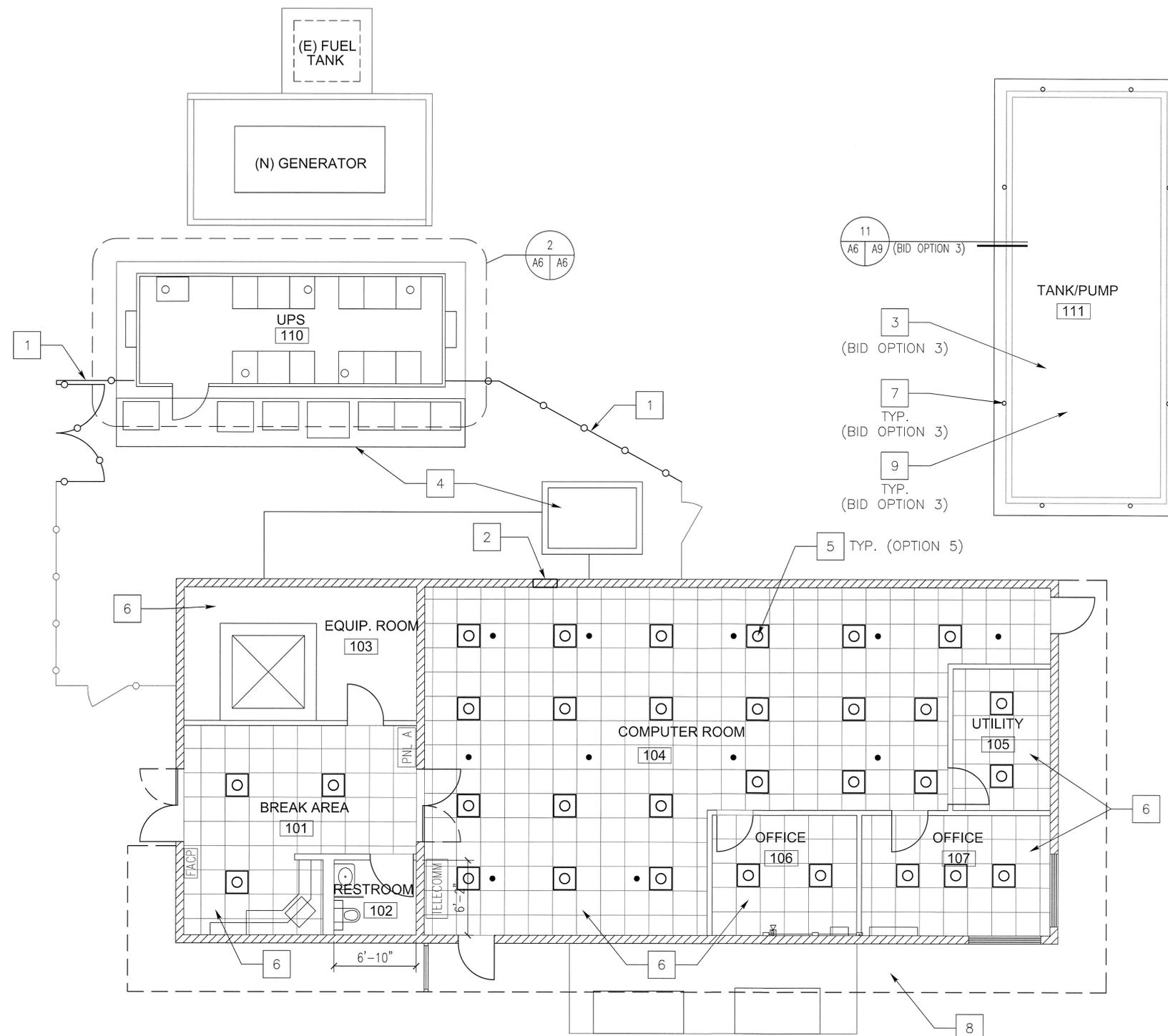
PROVIDE (N) ENCLOSURE FOR ELECTRICAL EQUIPMENT. ENCLOSURE SHALL BE SKID-MOUNTED WITH INSULATED FLOOR, WALL AND CEILING PANELS. EXTERIOR SURFACE SHALL BE MIN. 22 GAUGE STEEL WITH FACTORY-APPLIED FINISH.

ENCLOSURE SHALL INCLUDE DUAL 5-TON A/C UNITS FACTORY-INSTALLED AND WARRANTED BY ENCLOSURE MANUFACTURER. ENCLOSURE INSULATION VALUE SHALL BE R-30 AT WALLS AND R-30 AT ROOF, MINIMUM.

ENCLOSURE SHALL BE DESIGNED FOR A WIND LOAD OF 90 MPH, EXPOSURE 'D', AND FOR THE WEIGHT OF THE SPECIFIC ELECTRICAL EQUIPMENT TO BE INSTALLED.

ENCLOSURE SHALL INCLUDE INTERIOR LIGHTING, POWER CONNECTIONS FOR THE EQUIPMENT TO BE INSTALLED AND ONE ADDITIONAL CONVENIENCE ELECTRICAL OUTLET. SHOW ALL ELECTRICAL ITEMS IN SHOP DRAWINGS.

CONTRACTOR SHALL PROVIDE COORDINATION DRAWINGS SHOWING EQUIPMENT TO BE INSTALLED AND REQUIRED CLEARANCES. CONTRACTOR SHALL PROVIDE DETAILS FOR ANCHORING ENCLOSURE TO EXISTING CONCRETE PAD. ANCHORAGE DETAILS SHALL BE STAMPED BY CALIFORNIA LICENSED STRUCTURAL ENGINEER.



**ELECTRICAL ENCLOSURE**

SCALE: 3/16" = 1'-0"

2

**RENOVATION PLAN B4720**

SCALE: 3/16" = 1'-0"

1

**KEYNOTES**

- 1 INSTALL (N) FENCE - SEE SHEET C-2
- 2 INSTALL REINFORCING STEEL AT MASONRY OPENING, SEAL DUCT PENETRATION AT EXTERIOR WALL. SEE DETAIL 1/A11
- 3 REMOVE AND REPLACE ROOF, INCLUDING RAFTERS AT PUMP BUILDING TO ALLOW REPLACEMENT OF TANK. SEE DETAIL 11/A9 (OPTION 3)
- 4 PROVIDE CONCRETE PADS FOR ELECTRICAL AND MECHANICAL EQUIPMENT SEE SHEETS C2 AND E8.
- 5 REPLACE EXISTING FLUORESCENT LIGHT FIXTURES WITH NEW LED LIGHT FIXTURES. SEE SHEET E9. (OPTION 5)
- 6 INSTALL R-30 SCRIM-FACED BAIT INSULATION AT UNDERSIDE OF (E) ROOF IN ALL AREAS. (E) CEILING GRID TO REMAIN.
- 7 RE-INSTALL ALL ANTENNAS AND ROOF ACCESSORIES FOLLOWING ROOF REPLACEMENT (BID OPTION 3)
- 8 DETACH AND RESET (E) METAL PANELS AT BUILDING SOFFIT FOR HVAC REPLACEMENT
- 9 PROVIDE NEW WATER TANK AND FOOTINGS - SEE SHEET P5 FOR TANK. SUBMIT FOOTING DESIGN BASED ON SPECIFIC TANK PROVIDED. FOOTING DESIGN MUST BE PREPARED AND STAMPED BY A CALIFORNIA LICENSED STRUCTURAL ENGINEER. SEE SHEET A11 FOR STRUCTURAL CRITERIA. (TANK REPLACEMENT IS BID OPTION 3)



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ARMSTRONG FLIGHT RESEARCH CENTER  
EDWARDS, CA

**DRAWING TITLE**  
BUILDING 4720 RENOVATION

**PROJECT TITLE**  
REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

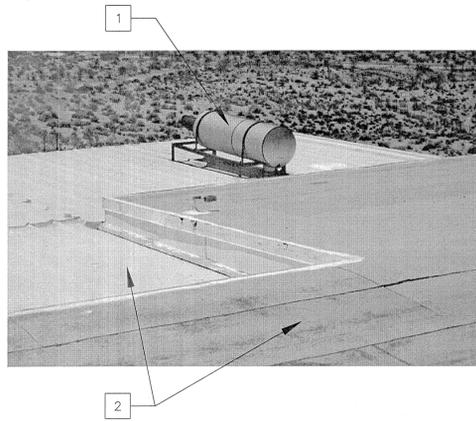
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office <i>Dan Goolbsy</i>	7-10-15
Project Requestor/Customer <i>J. H. O'Connell</i>	2-10-15
Facilities Project Manager <i>Stanford Jackson</i>	1-27-15
Chief, Office of Inspection Services <i>[Signature]</i>	1-28-15
Chief, Safety, Health and Environmental Office <i>[Signature]</i>	1-27-15
Signature Information Officer <i>[Signature]</i>	3 Feb 15

DATE STRD: DATE PRNTD: 5/9/14

DRAWN BY: DPM

SCALE: AS NOTED TRADE: EDM-1728

FILE NAME: A6 SHEET No. 12 of 48



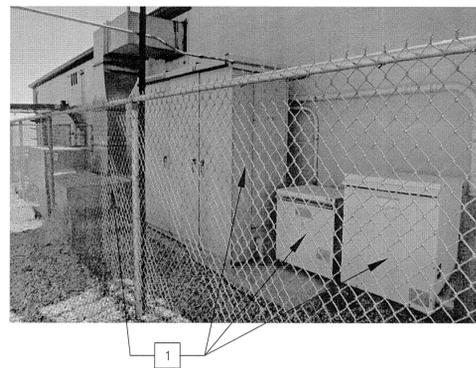
SOUTH ROOF - B4982

13



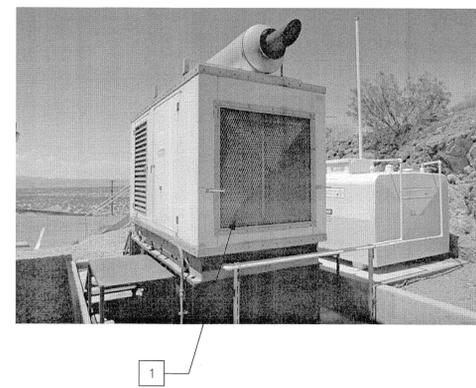
SHOWER AND WATER HEATER - B4982

10



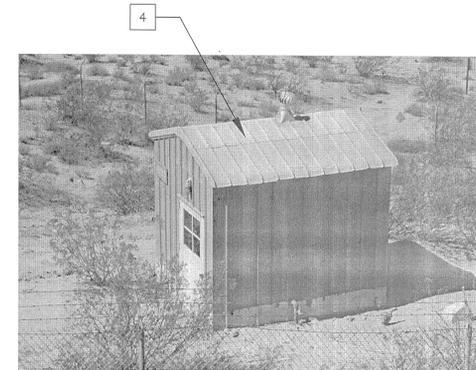
HVAC - B4720

7



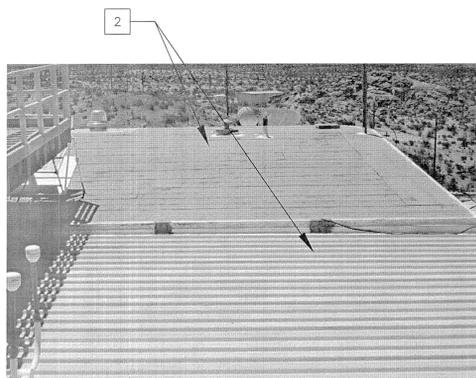
GENERATOR AND FUEL TANK - B4720

4



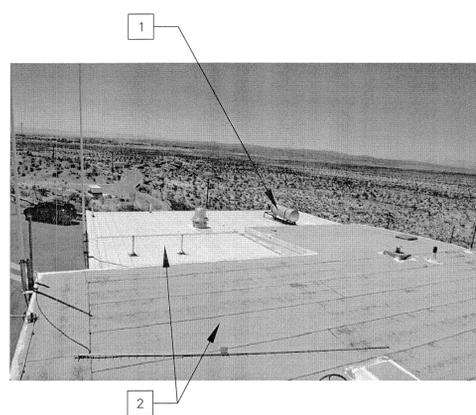
PUMP HOUSE B4983

1



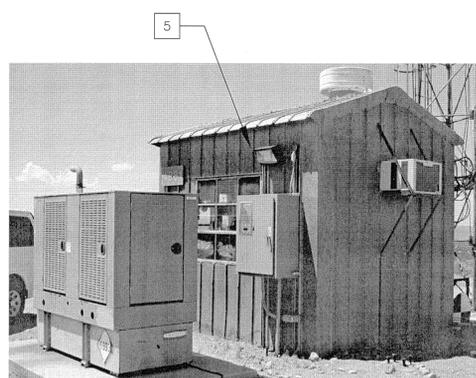
SOUTH ROOF - B4982

14



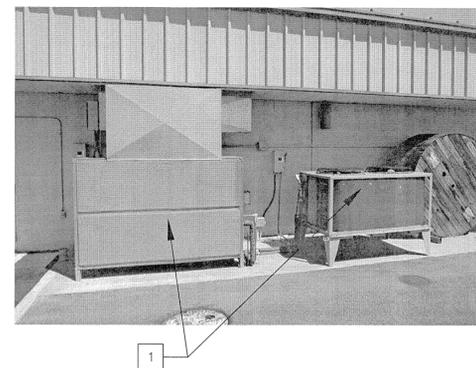
SOUTH ROOF - B4982

11



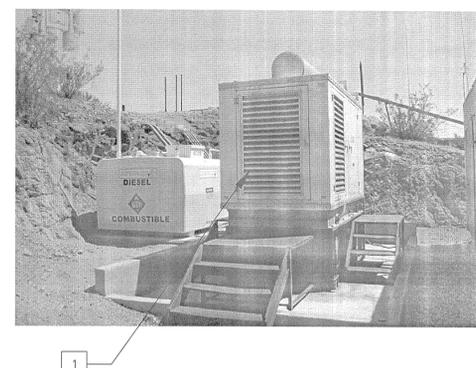
BORE SITE B4981

8



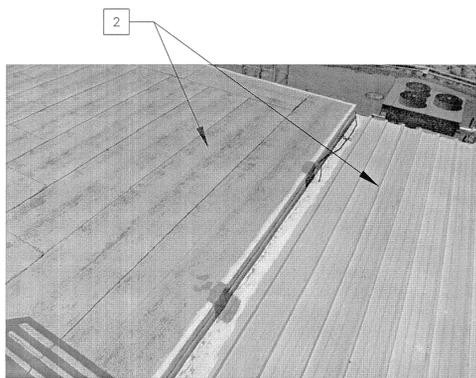
MECHANICAL EQUIPMENT - B4720

5



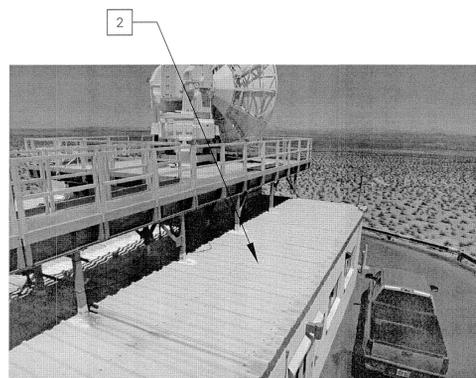
GENERATOR AND FUEL TANK - B4720

2



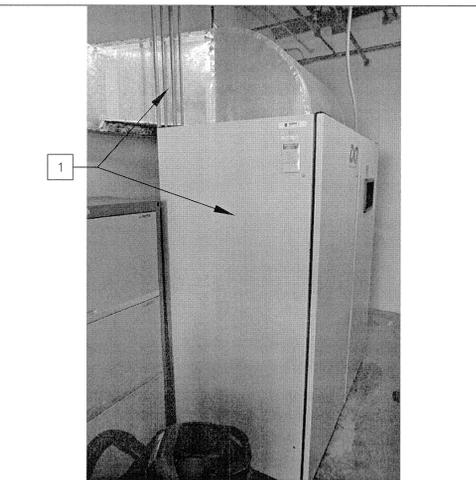
WEST ROOF - B4982

15



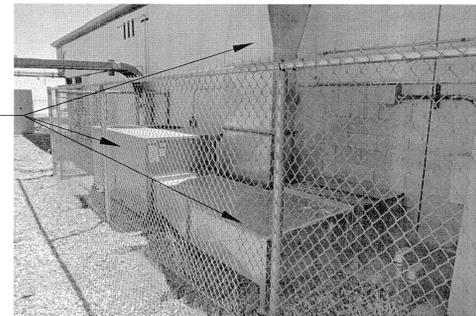
NORTH ROOF - B4982

12



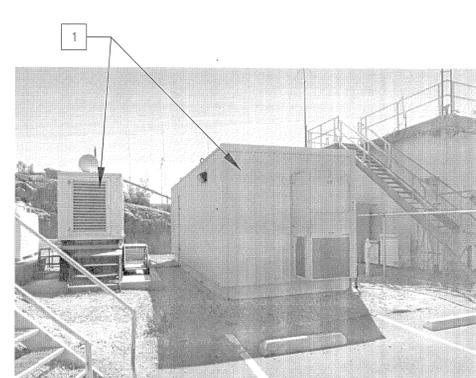
MECH EQUIPMENT - B4982

9



HVAC UNIT - B4720

6



UPS ENCLOSURE - B4720

3

KEYNOTES

- 1 REMOVE MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT AS INDICATED - SEE SHEETS M2, M4, P2, E2 & E6
- 2 DEMOLISH ROOFING AND SHEATHING, PREPARE SURFACE FOR NEW INSULATION/ROOF - SEE SHEET A4 (BID OPTION 1)
- 3 NOT USED
- 4 (E) PUMP HOUSE TO BE DEMOLISHED AND REPLACED. SEE DETAIL 1/A10 (BID OPTION 6)
- 5 BORE SITE BUILDING TO BE DEMOLISHED AND REPLACED. SEE SHEET DETAIL 2/A10 (OPTION 2)



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6/21/13	B	30% PRELIMINARY DESIGN		
12/21/12	A	15% CONCEPT DESIGN		

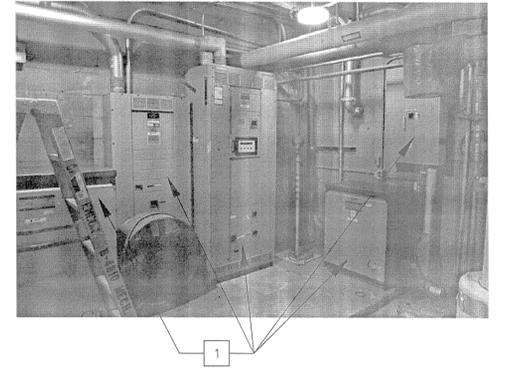
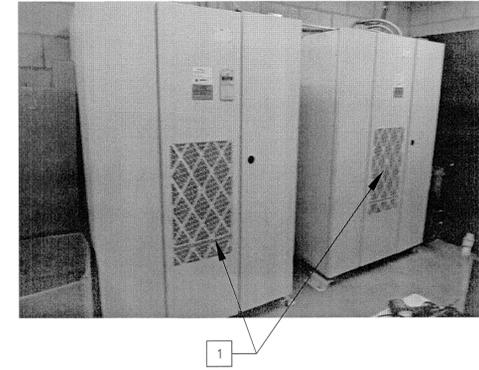
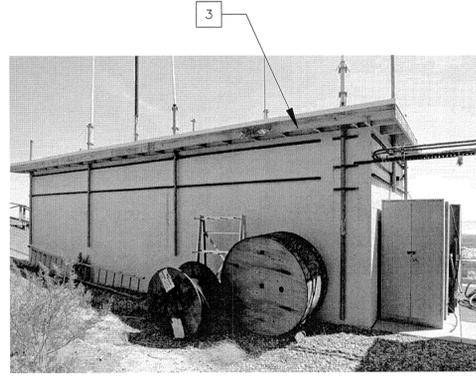
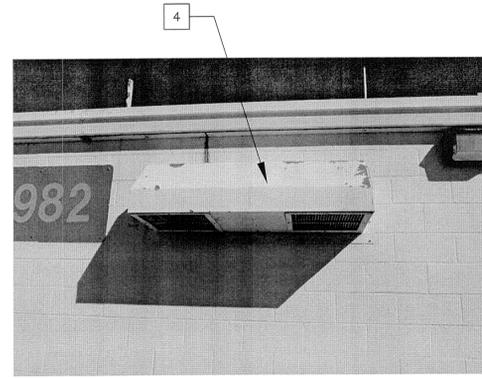
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
ARMSTRONG FLIGHT RESEARCH CENTER  
EDWARDS, CA

DRAWING TITLE  
PHOTO DETAILS

PROJECT TITLE  
REVITALIZE RADAR AND TELEMETRY  
TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief Facilities Engineering & Asset Mgmt. Office <i>Da. Lowry</i>	7-10-15
Project Engineer/Customer <i>J. Bennett</i>	2-10-15
Facilities Project Manager <i>Steph. Becken</i>	1-27-15
Chief, Office of Enterprise Services <i>W.D.</i>	1-28-15
Chief - Safety, Health and Environmental Office <i>[Signature]</i>	1-22-15
SAC, OIG Information Officer <i>[Signature]</i>	3 Feb 15

DATE STRID: 5/9/14  
DATE PRINTD: 5/9/14  
DRAWN BY: DRW  
SCALE: AS NOTED  
TRADE: EDM-1728  
SHEET No. 13 of 48



NOT USED

28

HVAC HOOD

25

TANK/PUMP BUILDING - B4720

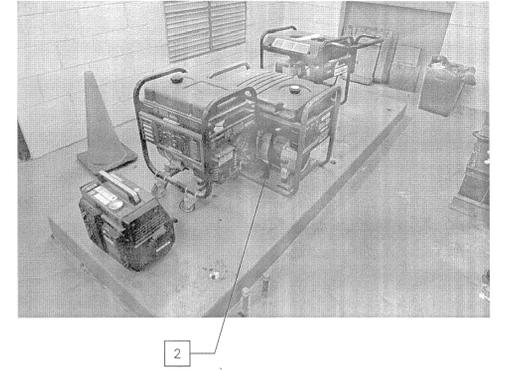
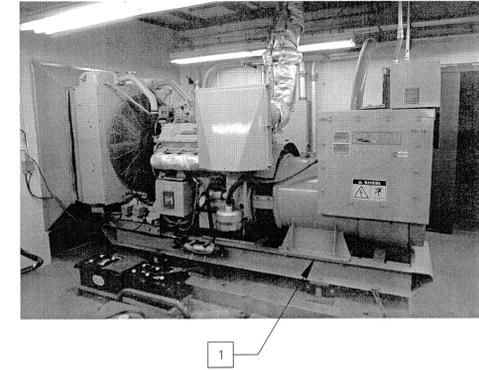
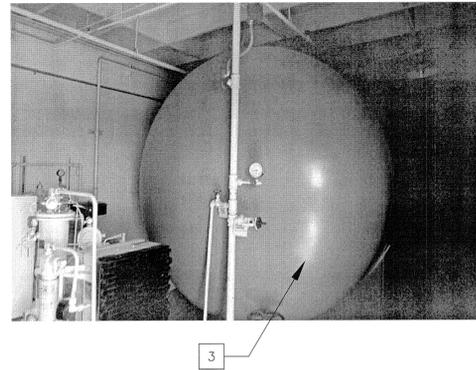
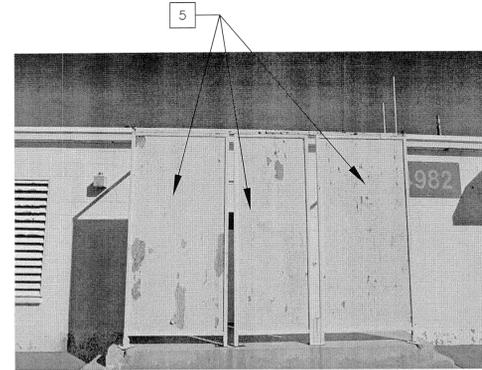
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UPS/BATTERIES - B4982

19

ELECTRICAL EQUIPMENT - B4982

16



NOT USED

29

PLYWOOD WIND GUARDS

26

TANK/PUMP BUILDING - B4720

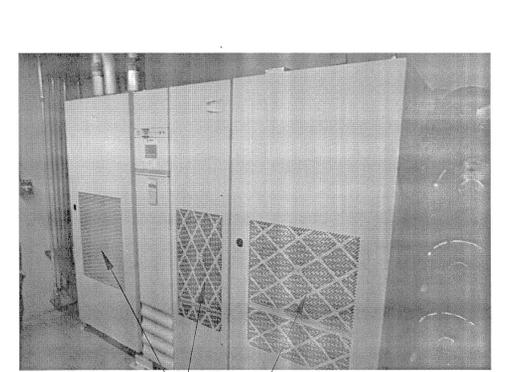
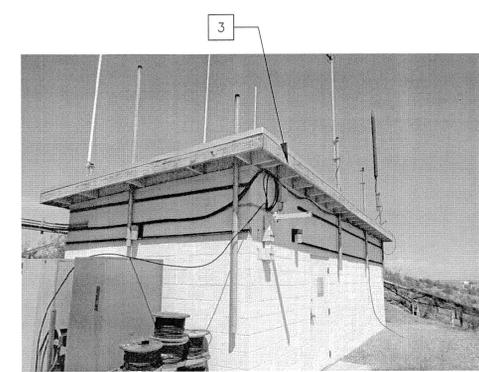
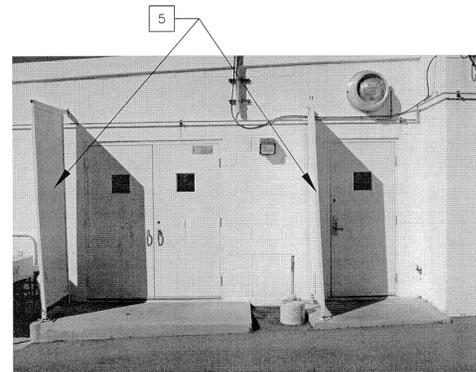
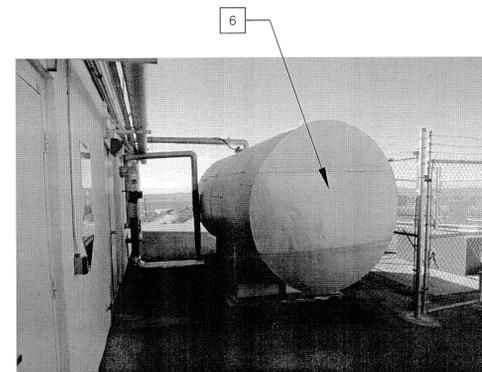
23

(E) GENERATOR - B4982

20

EQUIPMENT PAD - B4982

17



NOT USED

30

FIRE WATER TANK

27

PLYWOOD WIND GUARDS

24

TANK/PUMP BUILDING - B4720

21

UPS/BATTERIES - B4982

18

KEYNOTES

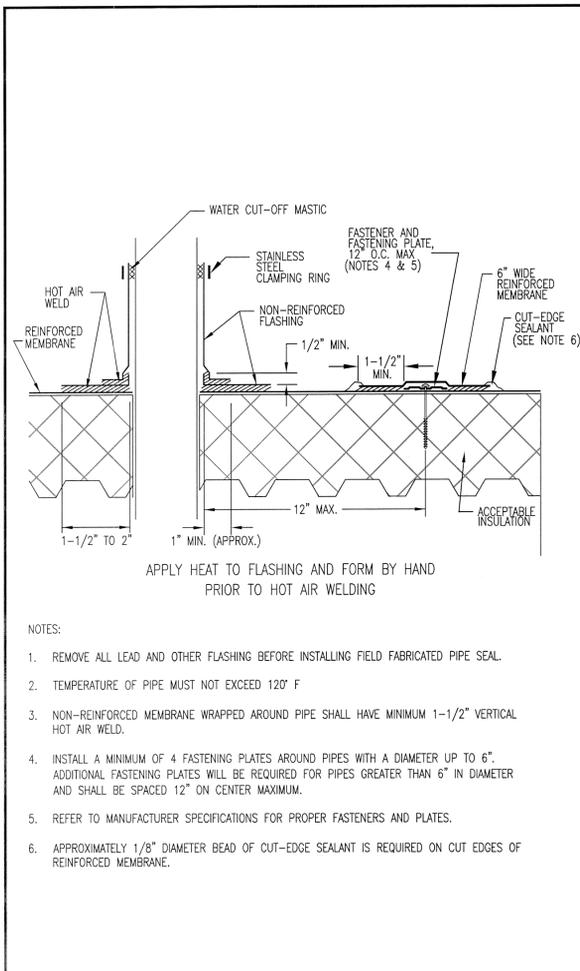
- 1 REMOVE MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT AS INDICATED - SEE SHEETS M2, M4, P2, E2 & E6
- 2 RE-USE EXISTING CONCRETE PAD FOR (N) ENGINE GENERATOR - SEE SHEET A4. PORTABLE GENERATORS SHOWN TO BE REMOVED BY GOVERNMENT PRIOR TO CONSTRUCTION.
- 3 REMOVE (E) ROOF AND TANK AT ACCESSORY BUILDING AT B4720 SITE FOR REPLACEMENT OF TANK SEE SHEETS A5 AND P6. PROVIDE NEW WATER TANK AND FOOTINGS - SEE SHEET P5 FOR TANK. SUBMIT FOOTING DESIGN BASED ON SPECIFIC TANK PROVIDED. FOOTING DESIGN MUST BE PREPARED AND STAMPED BY A CALIFORNIA LICENSED STRUCTURAL ENGINEER. SEE SHEET A11 FOR STRUCTURAL CRITERIA. (TANK REPLACEMENT IS BID OPTION 3)
- 4 DEMOLISH HVAC DUCT HOOD AT EXTERIOR WALL APPROX. 54" X 16" V.I.F.
- 5 DEMOLISH (E) PLYWOOD PANEL IN (E) METAL FRAME.
- 6 REMOVE AND REPLACE 2000 GALLON TANK - SEE SHEETS P2 AND P3 (BID OPTION 7)



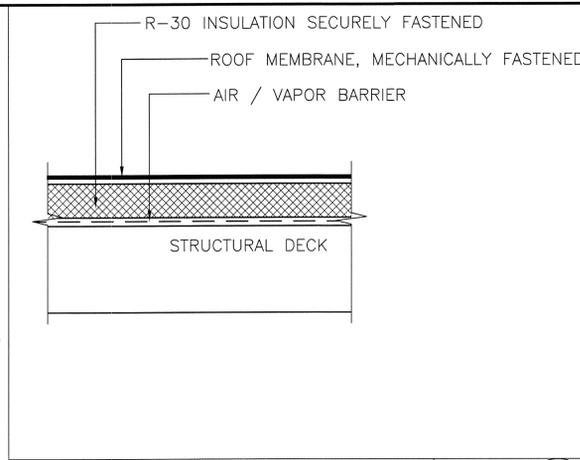
**DEVELOPMENT ONE, INC.**  
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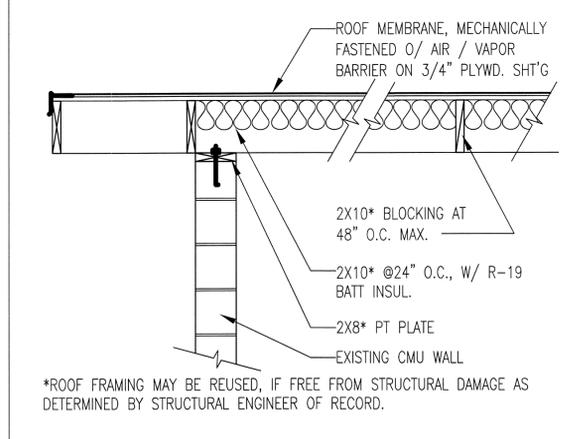
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ARMSTRONG FLIGHT RESEARCH CENTER EDWARDS, CA		<b>APPROVALS</b> DATE Chief, Facilities Engineering & Asset Mgmt. Office <i>Don Gooch</i> 7-10-15 Project Manager/Customer <i>A. Belmont</i> 2-10-15 Facilities Project Manager <i>Stanford Wilson</i> 1-27-15 Chief, Office of Acquisitive Services <i>K. [Signature]</i> 1-28-15 Chief - Safety, Health and Environmental Office <i>[Signature]</i> 1-27-15 Office of Information Officer <i>[Signature]</i> 3 Feb 15
<b>DRAWING TITLE</b> PHOTO DETAILS		DATE STRID: 5/9/14 DATE PRINT: 5/9/14 DRAWN BY: DRW SCALE: AS NOTED TRADE: EDM-1728 FILE NAME: A8 SHEET No. 14 of 48
<b>PROJECT TITLE</b> REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE		



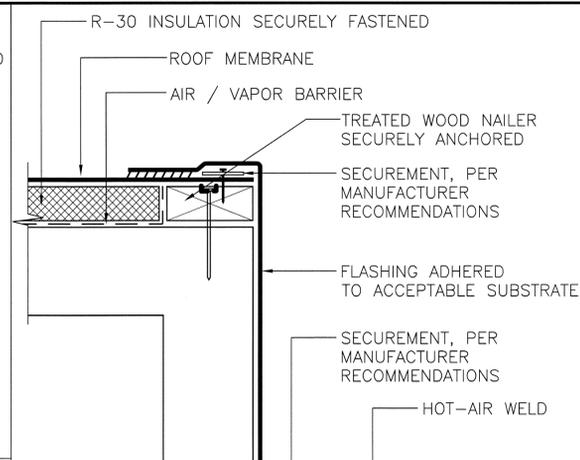
NOTES:  
 1. REMOVE ALL LEAD AND OTHER FLASHING BEFORE INSTALLING FIELD FABRICATED PIPE SEAL.  
 2. TEMPERATURE OF PIPE MUST NOT EXCEED 120° F  
 3. NON-REINFORCED MEMBRANE WRAPPED AROUND PIPE SHALL HAVE MINIMUM 1-1/2\"/>



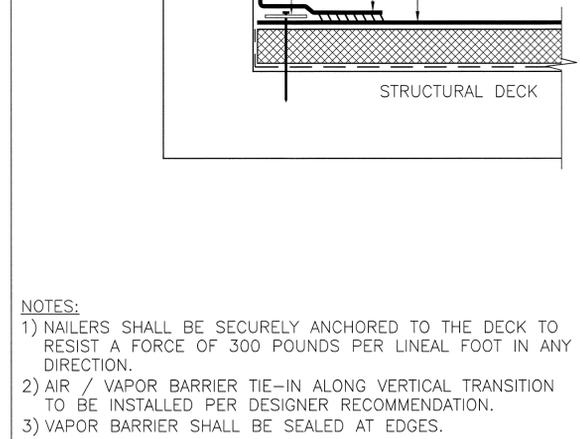
TYPICAL ROOF SECTION SCALE: 10 N.T.S. A4/A9



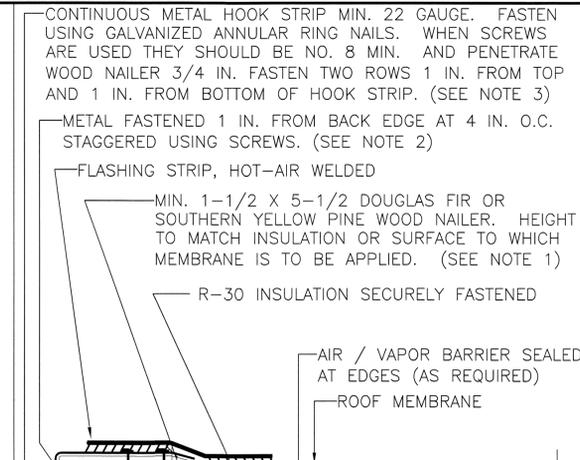
NOTES:  
 1) NAILERS SHALL BE SECURELY ANCHORED TO THE DECK TO RESIST A FORCE OF 300 POUNDS PER LINEAL FOOT IN ANY DIRECTION.  
 2) AIR / VAPOR BARRIER TIE-IN ALONG VERTICAL TRANSITION TO BE INSTALLED PER DESIGNER RECOMMENDATION.  
 3) VAPOR BARRIER SHALL BE SEALED AT EDGES.



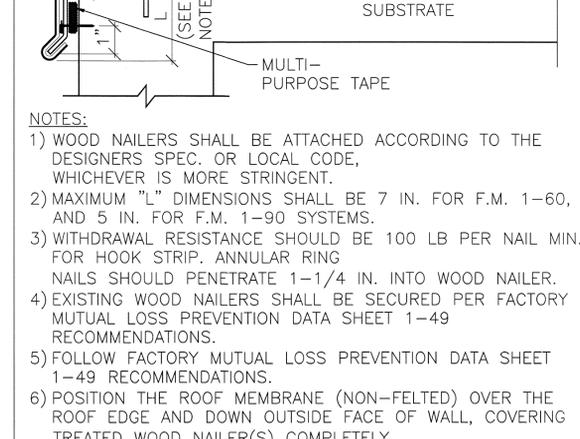
HI-LO ROOF TRANSITION SCALE: 8 N.T.S. A4/A9



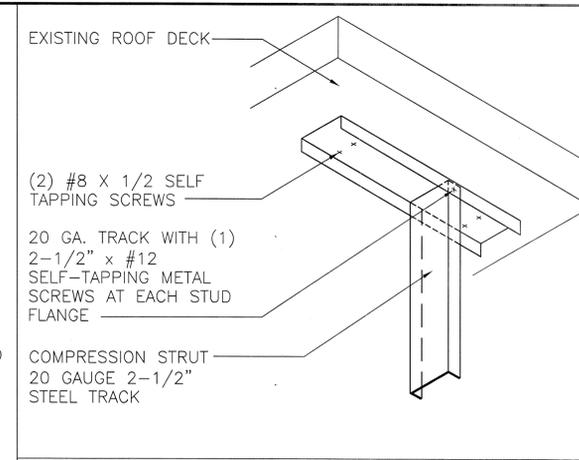
NOTES:  
 1) WOOD NAILERS SHALL BE ATTACHED ACCORDING TO THE DESIGNER'S SPEC. OR LOCAL CODE, WHICHEVER IS MORE STRINGENT.  
 2) MAXIMUM "L" DIMENSIONS SHALL BE 7 IN. FOR F.M. 1-60, AND 5 IN. FOR F.M. 1-90 SYSTEMS.  
 3) WITHDRAWAL RESISTANCE SHOULD BE 100 LB PER NAIL MIN. FOR HOOK STRIP. ANNULAR RING NAILS SHOULD PENETRATE 1-1/4 IN. INTO WOOD NAILER.  
 4) EXISTING WOOD NAILERS SHALL BE SECURED PER FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1-49 RECOMMENDATIONS.  
 5) FOLLOW FACTORY MUTUAL LOSS PREVENTION DATA SHEET 1-49 RECOMMENDATIONS.  
 6) POSITION THE ROOF MEMBRANE (NON-FELTED) OVER THE ROOF EDGE AND DOWN OUTSIDE FACE OF WALL, COVERING TREATED WOOD NAILER(S) COMPLETELY.



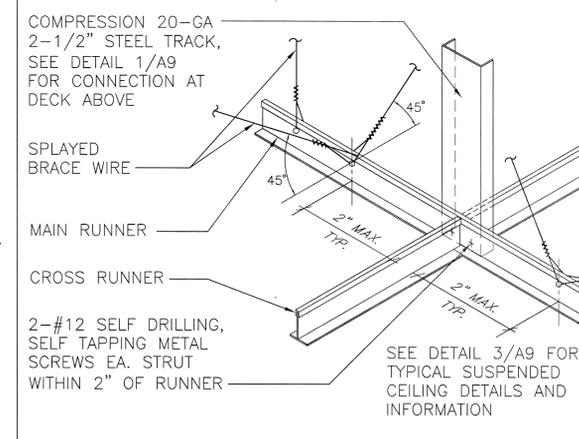
ROOF EDGE SCALE: 5 N.T.S. A4/A9



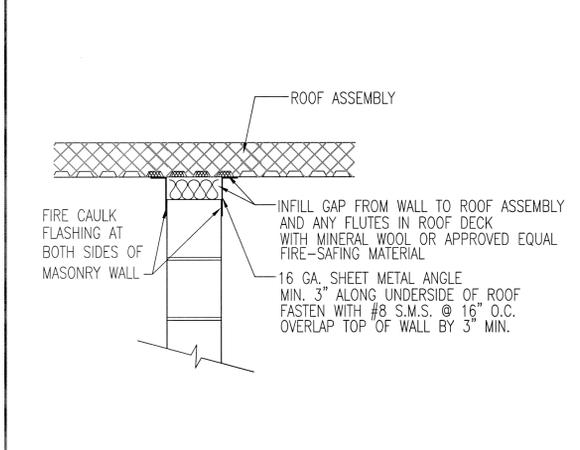
T-BAR CEILING SCALE: 2 N.T.S. A9/A9



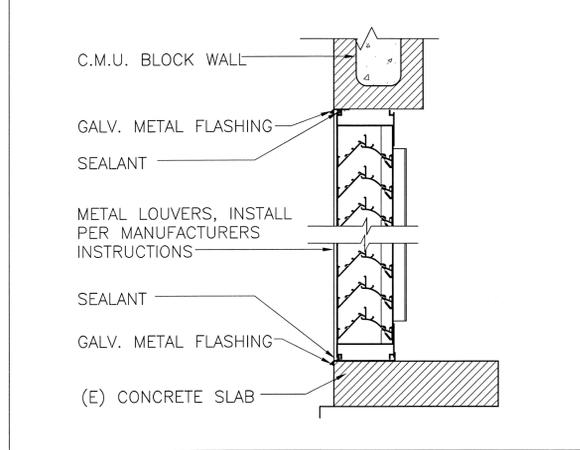
TYPICAL ROOF PENETRATION SCALE: 13 N.T.S. A4/A9



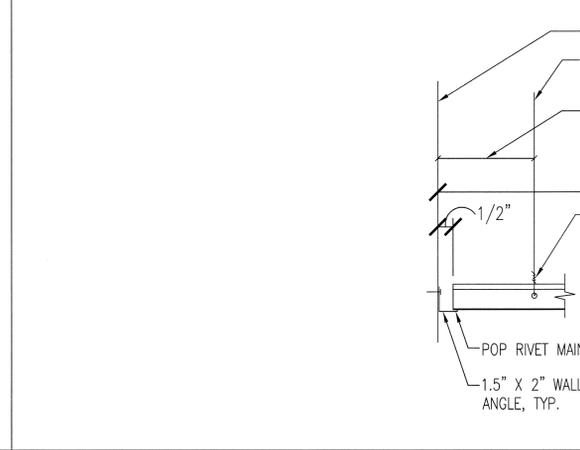
TANK/PUMP BLDG. ROOF SCALE: 11 N.T.S. A4/A9



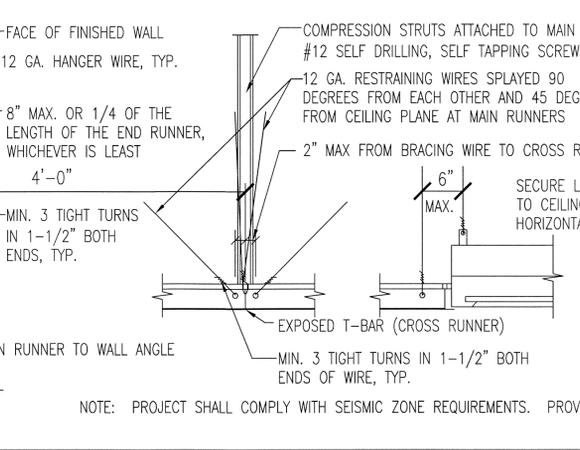
FIRE SAFING AT RATED WALL SCALE: 14 N.T.S. A3/A9



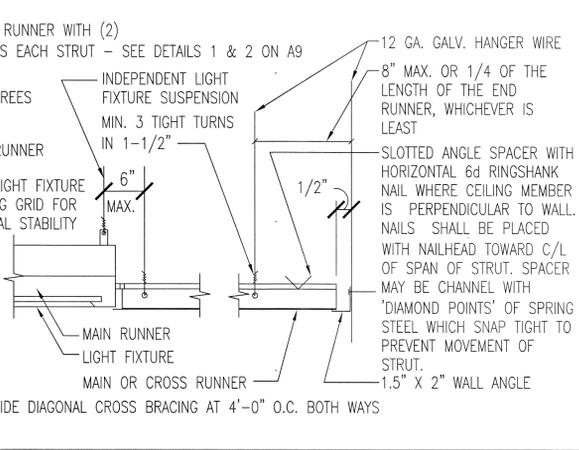
METAL LOUVERS SCALE: 12 N.T.S. A3/A9



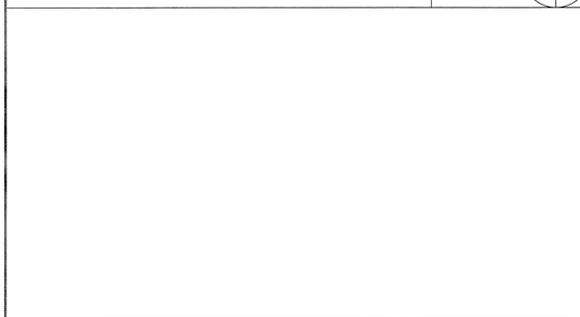
TYPICAL SUSPENDED CEILING DETAIL SCALE: 3 N.T.S. A3/A9



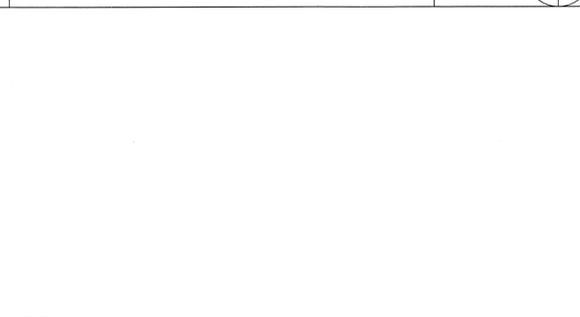
TYPICAL SUSPENDED CEILING DETAIL SCALE: 3 N.T.S. A3/A9



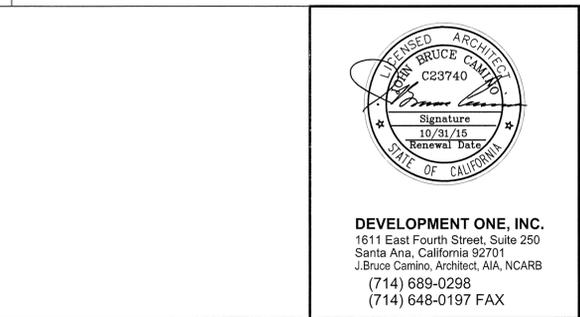
TYPICAL SUSPENDED CEILING DETAIL SCALE: 3 N.T.S. A3/A9



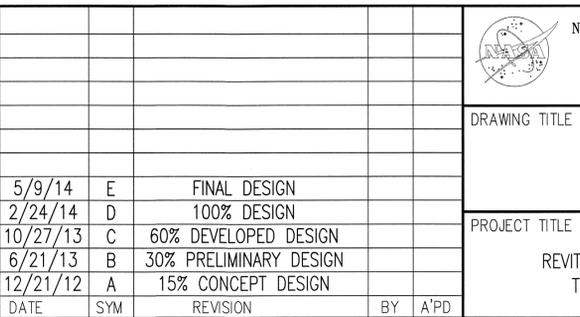
FIRE SAFING AT RATED WALL SCALE: 14 N.T.S. A3/A9



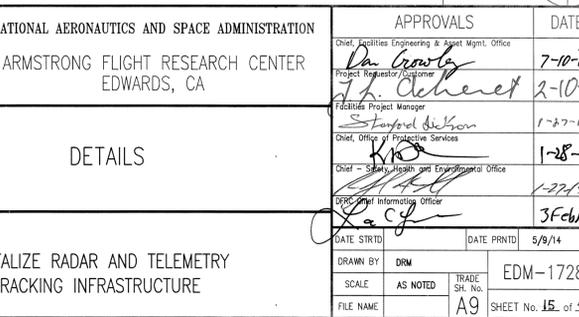
METAL LOUVERS SCALE: 12 N.T.S. A3/A9



TYPICAL SUSPENDED CEILING DETAIL SCALE: 3 N.T.S. A3/A9

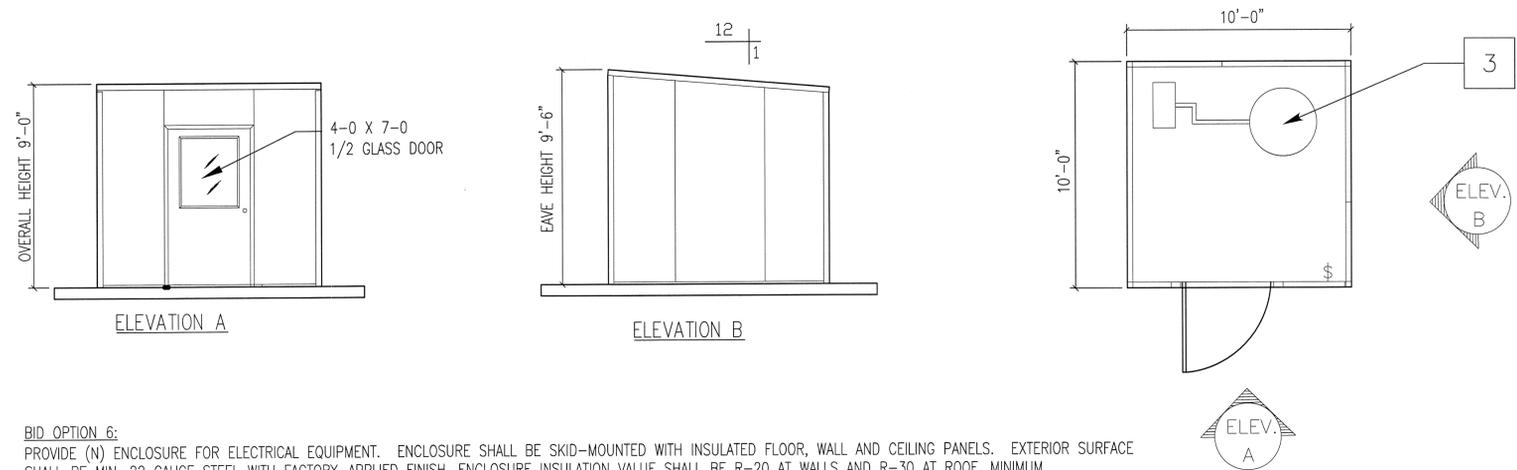


TYPICAL SUSPENDED CEILING DETAIL SCALE: 3 N.T.S. A3/A9



TYPICAL SUSPENDED CEILING DETAIL SCALE: 3 N.T.S. A3/A9

	<b>DEVELOPMENT ONE, INC.</b> 1611 East Fourth Street, Suite 250 Santa Ana, California 92701 J. Bruce Camino, Architect, AIA, NCARB (714) 689-0298 (714) 648-0197 FAX		5/9/14 E FINAL DESIGN 2/24/14 D 100% DESIGN 10/27/13 C 60% DEVELOPED DESIGN 6/21/13 B 30% PRELIMINARY DESIGN 12/21/12 A 15% CONCEPT DESIGN	DATE SYM REVISION BY A'PD	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ARMSTRONG FLIGHT RESEARCH CENTER EDWARDS, CA	DRAWING TITLE <b>DETAILS</b>	PROJECT TITLE <b>REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE</b>	APPROVALS Chief, Facilities Engineering & Asset Mgmt. Office: <i>D. Gandy</i> 7-10-15 Project Registrar/Inspector: <i>J. Oberer</i> 2-10-15 Facilities Project Manager: <i>Stanford Wilson</i> 1-27-15 Chief, Office of Protective Services: <i>K. P.</i> 1-28-15 Chief - Safety, Health and Environmental Office: <i>[Signature]</i> 1-27-15 Operational Informing Officer: <i>[Signature]</i> 3Feb15	DATE STRD: 5/9/14 DATE PRINTD: 5/9/14 DRAWN BY: DRW SCALE: AS NOTED TRADE SH. No.: A9 SHEET No. 15 of 48
	DATE: 5/9/14 SYM: E REVISION: FINAL DESIGN BY: A'PD		DATE: 5/9/14 SYM: E REVISION: FINAL DESIGN BY: A'PD		DATE: 5/9/14 SYM: E REVISION: FINAL DESIGN BY: A'PD		DATE: 5/9/14 SYM: E REVISION: FINAL DESIGN BY: A'PD		DATE: 5/9/14 SYM: E REVISION: FINAL DESIGN BY: A'PD



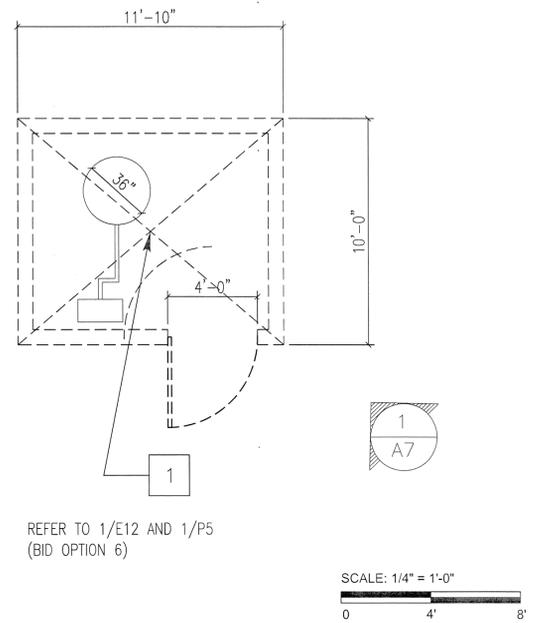
**BID OPTION 6:**  
 PROVIDE (N) ENCLOSURE FOR ELECTRICAL EQUIPMENT. ENCLOSURE SHALL BE SKID-MOUNTED WITH INSULATED FLOOR, WALL AND CEILING PANELS. EXTERIOR SURFACE SHALL BE MIN. 22 GAUGE STEEL WITH FACTORY-APPLIED FINISH. ENCLOSURE INSULATION VALUE SHALL BE R-20 AT WALLS AND R-30 AT ROOF, MINIMUM.

ENCLOSURE SHALL BE DESIGNED FOR A WIND LOAD OF 90 MPH, EXPOSURE 'D', AND FOR THE WEIGHT OF THE SPECIFIC ELECTRICAL EQUIPMENT TO BE INSTALLED.

ENCLOSURE SHALL INCLUDE INTERIOR LIGHTING, POWER CONNECTIONS FOR THE EQUIPMENT TO BE INSTALLED AND ONE ADDITIONAL CONVENIENCE ELECTRICAL OUTLET. SHOW ALL ELECTRICAL ITEMS IN SHOP DRAWINGS.

CONTRACTOR SHALL PROVIDE COORDINATION DRAWINGS SHOWING EQUIPMENT TO BE INSTALLED AND REQUIRED CLEARANCES. CONTRACTOR SHALL PROVIDE DETAILS FOR ANCHORING ENCLOSURE TO EXISTING CONCRETE PAD. ANCHORAGE DETAILS SHALL BE STAMPED BY CALIFORNIA LICENSED STRUCTURAL ENGINEER.

NOTE: SEE DETAILS 3/E12 AND 2/P5 FOR EQUIPMENT REQUIREMENTS.



**PUMP HOUSE B4983**

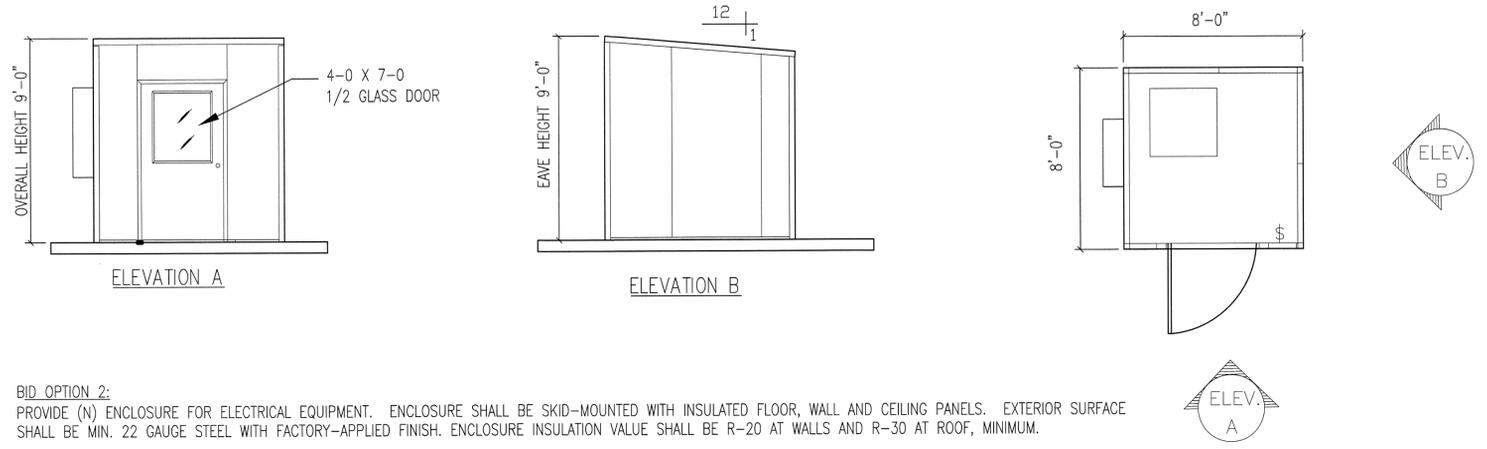
SCALE:  
1/4" = 1'-0"

3

**PUMP HOUSE B4983 DEMOLITION**

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

1



**BID OPTION 2:**  
 PROVIDE (N) ENCLOSURE FOR ELECTRICAL EQUIPMENT. ENCLOSURE SHALL BE SKID-MOUNTED WITH INSULATED FLOOR, WALL AND CEILING PANELS. EXTERIOR SURFACE SHALL BE MIN. 22 GAUGE STEEL WITH FACTORY-APPLIED FINISH. ENCLOSURE INSULATION VALUE SHALL BE R-20 AT WALLS AND R-30 AT ROOF, MINIMUM.

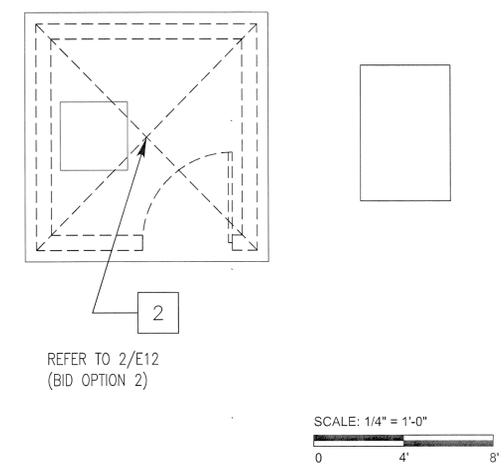
ENCLOSURE SHALL INCLUDE DUAL 1-TON A/C UNIT FACTORY-INSTALLED AND WARRANTED BY ENCLOSURE MANUFACTURER.

ENCLOSURE SHALL BE DESIGNED FOR A WIND LOAD OF 90 MPH, EXPOSURE 'D', AND FOR THE WEIGHT OF THE SPECIFIC ELECTRICAL EQUIPMENT TO BE INSTALLED.

ENCLOSURE SHALL INCLUDE INTERIOR LIGHTING, POWER CONNECTIONS FOR THE EQUIPMENT TO BE INSTALLED AND ONE ADDITIONAL CONVENIENCE ELECTRICAL OUTLET. SHOW ALL ELECTRICAL ITEMS IN SHOP DRAWINGS.

CONTRACTOR SHALL PROVIDE COORDINATION DRAWINGS SHOWING EQUIPMENT TO BE INSTALLED AND REQUIRED CLEARANCES. CONTRACTOR SHALL PROVIDE DETAILS FOR ANCHORING ENCLOSURE TO EXISTING CONCRETE PAD. ANCHORAGE DETAILS SHALL BE STAMPED BY CALIFORNIA LICENSED STRUCTURAL ENGINEER.

NOTE: REFER TO DETAIL 4/E12 FOR ELECTRICAL EQUIPMENT REQUIREMENTS.



**BORE SITE B4981**

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

4

**BORE SITE B4981 DEMOLITION**

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

2

**KEYNOTES**

- 1 DEMOLISH (E) PUMP HOUSE AND CLEAR AREA FOR NEW SKID MOUNTED PUMP AND ENCLOSURE - SEE DETAIL 3 FOR PUMP ENCLOSURE AND P5 FOR PUMP AND TANK REQUIREMENTS. PUMP HOUSE REPLACEMENT SCOPE IS BID OPTION 6.
- 2 DEMOLISH (E) BORE SITE BUILDING TO CONCRETE PAD .- SEE DETAIL 4 FOR EQUIPMENT ENCLOSURE. RELOCATE (E) ELECTRICAL EQUIPMENT TO (N) ENCLOSURE. BORE SITE BUILDING REPLACEMENT SCOPE IS BID OPTION 2.
- 3 PROVIDE NEW WATER TANK AND FOOTINGS - SEE SHEET P5 FOR TANK. SUBMIT FOOTING DESIGN BASED ON SPECIFIC TANK PROVIDED. FOOTING DESIGN MUST BE PREPARED AND STAMPED BY A CALIFORNIA LICENSED STRUCTURAL ENGINEER. SEE SHEET A11 FOR STRUCTURAL CRITERIA. (TANK REPLACEMENT IS BID OPTION 6)



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DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
6/21/13	B	30% PRELIMINARY DESIGN		
12/21/12	A	15% CONCEPT DESIGN		

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 ARMSTRONG FLIGHT RESEARCH CENTER  
 EDWARDS, CA

**DRAWING TITLE**  
 BORE SITE AND PUMP HOUSE

**PROJECT TITLE**  
 REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office <i>Don Rowley</i>	7-10-15
Project Requestor/Customer <i>T.A. Aheret</i>	7-10-15
Facilities Project Manager <i>Stacy Nelson</i>	1-27-15
Chief, Office of Professional Services <i>[Signature]</i>	1-28-15
Chief - Safety, Health and Environmental Office <i>[Signature]</i>	1-27-15
SPSIC (Procurement) Officer <i>[Signature]</i>	3Feb15

DATE STRD: / / DATE PRINTD: 5/9/14

DRAWN BY: DRW: EDM-1728  
 SCALE: AS NOTED  
 FILE NAME: A10 SHEET No. 16 of 48

**GENERAL**

- THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE, AND SHALL BE RESPONSIBLE FOR CONDITIONS OF ALL WORK AND MATERIALS INCLUDING THOSE FURNISHED BY SUB-CONTRACTORS. STRUCTURAL ENGINEER OF RECORD SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
- ALL MATERIALS AND WORKMANSHIP SHALL BE PERFORMED IN ACCORDANCE WITH 2013 CALIFORNIA BUILDING CODE.
- ALL DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE SHOWN ON PLANS, SECTIONS AND DETAILS.
- NOTES AND DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
- WHERE NO DETAILS SHOWN OR NOTED ON THE DRAWINGS, THE DETAILS SHALL BE THE SAME AS FOR OTHER SIMILAR WORK.
- OPENINGS, POCKETS, SLEEVES, ETC., SHALL NOT BE PLACED IN SLABS, BEAMS, WALLS, COLUMNS AND FOOTINGS UNLESS SPECIFICALLY DETAILED ON THE STRUCTURAL DRAWINGS.
- THIS SET OF DRAWINGS REPRESENT THE FINISHED STRUCTURE, METHOD OF CONSTRUCTION NOT NECESSARY INDICATED, THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKERS AND OTHER PERSONS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE BUT NOT BE LIMITED TO BRACING, SHORING, SCAFFOLDING, ETC.

**FOUNDATION**

- THE SOILS BEARING PRESSURE = 1,500 p.s.f.
- SUBGRADE SHALL BE 2" SAND OVER AND BELOW POLYETHYLENE FILM VAPOR BARRIER.
- SIDE OF FOUNDATION MAY BE POURED AGAINST STABLE EARTH UNLESS SHOWN OR NOTED OTHERWISE.
- CONTRACTOR SHALL PROVIDE TEMPORARY AND PERMANENT DEWATERING FOR EITHER SURFACE WATER, GROUND WATER OR SEEPAGE WATER.

**CONCRETE**

- ALL CONCRETE SHALL BE NORMAL WEIGHT CONFORMING TO THE FOLLOWING:
 

LOCATION	28-DAY MIN. COMPRESSIVE STRENGTH	MAXIMUM AGGREGATE SIZE (IN.)	MIX DESIGN SLUMP (INCHES)
A. ALL CONC. WORKS	4000 psi	1	3 (4" MAX)
- ALL CONCRETE MIX DESIGN SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION.
- PORTLAND CEMENT SHALL CONFORM TO ASTM C-150, TYPE V CEMENT WITH WATER-CEMENT RATIO OF 0.45
- AGGREGATE SHALL CONFORM TO ASTM C-33.
- WATER SHALL BE CLEAN, FREE FROM DELETERIOUS AMOUNTS OF ACIDS, ALKALIS OR ORGANIC MATERIALS, OILS, SALTS AS PER ACI 318.
- NOT USED.
- UNLESS SHOWN OR NOTED OTHERWISE, CONCRETE COVERAGE FOR REINFORCING BAR TO FACE OF BAR SHALL BE AS FOLLOWS:
 

A. CONCRETE IN CONTACT WITH EARTH, UNFORMED	3"
B. CONCRETE IN CONTACT WITH EARTH, FORMED	2"
C. WALLS	1.5"
D. BEAMS, GIRDERS & COLUMNS (TO TIES OR STIRRUPS)	1.5"
- CONDUIT PLACED IN A CONCRETE SLAB SHALL NOT EXCEED 1/3 OF THE THICKNESS OF THE SLAB AND SHALL BE PLACED BETWEEN THE TOP AND BOTTOM REINFORCING STEEL. MINIMUM CLEAR DISTANCE BETWEEN CONDUITS SHALL BE 6".
- CONSTRUCTION JOINTS: THE SURFACES OF ALL CONSTRUCTION JOINTS SHALL BE CLEAN, FREE FROM LOOSE DEBRIS. IMMEDIATELY BEFORE NEW CONCRETE IS PLACED, ALL CONSTRUCTION JOINTS SHALL BE WETTED AND STANDING WATER REMOVED.
- CONCRETE SHALL BE CURED IN ACCORDANCE WITH SECT 1905.11 OF 2013 C.B.C.
- REMOVAL OF CONCRETE FORMS AND SHORES SHALL BE IN ACCORDANCE WITH SECTION 1906.2 OF 2013 C.B.C.
- CONDUITS AND PIPES EMBEDDED IN CONCRETE SHALL COMPLY WITH THE PROVISION OF SECTION 1906.3 OF 2013 C.B.C.
- DESIGN AND CONSTRUCTION OF CONCRETE FORMWORK SHALL CONFORM TO ACI 347 "RECOMMENDED PRACTICE FOR CONCRETE FORMWORK".
- ALL SAW CUTS IN SLAB ON GRADE SHALL BE MADE NOT LATER THAN 24 HOURS AFTER PLACING CONCRETE.

**REINFORCING STEEL**

- ALL REINFORCING BARS SHALL BE ASTM A-615 GRADE 60 DEFORMED BILLET STEEL BARS, EXCEPT NOTED BELOW:
  - WELDED SMOOTH WIRE FABRIC SHALL CONFORM TO ASTM A-185.
- GRADE 60 BARS SHALL BE MARKED SO ITS IDENTIFICATION CAN BE MADE WHEN THE FINAL IN PLACE INSPECTION IS MADE.
- THE TIE WIRE USED SHALL BE BLACK ANNEALED WIRE, 16 GA. OR HEAVIER.
- BAR SUPPORTS SHALL CONFORM TO THE BAR SUPPORT SPECIFICATIONS CONTAINED IN THE "MANUAL OF STANDARD PRACTICE" BY ACI.
- A CERTIFIED COPY OF MILL TEST ON EACH HEAT OF REINFORCING STEEL DELIVERED SHOWING PHYSICAL AND CHEMICAL ANALYSIS SHALL BE PROVIDED UPON REQUEST AT THE TIME OF SHIPMENT.
- ALL REQUIREMENT OF CONCRETE REINFORCEMENT NOT COVERED ON THE DRAWINGS SHALL BE IN ACCORDANCE WITH ACI "MANUAL OF STANDARD PRACTICE".
- REINFORCING STEEL AT THE TIME OF THE CONCRETE IS PLACED SHALL BE FREE FROM MUD, OIL, OR OTHER NON METALLIC COATINGS THAT ADVERSELY AFFECT BONDING CAPACITY.
- ALL HOOKS SHALL CONFORM TO THE BEND DIMENSION PER ACI "STANDARD HOOK" UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- REINFORCING BARS SHALL NOT BE BENT OR STRAIGHTENED IN A MANNER THAT WILL INJURE THE MATERIAL.
- REINFORCING BARS SHALL CONFORM ACCURATELY TO THE DIMENSIONS SHOWN ON THE DRAWINGS WITH THE FABRICATING TOLERANCES PER ACI "MANUAL OF STANDARD PRACTICE."
- BARS SHALL BE SECURELY TIED TO PREVENT DISPLACEMENT DURING THE CONCRETE OPERATION AND ALL DOWELS SHALL BE WIRED IN PLACE BEFORE DEPOSITING CONCRETE.
- SPLICES OF REINFORCEMENT SHALL HAVE 42 BAR DIAMETER LAP OR 2'-0" LAP MINIMUM.
- DOWELS BETWEEN FOOTINGS AND WALLS OR COLUMNS SHALL HAVE SAME SIZE AS THE VERTICAL REINFORCEMENT, EMBEDMENT OF DOWELS SHALL BE 36 BAR DIAMETER OR 2'-0" MINIMUM UNLESS OTHERWISE SHOWN.
- MINIMUM LAP OF MESH SHALL BE NOT LESS THAN THE SPACING OF THE CROSS WIRE PLUS TWO INCHES OR 60 DIA. OR 8 IN. WHICHEVER IS GREATER.

**EPOXY ANCHORS**

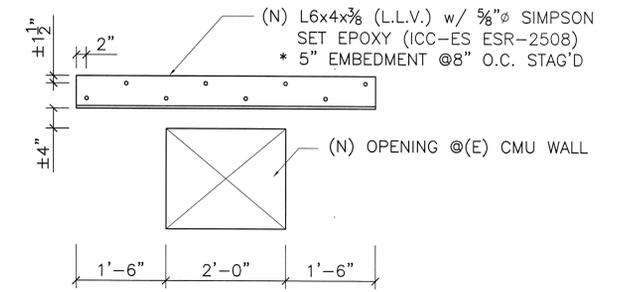
- EPOXY FOR EPOXY ANCHORS SHALL BE SET-XP EPOXY BY "SIMPSON STRONG-TIE" (ICC ER ESR-2508)
- ANCHORS USED FOR EPOXY ANCHORS SHALL BE CARBON STEEL CONFORMING TO ASTM A-307 THREADED RODS UNO. SIZE AND EMBEDMENT SHALL BE AS INDICATED ON PLANS.
- ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH THE EPOXY MANUFACTURER'S RECOMMENDATIONS AND THE CURRENT ICBO REPORT.
- SPECIAL INSPECTION SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 1704.13 OF THE IBC AND IN ACCORDANCE WITH THE SPECIFIC SPECIAL INSPECTION REQUIREMENTS SET FORTH IN THE CORRESPONDING ICC REPORT.
- DRILLED HOLES SHALL BE CLEANED OF DUST AND ANY DEBRIS USING NYLON BRUSH AND COMPRESSED AIR. OIL, SCALE, AND RUST SHALL BE REMOVED FROM THREADED RODS PRIOR TO INSTALLATION.
- UNLESS NOTED OTHERWISE IN THE PLANS, EPOXY ANCHORS SHALL HAVE THE FOLLOWING MINIMUM EMBEDMENT

BAR SIZE	MINIMUM EMBEDMENT*	REMARKS
#3	3 1/2"	
#4 OR 1/2"Ø	4 1/4"	
#5 OR 5/8"Ø	5 1/2"	
#6 OR 3/4"Ø	6 3/4"	

\* UNLESS NOTED OR DETAILED

**WELDING**

- ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS QUALIFIED AND CERTIFIED IN ACCORDANCE WITH THE QUALIFICATION PROCEDURE OF AWS.
- ALL WELDING SHALL BE ACCOMPLISHED USING THE SHIELDED METAL ARC WELDING PROCESS (SMAW) WITH E70XX ELECTRODES OR THE SUBMERGED ARC WELDING PROCESS (SAW) WITH E7X-EXXX ELECTRODES OR THE FLUX-CORED ARC WELDING PROCESS (FCAW) WITH E71T-8 ELECTRODES (E70T-4 ELECTRODES ALLOWED FOR SHOP WELDING ONLY). LOW HYDROGEN ELECTRODES SHALL BE USED AND KEPT DRY, AND PARENT METALS SHALL BE PREHEATED IN ACCORDANCE WITH AWS STANDARDS.
- ALL WELDING SHALL BE UNDER CONTINUOUS SPECIAL INSPECTION BY A REGISTERED SPECIAL INSPECTOR, EXCEPT WELDING DONE IN A BUILDING DEPARTMENT APPROVED FABRICATOR'S SHOP IN ACCORDANCE WITH 2010 CBC. WELDING INSPECTION MAY BE PERIODIC WHERE ALLOWED BY 2010 CBC. WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS. WELDERS SHALL HAVE LIGHT GAUGE STEEL CERTIFICATION WHEN WELDING LIGHT GAUGE STEEL.
- FULL PENETRATION WELDED CONNECTIONS (100%) AT MOMENT FRAMES, BRACED FRAMES, AND ALL FULL PENETRATION FIELD WELDS SHALL HAVE ULTRASONIC TESTING FOR COMPLIANCE WITH CBC 2010, OF THE UNIFORM BUILDING CODE. ULTRASONIC TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING AGENCY THAT HAS BEEN INSPECTED BY THE NATIONAL STANDARDS. TESTING INSPECTIONS SHALL BE QUALIFIED BY ASNT BUREAU OF RECOMMENDED PRACTICE SNT-TC-A1. PROVIDE SURFACE PREPARATION AND BACKUP PLATES AS REQUIRED PER AISC AND AWS.
- WELDING OF REINFORCING BARS SHALL BE DONE USING E 90XX ELECTRODES AND SHALL BE DONE ON A 706 REINFORCING STEEL ONLY. THE A 706 TYPE REINFORCING BARS SHALL BE IDENTIFIED BY THE SPECIAL INSPECTOR PRIOR TO WELDING IN THE FIELD. WELDING OF REINFORCING BARS SHALL CONFORM WITH AWS D1.4.
- WELD MATERIAL SHOULD BE ABLE TO ABSORB 20 "FOOT POUNDS" OF IMPACT AT MINUS TWENTY DEGREES FAHRENHEIT. FILLER METAL SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
  - SMAW - AWS A5.1 & A5.5
  - SAW - AWS A5.17 & A5.23
  - FCAW - AWS A5.29
- ALL EXPOSED WELDS SHALL BE FILLED AND GROUND SMOOTH WHERE METAL COULD COME IN CONTACT WITH THE PUBLIC.
- ALL WELDS SHOWN AS FULL PENETRATION (F.P.) SHALL BE FULLY DETAILED ON THE SHOP DRAWINGS.
- WELDING PROCEDURES, WELDER QUALIFICATION REQUIREMENTS AND WELDING ELECTRODES FOR STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF 2010 CBC.
- STEEL USED IN WELDING STRUCTURES SHALL CONFORM TO THE LIMITATIONS ON CHEMICAL PROPERTIES SPECIFIED IN THE LATEST EDITIONS OF AWS D1.1 AND D1.3 OF THE STRUCTURAL WELDING CODE - STEEL. PUBLISHED BY THE AMERICAN WELDING SOCIETY. NO WELDED SPLICES SHALL BE MADE EXCEPT THOSE SHOWN ON APPROVED PLAN.
- THE WELDING OF REINFORCING STEEL, METAL, INSERTS AND CONNECTIONS IN REINFORCED CONCRETE CONSTRUCTION SHALL CONFORM TO CBC STANDARD NO. 19-1.



MASONRY OPENING REINFORCEMENT

SCALE: 1/4" = 1'-0"  
N.T.S. A6A1

**PROJECT DESIGN CRITERIA**

- DESIGN BASED ON 2010 EDITION OF CALIFORNIA BUILDING CODE (CBC).
- SEISMIC DESIGN PARAMETERS (CBC,2010)

CATEGORIZATION/COEFFICIENT	DESIGN VALUE
SITE CLASS	D
SEISMIC DESIGN CATEGORY	D
MAPPED 0.2 SECOND SPECTRAL RESPONSE ACCELERATION S <sub>s</sub>	0.990 g
MAPPED ONE SECOND SPECTRAL RESPONSE ACCELERATION S <sub>1</sub>	0.428g
SITE COEFFICIENT FROM TABLE 1613A5.3(1), F <sub>a</sub>	0.9
SITE COEFFICIENT FROM TABLE 1613A5.3(2), F <sub>v</sub>	1.4
MAX. DESIGN SPECTRAL RESPONSE ACCELERATION FOR SHORT PERIOD, S <sub>ms</sub>	1.093g
MAX. DESIGN SPECTRAL RESPONSE ACCELERATION FOR ONE-SECOND PERIOD, S <sub>m1</sub>	0.673 g
DESIGN (5% DAMPED) SPECTRAL RESPONSE ACCELERATION FOR SHORT PERIOD, S <sub>ds</sub>	0.729g
DESIGN (5% DAMPED) SPECTRAL RESPONSE ACCELERATION FOR ONE-SECOND PERIOD, S <sub>d1</sub>	0.449g

- BASIC WIND SPEED = 110 MPH  
EXPOSURE = C  
IMPORTANT FACTOR I = 1.0

<p><b>DEVELOPMENT ONE, INC.</b> 1611 East Fourth Street, Suite 250 Santa Ana, California 92701 J. Bruce Camino, Architect, AIA, NCARB (714) 689-0298 (714) 648-0197 FAX</p>	<table border="1"> <tr> <th>DATE</th> <th>SYM</th> <th>REVISION</th> <th>BY</th> <th>A'PD</th> </tr> <tr> <td>5/9/14</td> <td>E</td> <td>FINAL DESIGN</td> <td></td> <td></td> </tr> <tr> <td>2/24/14</td> <td>D</td> <td>100% DESIGN</td> <td></td> <td></td> </tr> <tr> <td>10/27/13</td> <td>C</td> <td>60% DEVELOPED DESIGN</td> <td></td> <td></td> </tr> <tr> <td>6/21/13</td> <td>B</td> <td>30% PRELIMINARY DESIGN</td> <td></td> <td></td> </tr> <tr> <td>12/21/12</td> <td>A</td> <td>15% CONCEPT DESIGN</td> <td></td> <td></td> </tr> </table>	DATE	SYM	REVISION	BY	A'PD	5/9/14	E	FINAL DESIGN			2/24/14	D	100% DESIGN			10/27/13	C	60% DEVELOPED DESIGN			6/21/13	B	30% PRELIMINARY DESIGN			12/21/12	A	15% CONCEPT DESIGN			<p>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ARMSTRONG FLIGHT RESEARCH CENTER EDWARDS, CA</p> <p>DRAWING TITLE <b>STRUCTURAL NOTES</b></p> <p>PROJECT TITLE REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE</p>	<p>APPROVALS</p> <table border="1"> <tr> <th>DATE</th> <th>APPROVALS</th> </tr> <tr> <td>7-10-15</td> <td><i>Da...</i></td> </tr> <tr> <td>2-10-15</td> <td><i>J. Debe...</i></td> </tr> <tr> <td>1-27-15</td> <td><i>St...</i></td> </tr> <tr> <td>1-28-15</td> <td><i>YDA</i></td> </tr> <tr> <td>1-27-16</td> <td><i>...</i></td> </tr> <tr> <td>3 Feb 15</td> <td><i>...</i></td> </tr> </table>	DATE	APPROVALS	7-10-15	<i>Da...</i>	2-10-15	<i>J. Debe...</i>	1-27-15	<i>St...</i>	1-28-15	<i>YDA</i>	1-27-16	<i>...</i>	3 Feb 15	<i>...</i>
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**AIR HANDLING UNIT SCHEDULE**

SYMBOL	SUPPLY FAN							COOLING COIL										FILTER	OPERATING WEIGHT (LBS.)	REMARKS							
	CFM	EXT S.P.	NO. OF FANS	DRIVE	RPM	BHP PER FAN	ELECTRICAL			MIN. OSA (CFM)	MAX. FACE VELOCITY (FPM)	ROWS	FPI	TOTAL CAPACITY MBH	SENSIBLE CAPACITY MBH	ENT. AIR TEMP. (°F)					LVG. AIR TEMP. (°F)		CHILLED WATER TEMP. (°F)		FLOW RATE GPM	AIR PRESSURE DROP (IN WG)	WATER PRESSURE DROP
							MOTOR TOTAL HP	VOLT	PHASE							DB	WB				DB	WB	ENT	LVG.			
AH 1	3300	1.5	1	BELT	1612	1.817	2	460-60	3ø	120	450	6	14	77.87	66.48	79.00	65.20	58.2	57.8	45	55	15.3	.35	.59	4" PLEATED MEDIA-MERV 13	1450	- WITH 20KW DUCT HEATER, 460V-3ø-60, 2-STAGE. PROVIDE SA DUCT SMOKE DETECTOR.
AH 2	3300	1.5	1	BELT	1277	2.05	2	460-60	3ø	175	450	6	14	77.0	68.77	78.70	65.20	58.3	57.8	45	55	15.40	.463	.94	2" PLEATED MEDIA-MERV 13	550	- WITH 10KW DUCT HEATER, 460V-3ø-60, 2-STAGE. PROVIDE SA DUCT SMOKE DETECTOR.

**PACKAGED HEAT PUMP SCHEDULE**

SYMBOL	DESCRIPTION	LOCATION	AREA SERVED	NOMINAL TONNAGE	COOLING (BTUH)			HEATING (BTUH)			ELECTRICAL AT 60Hz				SUPPLY FAN ESP (INCHES)	MIN. OSA (CFM)	REFRIGERANT TYPE	OPERATING WEIGHT (LBS)	REMARKS	
					TOTAL	SENSIBLE	SEER/EER	INPUT	OUTPUT	COP/HSPF	MCA	MOCP	VOLT	PHASE						CFM
HP 1	SINGLE PACKAGE AC UNIT	BUILDING 4982	WORK ROOM	3	34,000	27,100	15.60	19,540	17,620	8.0	28	30	460	3	1,200	.75	120	R-410A	535	- WITH INTEGRATED 10.6KW HEATER, LOW AMBIENT KIT, BAROMETRIC RELIEF. OA HOOD

**CHILLED WATER PUMP UNIT SCHEDULE**

SYMBOL	DESCRIPTION	TYPE	SERVICE	LOCATION	GPM	HEAD IN FT.	ELECTRICAL AT 60Hz			RPM	ISOLATION TYPE	OPERATING WEIGHT (LBS)	REMARKS
							HP	VOLT	PHASE				
CHWP 1	CHW PUMP	END SUCTION	CHILLED WATER	BUILDING 4982	106	110	10	460	3	1,770	FRAME MOUNTED	336	- REUSE EXISTING ISOLATION CURB.
CHWP 2	CHW PUMP	END SUCTION	CHILLED WATER	BUILDING 4982	106	110	10	460	3	1,770	FRAME MOUNTED	336	- REUSE EXISTING ISOLATION CURB.

**PACKAGED COOLING ONLY A/C UNIT SCHEDULE**

SYMBOL	DESCRIPTION	LOCATION	AREA SERVED	NOMINAL TONNAGE	COOLING (BTUH)			ELECTRICAL AT 60Hz				SUPPLY FAN		MIN. OSA (CFM)	REFRIGERANT (LBS)	OPERATING WEIGHT (LBS)	REMARKS	
					TOTAL	SENSIBLE	EER	MCA	MOCP	VOLT	PHASE	CFM	ESP (INCHES)					HP
AC 1	SINGLE PACKAGE AC UNIT	BUILDING 4720	COMPUTER ROOM	7.5	87,130	69,690	12.20	18.0	20	460	3	3,000	1.0	2	120	R-410A	881	- WITH ECONOMIZER AND BAROMETRIC RELIEF. - WITH LOW AMBIENT KIT. - PROVIDE DUCT SMOKE DETECTOR.

**SPLIT SYSTEM HEAT PUMP SCHEDULE**

OUTDOOR CONDENSING UNIT																	FAN COIL UNIT												
SYMBOL	DESCRIPTION	LOCATION	AREA SERVED	NOMINAL TONNAGE	COOLING (BTUH)			HEATING (BTUH)			ELECTRICAL AT 60 HZ				REFRIGERANT TYPE	OPERATING WEIGHT (LBS)	REMARKS	SYMBOL	DESCRIPTION	LOCATION	AREA SERVED	SUPPLY FAN		ELECTRICAL AT 60 HZ			OPERATIONAL WEIGHT (LBS)	REMARKS	
					TOTAL	SENSIBLE	SEER/EER	INPUT	OUTPUT	COP/HSPF	MCA	MOCP	VOLT	PHASE								CFM	ESP (INCHES)	CFM	INCHES	CFM			MOTOR (HP)
CU 3	AIR COOLED CONDENSING UNIT	BUILDING 4720	COMPUTER ROOM, OFFICE, BREAK ROOM	15.0	168,000	136,000	10.6	89,600	82,100	3.4	30	40	460	3	R410A	770	- WITH LOW AMBIENT KIT.	FC 2	FAN COIL	BUILDING 4720	COMPUTER ROOM, OFFICE, BREAK ROOM	6,000	1.0	300	3.7	460	3	720	WITH INTEGRATED 20KW HEATER. 100% SLOPED ECONOMIZER (MODULATING) BAROMETRIC RELIEF PROVIDE DUCT SMOKE DETECTOR. 6" SUB-BASE. SEE NOTES BELOW

**NOTES:**

- PROVIDE SLOPED ROOF ON THE UNIT.
- CAULK AROUND ALL PANELS, EXCEPT THE PANEL WHERE ELECTRICAL AND REFRIGERANT CONNECTIONS ARE MADE AND ADD DRIP ACCESSORY.
- BONDED WASHERS SHALL BE INSTALLED ON ALL SCREWS.
- COAT THE UNIT TO PROTECT THE EXTERIOR FROM THE ELEMENTS.

**AIR DISTRIBUTION SCHEDULE**

SYMBOL	MODULE SIZE	NECK SIZE	CFM RANGE	REMARKS
CD-1 FOR LAY-IN CEILING, MODULAR CORE	24"x24"	6"	60-160	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		8"	110-210	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		10"	180-400	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		12"	240-550	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		14"	350-750	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		16"	450-800	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		18"	801-1000	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
CD-2 FOR SURFACE MOUNTED	12"x12"	6"	80-200	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		8"	150-350	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		10"	220-550	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		12"	320-700	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		14"	450-850	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		16"	500-950	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.

**AIR DISTRIBUTION SCHEDULE**

SYMBOL	MODULE SIZE	NECK SIZE	CFM RANGE	REMARKS
CD-3 FOR LAY-IN CEILING, MODULAR CORE.	24"x24"	6"x6"	60-100	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		8"x8"	101-200	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		10"x10"	201-300	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		12"x12"	301-450	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		14"x14"	451-600	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
		16"x16"	601-800	- 4-WAY THROW, UNLESS NOTED ON OTHERWISE ON PLANS.
CG-1 FOR LAY-IN AND SURFACE MOUNTED	-	6"x6"	60-100	- SURFACE MOUNTED. FIXED DEFLECTION RETURN. 3/4" SPACING, 35° DEFLECTION
		8"x8"	101-200	- SURFACE MOUNTED. FIXED DEFLECTION RETURN. 3/4" SPACING, 35° DEFLECTION
		10"x10"	201-300	- SURFACE MOUNTED. FIXED DEFLECTION RETURN. 3/4" SPACING, 35° DEFLECTION
		12"x12"	301-450	- SURFACE MOUNTED. FIXED DEFLECTION RETURN. 3/4" SPACING, 35° DEFLECTION
		14"x14"	451-600	- SURFACE MOUNTED. FIXED DEFLECTION RETURN. 3/4" SPACING, 35° DEFLECTION
		16"x16"	601-800	- SURFACE MOUNTED. FIXED DEFLECTION RETURN. 3/4" SPACING, 35° DEFLECTION
		18"x18"	801-1000	- SURFACE MOUNTED. FIXED DEFLECTION RETURN.
SWS	-	-	-	- SURFACE MOUNTED. DOUBLE DEFLECTION, 3/4" SPACING. - SEE PLANS FOR SIZE AND CFM.

**AIR DISTRIBUTION SCHEDULE**

SYMBOL	MODULE SIZE	NECK SIZE	CFM RANGE	REMARKS
SWR	-	-	-	- SURFACE MOUNTED. 3/4" SPACING, 35° DEFLECTION. - SEE PLANS FOR SIZE AND CFM.
EG-1 TITUS "350RL" OR APPROVED EQUAL.	-	6"x6"	60-100	- SURFACE MOUNTED. FIXED DEFLECTION EXHAUST.
		8"x8"	101-200	- SURFACE MOUNTED. FIXED DEFLECTION EXHAUST.
		10"x10"	201-300	- SURFACE MOUNTED. FIXED DEFLECTION EXHAUST.
		12"x12"	301-450	- SURFACE MOUNTED. FIXED DEFLECTION EXHAUST.
		14"x14"	451-600	- SURFACE MOUNTED. FIXED DEFLECTION EXHAUST.
		16"x16"	601-800	- SURFACE MOUNTED. FIXED DEFLECTION EXHAUST.
EG-2 TITUS "350 RL" OR APPROVED EQUAL.	12"x12"	-	0-120	- SURFACE MOUNTED
SWE TITUS "350 RL" OR APPROVED EQUAL.	SEE PLANS FOR SIZE	-	-	- SIDEWALL EXHAUST GRILLE.

**AIR SEPARATOR SCHEDULE**

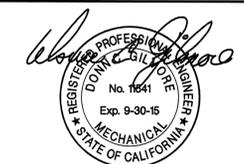
SYMBOL	DESCRIPTION	LOCATION	SERVICE	MAX. FLOW RATE AT 6 FPS (GPM)	PIPE SIZE (IN)	MAX. WORKING PRESSURE (PSI)	OPERATING WEIGHT (LBS)	REMARKS
AS 1	CHILLED WATER AIR SEPARATOR	BUILDING 4982 UTILITY ROOM	CHILLED WATER	90	2-1/2"	150	65	- ASME AIR SEPARATOR LESS STRAINER

**BLADDER TANK SCHEDULE**

SYMBOL	DESCRIPTION	LOCATION	SERVICE	CAPACITY (GAL)	MAX. WORKING PRESSURE (PSI)	OPERATING WEIGHT (LBS)	REMARKS
BT 1	CHILLED WATER BLADDER TANK	BUILDING 4982 UTILITY ROOM	CHILLED WATER	22	150	120	

**CHEMICAL POT FEEDER SCHEDULE**

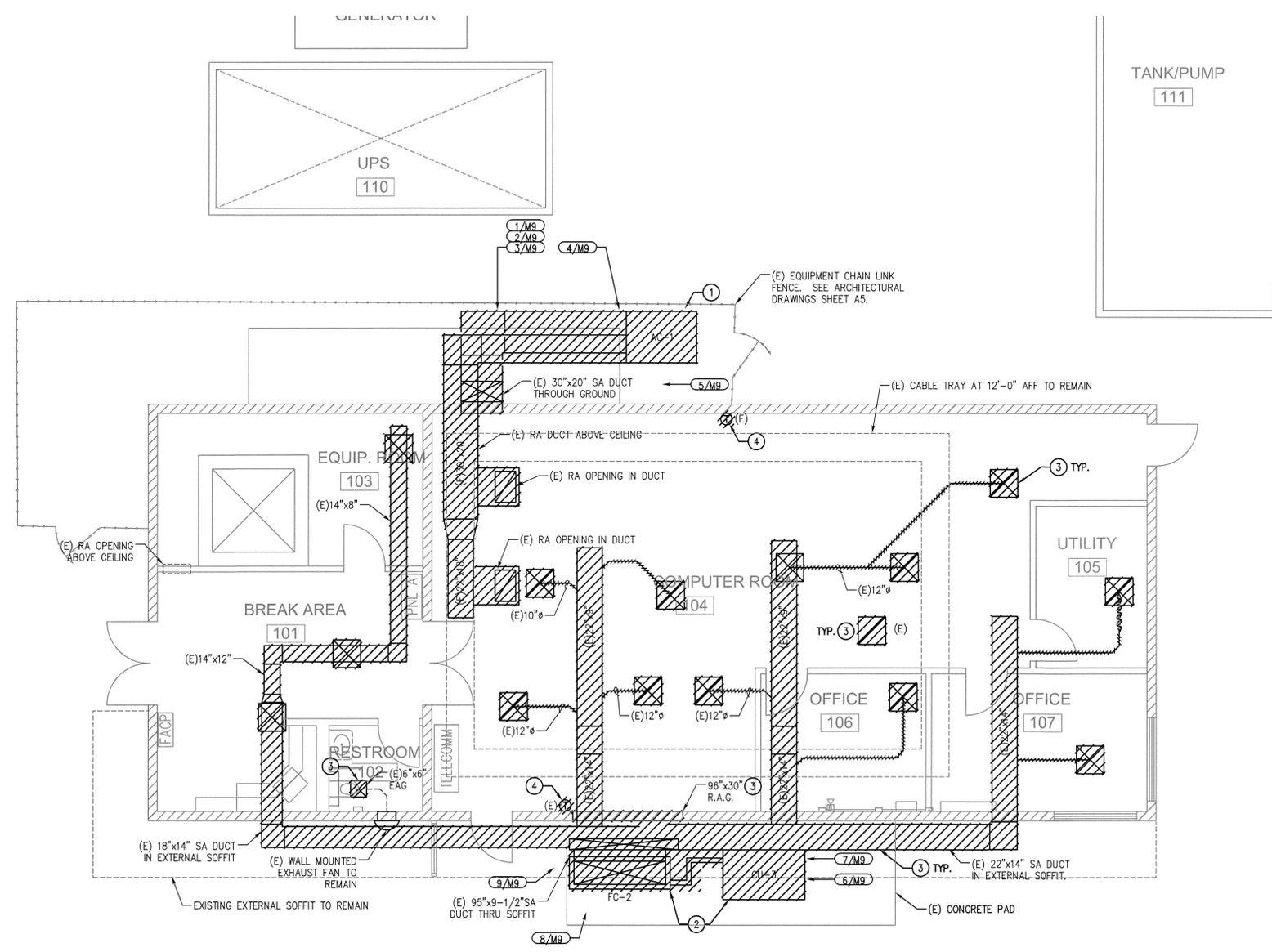
SYMBOL	DESCRIPTION	LOCATION	SERVICE	CAPACITY (GAL)	MAX. WORKING PRESSURE (PSI)	MAX. TEMP. (°F)	OPERATING WEIGHT (LBS)	REMARKS
CPF 1	CHEMICAL POT FEEDER	BUILDING 4982 UTILITY ROOM	CHILLED WATER	2	150	212	45	WITH FLOW INDICATOR DRAIN COCK.

  
**DONN C. GILMORE & ASSOC.**  
 REGISTERED PROFESSIONAL ENGINEERS  
 CONSULTING MECHANICAL AND ELECTRICAL ENGINEERS  
 5000 E. Spring St., 8th Floor Long Beach, CA 90815  
 591 Camino De La Reina, Ste. 1107 San Diego, CA 92108  
 Ph.: 562.497.2999 Fax: 619.618.2347

DATE	SYM	REVISION	BY	A/PD
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2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
6/21/13	B	30% DEVELOPED DESIGN		
12/21/12	A	15% CONCEPT DESIGN		

<b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		APPROVALS Chief, Facilities Engineering & Agent Mgmt. Office Project Requester/Customer Facilities Project Manager Chief, Office of Protective Services Chief - Safety, Health and Environmental Office Chief, Information Office	DATE 7-10-15 2-10-15 1-27-15 1-28-15 3-Feb-15
DRAWING TITLE <b>MECHANICAL SCHEDULES          BLDGS 4720 AND 4982</b>		PROJECT TITLE <b>REVITALIZE RADAR AND TELEMETRY          TRACKING INFRASTRUCTURE</b>	
DATE STRTD	DATE PRINTD	5/9/14	
DRAWN BY	AS NOTED	TRADE SH. No.	EDM-1728
SCALE	AS NOTED	FILE NAME	M1 SHEET No. 19 of 48

DWG: P112088 NASA ATF1000M12088 RZ.dwg USER: Alex Hernandez BLD: 4720 BASE: Demo IMAGES:  
 DATE: Sep 09, 2014 9:09am XREFS: A-TBLOCK.dwg Bases Plot RW2



**BUILDING 4720 – AERONAUTICAL TRACKING FACILITY (ATF 2)**  
 SCALE: 3/16" 1'-0

**REFERENCE NOTES:**

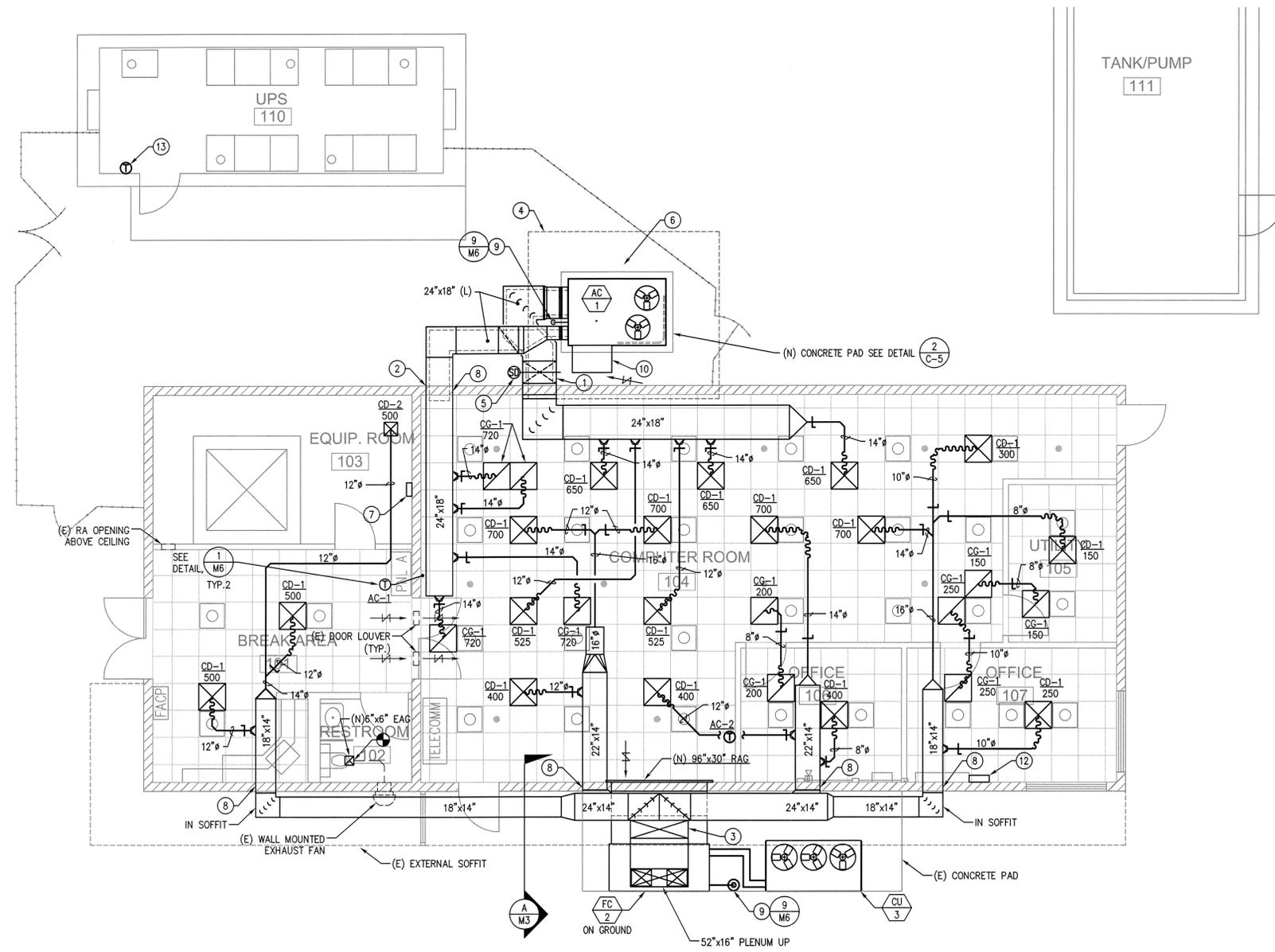
- ① EXISTING AC-1 SERVES COMPUTER ROOM TO BE REMOVED AND DISPOSED OF.
- ② EXISTING FC-2 AND CU-3 (SPLIT SYSTEM) SERVES BREAK AREA, COMPUTER ROOM, OFFICES AND UTILITY ROOM TO BE REMOVED AND DISPOSED OF INCLUDING ELECTRICAL DUCT HEATER, SMOKE DETECTION, REFRIGERANT PIPING AND OTHER APPURTENANCES.
- ③ EXISTING DUCTS, DIFFUSERS, GRILLES TO BE REMOVED AND DISPOSED OF.
- ④ EXISTING THERMOSTAT TO BE REMOVED AND DISPOSED OF.



 <b>DONN C. GILMORE &amp; ASSOC.</b> FOUNDED 1959 Consulting Mechanical and Electrical Engineers 5000 E. Spring St., 8th Floor Long Beach, CA 90815 591 Camino De La Reina, Ste. 1107 San Diego, CA 92108 Ph.: 562.497.2999 Ph.: 619.618.2347		DATE	SYM	REVISION	BY	A'PD
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<b>DRAWING TITLE</b> MECHANICAL DEMOLITION – BUILDING 4720		<b>DATE STRD</b> ANH, MT, WAS AS NOTED M2	<b>DATE PRINTD</b> 5/9/14 <b>EDM-1728</b> SHEET No. 20 of 48

<b>PROJECT TITLE</b> REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE		<b>DATE STRD</b> ANH, MT, WAS AS NOTED M2	<b>DATE PRINTD</b> 5/9/14 <b>EDM-1728</b> SHEET No. 20 of 48
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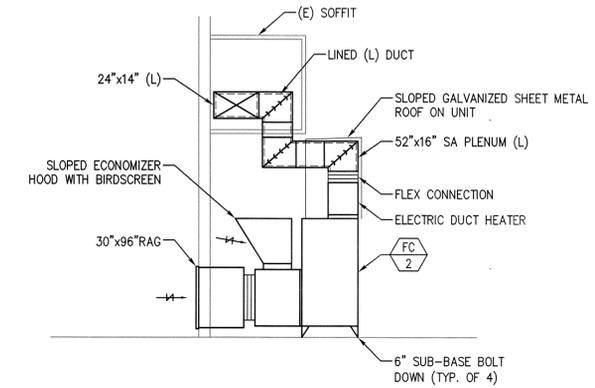


**GENERAL NOTES:**

1. REPLACE EXISTING CONTROLS WITH NEW DIRECT DIGITAL CONTROLS (DDC) AND TIED INTO THE CAMPUS WIDE EMS SYSTEM. REFER TO SHEET M7.

**REFERENCE NOTES:**

- 1 (N) 24"x18"(L) SAD PLENUM UP AND THRU WALL ABOVE CEILING.
- 2 (N) 24"x18"(L) RAD THRU WALL ABOVE CEILING.
- 3 52"x16"(L) SAD THRU EXTERNAL SOFFIT.
- 4 MINIMUM SERVICE CLEARANCE PER MANUFACTURER'S RECOMMENDATION.
- 5 PROVIDE SA DUCT SMOKE DETECTOR. ALARM SHALL BE COMPATIBLE WITH EXISTING SIMPLEX SYSTEM.
- 6 PROVIDE SERVICE ACCESS TO AC UNIT.
- 7 PROPOSED DDC CONTROL PANEL LOCATION.
- 8 REUSE EXISTING WALL PENETRATION FOR NEW DUCTWORK. MODIFY EXISTING WALL OPENING AS REQUIRED, PATCH AND SEAL AIR TIGHT.
- 9 (N) 3/4" CONDENSATE DRAIN TO DRYWELL.
- 10 HORIZONTAL ECONOMIZER.
- 11 INSULATED REFRIGERANT LINES.
- 12 PROPOSED ANNUNCIATOR PANEL. PROVIDE WIRED ROOM TEMPERATURE SENSOR AND ALARM PANEL FOR UPS EQUIPMENT SHELTER #110. TEMPERATURE RANGE ADJUSTABLE TO 95 DEGREES F. WIRED ANNUNCIATOR PANEL TO BE LOCATED IN BUILDING MANNED OFFICE, WITH 90dB ALARM SOUNDING FOR 45 SECONDS (MINIMUM) TEMPERATURE MONITOR INTERVALS TO BE 60 SECONDS (MAXIMUM) AND ACCURATE TO PLUS OR MINUS 3 DEGREES F.
- 13 PROPOSED TEMPERATURE SENSOR LOCATION.



**SECTION A**

SCALE: NONE



**BUILDING 4720 – AERONAUTICAL TRACKING FACILITY (ATF 2)**

SCALE: 3/16" 1'- 0"



**REGISTERED PROFESSIONAL ENGINEER**  
**MECHANICAL**  
 No. 11641  
 Exp. 9-30-15  
**STATE OF CALIFORNIA**

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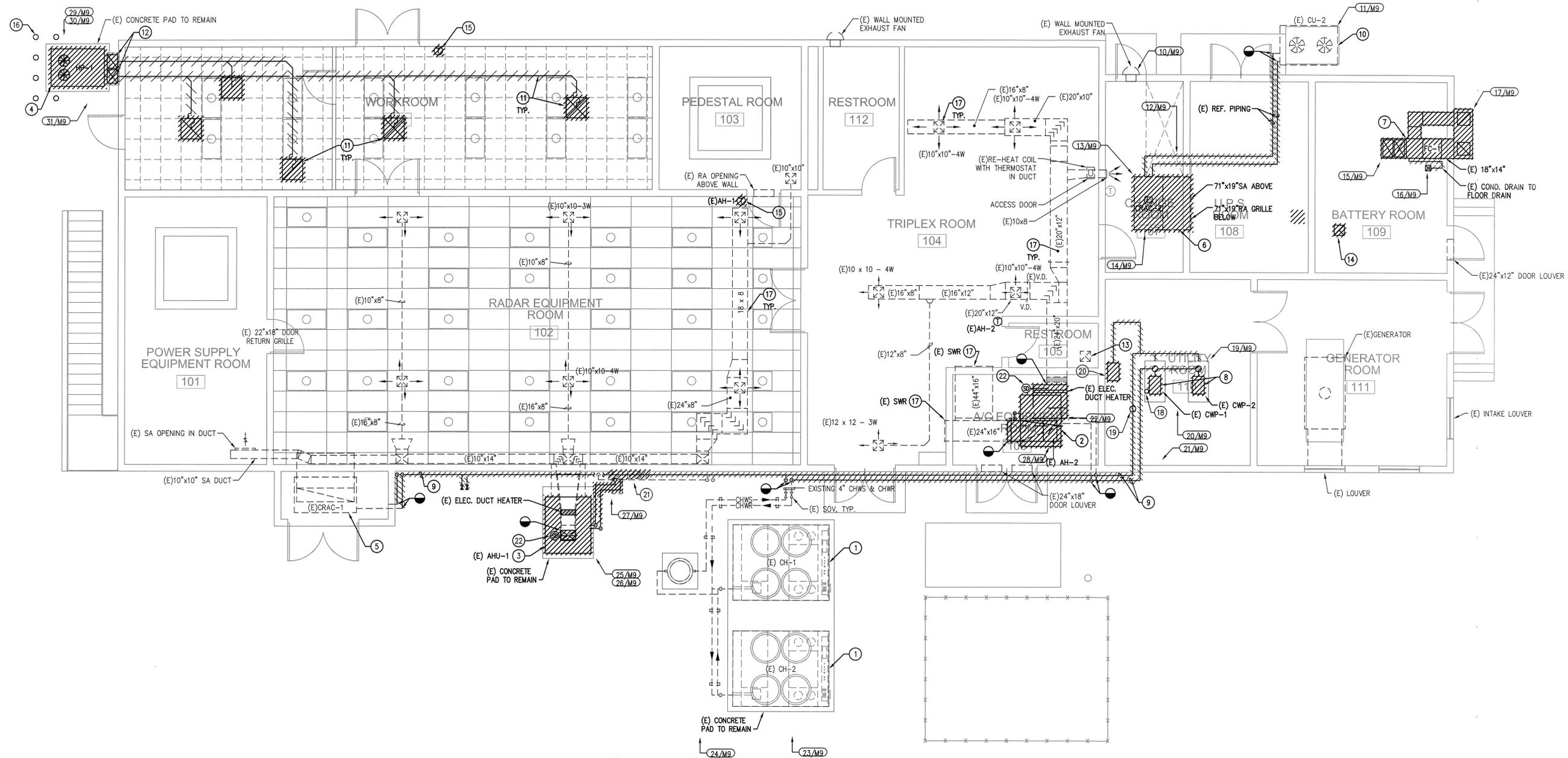
**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 DRYDEN FLIGHT RESEARCH CENTER  
 EDWARDS, CA

**DRAWING TITLE**  
 MECHANICAL REMODEL – BUILDING 4720

**PROJECT TITLE**  
 REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

APPROVALS		DATE
Chief, Facility Engineering & Asset Mgmt. Office	<i>[Signature]</i>	7-10-15
Project Manager	<i>[Signature]</i>	2-10-15
Facilities Project Manager	<i>[Signature]</i>	1-27-15
Chief, Office of Protective Services	<i>[Signature]</i>	1-28-15
Chief - Safety, Health and Environment Office	<i>[Signature]</i>	1-27-15
ERIC (2015) Information Officer	<i>[Signature]</i>	3 Feb 15
DATE STRTD	DATE PRNTD	5/9/14
DRAWN BY	ANH, MT, WAS	EDM-1728
SCALE	AS NOTED	TRADE SH. No.
FILE NAME	M3	SHEET No. 21 of 48

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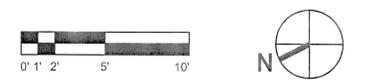


**BUILDING 4982 – AERONAUTICAL TRACKING FACILITY 1 (ATF 1)**  
 SCALE: 3/16" 1'- 0"

**REFERENCE NOTES:**

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| <p>① EXISTING CHILLERS (CH-1 &amp; 2) TO REMAIN.</p> <p>② EXISTING AH-2 AND ELECTRIC DUCT HEATER SERVING TRIPLEX ROOM, TO BE REMOVED AND DISPOSED OF.</p> <p>③ EXISTING AH-1 AND ELECTRIC DUCT HEATER SERVING RADAR EQUIPMENT ROOM / POWER SUPPLY EQUIPMENT ROOM, TO BE REMOVED AND DISPOSED OF.</p> <p>④ EXISTING HP-1 SERVING WORK ROOM, TO BE REMOVED AND DISPOSED OF.</p> <p>⑤ EXISTING CRAC-1 SERVING RADAR EQUIPMENTS, UNDER FLOOR AIR DISTRIBUTION, TO REMAIN.</p> <p>⑥ EXISTING CRAC-2 SERVING UPS ROOM THRU WALL TO BE RELOCATED, INCLUDING DUCTWORK, DIFFUSERS/GRILLES, REFRIGERANT PIPING AND OTHER APPURTENANCES. SEE REMODEL PLAN FOR EXACT LOCATION.</p> <p>⑦ EXISTING SELF CONTAINED AC UNIT (FC-1) SERVING BATTERY ROOM INCLUDING DUCTWORK, PIPING AND OTHER APPURTENANCES TO BE REMOVED AND DISPOSED OF.</p> <p>⑧ EXISTING CHILLED WATER PUMPS CWP-1/CWP-2 SERVING CH-1/CH-2, TO BE REPLACED. EXISTING CONCRETE PAD TO REMAIN AND BE REUSED.</p> <p>⑨ EXISTING 2-1/2" CHILLED WATER PIPES TO BE REMOVED TO CRAC-1 ENCLOSURE.</p> <p>⑩ EXISTING OUTDOOR CONDENSER UNIT (CU-2) SERVING CRAC-2, TO REMAIN.</p> | <p>⑪ EXISTING DUCT, DIFFUSERS, AND GRILLES TO BE REMOVED AND DISPOSED OF.</p> <p>⑫ EXISTING 16"x12" SA AND RA DUCT UP AND THROUGH THE WALL. TO BE REMOVED AND DISPOSED OF.</p> <p>⑬ EXISTING CEILING MOUNTED EXHAUST FAN TO REMAIN.</p> <p>⑭ EXISTING EXHAUST/RELIEF DUCT TO BE REMOVED AND DISPOSED OF.</p> <p>⑮ EXISTING THERMOSTAT TO BE REMOVED AND DISPOSED OF.</p> <p>⑯ EXISTING BOLLARDS REFER TO CIVIL DRAWINGS.</p> <p>⑰ EXISTING DUCTS, DIFFUSERS AND GRILLES TO REMAIN, CLEAN AND SEAL AIRTIGHT.</p> <p>⑱ EXISTING CHEMICAL POT FEEDER TO BE REPLACED WITH NEW.</p> <p>⑲ EXISTING AIR SEPARATOR TO BE REPLACED WITH NEW.</p> <p>⑳ EXISTING EXPANSION BLADDER TANK TO BE REPLACED WITH NEW.</p> <p>㉑ EXISTING HUMIDIFIER, PIPING AND HUMIDIFIER CONTROL TO BE REMOVED AND DISPOSED OF.</p> <p>㉒ EXISTING DUCT SMOKE DETECTOR TO BE REMOVED AND DISPOSED OF.</p> |
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**TEMPORARY COOLING**  
 PROVIDE TEMPORARY COOLING IN EQUIPMENT ROOMS 101 AND 102 AND POWER GENERATION FOR UTILITY CONNECTION DURING OUTAGES.



**PROFESSIONAL ENGINEER**  
 No. 11641  
 Exp. 9-30-16  
 REGISTERED MECHANICAL ENGINEER  
 STATE OF CALIFORNIA

**DONN C. GILMORE & ASSOC.**  
 FOUNDED 1959  
 Consulting Mechanical and Electrical Engineers  
 5000 E. Spring St., 8th Floor Long Beach, CA 90815  
 591 Camino De La Reina, Ste. 1107 San Diego, CA 92108  
 Ph.: 562.497.2999 Ph.: 619.618.2347

DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
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12/21/12	A	15% CONCEPT DESIGN		

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 DRYDEN FLIGHT RESEARCH CENTER  
 EDWARDS, CA

**DRAWING TITLE**  
 MECHANICAL DEMOLITION  
 - BUILDING 4982

**PROJECT TITLE**  
 REVITALIZE RADAR AND TELEMETRY  
 TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	7-10-15
Project Registrar/Customer	2-10-15
Facilities Project Manager	1-27-15
Chief, Office of Projective Services	1-28-15
Chief - Safety, Health and Environmental Office	1-27-15
SAIC Civil Information Officer	3-6-15

DATE STRUCK: DATE PRINTED: 5/9/14  
 DRAWN BY: AHH, MT, WAS  
 SCALE: AS NOTED TRADE SH. No. EDM-1728  
 FILE NAME: M4 SHEET No. 22 of 48

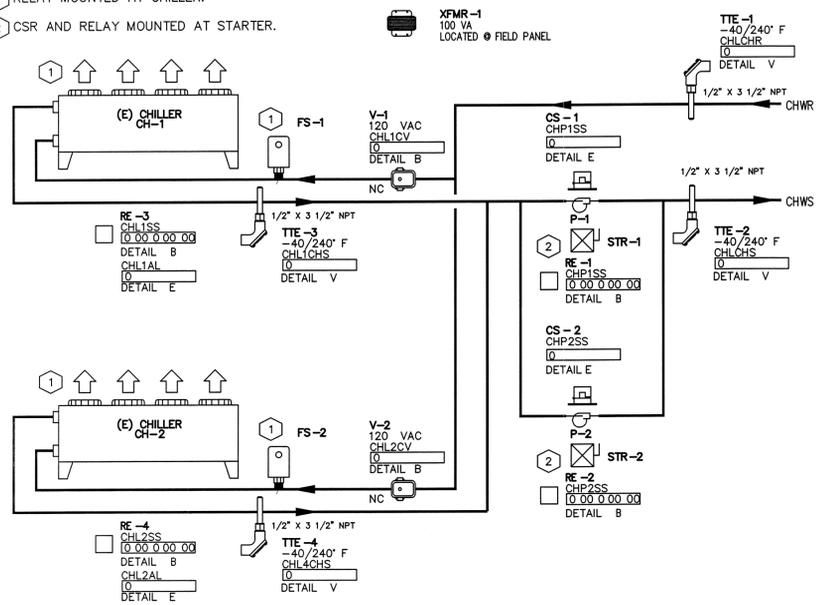
DWG: P112088 NASA ATF1.Dwg/MA12088.MA.dwg USER: Alex Hernandez  
 DATE: Sep 09, 2014 9:13am XREFS: ATBLOCK.D - AATF\_4982.Demo MD:4982 IMAGES:





INSTALLATION NOTES:

- 1 RELAY MOUNTED AT CHILLER.
- 2 CSR AND RELAY MOUNTED AT STARTER.



BUILDING 4982 - CHILLED WATER PIPING SYSTEM CONTROLS

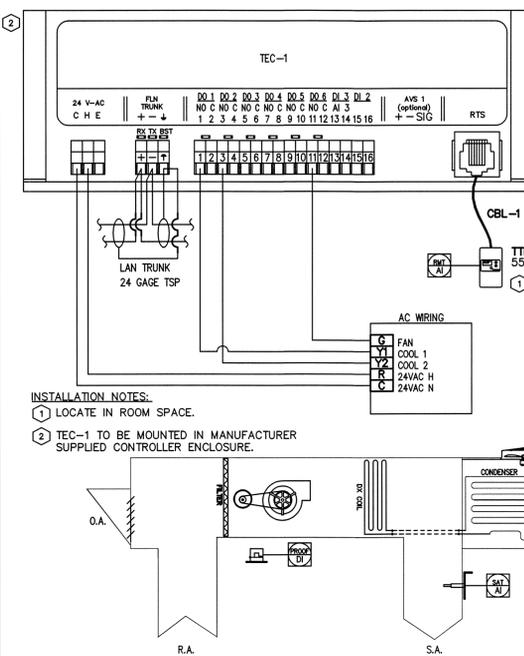
SCALE: NTS

6

CHILLED WATER PUMPS BUILDING 4982 (TYP. FOR CHWP-1 AND 2)

SCALE: NTS

4



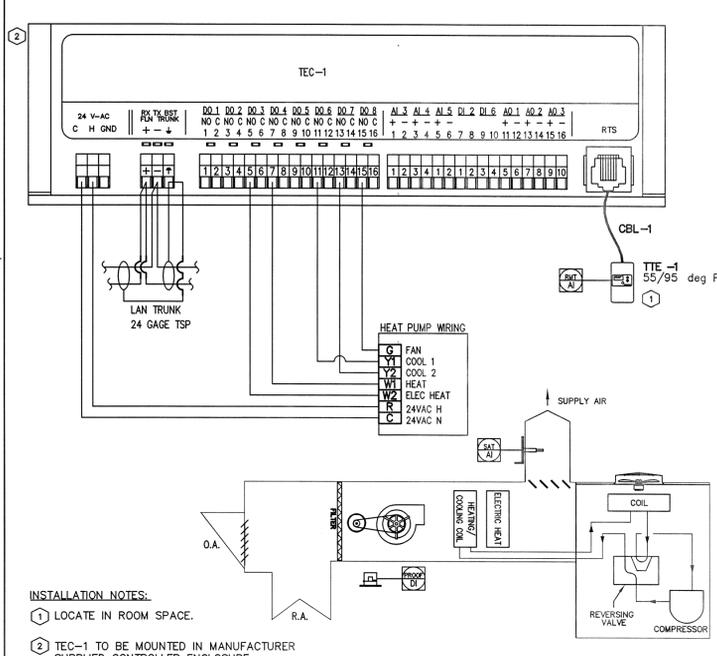
INSTALLATION NOTES:

- 1 LOCATE IN ROOM SPACE.
- 2 TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE.

BUILDING 4720 - PACKAGED COOLING ONLY UNIT (AC-1 ONLY)

SCALE: NTS

3



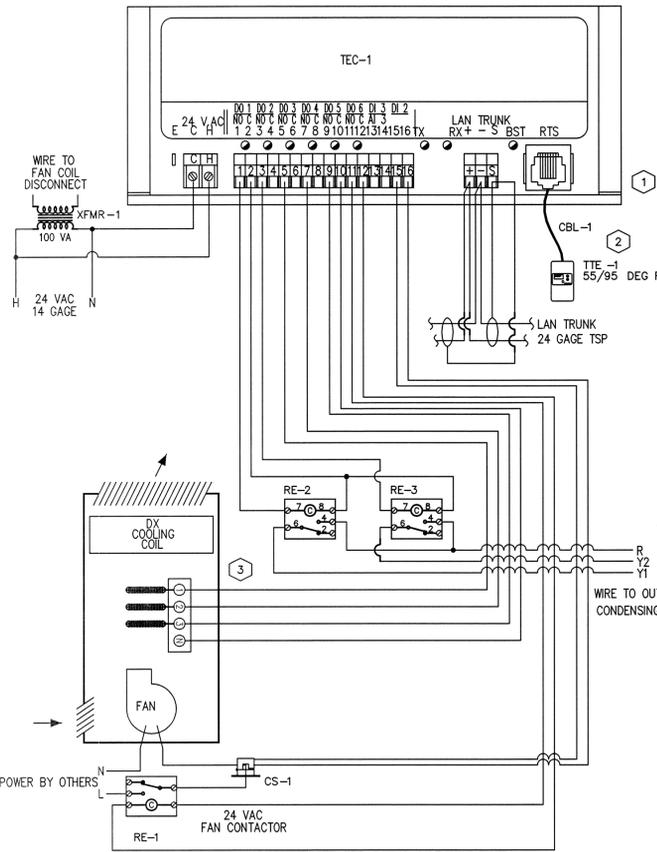
INSTALLATION NOTES:

- 1 LOCATE IN ROOM SPACE.
- 2 TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE.

HEAT PUMP CONTROL (FOR HP-1 BUILDING 4982)

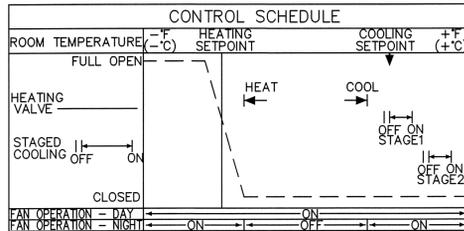
SCALE: NTS

2



INSTALLATION NOTES:

- 1 TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE
- 2 LOCATE AS SHOWN ON FLOOR PLANS/CONTRACT DOCUMENTS
- 3 REFER TO MI TO VERIFY IF MANUFACTURER REQUIRES INTERFACING RELAYS FOR ELECTRIC DUCT HEATER.



NOTES:  
1. THE ELECTRIC HEAT IS TIME MODULATED. THIS ALLOWS IT TO BE CONTROLLED PROPORTIONALLY RATHER THAN WITH DEADBANDS.

DEVICE	SIEMENS FITTER	SIEMENS ELEC.	MANUFACTURER	DIVISION 16	DIVISION 15
TTE-1		M,W			
TEC-1		M,W			
RE-1,2,3		M,W			
CS-1		M,W			
LAN TRUNK		W			
POWER (24VAC)		W			

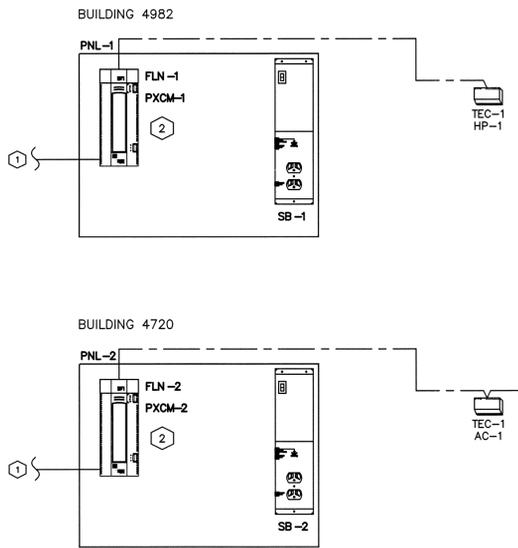
M-MOUNTED  
W-WIRED  
P-PIPED

COMMUNICATION WIRING:

- BLN: CAT-5/6 CABLE
- FLN-1: #24 1.5 TSP LOW CAPACITANCE CABLE H-F-1.5TSP24LC-CMP

INSTALLATION NOTES:

- 1 INTEGRATE NEW CONTROLLER TO EXISTING APOGEE SERVER LOCATED IN CITC (BUILDING 4836). NETWORK DROPS AND IP ADDRESSING TO COMPLY WITH EXISTING BAS STANDARDS.
- 2 ALL NEW GRAPHICS AND DATABASE FOR 4982 AND 4720 WILL RESIDE ON THE EXISTING BAS SERVER.



CONTROL DIAGRAM

SCALE: NTS

5

BUILDING 4982 - AHU WITH CHW (TYP. FOR AHU-1 AND 2)

SCALE: NTS

1

<p>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA</p>	<p>APPROVALS</p> <p><i>Don Gandy</i> 7-10-15 <i>J. J. Debever</i> 2-10-15</p>	<p>DATE</p>
	<p>DRAWING TITLE</p> <p>MECHANICAL CONTROL DIAGRAMS</p>	<p>DATE STRTD</p> <p>5/9/14</p>
<p>PROJECT TITLE</p> <p>REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE</p>	<p>DRAWN BY</p> <p>ANH, MT, WAS</p>	<p>EDM-1728</p>
<p>FILE NAME</p> <p>M7</p>	<p>SCALE</p> <p>AS NOTED</p>	<p>SHEET No. 25 of 48</p>

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NEW PXXM PANEL, SEE PLAN FOR LOCATION						
DESCRIPTION	POINT TYPE					NOTES
	DO	DI	AO	AI	S/W	
<b>AHU-1 AND AHU-2 (TYPICAL)</b>						
OA/RA/EA ECONOMIZER DAMPERS			X			DAMPERS FURNISHED WITH UNIT, ACTUATORS/CONTROLS BY SIEMENS
MIXED AIR TEMP				X		
CHW COOLING COIL			X			VALVE FURNISHED BY SIEMENS, INSTALLED BY PIPING CONTRACTOR
FREEZE STAT						HARD-WIRED FOR FAN SHUTDOWN - NOT A DISCRETE INPUT TO DDC
ELECTRIC HEATING	X					SINGLE STAGE OUTPUT
SFAN START/STOP	X					
SFAN STATUS		X				
SUPPLY TEMP				X		
SUPPLY RH				X		
ZONE TEMP				X		
RETURN TEMP				X		
RETURN RH				X		
<b>HP-1 AND FC-2 / CU-3</b>						
UNIT ENABLE	X					
UNIT STATUS		X				
HEAT ENABLE	X					
COOLING STAGE 1	X					
COOLING STAGE 2	X					
ZONE TEMP				X		
<b>AIR COOLED CHILLERS (X2)</b>						
CHILLER ENABLE	X					
CHILLER STATUS		X				
CHILLER ALARM		X				
CHWS TEMP				X		
CHWR TEMP				X		
CHW PUMP START/STOP	X					
CHW PUMP STATUS		X				
<b>AC-1</b>						
UNIT ENABLE	X					
UNIT STATUS		X				
COOLING STAGE 1	X					
COOLING STAGE 2	X					
ZONE TEMP				X		
<b>MISC</b>						
CRAC ZONE TEMP				X		
CRAC RUN STATUS		X				
* REQUIRES 120V POWER						
<b>ELECTRICAL NOTES</b>						
1. ELECTRICAL INSTALLATION OF THE DDC SYSTEM SHALL BE IN ACCORDANCE WITH NASA STANDARDS						
2. INCLUDE MOUNTING NEW PANEL & DEVICES, WIRE, CONDUIT, FIELD AND PANEL TERMINATIONS AND OTHER MISC. LABOR AND MATERIALS RELATED TO THE INSTALLATION OF THE ABOVE POINTS.						

**AHU W/ CHW - AH-1 & AH-2**

THE CONSTANT VOLUME AIR HANDLING UNIT CONSISTS OF A MIXED AIR SECTION WITH OUTDOOR AIR AND RETURN AIR DAMPERS, PRE-FILTER, CHILLED WATER COOLING COIL AND SUPPLY FAN WITH STARTER. THE UNIT IS DDC CONTROLLED USING ELECTRIC ACTUATION.

THE AIR HANDLING UNIT IS SCHEDULED FOR AUTOMATIC OPERATION ON A TIME OF DAY BASIS FOR OCCUPIED AND UNOCCUPIED MODES. WITHIN THE OCCUPIED MODE, THE SYSTEM CAN ENTER THE COOL-DOWN MODE WHEN THE SPACE TEMPERATURE IS ABOVE SET POINT. THE SYSTEM STAYS IN THE COOL-DOWN MODE UNTIL THE MODE SET POINT IS SATISFIED. WITHIN THE UNOCCUPIED MODE, NIGHT COOLING IS AVAILABLE WHEN THE SPACE TEMPERATURE RISES ABOVE 78 DEGREES F (29 DEGREES C). THE LATEST START TIME IS THE SCHEDULED OCCUPANCY FOR THE SPACE.

THE AIR HANDLING UNIT OPERATES IN COOL-DOWN, OCCUPIED, UNOCCUPIED, NIGHT COOLING AND SAFETY MODES AS FOLLOWS (ALL SUGGESTED SET POINTS AND SETTINGS ARE ADJUSTABLE.):

**COOL-DOWN**

THE SUPPLY FAN STARTS. THE COOLING COIL VALVE AND THE MIXING DAMPERS MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE SET POINT. WHEN THE OUTDOOR AIR DRY BULB TEMPERATURE IS ABOVE THE ECONOMIZER CHANGEOVER VALUE, THE MIXING DAMPERS ARE POSITIONED FOR 100% RETURN AIR. IF TIME REACHES THE LATEST START TIME DURING THE COOL-DOWN MODE, THE OUTDOOR AIR DAMPER OPENS TO ITS MINIMUM POSITION OR IS CONTROLLED IN ECONOMIZER OPERATION. THE SYSTEM IS PREVENTED FROM ENTERING THE COOL-DOWN MODE MORE THAN ONCE PER DAY.

**OCCUPIED**

THE FAN STARTS OR CONTINUES TO RUN AND THE UNIT IS CONTROLLED AS FOLLOWS:

WHEN THE OUTSIDE AIR DRY BULB TEMPERATURE IS BELOW THE ECONOMIZER CHANGEOVER VALUE, THE COOLING COIL VALVE AND MIXED AIR DAMPERS MODULATE IN SEQUENCE WITHOUT OVERLAP TO MAINTAIN THE SUPPLY AIR TEMPERATURE SET POINT WITH A LOW LIMIT OF 48 DEGREES F (9 DEGREES C) AT THE MIXED AIR SENSOR. THE MIXING DAMPERS RAMP OPEN SLOWLY TO MINIMIZE OVERSHOOTING.

WHEN THE OUTSIDE AIR DRY BULB TEMPERATURE IS ABOVE THE ECONOMIZER CHANGEOVER VALUE, THE MIXING DAMPERS ARE PLACED IN THE MINIMUM OUTDOOR AIR POSITION. THE COOLING COIL VALVE MODULATES TO MAINTAIN THE SUPPLY AIR TEMPERATURE SET POINT.

**UNOCCUPIED (NORMAL OFF)**

THE SUPPLY FAN IS OFF, THE COOLING COIL VALVE CLOSES AND MIXING DAMPERS CLOSE TO THE OUTDOOR AIR.

**NIGHT COOLING**

THE SUPPLY FAN STARTS WITH THE COOLING COIL VALVE AND MIXING DAMPERS MODULATING TO MAINTAIN THE SUPPLY AIR TEMPERATURE SET POINT FOR A MAXIMUM SPACE TEMPERATURE OF 78 DEGREES F (29 DEGREES C). WHEN THE OUTSIDE AIR DRY BULB TEMPERATURE IS ABOVE THE ECONOMIZER CHANGEOVER VALUE, THE MIXING DAMPERS ARE CLOSED TO THE OUTSIDE AIR.

**SAFETY**

SMOKE DETECTORS IN THE SUPPLY AIR STREAMS DE-ENERGIZE THE SUPPLY FAN UPON ACTIVATION. ALL DAMPERS AND VALVES POSITION TO THEIR NORMAL POSITION AFTER THE FAN IS DE-ENERGIZED. A LOW TEMPERATURE DETECTOR IN THE MIXED AIR STREAM DE-ENERGIZES THE SUPPLY FAN WHEN TEMPERATURES BELOW 38 DEGREES F (3 DEGREES C) ARE SENSD. THE COOLING COIL VALVE OPENS. ALL OTHER DAMPERS AND VALVES POSITION TO THEIR NORMAL POSITION AFTER THE FAN IS DE-ENERGIZED.

A CURRENT SWITCH IS INSTALLED AT SUPPLY FAN. THE DDC SYSTEM USES THIS SWITCH TO CONFIRM THE FAN IS IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL AND THE SYSTEM GOES TO NORMAL OFF MODE.

**HEAT PUMP HP-1 & FC-2/CU-3**

THE HEAT PUMP SYSTEM HAS COMPRESSORS BY AN APPLICATION SPECIFIC DDC CONTROLLER USING ELECTRIC ACTUATION. THE SPACE SERVED BY THE HEAT PUMP IS CONTROLLED IN OCCUPIED AND UNOCCUPIED MODES AS FOLLOWS:

**OCCUPIED**

THE UNIT FAN IS ON. THE CONTROLLER MODULATES THE STAGES OF THE COMPRESSORS IN SEQUENCE TO MAINTAIN THE ROOM TEMPERATURE AT SET POINT.

**UNOCCUPIED**

THE HEAT PUMP IS CONTROLLED USING THE UNOCCUPIED SPACE TEMPERATURE SET POINT. THE UNIT FAN IS OFF WHEN THE SPACE TEMPERATURE IS BETWEEN THE HEATING AND COOLING UNOCCUPIED SET POINT. THE CONTROLLER MAY RESET TO THE OCCUPIED MODE FOR A PREDETERMINED TIME PERIOD UPON A SIGNAL FROM THE CONTROL SYSTEM OR MANUALLY AT THE ROOM SENSOR.

**PACKAGED UNIT COOLING ONLY AC-1**

AN APPLICATION SPECIFIC DDC CONTROLLER USING ELECTRIC ACTUATION CONTROLS THE AIR CONDITIONING UNIT. THE SPACE SERVED BY THE AC UNIT IS CONTROLLED IN OCCUPIED AND UNOCCUPIED MODES AS FOLLOWS:

**OCCUPIED**

THE AC UNIT FAN OPERATES CONTINUOUSLY. THE CONTROLLER MONITORS THE ROOM TEMPERATURE SENSOR AND STAGES THE DX COOLING AND TIME MODULATES THE ELECTRIC HEATING COIL IN SEQUENCE TO MAINTAIN THE SPACE TEMPERATURE AT SET POINT.

**UNOCCUPIED**

THE AC UNIT IS CONTROLLED USING THE UNOCCUPIED SPACE TEMPERATURE SET POINT. THE AC UNIT FAN IS OFF WHEN THE SPACE IS SATISFIED. THE CONTROLLER MAY RESET TO THE OCCUPIED MODE FOR A PREDETERMINED TIME PERIOD UPON A SIGNAL FROM THE CONTROL SYSTEM OR MANUALLY FROM A SWITCH AT THE ROOM SENSOR.

THE DDC SYSTEM USES A CURRENT SWITCH TO MONITOR THE AC FAN STATUS.

**CRAC-1 AND 2**

THE BAS WILL MONITOR THE OPERATIONAL/ALARM STATUS OF CRAC UNITS. UPON ACTIVATION OF THE ALARM CONTACTS, THE BAS WILL SEND ALARM NOTIFICATION TO THE EXISTING CENTRAL MONITORING STATION. IN ADDITION THE BAS WILL MONITOR ROOM TEMP FOR AREAS SERVED BY CRAC UNITS. UPON A RISE IN TEMP ABOVE THE ALARM LIMIT, THE BAS WILL INITIATE ALARM NOTIFICATION TO THE EXISTING CENTRAL MONITORING STATION.

**CHILLER 1 AND 2**

THE CHILLED WATER SYSTEM CONSISTS OF A 2 PACKAGED AIR-COOLED CHILLERS WITH PRIMARY AND BACK-UP CHILLED WATER PUMPS. THE SYSTEM IS DDC CONTROLLED WITH ELECTRIC ACTUATION.

THE SYSTEM OPERATES AS FOLLOWS (ALL SUGGESTED SET POINTS AND SETTINGS ARE ADJUSTABLE.):

**PUMP ALTERNATION**

PUMPS ALTERNATE TO EQUALIZE RUNTIME. SELECTION OF THE LEAD PUMP IS EVALUATED ON A WEEKLY BASIS. THE PUMP WITH THE LEAST RUNTIME IS THE LEAD PUMP.

**CHILLER CONTROL**

CHILLERS ALTERNATE TO EQUALIZE RUNTIME. SELECTION OF THE LEAD CHILLER IS EVALUATED ON A WEEKLY BASIS. THE CHILLER WITH THE LEAST RUNTIME IS THE LEAD CHILLER.

THE CHILLED WATER SYSTEM ENABLE POINT IS CONTROLLED EITHER MANUALLY BY THE OPERATOR OR BY A PROGRAM FUNCTION (I.E., TIME-OF-DAY). IF THE CHILLED WATER SYSTEM ENABLE POINT IS ON AND THERE IS A CALL FOR COOLING, AND THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEGREES F (13 DEGREES C) THE CHILLER AND LEAD PUMP ARE STARTED.

AFTER FLOW IS PROVEN, THE CHILLER OPERATES UNDER ITS OPERATING AND SAFETY CONTROLS.

THE CHILLED WATER SYSTEM CONTINUES TO OPERATE UNTIL EITHER THE CHILLED WATER SYSTEM ENABLE POINT IS OFF OR COOLING IS NO LONGER REQUIRED. WHEN THE CHILLED WATER SYSTEM SHUTS DOWN, THE CHILLER AND PUMP GO THROUGH A CHILLER STOP SEQUENCE.

THE CHILLER STOP SEQUENCE FIRST STOPS THE CHILLER. AFTER TIME DELAY, THE CHILLED WATER PUMPS ARE STOPPED.

THE DDC SYSTEM USES CURRENT SWITCHES TO CONFIRM THE PUMPS ARE IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL. IF THE LEAD PUMP GOES INTO ALARM, THE SECOND PUMP STARTS.

THE DDC SYSTEM MONITORS THE CHILLER ALARM POINT. UPON RECEIPT OF A CHILLER ALARM THE CHILLER AND PUMP GO THROUGH A CHILLER STOP SEQUENCE.

THE OPERATING STATUS OF THE CHILLER IS DETERMINED BY MONITORING THE START/STOP POINT, CHILLER ALARM POINT AND THE CHILLED WATER SUPPLY TEMPERATURE.

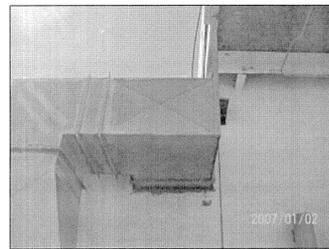
**SEQUENCE OF OPERATION**

SCALE: NTS 1

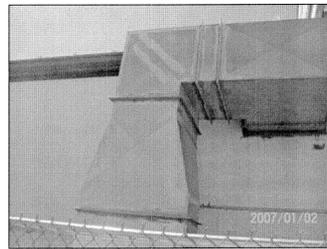
<p><b>DONN C. GILMORE &amp; ASSOC.</b> FOUNDED 1959 Consulting Mechanical and Electrical Engineers 5000 E. Spring St., 8th Floor Long Beach, CA 90815 591 Camino De La Reina, Ste. 1107 San Diego, CA 92108 Ph.: 562.497.2999 Ph.: 619.618.2347</p>	<table border="1"> <tr><th>DATE</th><th>SYM</th><th>REVISION</th><th>BY</th><th>A'PD</th></tr> <tr><td>5/9/14</td><td>E</td><td>FINAL DESIGN</td><td></td><td></td></tr> <tr><td>2/24/14</td><td>D</td><td>100% FINAL DESIGN</td><td></td><td></td></tr> <tr><td>10/27/13</td><td>C</td><td>60% DEVELOPED DESIGN</td><td></td><td></td></tr> <tr><td>6/21/13</td><td>B</td><td>30% DEVELOPED DESIGN</td><td></td><td></td></tr> <tr><td>12/21/12</td><td>A</td><td>15% CONCEPT DESIGN</td><td></td><td></td></tr> </table>	DATE	SYM	REVISION	BY	A'PD	5/9/14	E	FINAL DESIGN			2/24/14	D	100% FINAL DESIGN			10/27/13	C	60% DEVELOPED DESIGN			6/21/13	B	30% DEVELOPED DESIGN			12/21/12	A	15% CONCEPT DESIGN			<p><b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA</p> <p>DRAWING TITLE <b>MECHANICAL CONTROL DIAGRAMS</b></p> <p>PROJECT TITLE <b>REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE</b></p>	<table border="1"> <tr><th>APPROVALS</th><th>DATE</th></tr> <tr><td>Chief, Facilities Engineering &amp; Asset Mgmt. Office <i>[Signature]</i></td><td>2-10-15</td></tr> <tr><td>Project Registrar/Engineer <i>[Signature]</i></td><td>2-10-15</td></tr> <tr><td>Facilities Project Manager <i>[Signature]</i></td><td>1-27-15</td></tr> <tr><td>Chief, Office of Protective Services <i>[Signature]</i></td><td>1-28-15</td></tr> <tr><td>Chief - Safety, Health and Environmental Office <i>[Signature]</i></td><td>1-27-15</td></tr> <tr><td>DDC Chief Information Officer <i>[Signature]</i></td><td>3 Feb 15</td></tr> </table>	APPROVALS	DATE	Chief, Facilities Engineering & Asset Mgmt. Office <i>[Signature]</i>	2-10-15	Project Registrar/Engineer <i>[Signature]</i>	2-10-15	Facilities Project Manager <i>[Signature]</i>	1-27-15	Chief, Office of Protective Services <i>[Signature]</i>	1-28-15	Chief - Safety, Health and Environmental Office <i>[Signature]</i>	1-27-15	DDC Chief Information Officer <i>[Signature]</i>	3 Feb 15
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**CONTROLS POINTS LIST**

SCALE: NTS 2



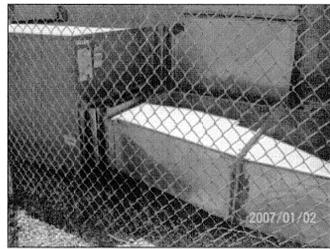
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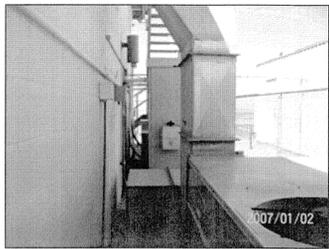
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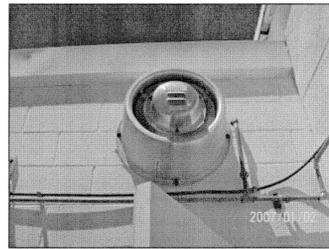
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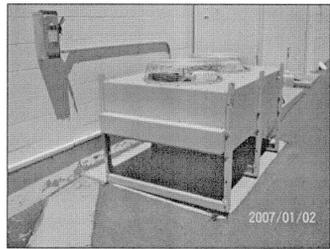
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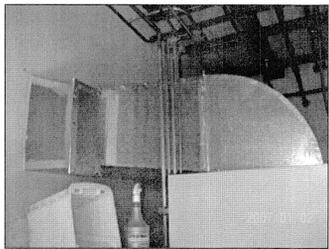
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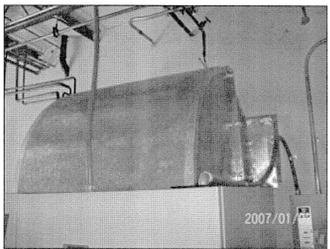
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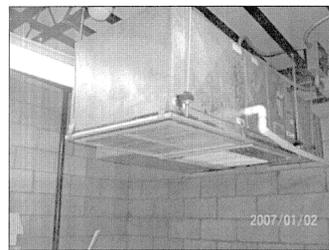
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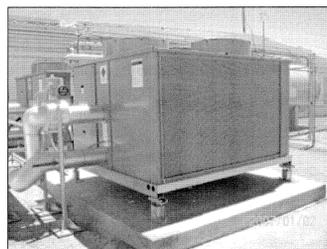
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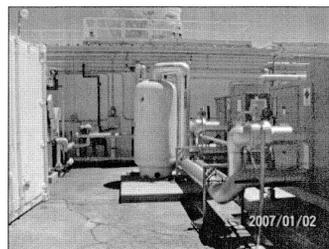
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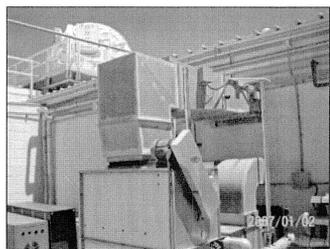
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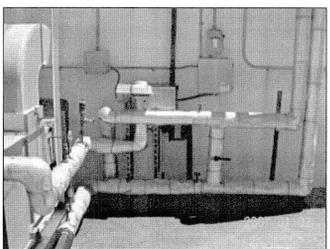
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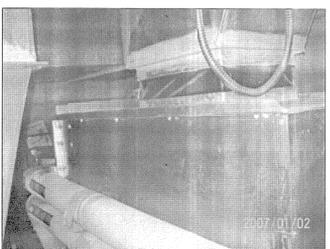
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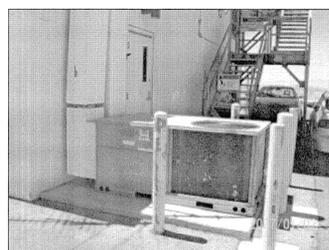
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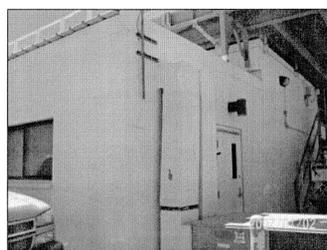
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**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 DRYDEN FLIGHT RESEARCH CENTER  
 EDWARDS, CA

DRAWING TITLE  
 EXISTING MECHANICAL PHOTOS

PROJECT TITLE  
 REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office <i>Don Cowley</i>	7-10-15
Project Manager/Engineer <i>Jim Deheret</i>	2-10-15
Facilities Project Manager <i>Stanford Dickson</i>	1-27-15
Chief, Office of Aerospace Services <i>W. S.</i>	1-28-15
Chief - Safety, Health & Environmental Office <i>W. S.</i>	1-27-15
SPRC Data Information Office <i>La G...</i>	3 Feb 15

DATE STRID: DATE PRINTD: 5/9/14  
 DRAWN BY: ANH, MT, WAS  
 SCALE: AS NOTED TRADE: SHL No.  
 FILE NAME: M9 SHEET No. 27 of 48

**PLUMBING GENERAL NOTES**

- THE PLUMBING SYSTEM DESIGN, INSTALLATION AND MATERIALS SHALL CONFORM IN COMPLIANCE WITH LATEST IPC AND STANDARDS AS ADOPTED AND AMENDED BY THE AUTHORITY HAVING JURISDICTION. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHER APPLICABLE CODES AND STANDARDS TO THIS PROJECT.
- PLUMBING QUALITY AND WEIGHTS OF MATERIALS, ALTERNATE METHODS OF CONSTRUCTION SHALL CONFORM TO CHAPTER 3 OF THE LATEST IPC CODE.
- CONTRACTOR SHALL COORDINATE ALL WORK SHOWN ON THESE DRAWINGS AND SPECIFICATIONS WITH ALL DISCIPLINES AND TRADES PRIOR TO SUBMITTAL OF BID AND INSTALLATION OF SYSTEM.
- ALL PLUMBING FIXTURE LOCATIONS (WATER CLOSETS, LAVATORIES ETC.) ARE DIAGRAMMATIC AND CONTRACTOR SHALL REFER TO ARCHITECTURAL DRAWINGS FOR HANDICAP FIXTURES, EXACT LOCATIONS, MOUNTING HEIGHTS AND COLOR.
- ANY DEVIATIONS FROM THE DRAWINGS OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER PRIOR TO INSTALLATION.
- THESE DRAWINGS DO NOT INCLUDE ALL NECESSARY SAFETY REQUIREMENTS. CONTRACTOR TO COMPLY TO SAFETY REQUIREMENTS SET FORTH BY THE LOCAL AUTHORITIES HAVING JURISDICTION.
- TRAP PRIMERS FOR FLOOR DRAINS AND FLOOR SINKS AND WATER HAMMER ARRESTORS TO BE INSTALLED AS PER THE LATEST IPC AND THE LATEST EDITION OF THE AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE 1010) SIZING AND INSTALLATION REQUIREMENTS. TRAP GUARDS IS ACCEPTABLE IN LIEU OF TRAP PRIMERS FOR FLOOR DRAIN OR FLOOR SINK.
- CONTRACTOR TO REFER TO PLUMBING FIXTURE SCHEDULE FOR INDIVIDUAL WASTE, VENT & WATER CONNECTIONS AT EACH PLUMBING FIXTURE.
- ALL HOT & COLD WATER PIPING TO BE INSULATED AS PER LATEST IPC CODE REQUIREMENTS:
 

PIPE SIZE	INSULATION THICKNESS	INSULATION VALUE
1/2" - 1"	1-1/2"	R = 4.0
1-1/4" - 3"	1-1/2"	R = 4.0
3" AND LARGER	2"	R = 4.0
- TEST SYSTEM(S) IN ACCORDANCE WITH REQUIREMENTS OF THE GOVERNING AUTHORITIES.
- STEEL PLATE SUPPORTS FOR ALL WALL FIXTURES: SUPPORT WITH 3/8" THICK x 8" HIGH STEEL PLATES RECESSED AND BOLTED TO STUDS AND TAPPED FOR FIXTURE BOLTS. LENGTH OF PLATE AT LEAST ON STUD BEYOND FIXTURE, UNLESS CARRIERS ARE SPECIFIED.
- ALL PLUMBING WORK SHALL BE INSTALLED SO AS TO AVOID INTERFERENCE WITH ELECTRICAL AND MECHANICAL EQUIPMENT AND STRUCTURAL FRAMING.
- ALL INDIRECT WASTE PIPING ON ROOF SHALL BE TYPE "M" COPPER SUPPORTED WITH PREASSEMBLED HIGH DENSITY POLYPROPYLENE PLASTIC SUPER SLEEPER SYSTEM. SLEEPERS ARE HEIGHT ADJUSTABLE AND SHALL BE SET IN MASTIC AT 6"-0" O.C. PIPING SHALL BE SLOPED TO AND TERMINATED AT AN APPROVED RECEPTOR.
- ALL CLEANOUTS SHALL BE INSTALLED WHERE READILY ACCESSIBLE AND LOCATED AS PER CODE REQUIREMENTS. THE CONTRACTOR SHALL COORDINATE ALL CLEAN OUT LOCATIONS WITH EQUIPMENT, CABINETS, ETC., AND THE CONTRACTING OFFICER PRIOR TO ANY INSTALLATION.
- ALL PLUMBING FIXTURE VENTS TO TERMINATE A MIN. OF 12 INCHES FROM ANY VERTICAL SURFACE AND 25 FEET FROM OR TERMINATED 3'-0" ABOVE ANY OUTSIDE AIR INTAKES.
- ALL PIPING DISCHARGING INTO FLOOR-SINKS AND/OR FLOOR-DRAINS TO HAVE A MINIMUM AIRGAP AS REQUIRED BY LOCAL CODES.
- ALL VALVES, UNIONS, ETC. TO BE SAME SIZE AS LINE SIZE UNLESS OTHERWISE INDICATED ON DRAWINGS.
- UNIONS SHALL BE PROVIDED AND INSTALLED AFTER EACH SCREW-TYPE VALVE AND PRIOR TO EQUIPMENT CONNECTIONS.
- ALL EQUIPMENT SHALL BE LATERALLY SUPPORTED IN ALL DIRECTIONS TO RESIST A MINIMUM AIRGAP AS REQUIRED BY LOCAL CODES.
- BEFORE FABRICATION OR INSTALLATION, THIS CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT AND EQUIPMENT PROVIDED UNDER ANOTHER SECTION OF SPECIFICATIONS. EXACT ROUGH-IN LOCATIONS AND REQUIREMENTS SHALL BE COORDINATED IN FIELD.
- IF SOILS REPORT INDICATES THAT LOCAL SOIL IS CORROSIVE, ALL UNDERGROUND METALLIC PIPE AND FITTINGS SHALL BE PROTECTED IN ACCORDANCE WITH THE SOILS ENGINEER'S RECOMMENDATIONS.
- NO PIPING SHALL BE DIRECTLY EMBEDDED IN CONCRETE OR MASONRY WALLS OR FOOTING.
- THE PLUMBING CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR ALL POINTS OF CONNECTION WITH THE GENERAL CONTRACTOR AND OTHER TRADES PRIOR TO BID.
- ALL WASTE AND VENT PIPING SHALL SLOPE AT 2%. IF LESS THAN 2% APPROVAL MUST BE OBTAINED FROM BUILDING OFFICIAL OR AUTHORITY HAVING JURISDICTION PRIOR TO INSTALLATION AND REFER TO NOTE 5.
- ALL VALVES, TRAP PRIMERS, WATER HAMMER ARRESTORS OR OTHER EQUIPMENT SHOWN IN WALLS OR ABOVE NON-ACCESSIBLE CEILINGS SHALL BE INSTALLED BEHIND AN ACCESS PANEL.
- ALL HORIZONTAL PIPING LINES EXTENDED AND CONNECTED TO EQUIPMENT SHALL BE RUN AT THE HIGHEST POSSIBLE ELEVATIONS AND NOT LESS THAN 6" ABOVE THE FLOOR TO PROVIDE CLEARANCE FOR CLEANING. AT WALL OR COLUMN LOCATIONS, PIPING ROUGH-IN SHALL BE STUBBED IN WALLS WHENEVER POSSIBLE.
- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH AND BE CONSIDERED TO BE A PART OF SEPARATE COMPLETE PLUMBING SPECIFICATION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING AND REPAIRING ALL AREAS INCLUDING ADJACENT AREAS WHICH ARE EXCAVATED AND/OR DAMAGED BY HIS OPERATIONS. IN ADDITION, THE CONTRACTOR SHALL RESTORE TO THEIR ORIGINAL CONDITION ALL AREAS DAMAGED BY HIS OPERATIONS.
- ALL CONNECTIONS TO EXISTING SERVICES SHALL BE MADE SUCH THAT INTERRUPTION TIME WILL BE AS SHORT AS POSSIBLE. THE CONTRACTOR SHALL GIVE THE CONTRACTING OFFICER SUFFICIENT NOTICE OF SUCH INTERRUPTION AND THE ACTUAL SHUT-DOWN TIME SHALL BE AT A TIME DESIGNATED BY THE CONTRACTING OFFICER.
- ALL CUTTING OF EXISTING PAVING, WALKS AND/OR FLOORS SHALL BE BY MACHINE SAW CUTTING. HOLES FOR PIPES IN CONCRETE WALLS OR FLOORS SHALL BE DONE USING CORE DRILLING EQUIPMENT.
- VERIFY EXACT LOCATIONS, DEPTH AND SIZE OF ALL PIPING TO WHICH CONNECTIONS ARE REQUIRED. FINAL CONNECTIONS TO EXISTING UTILITIES SHALL BE BY THIS CONTRACTOR.
- ALL NEW OR REPAIRED DOMESTIC HOT AND COLD WATER SYSTEM SHALL BE DISINFECTED BY WATER-CHLORINIZATION PRIOR TO USE. THE METHOD SHALL BE PRESCRIBED BY THE HEALTH AUTHORITY OR IPC SECTION 610. BACTERIOLOGICAL TESTING SHALL BE PERFORMED BY INDEPENDENT THIRD PARTY TESTING LABORATORY. SEE SPECIFICATION SECTION 22 00 00, SUB SECTION 3.9.

**PLUMBING LEGEND & ABBREVIATION**

SYMBOL	ABBREV	PIPE DESCRIPTION
— S —	S	SOIL PIPE (ABOVE GRADE)
— S —	S	SOIL PIPE (BELOW GRADE)
— V —	V	VENT
— CW —	CW	COLD WATER
— HW —	HW	HOT WATER
— HWR —	HWR	HOT WATER RETURN
— G —	G	GAS
— CD —	CD	CONDENSATE DRAIN
— DR —	DR	SECONDARY CONDENSATE DRAIN
— SD —	SD	STORM DRAIN
— OD —	OD	OVERFLOW DRAIN
— F —	F	FIRE PROTECTION LINE
— AS —	AS	AUTOMATIC SPRINKLER SYSTEM
— UP —	UP	PIPE UP/RISER
— DN —	DN	PIPE TEE DOWN
— DN —	DN	PIPE DOWN
— FCU —	FCU	FLOOR CLEANOUT
— COTG —	COTG	CLEANOUT TO GRADE
— WCO —	WCO	WALL CLEANOUT
— SOV —	SOV	SHUT-OFF VALVE
— CV —	CV	CHECK VALVE
— U —	U	UNION
— GSOV —	GSOV	GAS COCK SHUT-OFF VALVE
— AGSOV —	AGSOV	AUTOMATIC GAS SHUT-OFF VALVE
— (E) —	EXIST	EXISTING EQUIPMENT/PIPING
— POC —	POC	POINT OF CONNECTION
— POD —	POD	POINT OF DISCONNECTION
— ( # ) —	FU	FIXTURE UNIT
— ABV —	ABV	ABOVE
— ADA —	ADA	AMERICAN DISABILITIES ACT
— AFF —	AFF	ABOVE FINISH FLOOR
— AFG —	AFG	ABOVE FINISH GRADE
— AP —	AP	ACCESS PANEL
— BEL —	BEL	BELOW
— CLG —	CLG	CEILING
— CONN —	CONN	CONNECTION
— CONT —	CONT	CONTINUATION
— DN —	DN	DOWN
— FLR —	FLR	FLOOR
— FU —	FU	FIXTURE UNITS
— GPM —	GPM	GALLONS PER MINUTE
— ICW —	ICW	INDUSTRIAL COLD WATER
— IE —	IE	INVERT ELEVATION
— INT —	INT	INTEGRAL
— PSI —	PSI	POUNDS PER SQUARE INCH
— T/PRV —	T/PRV	TEMPERATURE & PRESSURE RELIEF VALVE
— TYP —	TYP	TYPICAL
— W/ —	W/	WITH
— GM —	GM	GAS METER
— OAL —	OAL	OVERALL LENGTH

**PLUMBING SPECIALITIES & EQUIPMENT SCHEDULE**

MARK	ITEM	DESCRIPTION / REMARKS
IWH 1	ELECTRIC INSTANTANEOUS WATER HEATER	MOUNTED BELOW SINK/LAVATORY, WATER HEATER SHALL BE 4100W, 208V/3PH, 60Hz.
IWA 1	WATER HAMMER ARRESTOR (TOILET RM)	SEAMLESS COPPER BODY CONSTRUCTION. CERTIFIED TO PDI STANDARD WH-201 SIZE AND INSTALLATION PER MANUFACTURER'S RECOMMENDATION. LOCATED BEHIND ACCESS PANEL.
IWT 1	FIRE WATER TANK	HYDROPNEUMATIC FIRE PROTECTION TANK, ASME PRESSURE VESSEL DESIGNED IN ACCORDANCE WITH NFPA 22 AND INSTALLED IN ACCORDANCE WITH NFPA 22, TANK SHALL BE 2,000 GALLON CAPACITY FILLED WITH WATER TO 2/3 VOLUME AND PRESSURIZED AT 125 PSI. TANK SHALL BE WITH FACTORY APPLIED INTERNAL AND EXTERNAL COATING. TANK DIMENSION: 4'-6"x18'-0" OAL. TANK SHALL BE MOUNTED IN STEEL SADDLE, PROVIDE WITH EXTERNAL BATT WITH JACKET INSULATION SYSTEM. TANK INTERNAL LINING TO BE POLYURETHANE. TANK OPERATING WEIGHT: 17,800 LBS.
IWT 2	FIRE WATER TANK	HYDROPNEUMATIC FIRE PROTECTION TANK, ASME PRESSURE VESSEL DESIGNED IN ACCORDANCE WITH NFPA 22 AND INSTALLED IN ACCORDANCE WITH NFPA 22, TANK SHALL BE 5,000 GALLON CAPACITY FILLED WITH WATER TO 2/3 VOLUME AND PRESSURIZED AT 125 PSI. TANK SHALL BE WITH FACTORY APPLIED INTERNAL AND EXTERNAL COATING. TANK SHALL BE MOUNTED IN STEEL SADDLE. TANK INTERNAL LINING TO BE POLYURETHANE. TANK DIMENSION: 7'-0"x19'-9" OAL. TANK OPERATING WEIGHT: 43,300 LBS.
PT 1	SKID MOUNTED PUMP AND TANK	SKID MOUNTED PUMP, TANK AND PUMP CONTROL. PUMP SHALL BE RATED AT 10HP, 208V/3PH, TANK SHALL BE VERTICAL 300 GALLON CAPACITY SKID DIMENSION. PUMP PACKAGE SHALL BE PROVIDED WITH WEATHER PROOF ENCLOSURE. SEE ARCHITECTURAL DRAWINGS FOR ENCLOSURE INFORMATION.

**PLUMBING MATERIAL SCHEDULE**

- WATER PIPE - TYPE 'L' COPPER WITH WROUGHT COPPER FITTINGS AND 95/5 LEAD FREE SOLDER AT 3 PSI/100 FT WITH MAX VELOCITY OF 8 FT/S FOR COLD WATER AND 5 FT/S FOR HOT WATER.
- ALL HOT WATER AND HOT WATER RETURN PIPING SHALL BE INSULATED WITH INSULATION HAVING A K-FACTOR OF 0.25.
- SEWER AND VENT PIPE, STORM WATER BELOW FLOOR/GRADE - ABS PIPE AND FITTINGS, GRAVITY AT 2% SLOPE FOR BELOW FLOOR, AND PVC PIPES & FITTINGS FOR ABOVE FLOOR INSTALLATION.
- STORM AND OVERFLOW DRAIN - HUBLESS CAST IRON SOIL PIPE AND FITTINGS WITH HUSKY FOUR BANDED STAINLESS STEEL COUPLING, FOR ABOVE FLOOR ONLY.
- GAS - BLACK STEEL SCHEDULE 40 SCREWED FITTING INSIDE, OUTSIDE PIPE SHALL BE POLYETHYLENE BUTYL-A WITH #12 BARE TRACE WIRE.
- ANCHOR WATER SUPPLY PIPING IN WALL WITH CAST BRASS OR WROUGHT COPPER 90° DROP ELL FITTING AS MANUFACTURED BY NIBCO OR APPROVED EQUAL.
- SUPPORT PIPING WITH CLEVIS OR SPLIT RING TYPE HANGERS. "PLUMBERS TAPE" OR WIRE IS NOT PERMITTED.

**WATER CALCULATION**

STREET PRESSURE (ASSUMED).....	70 PSI
SYSTEM DESIGN .....	70 PSI
<b>PRESSURE LOSSES:</b>	
STATIC 15 x 0.433.....	6.5 PSI
2 METER AT 60 GPM.....	3.5 PSI
RESIDUAL REQUIRED AT WATER CLOSET.....	30 PSI
PRESSURE REDUCING VALVE .....	0 PSI
BACKFLOW PREVENTER .....	12 PSI
SUB TOTAL PRESSURE LOSSES .....	52 PSI
<b>PRESSURE AVAILABLE FOR FRICTION LOSS:</b>	
SYSTEM DESIGN - SUB TOTAL LOSSES [70 - 52] = .....	16 PSI
SYSTEM DEVELOPED LENGTH 190 + 20% = .....	228 FT
[[16 x 100] / 228] = 7 PSI LOSS PER 100 FT	
COLD WATER MAX VELOCITY .....	8 FT/S
HOT WATER MAX VELOCITY .....	5 FT/S

**WATER CALCULATION**

PIPE SIZE	FLOW GPM	FIXTURE UNITS		VELOCITY FT. / SEC	
		FL-TANK	FL-VALVE	CW	HW
1/2"	2	1	-	8	5
3/4"	5	6	-	8	5
1"	10	16	-	8	5
1-1/4"	19	28	-	8	5
1-1/2"	30	54	13	8	5
2"	55	151	60	8	5
2-1/2"	93	347	213	8	5
3"	125	506	396	8	5

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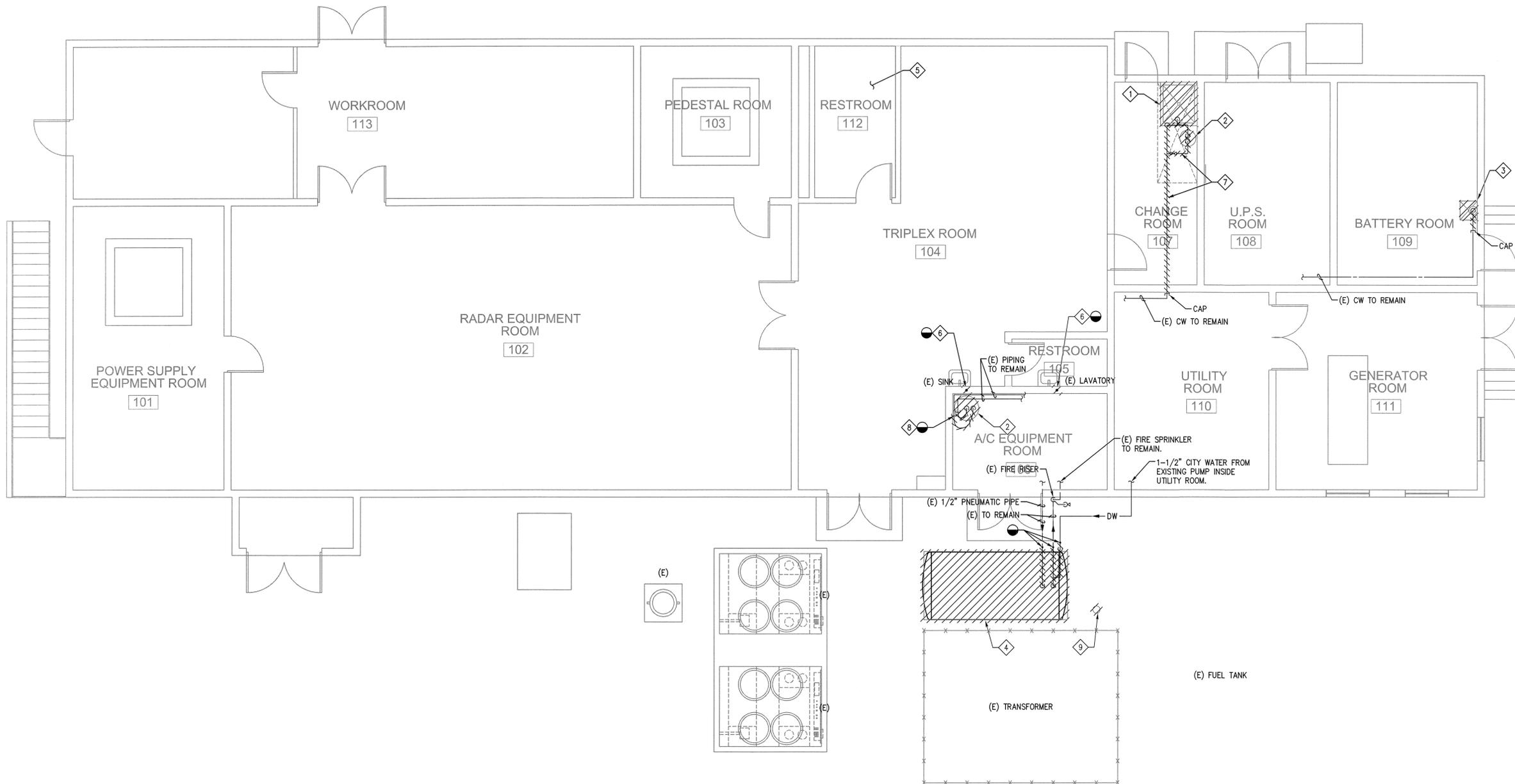
**APPROVALS**

APPROVAL	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	7-10-15
Project Registrar/Engineer	2-10-15
Facilities Project Manager	1-27-15
Chief, Office of Protective Services	1-28-15
Chief - Safety, Health and Environmental Office	1-27-15
ISPC OAS Information Officer	3 Feb 15

**DRAWING TITLE**  
 PLUMBING LEGEND AND NOTES, SCHEDULES, AND ABBREVIATIONS

**PROJECT TITLE**  
 REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

DATE STRID: 5/9/14 DATE PRINTD: 5/9/14  
 DRAWN BY: ANH, MT, WAS  
 SCALE: AS NOTED TRADE: SHL No. EDM-1728  
 FILE NAME: P1 SHEET No. 28 of 48

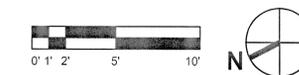


**BUILDING 4982 – AERONAUTICAL TRACKING FACILITY 1 (ATF 1)**

SCALE: 3/16" 1'-0"  
TOTAL: 5067 SF

**DEMOLITION NOTES:**

- 1 REMOVE EXISTING SHOWER CUT AND CAP EXISTING SERVICES BELOW FLOOR AND ABOVE CEILING. HOT AND COLD WATER SHALL BE CUT AND CAPPED AT MAIN BRANCH.
- 2 REMOVE EXISTING WATER HEATER, ASSOCIATED PIPING AND APPURTENANCES. WATER SHALL BE CUT AND CAPPED AT MAIN BRANCH.
- 3 REMOVE EXISTING EMERGENCY EYE WASH. CUT AND CAP EXISTING SERVICE BELOW FLOOR AND ABOVE CEILING. WATER SHALL BE CUT AND CAPPED AT MAIN BRANCH.
- 4 BID OPTION #7: REMOVE EXISTING FIRE WATER TANK. LEAVE READY FOR RECONNECTION OF NEW FIRE WATER TANK.
- 5 EXISTING WATER CLOSET, URINAL, LAVATORY AND INSTANTANEOUS ELECTRIC WATER HEATER TO REMAIN.
- 6 REMOVE EXISTING HOT WATER TO LAVATORY/SINK. CAP HOT WATER IN WALL.
- 7 REMOVE EXISTING DOMESTIC WATER SUPPLY TO EXISTING SHOWER AND WATER HEATER.
- 8 DISCONNECT AND CAP WATER SUPPLY TO WATER HEATER. PROVIDE SOV FOR FUTURE.
- 9 REMOVE AND DISPOSE OF EXISTING BOLLARD TO ACCOMMODATE NEW FIRE PROTECTION TANK.

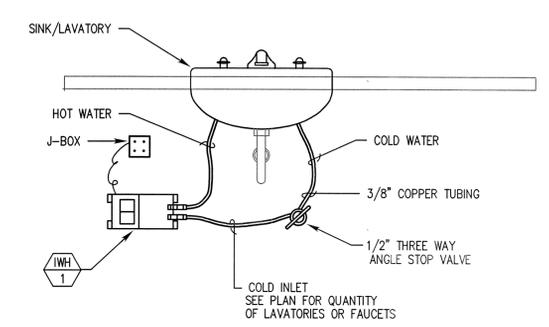


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<p><b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA</p>	<p>APPROVALS</p> <p><i>Da...</i> 7-10-15 <i>...</i> 7-10-15 <i>...</i> 1-27-15 <i>...</i> 1-28-15 <i>...</i> 3 Feb 15</p>		DATE
	<p>DRAWING TITLE</p> <p>BUILDING 4982 PLUMBING DEMOLITION FLOOR PLAN</p>		
<p>PROJECT TITLE</p> <p>REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE</p>		DATE STRTD	DATE PRNTD
		DRAWN BY	ANH, MT, WAS
		SCALE	AS NOTED
		FILE NAME	EDM-1728
		TRADE	P2
		SHEET No.	29 of 48

DWG: P112088 NASA ATF10.dwg USER: Alex Hernandez DATE: Sep 09, 2014 9:22am XREFS: A:TELOCKD A:ATF 4982.Demo IMAGES:





**ELECTRICAL WATER HEATER DETAIL**

SCALE: NONE 1

DWG: P112088 NASA A1FDwgP112088 P4.dwg USER: Alex Hernandez DATE: Sep 05, 2014 9:24am XREFS: ATBLOCK.D IMAGES:

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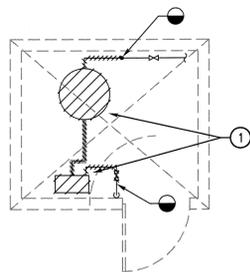
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DRAWING TITLE  
**PLUMBING DETAILS**

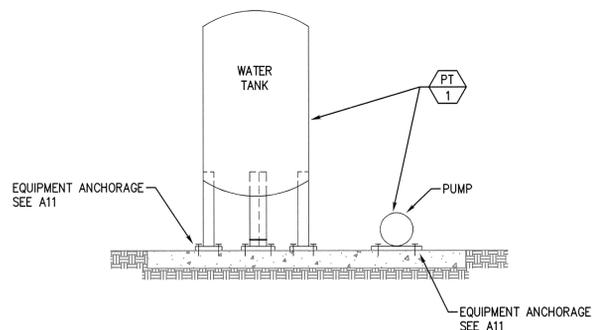
PROJECT TITLE  
 REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE

APPROVALS		DATE
Chief, Facilities Engineering & Asset Mgmt. Office	<i>Da Gony</i>	7-10-15
Project Registrar/Customer	<i>J. J. Dehenet</i>	7-10-15
Facilities Project Manager	<i>Stacy Nelson</i>	1-20-15
Chief, Office of Protective Services	<i>[Signature]</i>	1-28-15
Chief - Safety, Health and Environmental Office	<i>[Signature]</i>	1-27-15
Sign Off Information Officer	<i>Da Gony</i>	3 Feb 15
DATE STRTD	DATE PRNTD	5/9/14
DRAWN BY	AJH, MT, WAS	EDM-1728
SCALE	AS NOTED	TRADE SH. No.
FILE NAME	P4	SHEET No. 31 of 48

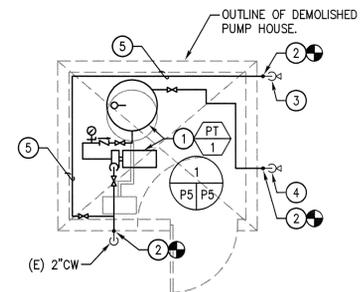


REFERENCE NOTES:

- 1 REMOVE EXISTING WATER PUMP AND STORAGE TANK AND RELATED PIPING.



DETAIL  
SCALE: NTS

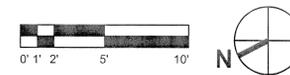


NOTES:

- PROVIDE INSULATION WITH JACKET TO NEW TANK, PUMP, VALVES AND PIPING.
- ALL ABOVE GROUND PIPING SHALL BE PROVIDED WITH HEAT TRACING.

REFERENCE NOTES:

- 1 INSTALL NEW SKID MOUNTED PUMP AND WATER TANK.
- 2 POINT OF CONNECTION TO EXISTING.
- 3 EXISTING INSULATED WATER VALVE.
- 4 EXISTING INSULATED WATER SUPPLY PIPE TO BELOW GRADE.
- 5 NEW 2" CW.



DEMOLITION - PUMP HOUSE B4983

SCALE: 3/16"=1'-0"

1

REMODEL - PUMP HOUSE B4983

SCALE: 3/16"=1'-0"

2

DWG: P:\12088 NASA ATF\Drawings\F12088 P5.dwg USER: Alex Hernandez DATE: Sep 09, 2014 9:24am XREFS: A-BLOCK-D BLDG-4720-BASE-Demo IMAGES:

**DONN C. GILMORE & ASSOC.**  
FOUNDED 1959  
Consulting Mechanical and Electrical Engineers  
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DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
6/21/13	B	30% DEVELOPED DESIGN		
12/21/12	A	15% CONCEPT DESIGN		

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
DRYDEN FLIGHT RESEARCH CENTER  
EDWARDS, CA

**DRAWING TITLE**  
BUILDING 4983  
PLUMBING FLOOR PLAN

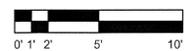
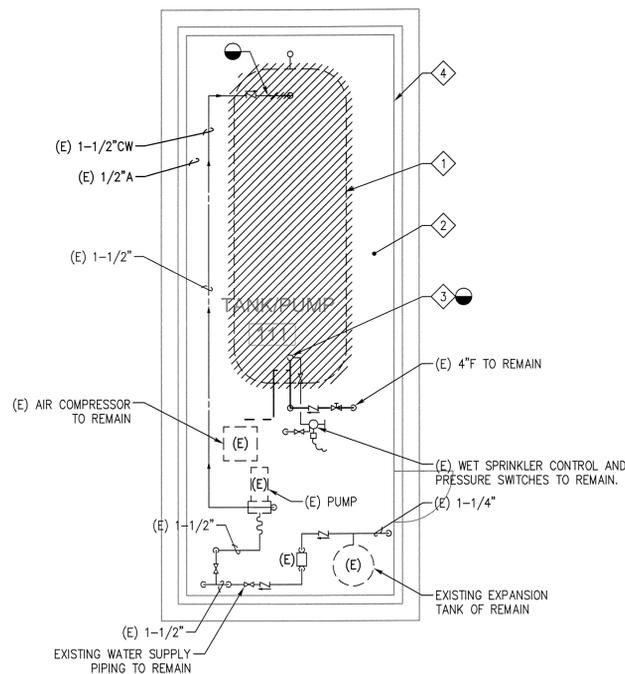
**PROJECT TITLE**  
REVITALIZE RADAR AND TELEMTRY TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief, Facilities Engineering & Assesment Office <i>San Loydy</i>	7-10-15
Project Registrar/Operations <i>J. J. Oberst</i>	2-10-15
Facilities Project Manager <i>Stefan Weber</i>	1-27-15
Chief, Office of Protective Services <i>K. S. ...</i>	1-28-15
Chief - Safety, Health, and Environmental Office <i>...</i>	1-27-15
DRG- Chief Information Officer <i>R. C. ...</i>	3 Feb 15

DATE STRTD	DATE PRNTD	5/9/14
DRAWN BY	ANH, MT, WAS	EDM-1728
SCALE	AS NOTED	
FILE NAME	TRADE SH. No.	P5
	SHEET No.	32 of 48

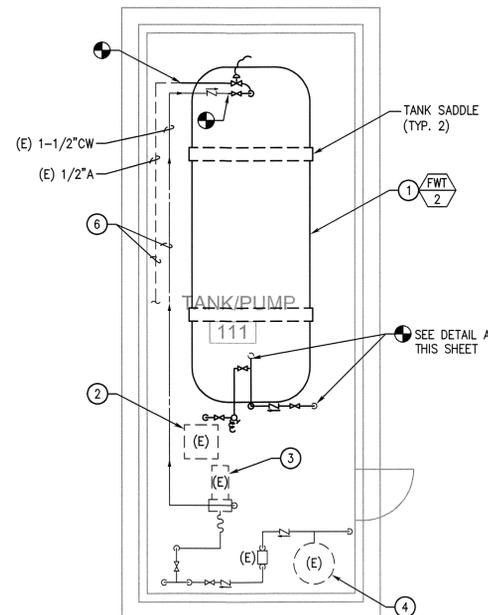
DEMOLITION NOTES

- 1 REMOVE EXISTING ABOVE GROUND WATER STORAGE TANK. EXISTING WATER SUPPLY CONNECTION FOR FUTURE NEW TANK TO REMAIN.
- 2 TEMPORARILY REMOVE EXISTING WET PIPE SPRINKLER SUPPLY AND PIPING IN THIS AREA.
- 3 DISCONNECT TANK WATER OUTLET. PRESERVE PIPING FOR FUTURE TANK CONNECTION.
- 4 EXISTING ROOF SHALL BE REMOVED TO PROVIDE ACCESS OF EXISTING TANK REMOVAL. SEE ARCHITECTURAL DRAWING FOR DIRECTION.

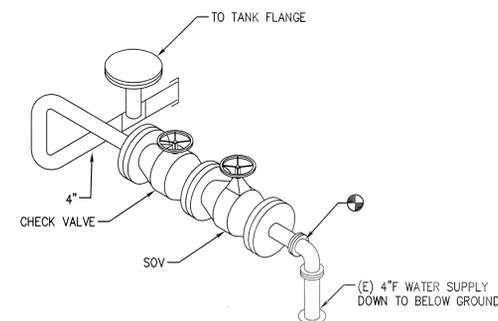


REMODEL NOTES

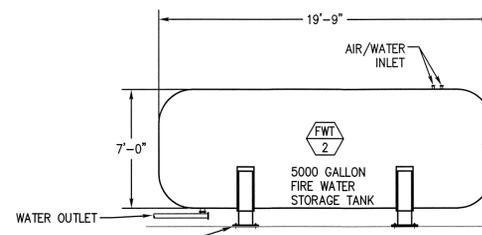
- 1 BID OPTION #3: NEW ABOVE GROUND 5000 GALLON, GLASS LINED WATER STORAGE TANK. CONNECT WATER INLET AND OUTLET CONNECTIONS TO EXISTING WATER SUPPLIES.
- 2 EXISTING AIR COMPRESSOR TO REMAIN.
- 3 EXISTING WATER PUMP TO REMAIN.
- 4 EXISTING EXPANSION TANK TO REMAIN.
- 5 EXISTING 4\"/>



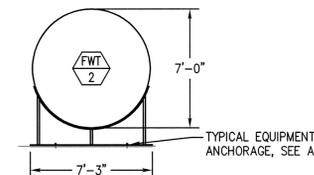
PLAN VIEW  
SCALE: 3/16" = 1'-0"



DETAIL A  
SCALE: NTS



SIDE ELEVATION  
SCALE: 3/16" = 1'-0"



FRONT ELEVATION  
SCALE: 3/16" = 1'-0"



DEMOLITION - AERONAUTICAL TRACKING FACILITY (ATF 2) B4720

SCALE:  
3/16"=1'-0" 1

REMODEL - AERONAUTICAL TRACKING FACILITY (ATF 2) B4720

SCALE:  
AS NOTED 2

DWG: P112088 NASA ATF Dwg P112088 PG.dwg USER: Alex Hernandez DATE: Sep 09, 2014 9:27:00 AM XREFS: A:TELOCK-D BLDG 4720 BASE-NEW IMAGES:

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DATE	SYM	REVISION	BY	A'PD
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12/21/12	A	15% CONCEPT DESIGN		

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 DRYDEN FLIGHT RESEARCH CENTER  
 EDWARDS, CA

**DRAWING TITLE**  
 BUILDING 4720  
 DEMOLITION AND REMODEL PLANS

**PROJECT TITLE**  
 REVITALIZE RADAR AND TELEMETRY  
 TRACKING INFRASTRUCTURE

APPROVALS		DATE
Chief, Facilities Engineering & Asset Mgmt. Office	<i>[Signature]</i>	7-10-15
Project Registrar/Engineer	<i>[Signature]</i>	2-10-15
Facilities Project Manager	<i>[Signature]</i>	1-27-15
Chief, Office of Protective Services	<i>[Signature]</i>	1-28-15
Chief - Safety, Health and Environment Office	<i>[Signature]</i>	1-27-15
SRIC Chief Information Officer	<i>[Signature]</i>	3 Feb 15

DATE STRTD:	DATE PRINTD:	5/9/14
DRAWN BY:	ANH, MT, WAS	EDM-1728
SCALE:	AS NOTED	
FILE NAME:	P6	SHEET No. 33 of 48

**ANNOTATIONS**

- 1 → DETAIL REFERENCE NUMBER
- 22 E6 → SHEET DETAIL IS SHOWN ON
- SHEET ON WHICH DETAIL IS TAKEN
- 3 → LIGHTING FIXTURE CALL OUT, "3" INDICATES FIXTURE TYPE (REFER TO LIGHTING FIXTURE SCHEDULE), NUMBER ADJACENT INDICATES QUANTITIES (NUMBER IS SHOWN FOR BRANCH CIRCUIT PURPOSES ONLY, NOT FOR MATERIAL TAKE-OFF), NUMBER "93" INDICATES FIXTURE WATTS
- 2 → PLAN NOTE REFERENCE, REFER TO NOTES ON SHEET, OR AS DIRECTED.
- 4 → REVISION REFERENCE.

**ABBREVIATIONS**

- A/C AIR CONDITIONING
- ADA AMERICAN WITH DISABILITIES ACT
- A.F.F. ABOVE FINISH FLOOR
- A.F.G. ABOVE FINISH GRADE
- AWG AMERICAN WIRE GAUGE
- AMP, A AMPERE
- A.I.C. AMPERES INTERRUPTING CAPACITY (SYMMETRICAL)
- AF/AT AMP FRAME, AMP TRIP
- AS/AF AMP SWITCH, AMP FUSE
- ATS AUTOMATIC TRANSFER SWITCH
- CIRCT, CKT. CIRCUIT
- CB CIRCUIT BREAKER
- C CONDUIT
- CM CENTIMETER
- C.O. CONDUIT ONLY, COMPLETE WITH PULL STRING
- CONN CONNECTED
- CPT CONTROL POWER TRANSFORMER
- CLCB CURRENT LIMITING CIRCUIT BREAKER
- CLF CURRENT LIMITING FUSE
- CT CURRENT TRANSFORMER
- DIA DIAMETER
- D.E.C. ELECTRICAL CONTRACTOR
- DMS ENERGY MANAGEMENT CONTROL SYSTEM
- EMT ELECTRICAL METALLIC TUBING
- ENT ELECTRICAL NON-METALLIC TUBING
- EWG ELECTRIC WATER COOLER
- E-O-L END-OF-LINE CIRCUIT TERMINATOR
- EF EXHAUST FAN
- E/G EQUIPMENT GROUND (GREEN)
- E EXISTING EQUIPMENT
- EP EXPLOSION PROOF
- FA FIRE ALARM
- FLA FULL LOAD AMPS
- GFCI GROUND FAULT CIRCUIT INTERRUPTER
- GRD GROUND
- HOA HAND-OFF-AUTO
- HVAC HEATING, VENTILATING AND AIR CONDITIONING
- H,W,D,L,H HEIGHT, WIDTH, DEPTH, LENGTH
- HID HIGH INTENSITY DISCHARGE
- HP HORSEPOWER
- HPS HIGH PRESSURE SODIUM
- I/G ISOLATED GROUND
- JBOX JUNCTION BOX
- K DEGREE KELVIN
- KVA KILOVOLT AMPERES
- KW KILOWATT
- LCL LONG CONTINUOUS LOAD
- L.F. LINEAR FEET
- LTS, L.TS LIGHTING
- LPS LOW PRESSURE SODIUM
- MAX. MAXIMUM
- MBP MAINTENANCE BYPASS
- MCB MAIN CIRCUIT BREAKER
- MIN. MINIMUM
- MLO MAIN LUGS ONLY
- MM MILLIMETER
- MV MERCURY VAPOR
- MH METAL HALIDE
- MCC MOTOR CONTROL CENTER
- MCM THOUSAND CIRCULAR MILS
- MCP MOTOR CIRCUIT PROTECTOR
- MFR. MANUFACTURER
- MTD MOUNTED
- MW MICROWAVE
- N NEW EQUIPMENT
- NEC NATIONAL ELECTRICAL CODE
- NC NORMALLY CLOSED
- NO NORMALLY OPENED
- NF NON-FUSED
- NIC NOT IN CONTRACT
- NL NIGHT LIGHT
- NO. or # NUMBER
- OFCI OWNER FURNISHED, CONTRACTOR INSTALLED.
- P POLE
- PC PHOTOCELL
- PH. or P OVER 600 VOLTS
- PHASE PHASE
- PROVIDE FURNISH, INSTALL AND CONNECT.
- PT POTENTIAL TRANSFORMER
- PA PUBLIC ADDRESS
- REC, RECEPT RECEPTACLE
- REF REFRIGERATOR
- RGS RIGID GALVANIZED STEEL
- SECONDARY 600 VOLTS AND LESS
- SQ. SQUARE
- TC TIME CLOCK
- TEL./DATA TELEPHONE AND DATA
- TV TELEVISION
- TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION
- TYP TYPICAL
- U.O.N. UNLESS OTHERWISE NOTED
- V VOLTS
- VA VOLT AMPERES
- WP WEATHERPROOF
- W WIRE
- XFMR TRANSFORMER

**GENERAL NOTES:**

1. CONDUIT SIZES CALLED OUT ON DRAWINGS ARE NOT NECESSARILY BASED ON THE MINIMUM SIZE ALLOWED BY THE NATIONAL ELECTRICAL CODE AND MAY BE PURPOSELY OVSIZED FOR EASE OF CONDUCTOR PULLING OR TO AVOID EXCESS CONDUIT HEATING. IN NO CASE SHALL CONDUIT SIZE BE SMALLER THAN IS REQUIRED BY THE NATIONAL ELECTRICAL CODE.
2. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL JUNCTION AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT, WHETHER OR NOT SPECIFICALLY INDICATED ON THE PLANS. SIZE OF THESE BOXES SHALL BE PER THE NATIONAL ELECTRICAL CODE.
3. THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT FOR TEMPORARY CONSTRUCTION POWER AS REQUIRED.
4. ALL PENETRATIONS THROUGH FIRE BARRIERS SHALL BE FIRE STOPPED TO MAINTAIN THE INTEGRITY OF THE FIRE BARRIER. FIRE STOPPING MATERIAL SHALL BE U.L. LISTED.
5. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CONTRACTING OFFICER BEFORE DRILLING ANY PENETRATION THROUGH STRUCTURAL MEMBERS OR FIRE RATED WALLS AND SLABS.
6. SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF WORK, THE CONTRACTOR SHALL MARK SUCH CHANGES ON THE AS-BUILT DRAWINGS. IF THESE CHANGES REQUIRE ALTERNATE METHODS TO THOSE SPECIFIED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SUBMIT DRAWINGS SHOWING THE PROPOSED ALTERNATE METHODS TO THE CONTRACTING OFFICER. THE CONTRACTOR SHALL NOT PROCEED UNTIL APPROVAL IS OBTAINED. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION SHALL NOT BE CONSIDERED AN ITEM FOR EXTRA COST.
7. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. TESTING SHALL BE DONE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT A COPY OF SHOP DRAWINGS TO THE CONTRACTING OFFICER FOR INFORMATION.
8. PROVIDE TESTING BY OPERATING THE INSTALLATION AND RUNNING TESTS TO DEMONSTRATE ITS OPERATIONS AND COMPLIANCE WITH THE EQUIPMENT SPECIFICATIONS TEST ALL WIRING AND EQUIPMENT TO INSURE PROPER OPERATION ACCORDING TO FUNCTIONS SPECIFIED HEREIN AND ON THE DRAWINGS.  
WARRANTY:  
9. ALL WORK IN THIS SECTION SHALL BE UNDER WARRANTY FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE WORK AS A WHOLE BY THE CONTRACTING OFFICER. SHOULD ANY EQUIPMENT OR MATERIAL FAIL WITHIN THIS PERIOD, THE CONTRACTOR SHALL REPLACE OR REPAIR THAT ITEM AT NO COST FOR MATERIAL AND/OR SERVICES IF SUCH IS DUE TO FAULTY WORKMANSHIP OR QUALITY OF MATERIAL FURNISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO ANY PART OF THE PREMISES CAUSED BY FAILURE IN THE EQUIPMENT FURNISHED AS PART OF THE CONTRACT DRAWINGS FOR A PERIOD OF ONE YEAR AFTER THE FINAL ACCEPTANCE OF THE WORK AS A WHOLE.
10. ALL MECHANICAL CONTROL SYSTEMS EQUIPMENT SHALL BE PROVIDED, INSTALLED AND WRED BY THE MECHANICAL CONTRACTOR PER THE CONTRACT DOCUMENTS. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUITS ONLY FOR CONTROL WIRING. ELECTRICAL POWER FOR THE MECHANICAL CONTROL SYSTEM EQUIPMENT SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. THIS INCLUDES THE POWER WIRING, AND CONNECTION TO THE MECHANICAL CONTROL SYSTEMS EQUIPMENT.
11. ALL EQUIPMENT SHALL BE DESIGNED AND INSTALLED FOR USE IN A SEISMIC ZONE 4 AREA. ALL SEISMIC DESIGN SHALL BE STAMPED AND SIGNED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA.
12. POT HOLE TEST, AND LOCATE ALL UTILITY LINES WITHIN THE PROJECT AREA PRIOR TO START OF EXCAVATION IN ORDER TO AVOID DAMAGE TO EXISTING UNDERGROUND UTILITIES. REPAIR ALL DAMAGES TO EXISTING UTILITIES AT NO COST TO OWNER.
13. PATCH AND PAINT ALL EXPOSED ELECTRICAL MATERIAL, INCLUDING CONDUIT, SURFACE METAL RACEWAYS, JUNCTION BOXES, PANELS, AND DEVICES TO MATCH THE ADJACENT SURFACES IN TEXTURE AND COLOR.
14. REPAIR ANY DAMAGE TO EXISTING CONSTRUCTION RESULTING FROM THE INSTALLATION OF ELECTRICAL ITEMS. THE AREAS REPAIRED SHALL MATCH THE ADJACENT SURFACES IN TEXTURE AND COLOR.
15. PROVIDE DEWATERING EFFORT FOR NEW BELOW GRADE EXCAVATION/TRENCHING IF GROUND WATER IS ENCOUNTERED. THE CONTRACTOR SHALL OBTAIN A DIGGING PERMIT BEFORE ANY EXCAVATION OR TRENCHING.
16. ALL ELECTRICAL SPLICES SHALL BE WATERPROOF.
17. ALL MOUNTING HARDWARE, CHANNELS AND FASTENING DEVICES IN EXTERIOR LOCATIONS SHALL BE 316 STAINLESS STEEL UNLESS NOTED.
18. PROVIDE A COMPLETE AND OPERATING ELECTRICAL SYSTEM. PROVIDE SHALL MEAN "FURNISH AND INSTALL". WORK INCLUDES INSTALLATION OF ALL ELECTRICAL EQUIPMENT AND SYSTEMS, INCLUDING ANY FURNISHED BY OWNER OR OTHER TRADES, COMPLETE AND OPERATIONAL TO THE SATISFACTION OF THE CONTRACTING OFFICER, AS LIMITED BY THE INTENT OF THE CONTRACT DOCUMENTS.
19. THE CONTRACTOR SHALL COMPLY WITH THE CONSTRUCTION PRACTICES AND REQUIREMENTS OF THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE (NFPA 70), NATIONAL ELECTRICAL SAFETY CODE, AMERICAN ELECTRICIANS HANDBOOK BY CROFT EDISON ELECTRIC INSTITUTE, AMERICANS WITH DISABILITIES ACT, APPLICABLE INSTRUCTIONS OF MANUFACTURERS OF EQUIPMENT AND MATERIALS SUPPLIED FOR THE PROJECT, AND ALL ORDINANCES, RULES AND POLICIES OF THE STATE AND COUNTY IN WHICH THE WORK IS TO BE PERFORMED.
20. ALL CIRCUITS SHALL INCLUDE AN INSULATED GREEN GROUNDING CONDUCTOR, SIZED PER THE NATIONAL ELECTRICAL CODE. THIS CONDUCTOR SHALL BE CARRIED IN ALL RACEWAYS INCLUDING THOSE INSTALLED FOR SWTCH LEGS AND SHALL BE ATTACHED TO THE DEVICE OR EQUIPMENT HOUSING USING A SUITABLE GROUNDING LUG.
21. AT COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL PROVIDE A COPY OF AS-BUILT DRAWINGS IN CD-ROM TO THE CONTRACTING OFFICER.
22. SAWCUT EXISTING AC PAVEMENT/SIDEWALK FOR NEW UNDERGROUND DUCTLINE INSTALLATIONS. PATCH AND REPAIR AC PAVEMENT/SIDEWALK TO MATCH EXISTING ADJACENT SURFACES. AT NON-PAVED AREAS, RESTORE SURFACES TO MATCH EXISTING ADJACENT SURFACES. REFER TO 013300 FOR DRAWING FORMAT.
23. ALL OUTAGES SHALL BE COORDINATED AND SCHEDULED WITH THE CONTRACTING OFFICER AT LEAST (3) WEEKS IN ADVANCE OF REQUESTED OUTAGE IN WRITING. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING GENERATOR SUPPORT FOR SCHEDULED ELECTRICAL OUTAGE DUE TO CONSTRUCTION CONTRACT WORK.
24. ALL NEW PRIMARY ELECTRICAL DUCTS AND TELECOMMUNICATION AND CATV DUCTS SHALL BE CONCRETE ENCASED. REFER TO TYPICAL DETAIL ON DWG. E-7.
25. ALL SITE 15KV DISTRIBUTION CONDUITS SHALL INCLUDE #4/0 AWG BARE COPPER GROUND CONDUCTOR.
26. PROVIDE GROUND BOND OF SWITCHGEAR SECTIONS TO SUBSTATION GRID USING #4/0 AWG BARE COPPER WIRE AND BOLTED CONNECTIONS.
27. ALL ELECTRICAL CONDUCTORS FOR DISTRIBUTION AT 480 VOLTS AND BELOW SHALL BE THHN, 90°C INSULATION EXCEPT WHERE SPECIFIED ON SINGLE LINE DIAGRAM TO INSTALL DOL TYPE RHH/RHW-2 90°C CONDUCTORS.
28. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG FOR BOTH POWER AND CONTROL CIRCUITS.
29. OBTAIN CONFINED SPACE PERMIT FROM NASA PRIOR TO ENTRY OF UNDER GROUND MANHOLES AND VAULTS.
30. GOVERNMENT RESERVES THE RIGHT TO WITNESS FACTORY TESTING. NOTIFY GOVERNMENT 30 CALENDAR DAYS PRIOR TO EQUIPMENT FACTORY TESTS FOR GOVERNMENT REPRESENTATIVE ATTENDANCE.

**ONE LINE DIAGRAM**

- ←[52]→ 15KV RATED DRAW OUT VACUUM CIRCUIT BREAKER.
- ←[ ]→ LOW VOLTAGE DRAW OUT METAL CLAD CIRCUIT BREAKER.
- [ ]— FIXED MOUNTED LOW VOLTAGE CIRCUIT BREAKER.
- [ ]— DISCONNECT SWITCH, RATED AS INDICATED.
- ←[ ]→ DRAW OUT FUSE, RATED AS INDICATED.
- [ ]— SURGE ARRESTER.
- [ ]— GROUND CONNECTION.
- [ ]— TRANSFORMER, RATING AS INDICATED.
- [METER] DIGITAL AMMETER, VOLTMETER, KILOWATT METER AS NOTED.
- [ ] CURRENT TRANSFORMER.
- ←[ ]→ DRAW OUT TYPE POTENTIAL TRANSFORMER.
- [PANEL] CIRCUIT BREAKER PANEL BOARD, RATED PER SCHEDULE.
- [G] ENGINE GENERATOR, RATED AS INDICATED.
- [TVSS] TRANSIENT VOLTAGE SURGE SUPPRESSER.
- [PLC] PROGRAMMABLE LOGIC CONTROLLER.
- [GND BUS] GROUND BUSS, EQUIPMENT ENCLOSURE OR WALL MOUNTED.
- [ ] 15KV, 4-WAY SWITCH.
- [ ] 15KV, 5-WAY SWITCH.
- [ ] OR [ ] 15KV CABLE SPLICE, WATER-PROOF.
- [ ] 15KV FUSED LOAD BREAKER SWITCH.

**POWER SYMBOLS**

- [ ] DUPLEX RECEPTACLE, WALL MOUNTED AT +18" A.F.F. OR AS NOTED.
- [ ] DOUBLE DUPLEX RECEPTACLE, WALL MOUNTED AT +18" A.F.F. OR AS NOTED.
- [ ] DUPLEX, GFCI RECEPTACLE, WALL MOUNTED AT +18" A.F.F. OR AS NOTED.
- [ ] JUNCTION BOX, WALL MOUNTED AT +18" A.F.F. OR AS NOTED. 4S/DP MINIMUM OR AS REQUIRED BY N.E.C..
- [ ] JUNCTION BOX, MOUNTED IN ACCESSIBLE CEILING FOR APPLICATION DENOTED ON PLAN. 4S/DP MINIMUM OR AS REQUIRED BY N.E.C..
- [ ] EXHAUST FAN, OR MOTOR LOAD. REFER TO MECHANICAL, PLUMBING OR KITCHEN DRAWINGS FOR SPECIFIC LOAD REQUIREMENTS OR AS NOTED.
- [ ] FLUSH MOUNTED ELECTRICAL PANEL BOARD OR LOAD CENTER. REFER TO PANEL SCHEDULE.
- [ ] SURFACE MOUNTED ELECTRICAL PANEL BOARD OR LOAD CENTER. REFER TO PANEL SCHEDULE.
- [ ] TRANSFORMER, REFER TO SINGLE LINE DIAGRAM.
- [ ] FUSED DISCONNECT SWITCH, HP RATED WITH FUSES PER EQUIPMENT MANUFACTURER AND WEATHERPROOF AS REQUIRED. PROVIDE FINAL CONNECTION TO UNIT EQUIPMENT.
- [ ] NON-FUSED DISCONNECT SWITCH, HP RATED AND WEATHERPROOF AS REQUIRED. PROVIDE FINAL CONNECTION TO UNIT EQUIPMENT.
- [ ] GROUND CONNECTION, SIZE AS INDICATED OR AS REQUIRED.
- [ ] SINGLE POLE SWITCHES, WALL MOUNTED AT +48" A.F.F. (MAX). SUBSCRIPTS AT SYMBOL INDICATE THE FOLLOWING:  
2 - DOUBLE POLE  
3 - THREE WAY  
4 - FOUR WAY  
K - KEY OPERATED  
LV - LOW VOLTAGE  
a, b, c, ETC. - DESIGNATES QUANTITY OF SWITCHES AT EACH LOCATION.  
NOTE: ALL WALL SWITCHES CONTROLLING EMERGENCY CIRCUITS SHALL BE ENGRAVED WITH "EMERGENCY"
- [ ] PULL BOX, SIZED AS INDICATED. LETTER "P" OR "C" INDICATES POWER OR COMMUNICATIONS CIRCUITS.
- [ ] MANHOLE, SIZED AS INDICATED. LETTER "P" OR "C" INDICATES POWER OR COMMUNICATIONS CIRCUITS.
- [ ] GROUND WELL
- [ ] QUADPLEX RECEPTACLE (5-20R) IN FLOOR BOX.
- [ ] SINGLE LOCKING 20A, 208V, 3-PHASE RECEPTACLE (L15-20R) IN FLOOR BOX.
- [ ] SINGLE LOCKING 30A, 120V RECEPTACLE (L5-30R) IN FLOOR BOX.
- [ ] SINGLE LOCKING 20A, 208V, SINGLE-PHASE RECEPTACLE (L6-20R) IN FLOOR BOX.
- [ ] THERMOSTAT BY MECHANICAL. PROVIDE BACK BOX AND 1/2" CONDUIT TO UNIT SPECIFIED.

**TELEPHONE/DATA SYMBOLS**

- [ ] TELEPHONE OUTLET BOX, RECESSED WALL MOUNTED AT +48" A.F.F. PROVIDE SINGLE RJ45 JACK.

**LIGHTING SYMBOLS**

- [ ] RECESSED MOUNTED LENSED FIXTURE AND JUNCTION BOX. REFER TO SPECIFICATION NOTED ON PLANS.
- [ ] RECESSED MOUNTED LENSED EMERGENCY BATTERY FIXTURE AND JUNCTION BOX. REFER TO SPECIFICATION NOTED ON PLANS.
- [ ] WALL MOUNTED LIGHTING FIXTURE AND OUTLET BOX. REFER TO LIGHTING FIXTURE SCHEDULE AND PLANS FOR MOUNTING HEIGHT.
- [ ] STRIP LIGHTING FIXTURE AND JUNCTION BOX. REFER TO LIGHTING FIXTURE SCHEDULE, OR AS NOTED ON PLANS.
- [ ] STRIP LIGHTING EMERGENCY FIXTURE AND OUTLET BOX. REFER TO LIGHTING FIXTURE SCHEDULE, OR AS NOTED ON PLANS.

**BRANCH CIRCUIT SYMBOLS**

- [A-1,3,5] HOME RUN TO PANEL. LETTER DESIGNATES PANEL, NUMBERS INDICATE CIRCUITS. UNLESS OTHERWISE NOTED.
- CONCEALED BRANCH CIRCUIT UNLESS OTHERWISE NOTED.
- CONDUIT RUN CONCEALED BELOW GRADE, 1" C MINIMUM WITH CODE SIZED EQUIPMENT GROUND.
- [ ] CONDUIT STUB OUT, CAP, MARK AND RECORD.
- [ ] CONDUIT CONTINUATION.
- [ ] INDICATES FLEXIBLE CONNECTION TO EQUIPMENT. NUMBER OF CONDUCTORS AS REQUIRED.

**REGISTERED PROFESSIONAL ENGINEER**  
No. E06961  
Exp. 6-30-16  
**ELECTRICAL ENGINEER**  
STATE OF CALIFORNIA

**DONN C. GILMORE & ASSOC.**  
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DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
6/21/13	B	30% DEVELOPED DESIGN		
12/21/12	A	15% CONCEPT DESIGN		

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
DRYDEN FLIGHT RESEARCH CENTER  
EDWARDS, CA

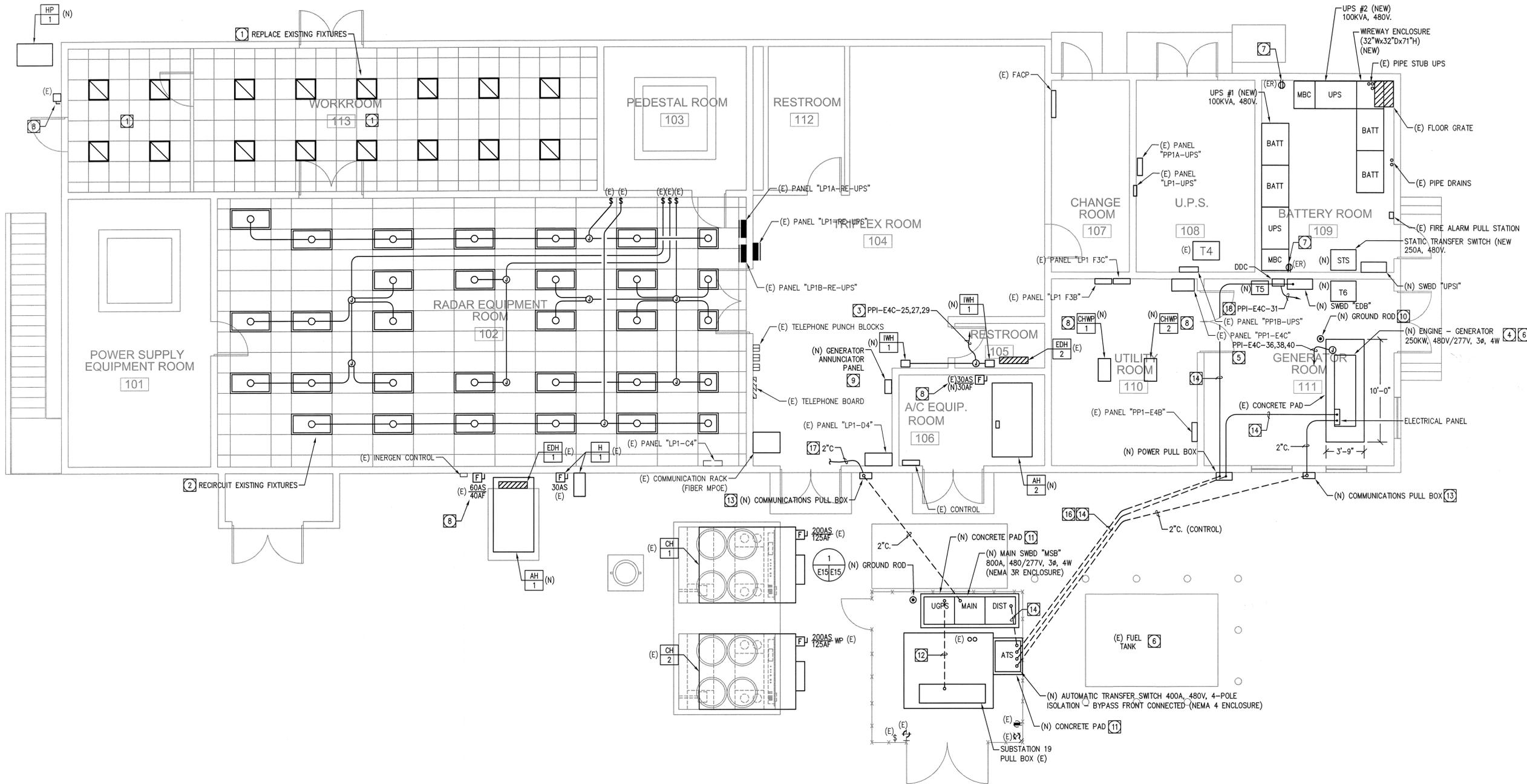
DRAWING TITLE  
**ELECTRICAL SYMBOLS, NOTES AND ABBREVIATIONS**

PROJECT TITLE  
**REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE**

APPROVALS		DATE
Chief, Facilities Engineering & Asset Mgmt. Office	[Signature]	7-10-15
Project Technical Director	[Signature]	2-10-15
Facilities Project Manager	[Signature]	1-27-15
Chief, Office of Protective Services	[Signature]	1-28-15
Chief - Safety, Health and Environmental Office	[Signature]	1-27-15
Special Information Officer	[Signature]	3 Feb 15
DATE STRID	DATE PRINTD	5/9/14
DRAWN BY	AHL, MT, WAS	EDM-1728
SCALE	AS NOTED	TRADE SL No.
FILE NAME	E1	SHEET No. 34 of 48







**BUILDING 4982 - AERONAUTICAL TRACKING FACILITY 1 (ATF 1) - REMODEL**

SCALE: 3/16" = 1'-0"  
TOTAL: 5067 SF

**SHEET SPECIFIC NOTES:**

- 1 OPTION 5: PROVIDE NEW 2'x2' RECESSED LED LIGHT FIXTURES IN ROOM 113. PROVIDE CONNECTION TO EXISTING SWITCH CIRCUITS, RETAINED FROM DEMOLITION. PROVIDE FIXTURES RATED 40W, 3500K, WITH MINIMUM 3540 LUMEN OUTPUT AND CRI VALUE OF 82.
- 2 PROVIDE NEW SWITCH LEG CIRCUITRY FOR EXISTING LIGHT FIXTURES, IN ROOM 102, AS SHOWN. CLEAN AND RE-LAMP EXISTING FIXTURES. WIRE TO EXISTING LIGHT SWITCHES. PROVIDE SWITCH LEG WIRING WITH #12 AWG LINE, NEUTRAL, AND GROUND CONDUCTORS IN 3/4" CONDUIT. CONDUIT AND JUNCTION BOX SYSTEM PROVIDED AS A GUIDELINE. FIELD DEVELOP WITH ROUTING AND JUNCTION BOX QUANTITY AS REQUIRED.
- 3 PROVIDE 3/4"C-3 #10, 1 #10 GROUND TO NEW 30A, 3-POLE CIRCUIT BREAKER. PROVIDE BRANCH CIRCUIT CONTINUATION IN CONDUIT, THROUGH JUNCTION BOX, TO WATER HEATER TERMINATION, PER MANUFACTURER'S INSTRUCTIONS. BREAKER TYPE AND AIC RATING TO MATCH EXISTING.
- 4 PROVIDE ENGINE-GENERATOR MOUNTED ON EXISTING EQUIPMENT PAD, WITH VIBRATION ISOLATORS. PROVIDE CEILING/ROOF PENETRATION FOR INSULATED EXHAUST STACK PIPE, WITH WATER-PROOF SEALANT. PROVIDE RADIATOR FAN EXHAUST DUCT, WITH COUPLING, TO EXISTING WALL LOUVER. PROVIDE MUFFLER MOUNTED ON ROOF, WITH STAND FOR STRUCTURAL BRACING AND ANCHORAGE.
- 5 PROVIDE BATTERY CHARGER AND WATER JACKET HEATER SUPPLY CIRCUIT AS 3/4"C-4 #10, 1 #10 GND. ON NEW 30A, 3-POLE CIRCUIT BREAKER. TYPE AND AIC RATING TO MATCH EXISTING.
- 6 PROVIDE FUEL TRANSFER PIPING FOR SUPPLY AND RETURN BETWEEN EXTERIOR TANK AND ENGINE FRAME MOUNTED PUMPS.
- 7 RELOCATE EXISTING RECEPTACLE TO EAST WALL IN APPROXIMATE LOCATION SHOWN.
- 8 PROVIDE RECONNECTION OF EXISTING SAFETY SWITCH TO UNIT TERMINATION, WITH FEEDER IN FLEXIBLE SEALTIGHT STEEL CONDUIT.
- 9 PROVIDE 1" CONDUIT TO GENERATOR CONTROL PANEL, WITH WIRING PER MANUFACTURER'S INSTRUCTIONS.

- 10 PROVIDE NEW GROUND ROD (3/4" DIAMETER x 10' LENGTH), AS COPPER-CLAD STEEL, WITH EXOTHERMIC WELD CONNECTION TO GROUNDING ELECTRODE CONDUCTOR. PROVIDE FALL OF POTENTIAL GROUND TEST (3-POINT) FOR VERIFICATION OF EARTH GROUND RESISTANCE LESS THAN 25 OHMS. PROVIDE ADDITIONAL GROUND ROD (IF REQUIRED) AT MINIMUM 10' SEPARATION DISTANCE.
- 11 SEE CIVIL PLANS FOR CONCRETE PAD SIZE AND CONSTRUCTION.
- 12 PROVIDE (3) 3"C-4 #300MCM, 1 #1/0 GND. (IN EACH).
- 13 PROVIDE COMMUNICATIONS PULL BOX (18x18"x6"D), RATED NEMA TYPE 3R, ON EXTERIOR WALL AT +48" ABOVE FINISHED GRADE.
- 14 PROVIDE (2) 2"C-4 #3/0, 1 #3 GND. (IN EACH).
- 15 PROVIDE POWER PULL BOX (24x24"x6"D), RATED NEMA TYPE 3R, ON EXTERIOR WALL AT +48" ABOVE FINISHED GRADE.
- 16 PROVIDE WRAPPED RGS CONDUIT ON STUB-UP IN GRADE TO PULL BOX.
- 17 PROVIDE SEALED EXTERIOR WALL PENETRATION AND CONDUIT STUB INTO INTERIOR CEILING SPACE.
- 18 PROVIDE 3/4"C-2 #12, 1 #12 GND.

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2/24/14	D	100% FINAL DESIGN	
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6/21/13	B	30% DEVELOPED DESIGN	
12/21/12	A	15% CONCEPT DESIGN	
			A'PD

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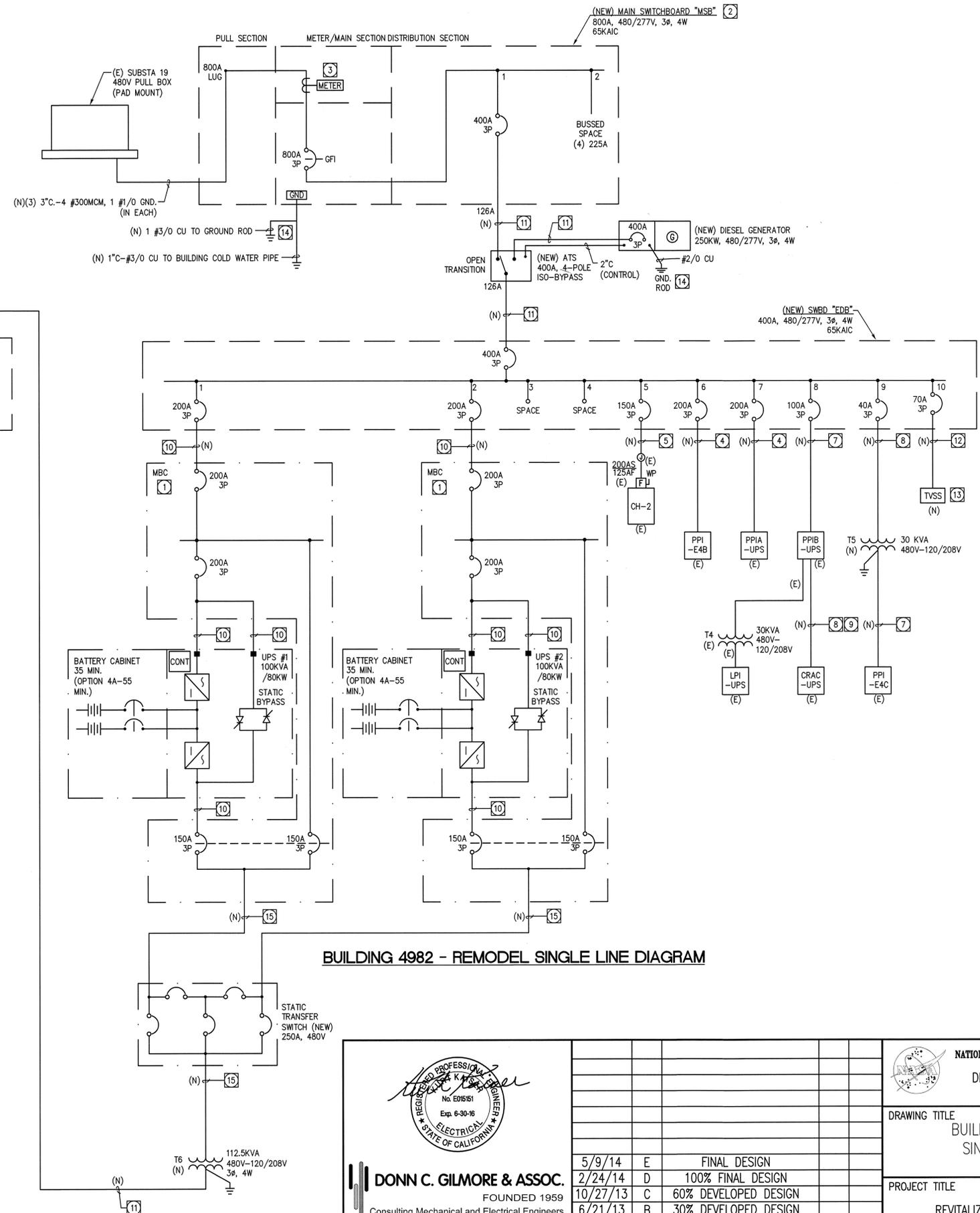
**DRAWING TITLE**  
BUILDING 4982 REMODEL  
PLAN

**PROJECT TITLE**  
REVITALIZE RADAR AND TELEMETRY  
TRACKING INFRASTRUCTURE

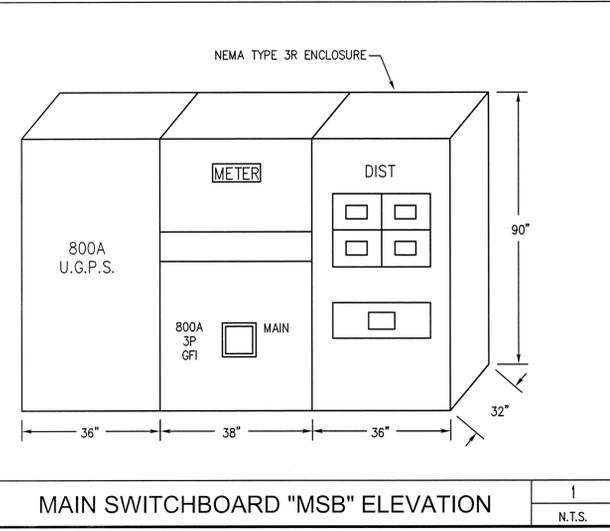
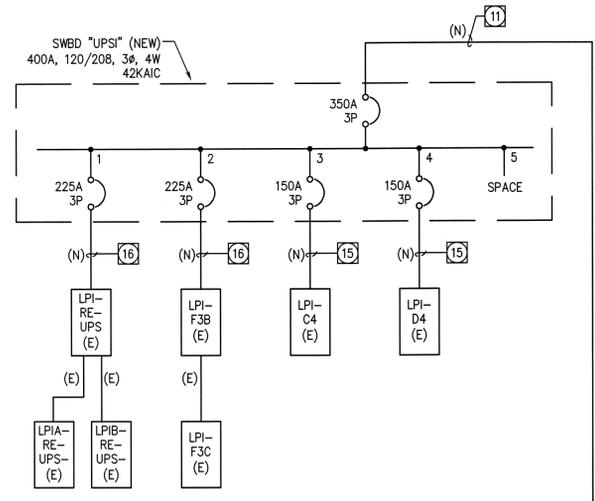
APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office	7-10-15
Project Manager/Contractor	2-10-16
Facilities Project Manager	1-27-15
Chief, Office of Protective Services	1-28-15
Chief - Safety, Health and Environmental Office	1/27/15
SPIC Chief Information Officer	3 Feb 15

DATE STRD	DATE PRINTD
AS NOTED	5/9/14
SCALE	EDM-1728
FILE NAME	E4 SHEET No. 37 of 48

DWG: P112088 NASA ATF1Dwg1E12088 Ed.dwg USER: Alex Hernandez A:ATF\_4982-New IMAGES: DATE: Sep 09, 2014 8:53am XREFS: A:BLOCKCD ATF Base Plan (Elect)



- SINGLE LINE DIAGRAM SPECIFIC NOTES:**
- 1 PROVIDE MAINTENANCE BYPASS SWITCH WITH ELECTRICALLY INTERLOCKED CIRCUIT BREAKERS FOR SIMULTANEOUS CLOSURE ONLY WHEN UPS IS IN STATIC BYPASS MODE.
  - 2 PROVIDE METER SWITCHBOARD IN AN EQUIPMENT SHELTER MOUNTED ON BUILDING EXTERIOR. SEE REMODEL PLAN (E4) AND DETAIL #1, ON THIS SHEET.
  - 3 PROVIDE NETWORKED 3-PHASE DIGITAL MULT-FUNCTION POWER MONITOR, WITH MODBUS RTU. POWER MEASUREMENTS SHALL INCLUDE VOLTS, AMPS, KW, KVA, KWH, FREQ. AND PF. INTEGRATED MEMORY SHALL STORE MAXIMUM KW DEMAND, AND TOTALIZED KWH READINGS.
  - 4 PROVIDE 2"C-4 #3/0, 1 #6 GND.
  - 5 PROVIDE 2"C-3 #2/0, 1 #6 GND.
  - 6 NOT USED
  - 7 PROVIDE 1 1/2"C-4 #1, 1 #8 GND.
  - 8 PROVIDE 3/4"C-3 #8, 1 #10 GND.
  - 9 TERMINATE SPECIFIED CONDUCTORS ON EXISTING 40A, 3-POLE BREAKER.
  - 10 PROVIDE 2"C-4 #3/0, 1 #6 GND.
  - 11 PROVIDE (2) 2"C-4 #3/0, 1 #3 GND. (EACH)
  - 12 PROVIDE 1 1/4"C-4#4, 1#6 GND, WITH 5' MAXIMUM LENGTH.
  - 13 PROVIDE SERVICE ENTRANCE (CATEGORY C) TVSS PANEL MOUNTED ON WALL ADJACENT TO PANEL "EDB", WITH RATED SURGE CAPACITY OF 400KA, SURGE COUNTER AND AUDIBLE ALARM.
  - 14 PROVIDE 3/4" DIA x 10' LENGTH COPPER CLAD STEEL GROUND ROD WITH EXOTHERMIC WELD CONNECTION TO GROUNDING ELECTRODE CONDUCTOR.
  - 15 PROVIDE 2"C-4 #1/0, 1 36GND.
  - 16 PROVIDE 2 1/2"C-4 #4/0, 1 #4 GND.



**BUILDING 4982 - REMODEL SINGLE LINE DIAGRAM**

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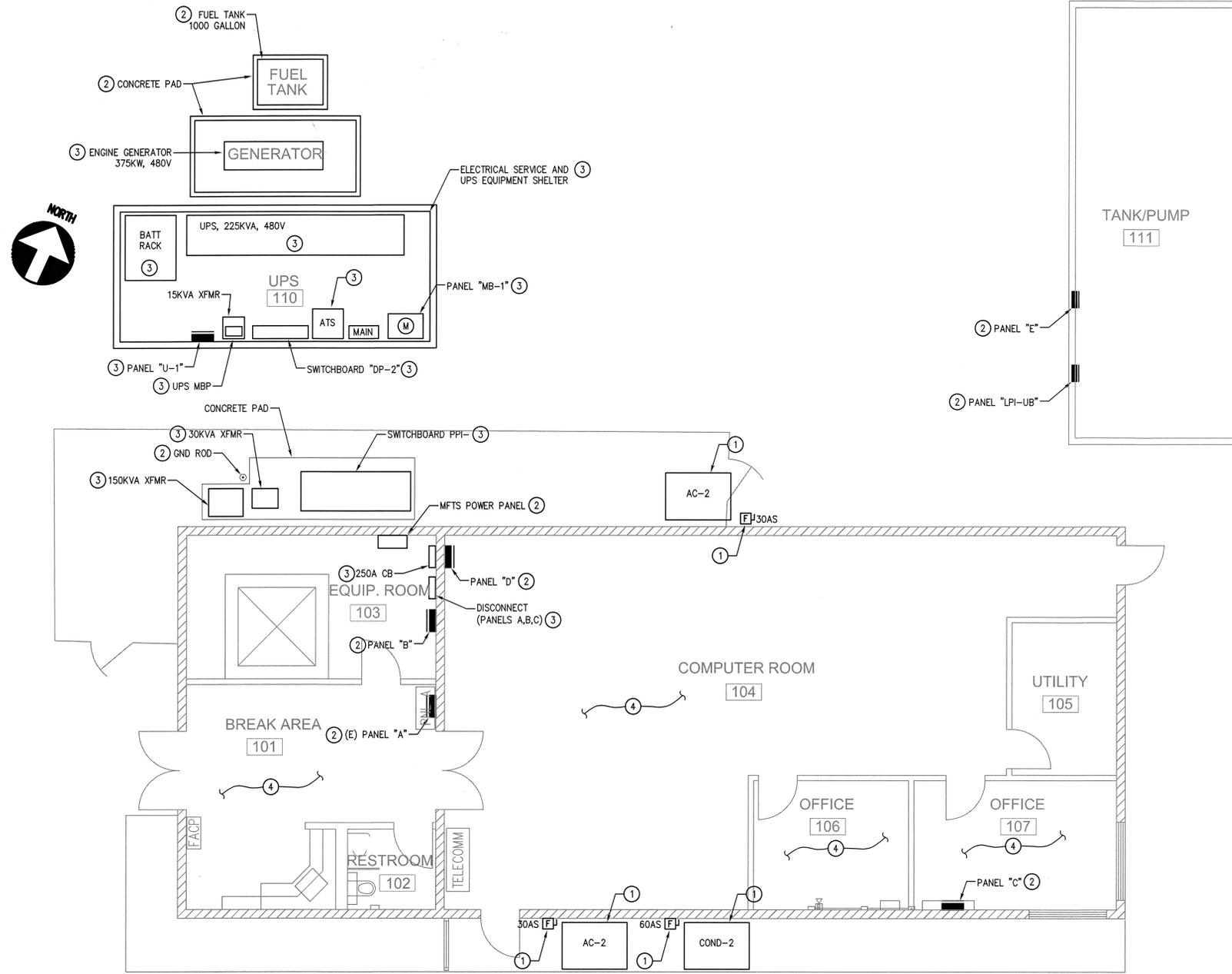
DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
6/21/13	B	30% DEVELOPED DESIGN		
12/21/12	A	15% CONCEPT DESIGN		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION		APPROVALS	DATE
DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		Chief, Facilities Engineering & Asset Mgmt. Office <i>[Signature]</i>	7-10-15
		Project Registrar/Contractor <i>[Signature]</i>	2-10-15
DRAWING TITLE BUILDING 4982 REMODEL SINGLE LINE DIAGRAM		Facilities Project Manager <i>[Signature]</i>	3-27-15
		Chief, Office of Regulatory Services <i>[Signature]</i>	1-28-15
PROJECT TITLE REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE		Chief - Safety, Health and Environmental Office <i>[Signature]</i>	1/27/15
		Chief, Chief Information Officer <i>[Signature]</i>	3Feb15
DATE STRTD	DATE PRNTD	5/9/14	
DRAWN BY	ANHL, MT, WAS	EDM-1728	
SCALE	AS NOTED	TRADE	SN. No.
FILE NAME	E5	SHEET No. 38 of 48	

DWG: P112088 NASA ATFDW012088 E5.dwg USER: Alex Hernandez  
 DATE: Sep 09, 2014 8:53am XREFS: A-BLOCK-D IMAGES:

**DEMOLITION SHEET NOTES:**

- ① DISCONNECT AND REMOVE ELECTRICAL WIRING AND CONDUIT FROM MECHANICAL UNIT, SCHEDULED FOR DEMOLITION. REMOVE DISCONNECT SWITCH AND FEEDER CONDUCTORS/CONDUIT BACK TO SERVICE SWITCHBOARD.
- ② EXISTING EQUIPMENT TO REMAIN.
- ③ DISCONNECT AND REMOVE ELECTRICAL EQUIPMENT. REMOVE FEEDER CONDUCTORS AND CONDUIT BACK TO SUPPLY PANEL.
- ④ DISCONNECT AND REMOVE EXISTING LIGHT FIXTURES. REMOVE SWITCH CIRCUIT AND ASSOCIATED CONDUIT IN CEILING SPACE TO LOCAL JUNCTION BOX. INSULATE WIRING IN PREPARATION FOR REUSE PER REMODEL PLAN.
- ⑤ TO BE DEMOLISHED.



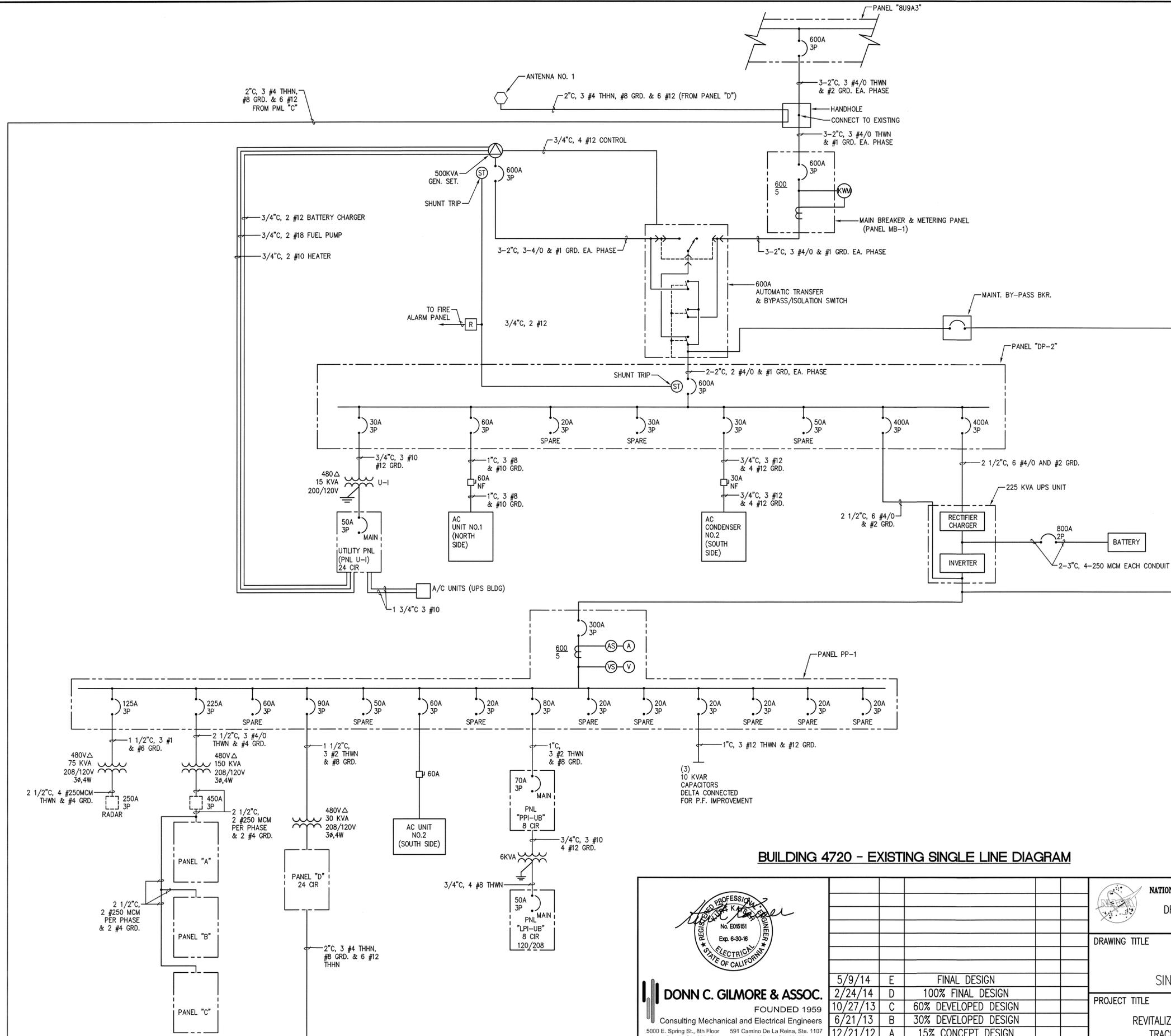
**BUILDING 4720 – AERONAUTICAL TRACKING FACILITY (ATF 2) – DEMOLITION**  
 SCALE: 3/16" 1'-0" (TOTAL SQUARE FEET = 2200)  
 TOTAL: 5067 SF

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12/21/12	A	15% CONCEPT DESIGN		

 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA	APPROVALS Chief, Facilities Engineering & Asset Mgmt. Office Project Recovery/Closeout Facilities Project Manager Chief, Office of Protective Services Chief - Safety, Health and Environmental Office ASBC Chief, Information Officer	DATE 7-10-15 2-10-15 1-27-15 1-28-15 1/21/15 3 Feb 15
	DRAWING TITLE BUILDING 4720 DEMOLITION PLAN	
PROJECT TITLE REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE		DATE STRID: 5/9/14 DATE PRINTD: 5/9/14 DRAWN BY: ANH, MT, WAS SCALE: AS NOTED TRADE: E6 SHEET No. 39 of 48

DWG: P112088 NASA ATF02088 EG.dwg USER: Alex Hernandez  
 DATE: Sep 05 2014 8:54am XREFS: ATF02088-0 BLDG 4720 BASE.Demo IMAGES:



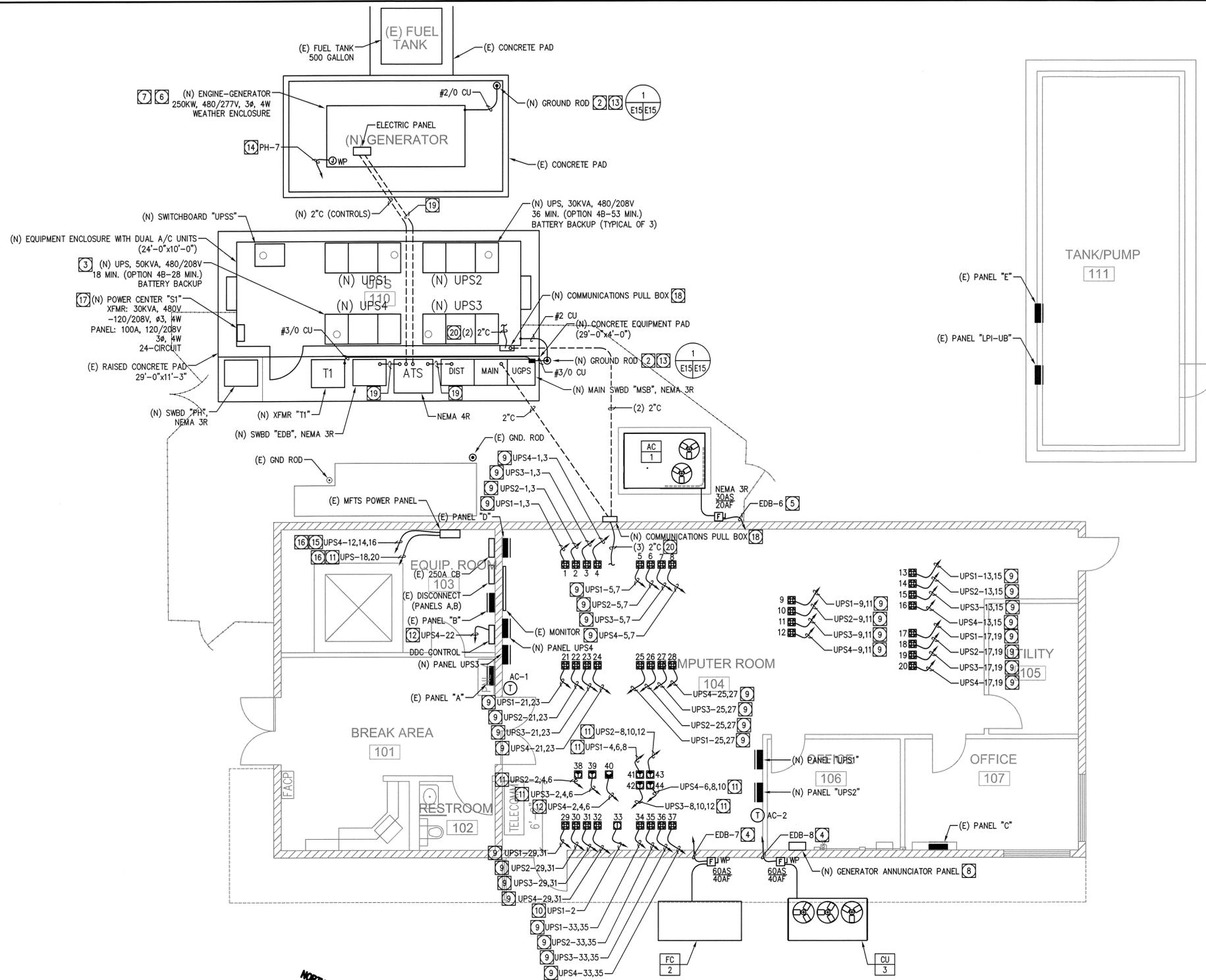
**BUILDING 4720 - EXISTING SINGLE LINE DIAGRAM**

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12/21/12	A	15% CONCEPT DESIGN	
DATE	SYM	REVISION	BY

<b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		<b>APPROVALS</b> Chief, Facilities Engineering & Asset Mgmt. Office <i>[Signature]</i> Project Registrar/Engineer <i>[Signature]</i> Facilities Project Manager <i>[Signature]</i> Chief, Office of Protective Services <i>[Signature]</i> Chief - Safety, Health and Environmental Office <i>[Signature]</i> DRIC Chief Information Officer <i>[Signature]</i>	<b>DATE</b> 7-10-15 2-10-15 1-27-15 1-28-15 1-27-15 3 Feb 15
<b>DRAWING TITLE</b> BUILDING 4720 EXISTING SINGLE LINE DIAGRAM			
<b>PROJECT TITLE</b> REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE			
DATE STRTD	DATE PRNTD	5/9/14	
DRAWN BY	ANH, MT, WAS	EDM-1728	
SCALE	AS NOTED	TRADE	SH. No.
FILE NAME	E7	SHEET No. 40 of 48	

DWG: P112088 NASA AFDW/E12088 E7.dwg USER: Alex Hernandez  
 DATE: Sep 09, 2014 8:56am XREFS: A-TELECKD IMAGES:



**GENERAL NOTES:**

1. ALL RECEPTACLES IN ROOM 104 ARE TO BE MOUNTED IN CEILING SPACE DIRECTLY ABOVE RACK ROW REAR.

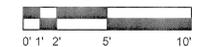
**SHEET SPECIFIC NOTES:**

- 1 PROVIDE 1" C-4 #6, 1 #10 GND. TO 30A, 3-POLE CIRCUIT BREAKER IN SWITCHBOARD "PH" FOR BATTERY CHARGER AND WATER JACKET HEATER SUPPLY, FIELD DEVELOP UNDERGROUND CONDUIT INSTALLATION.
- 2 PROVIDE NEW GROUND ROD (3/4" DIAMETER x 10' LENGTH), AS COPPER-CLAD STEEL, WITH COPPER GROUNDING ELECTRODE CONDUCTOR BONDED TO EQUIPMENT FRAME OR SWITCHBOARD WITH BOLTED CONNECTION.
- 3 UPS SYSTEM PROVIDED WITH HIGHER RATING FOR MFTS TRACKING SYSTEM, WITH SERVO MOTOR AND UPLINK SYSTEM LOAD OF APPROXIMATELY 6KVA.
- 4 PROVIDE 3/4" C-3 #6, 1 #10 GND.
- 5 PROVIDE 3/4" C-3 #10, 1 #10 GND.
- 6 PROVIDE ENGINE-GENERATOR MOUNTED ON EXISTING EQUIPMENT PAD.
- 7 PROVIDE FUEL TRANSFER PIPING FOR SUPPLY AND RETURN BETWEEN TANK AND ENGINE FRAME MOUNTED PUMPS.
- 8 PROVIDE 1" CONDUIT TO GENERATOR CONTROL PANEL, WITH WIRING PER MANUFACTURER'S INSTRUCTIONS.
- 9 PROVIDE 3/4" C-2 #12, 2 #12 NEU, 2 #12 GND.
- 10 PROVIDE 3/4" C-2 #10, 1 #10 GND.
- 11 PROVIDE 3/4" C-3 #12, 1 #12 GND.
- 12 PROVIDE 3/4" C-2 #12, 1 #12 GND.
- 13 PROVIDE FALL OF POTENTIAL GROUND TEST (3-POINT) FOR VERIFICATION OF EARTH GROUND RESISTANCE LESS THAN 25 OHMS. PROVIDE ADDITIONAL GROUND ROD (IF REQUIRED) AT MINIMUM 10' SEPARATION DISTANCE.
- 14 PROVIDE 1" C-4 #6, 1 #10 GROUND TO 30A, 3-POLE CIRCUIT BREAKER IN SWITCHBOARD "PH".
- 15 PROVIDE 1" C-4 #4, 1 #8 GND.
- 16 PROVIDE SPliced CONNECTION TO EXISTING MFTS CONDUCTORS IN PANEL. OTHER PANEL CIRCUITS TO BE DISCONNECTED, PANEL TO BE USED AS PULL BOX FOR REUSE OF UNDERGROUND CONDUITS TO MFTS UNITS ON BUILDING EXTERIOR.
- 17 PROVIDE WALL MOUNTED UL LISTED POWER CENTER CONTAINING A 30KVA TRANSFORMER WITH PRIMARY AND SECONDARY CIRCUIT BREAKERS, AND 24-CIRCUIT BREAKER PANEL IN A NEMA 1 (OR NEMA 3R) ENCLOSURE. PROVIDE (2) 3-POLE CIRCUIT BREAKERS RATED FOR AIR CONDITIONER OVER-CURRENT PROTECTION. PROVIDE (2) 1-POLE 20A CIRCUIT BREAKERS FOR ENCLOSURE LIGHT AND MAINTENANCE RECEPTACLE CIRCUITS.
- 18 PROVIDE COMMUNICATIONS PULL BOX (18"x18"x6"D), RATED NEMA TYPE 3R, ON EXTERIOR WALL AT +48" ABOVE FINISHED GRADE.
- 19 PROVIDE (2) 2" C-4 #3/0, 1 #3 GND. (IN EACH).
- 20 PROVIDE SEALED EXTERIOR WALL PENETRATION AND CONDUIT STUB INTO INTERIOR CEILING SPACE.



**BUILDING 4720 - AERONAUTICAL TRACKING FACILITY (ATF 2) - POWER REMODEL**

SCALE: 3/16" 1' = 0" (TOTAL SQUARE FEET = 2200)  
TOTAL: 5067 SF



DWG: P112088 NASA ATF12088 EB.dwg USER: Alex Hernandez DATE: Sep 09, 2014 8:57 am XREFS: ATBLOCK-D BLDG 4720 BASE-New IMAGES:

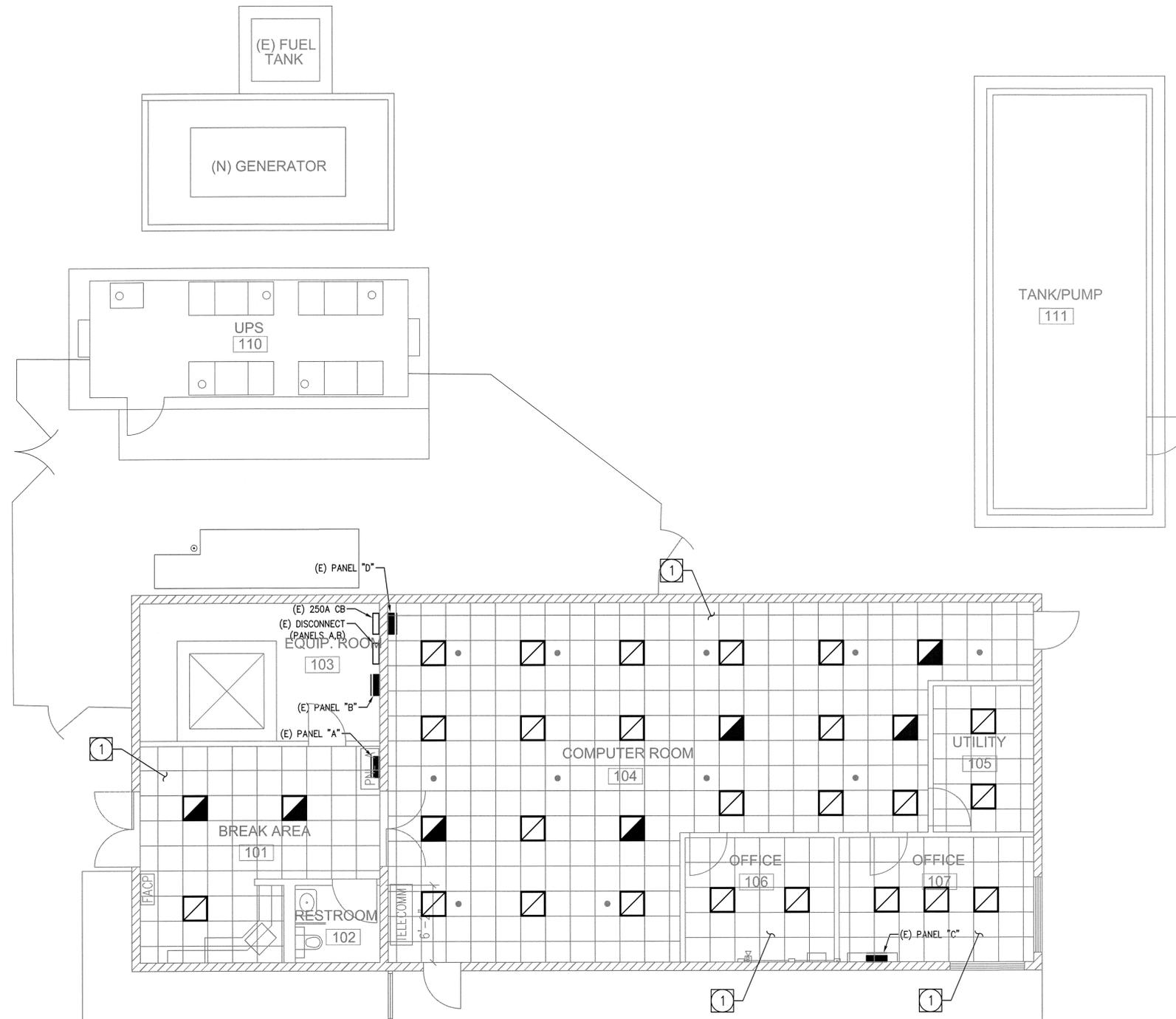
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION		APPROVALS		DATE
DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		Chief, Facilities Engineering & Asset Mgmt. Office	<i>[Signature]</i>	7-10-15
		Project Registrar/Customer	<i>[Signature]</i>	2-10-15
BUILDING 4720 REMODEL POWER PLAN		Facilities Project Manager	<i>[Signature]</i>	1-27-15
		Chief, Office of Protective Services	<i>[Signature]</i>	1-28-15
REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE		Chief - Safety, Health and Environmental Office	<i>[Signature]</i>	1-27-15
		DRIC Chief Information Officer	<i>[Signature]</i>	3-6-15
DATE STD'D	DATE PRINT'D	5/9/14		
DRAWN BY	ANH, MT, WAS	EDM-1728		
SCALE	AS NOTED	TRADE	E8	
FILE NAME		SHEET No.	41 of 48	

SHEET SPECIFIC NOTES:

1 OPTION 5: PROVIDE NEW 2'x2' RECESSED LED LIGHT FIXTURES IN ROOM. PROVIDE CONNECTION TO EXISTING LIGHTING CIRCUITS. PROVIDE NEW SWITCH CIRCUITRY CONNECTIONS TO ALLOW SEPARATE SWITCHING FOR EAST AND WEST SIDES OF ROOM 104. PROVIDE FIXTURES RATED 40W, 3500K, WITH MINIMUM 3540 LUMEN OUTPUT AND CRI VALUE OF 82.



BUILDING 4720 – AERONAUTICAL TRACKING FACILITY (ATF 2) – LIGHTING REMODEL

SCALE: 3/16" 1' = 0" (TOTAL SQUARE FEET = 2200)  
TOTAL: 5067 SF

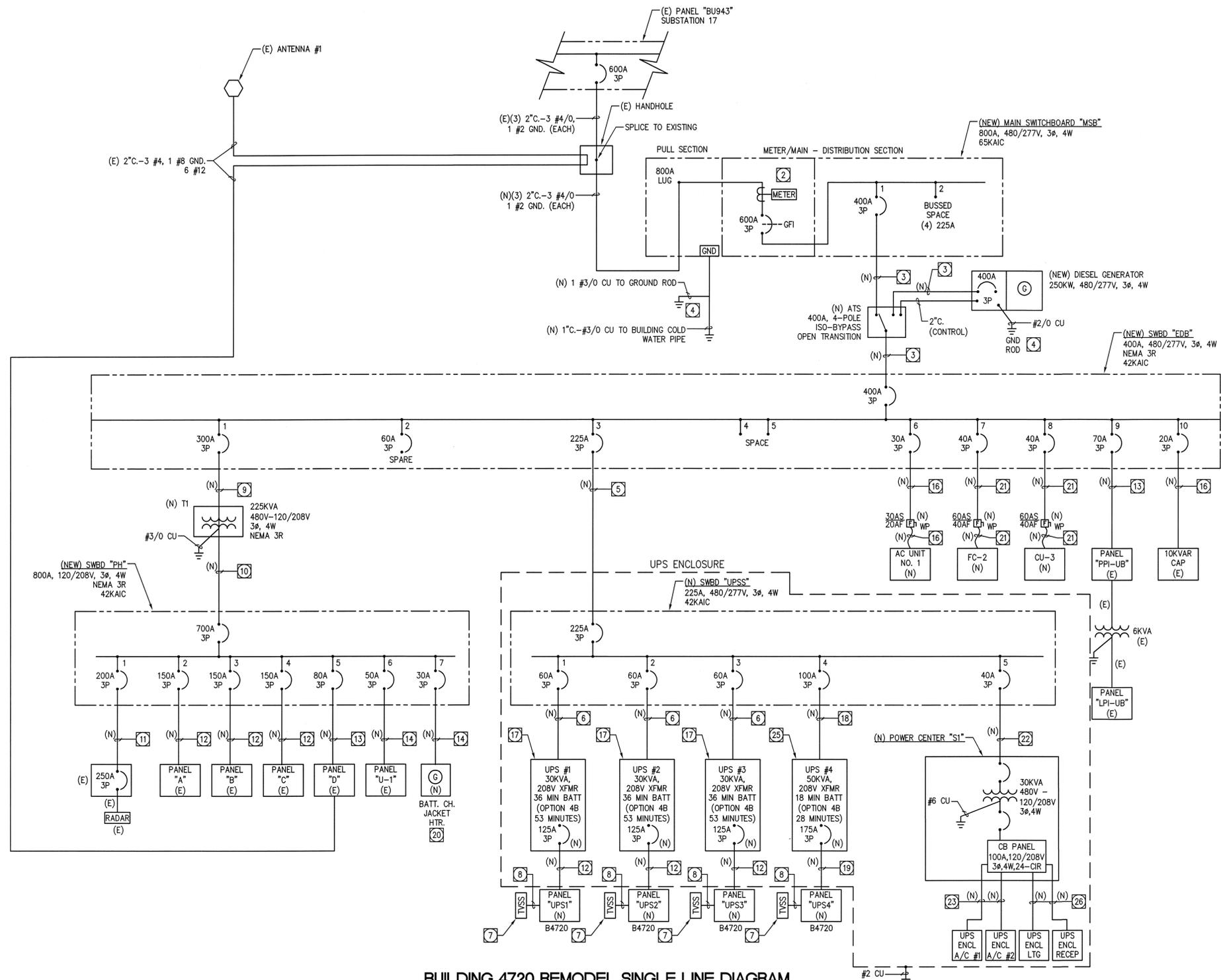


DWG: P:\12088 NASA ATF\Drawings\12088 ED.dwg USER: Alex Hernandez DATE: Sep 09, 2014 8:58am XREFS: A-BLOCK-D BLDG 4720 BASE-New IMAGES:

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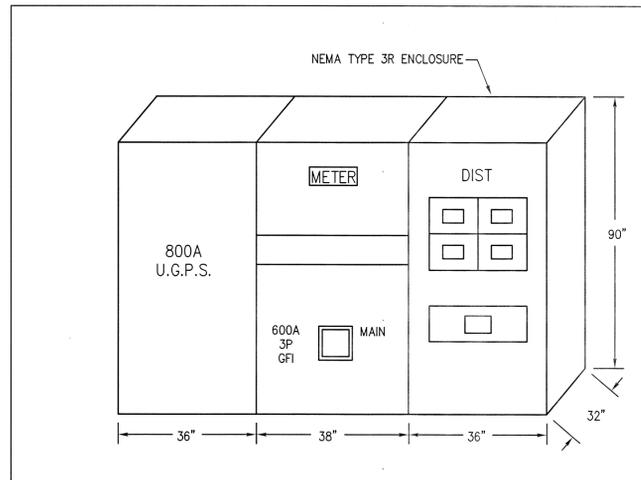
<b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		<b>APPROVALS</b>		<b>DATE</b>
		Chief, Facilities Engineering & Asset Mgmt. Office <i>[Signature]</i>		7-10-15
		Project Manager/Customer <i>[Signature]</i>		2-10-15
		Facilities Project Manager <i>[Signature]</i>		1-27-15
		Chief, Office of Protective Services <i>[Signature]</i>		1-28-15
		Chief - Safety, Health, and Environmental Office <i>[Signature]</i>		1-27-15
		DRDC Chief Information Officer <i>[Signature]</i>		3 Feb 15
<b>DRAWING TITLE</b> BUILDING 4720 REMODEL LIGHTING PLAN		<b>PROJECT TITLE</b> REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE		
DATE STRTD:	DATE PRNTD: 5/9/14	DRAWN BY: ANH, MT, WAS	TRADE: E9	SHEET No. 42 of 48
SCALE: AS NOTED				EDM-1728



**BUILDING 4720 REMODEL SINGLE LINE DIAGRAM**  
SCALE: NONE

**SINGLE LINE DIAGRAM SPECIFIC NOTES:**

- 1 PROVIDE MAIN METER SWITCHBOARD IN A NEMA TYPE 3R ENCLOSURE, PAD MOUNTED ON BUILDING EXTERIOR. SEE REMODEL PLAN (E8) AND DETAIL #1, ON THIS SHEET.
- 2 PROVIDE NETWORKED 3-PHASE DIGITAL MULTI-FUNCTION POWER MONITOR, WITH MODBUS RTU. POWER MEASUREMENTS SHALL INCLUDE VOLTS, AMPS, KW, KVA, KWH, FREQ, AND PF. INTEGRATED MEMORY SHALL STORE MAXIMUM KW DEMAND, AND TOTALIZED KWH READING.
- 3 PROVIDE (2) 2"C-4 #3/0, 1 #3 GND. (EACH).
- 4 PROVIDE 3/4" DIAx10' LENGTH COPPER CLAD STEEL GROUND ROD, WITH EXOTHERMIC WELD CONNECTION TO GROUNDING ELECTRODE CONDUCTOR.
- 5 PROVIDE 2 1/2"C-4 #4/0, 1 #4 GND.
- 6 PROVIDE 1 1/4"C-4 #4, 1 #10 GND.
- 7 PROVIDE DISTRIBUTION (CATEGORY B) TVSS PANEL MOUNTED ON WALL ADJACENT TO PANEL, WITH RATED SURGE CAPACITY OF 200KA, AND AUDIBLE ALARM.
- 8 PROVIDE 3/4"C-3 #10, 1 #10 GND. TO 30A, 3-POLE CIRCUIT BREAKER IN PANEL.
- 9 PROVIDE (2) 1 1/2"C-3 #1/0, 1 #4 GND. (EACH).
- 10 PROVIDE (3) 2 1/2"C-4 #250MCM, 1 #1/0 GND. (EACH).
- 11 PROVIDE 2"C-4 #3/0, 1 #6 GND.
- 12 PROVIDE 2"C-4 #1/0, 1 #6 GND.
- 13 PROVIDE 1 1/4"C-4 #3, 1 #8 GND.
- 14 PROVIDE 1"C-4 #6, 1 #10 GND.
- 15 PROVIDE 1"C-3 #4, 1 #8 GND.
- 16 PROVIDE 3/4"C-3 #10, 1 #10 GND.
- 17 OPTION 4B - PROVIDE 53 MINUTE BATTERY BACKUP.
- 18 PROVIDE 2"C-4 #1, 1 #8 GND.
- 19 PROVIDE 2"C-4 #2/0, 1 #6 GND.
- 20 PROVIDE UNDERGROUND FEEDER TO NEW ENGINE BATTERY CHARGER AND JACKET HEATER TERMINATION, PER MANUFACTURER'S INSTRUCTIONS.
- 21 PROVIDE 3/4"C-3 #6, 1 #10 GND.
- 22 PROVIDE 3/4"C-3 #6, 1 #10 GND.
- 23 PROVIDE 1"C-3 #4, 1 #10 GND. FROM 60A, 3-POLE CIRCUIT BREAKER TO AC UNIT ELECTRICAL TERMINATION.
- 24 PROVIDE MINI-POWER CENTER WITH 3KVA, 480V-120/208V, SINGLE-PHASE TRANSFORMER, PRIMARY/SECONDARY CIRCUIT BREAKER PROTECTION, AND 12-CIRCUIT PANEL WITH (2) 15A SINGLE-POLE BREAKERS.
- 25 OPTION 4B - PROVIDE 28 MINUTE BATTERY BACKUP.
- 26 PROVIDE 3/4"C-2 #12, 1 #12 GROUND FROM 20A, 1-POLE CIRCUIT BREAKER TO ENCLOSURE ELECTRICAL TERMINATION, DESIGNATED BY MANUFACTURER.



**MAIN SWITCHBOARD "MSB" ELEVATION**

DWG: P112088 NASA AFD\Draw\12088 E10.dwg USER: Alex Hernandez DATE: Sep 09, 2014 9:00am XREFS: ATELOCKD IMAGES:

		<b>DONN C. GILMORE &amp; ASSOC.</b> FOUNDED 1959 Consulting Mechanical and Electrical Engineers 5000 E. Spring St., 8th Floor Long Beach, CA 90815 Ph.: 562.497.2999 591 Camino De La Reina, Ste. 1107 San Diego, CA 92108 Ph.: 619.618.2347			
DATE	SYM	REVISION	BY	A'PD	
5/9/14	E	FINAL DESIGN			
2/24/14	D	100% FINAL DESIGN			
10/27/13	C	60% DEVELOPED DESIGN			
6/21/13	B	30% DEVELOPED DESIGN			
12/21/12	A	15% CONCEPT DESIGN			

<b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		<b>APPROVALS</b> DATE 7-10-15 2-10-15 1-28-15 1-27-15 3 Feb 15	
DRAWING TITLE <b>BUILDING 4720 REMODEL          SINGLE LINE DIAGRAM</b>		PROJECT TITLE <b>REVITALIZE RADAR AND TELEMETRY          TRACKING INFRASTRUCTURE</b>	
DATE STRTD	DATE PRNTD	5/9/14	
DRAWN BY	ANH, MT, WAS	EDM-1728	
SCALE	AS NOTED		
FILE NAME	E10	SHEET No. 43	of 48

VOLTS: 120/208 PHASE: 3PH, 4W MTG: SURFACE				PANELBOARD: UPS1 (NEW) LOCATION: RM 104				MAIN: 125A BUS: 125A AIC: 22KA								
CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION	BUS ABC	CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION
	A	B	C							A	B	C				
1	180			R	20/1	1	RECEP. 1	A	2	800			R	20/1	1	RECEP. 33
3		180		R	20/1	1	RECEP. 1	B	4		600		R	20/3	1	RECEP. 41
5			180	R	20/1	1	RECEP. 5	C	6			600				
7	180			R	20/1	1	RECEP. 5	A	8	600						
9		180		R	20/1	1	RECEP. 9	B	10							
11			180	R	20/1	1	RECEP. 9	C	12							
13	180			R	20/1	1	RECEP. 13	A	14							
15		180		R	20/1	1	RECEP. 13	B	16							
17			180	R	20/1	1	RECEP. 17	C	18							
19	180			R	20/1	1	RECEP. 17	A	20							
21		180		R	20/1	1	RECEP. 21	B	22							
23			180	R	20/1	1	RECEP. 21	C	24							
25	180			R	20/1	1	RECEP. 25	A	26							
27		180		R	20/1	1	RECEP. 25	B	28							
29			180	R	20/1	1	RECEP. 29	C	30							
31	180			R	20/1	1	RECEP. 29	A	32							
33		180		R	20/1	1	RECEP. 34	B	34							
35			180	R	20/1	1	RECEP. 34	C	36							
37				R	20/1		SPARE	A	38							
39				R	20/1		SPARE	B	40							
41				R	20/1		SPARE	C	42							

CONNECTED:	VA	AMPS	L.C.L. @ 125% = 0	LOAD TYPE:
PHASE A = 2480	21		RECEPT. (> 10 kVA @ 50%) = 4460	G - GENERAL (100%)
PHASE B = 1500	13		KITCHEN @ 65% = 0	M - MOTOR (100%)
PHASE C = 1680	14		OTHER LOAD @ 100% = 1200	L - L.C.L. (125%)
TOTAL = 5660	16		TOTAL VA = 5660	R - RECEPTACLE (50%)
			(10 kVA @ 100%)	X - X-RAY (100%)
			TOTAL AMPS = 16	X1 - X-RAY (50%)
				K - KITCHEN ( 65%)

VOLTS: 120/208 PHASE: 3PH, 4W MTG: SURFACE				PANELBOARD: UPS2 (NEW) LOCATION: RM 104				MAIN: 125A BUS: 125A AIC: 22KA								
CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION	BUS ABC	CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION
	A	B	C							A	B	C				
1	180			R	20/1	1	RECEP. 2	A	2	600			R	20/3	1	RECEP. 38
3		180		R	20/1	1	RECEP. 2	B	4		600					
5			180	R	20/1	1	RECEP. 6	C	6			600				
7	180			R	20/1	1	RECEP. 6	A	8	600						
9		180		R	20/1	1	RECEP. 10	B	10		600					
11			180	R	20/1	1	RECEP. 10	C	12			600				
13	180			R	20/1	1	RECEP. 14	A	14							
15		180		R	20/1	1	RECEP. 14	B	16							
17			180	R	20/1	1	RECEP. 18	C	18							
19	180			R	20/1	1	RECEP. 18	A	20							
21		180		R	20/1	1	RECEP. 22	B	22							
23			180	R	20/1	1	RECEP. 22	C	24							
25	180			R	20/1	1	RECEP. 26	A	26							
27		180		R	20/1	1	RECEP. 26	B	28							
29			180	R	20/1	1	RECEP. 30	C	30							
31	180			R	20/1	1	RECEP. 30	A	32							
33		180		R	20/1	1	RECEP. 35	B	34							
35			180	R	20/1	1	RECEP. 35	C	36							
37				R	20/1		SPARE	A	38							
39				R	20/1		SPARE	B	40							
41				R	20/1		SPARE	C	42							

CONNECTED:	VA	AMPS	L.C.L. @ 125% = 0	LOAD TYPE:
PHASE A = 2280	19		RECEPT. (> 10 kVA @ 50%) = 3660	G - GENERAL (100%)
PHASE B = 2100	18		KITCHEN @ 65% = 0	M - MOTOR (100%)
PHASE C = 2280	19		OTHER LOAD @ 100% = 3000	L - L.C.L. (125%)
TOTAL = 6660	18		TOTAL VA = 6660	R - RECEPTACLE (50%)
			(10 kVA @ 100%)	X - X-RAY (100%)
			TOTAL AMPS = 18	X1 - X-RAY (50%)
				K - KITCHEN ( 65%)

VOLTS: 120/208 PHASE: 3PH, 4W MTG: SURFACE				PANELBOARD: UPS4 (NEW) LOCATION: RM 104				MAIN: 175A BUS: 225A AIC: 22KA								
CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION	BUS ABC	CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION
	A	B	C							A	B	C				
1	180			R	20/1	1	RECEP. 4	A	2	600			R	20/2	1	RECEP. 40
3		180		R	20/1	1	RECEP. 4	B	4		600					
5			180	R	20/1	1	RECEP. 8	C	6			600				
7	180			R	20/1	1	RECEP. 8	A	8	600						
9		180		R	20/1	1	RECEP. 12	B	10		600					
11			180	R	20/1	1	RECEP. 12	C	12			4200				
13	180			R	20/1	1	RECEP. 16	A	14	4200						
15		180		R	20/1	1	RECEP. 16	B	16		4200					
17			180	R	20/1	1	RECEP. 20	C	18			1200				
19	180			R	20/1	1	RECEP. 20	A	20	1200						
21		180		R	20/1	1	RECEP. 24	B	22		100					
23			180	R	20/1	1	RECEP. 24	C	24							
25	180			R	20/1	1	RECEP. 28	A	26							
27		180		R	20/1	1	RECEP. 28	B	28							
29			180	R	20/1	1	RECEP. 32	C	30							
31	180			R	20/1	1	RECEP. 32	A	32							
33		180		R	20/1	1	RECEP. 37	B	34							
35			180	R	20/1	1	RECEP. 37	C	36							
37				R	20/1		SPARE	A	38							
39				R	20/1		SPARE	B	40							
41				R	20/1		SPARE	C	42							

CONNECTED:	VA	AMPS	L.C.L. @ 125% = 0	LOAD TYPE:
PHASE A = 7680	64		RECEPT. (> 10 kVA @ 50%) = 4260	G - GENERAL (100%)
PHASE B = 6400	53		KITCHEN @ 65% = 0	M - MOTOR (100%)
PHASE C = 7080	59		OTHER LOAD @ 100% = 16900	L - L.C.L. (125%)
TOTAL = 21160	59		TOTAL VA = 21160	R - RECEPTACLE (50%)
			(10 kVA @ 100%)	X - X-RAY (100%)
			TOTAL AMPS = 59	X1 - X-RAY (50%)
				K - KITCHEN ( 65%)

VOLTS: 120/208 PHASE: 3PH, 4W MTG: SURFACE				PANELBOARD: UPS3 (NEW) LOCATION: RM 104				MAIN: 125A BUS: 125A AIC: 22KA								
CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION	BUS ABC	CKT #	←-- LOAD (VA) --→			LOAD TYPE	BKR	QUAN	OUTLET DESCRIPTION
	A	B	C							A	B	C				
1	180			R	20/1	1	RECEP. 3	A	2	600			R	20/3	1	RECEP. 39
3		180		R	20/1	1	RECEP. 3	B	4		600					
5			180	R	20/1	1	RECEP. 7	C	6			600				
7	180			R	20/1	1	RECEP. 7	A	8	600						
9		180		R	20/1	1	RECEP. 11	B	10		600					
11			180	R	20/1	1	RECEP. 11	C	12			600				
13	180			R	20/1	1	RECEP. 15	A	14							
15		180		R	20/1	1	RECEP. 15	B	16							
17			180	R	20/1	1	RECEP. 19	C	18							
19	180			R	20/1	1	RECEP. 19	A	20							
21		180		R	20/1	1	RECEP. 23	B	22							
23			180	R	20/1	1	RECEP. 23	C	24							
25	180			R	20/1	1	RECEP. 27	A	26							
27		180		R	20/1	1	RECEP. 27	B	28							
29			180	R	20/1	1	RECEP. 31	C	30							
31	180			R	20/1	1	RECEP. 31	A	32							
33		180		R	20/1	1	RECEP. 36	B	34							
35			180	R	20/1	1	RECEP. 36	C	36							
37				R	20/1		SPARE	A	38							
39				R	20/1		SPARE	B	40							
41				R	20/1		SPARE	C	42							

CONNECTED:	VA	AMPS	L.C.L. @ 125% = 0	LOAD TYPE:
PHASE A = 2280	19		RECEPT. (> 10 kVA @ 50%) = 4260	G - GENERAL (100%)
PHASE B = 2100	18		KITCHEN @ 65% = 0	M - MOTOR (100%)
PHASE C = 2280	19		OTHER LOAD @ 100% = 2400	L - L.C.L. (125%)
TOTAL = 6660	18		TOTAL VA = 6660	R - RECEPTACLE (50%)
			(10 kVA @ 100%)	X - X-RAY (100%)
			TOTAL AMPS = 18	X1 - X-RAY (50%)
				K - KITCHEN ( 65%)

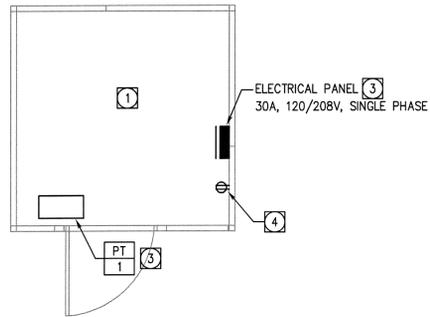
DWG: P:\12088 NASA AFD\DWG\12088 E11.dwg USER: Alex Hernandez  
 DATE: Sep 09, 2014 9:05am XREFS: ATELOCKD IMAGES:

**DONN C. GILMORE & ASSOC.**  
 FOUNDED 1959  
 Consulting Mechanical and Electrical Engineers  
 5000 E. Spring St., 8th Floor 591 Camino De La Reina, Ste. 1107  
 Long Beach, CA 90815 San Diego, CA 92108  
 Ph.: 562.497.2999 Ph.: 619.618.2347

DATE	SYM	REVISION	BY	A'PD
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
6				

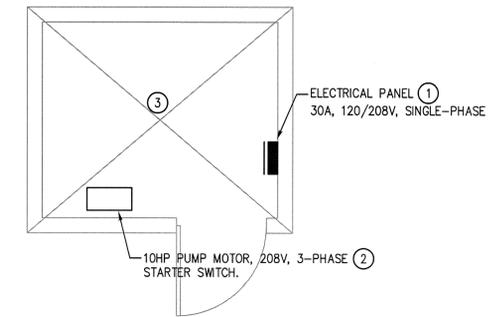
REMODEL NOTES:

- 1 PREFABRICATED SHELTER FURNISHED WITH INTERIOR AND EXTERIOR LIGHTING, WITH WALL SWITCH. PROVIDE ELECTRICAL CONNECTION FROM 20A, SINGLE-PHASE BREAKER AT REINSTALLED CIRCUIT BREAKER PANEL. PROVIDE 3/4" C-2 #12, 1 #12 GROUND.
- 2 INSTALL ELECTRICAL CIRCUIT BREAKER PANEL, RETAINED FROM DEMOLITION.
- 3 INSTALL HOA STARTER SWITCH, RETAINED FROM DEMOLITION, AND PUMP MOTOR SUPPLY WIRING IN CONDUIT.
- 4 PROVIDE MAINTENANCE RECEPTACLE ON SUPPLY CIRCUIT FROM ELECTRICAL PANEL USING EXISTING 20A, 1-POLE CIRCUIT BREAKER AND 3/4" C-2 #12, 1 #12 GROUND.



DEMOLITION NOTES:

- 1 DISCONNECT AND REMOVE. RETAIN FOR INSTALLATION IN NEW BUILDING. NOTE LINE AND LOAD SIDE CONDUCTORS AND CONDUIT RATINGS FOR REPLACEMENT IN NEW BUILDING REMODEL.
- 2 DISCONNECT ELECTRICAL SUPPLY CONDUCTORS AND CONDUIT FROM PUMP MOTOR. RETAIN STARTER SWITCH.
- 3 DISCONNECT AND REMOVE GENERAL ELECTRICAL RECEPTACLES, LIGHT FIXTURES, AND SWITCH.



OPTION 6 - ELECTRICAL PUMP HOUSE B4983 REMODEL

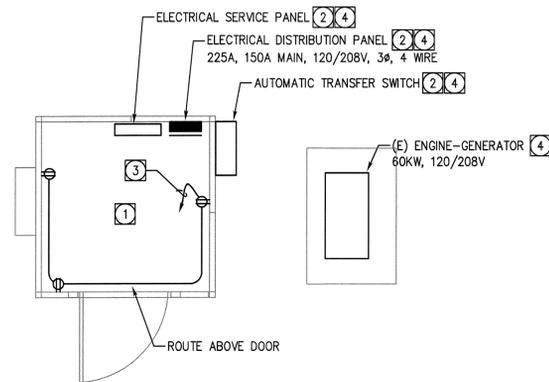
SCALE: 1/4"=1'-0" 3

OPTION 6 - ELECTRICAL PUMP HOUSE B4983 DEMOLITION

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

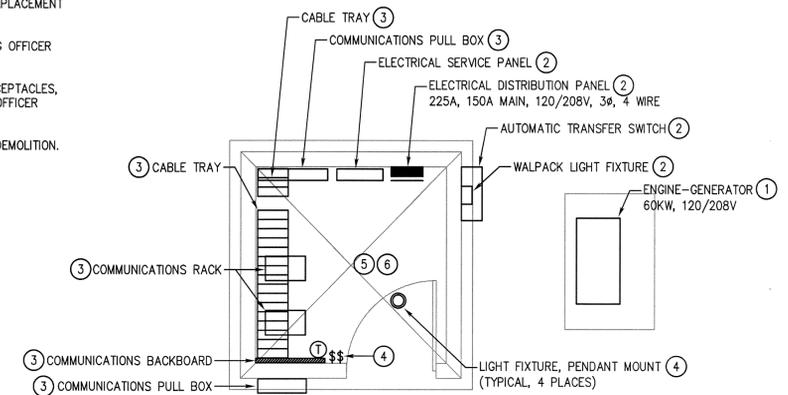
REMODEL NOTES:

- 1 PREFABRICATED SHELTER FURNISHED WITH INTERIOR/EXTERIOR LIGHTING, WALL SWITCH, AND AIR CONDITIONING UNIT. PROVIDE WIRING IN CONDUIT TO DESIGNATED EQUIPMENT TERMINATION, FROM REINSTALLED ELECTRICAL CIRCUIT BREAKER PANEL.
- 2 INSTALL ELECTRICAL EQUIPMENT, RETAINED FROM DEMOLITION.
- 3 PROVIDE 3/4" C-2 #12, 1 #12 GROUND TO 20A, 1-POLE CIRCUIT BREAKER IN ELECTRICAL PANEL.
- 4 PROVIDE REINSTALLATION OF SERVICE FEEDER AND DISTRIBUTION FEEDERS, FROM UTILITY SERVICE AND GENERATOR, THROUGH AUTOMATIC TRANSFER SWITCH, TO DISTRIBUTION, IN CODE SIZED CONDUIT.



DEMOLITION NOTES:

- 1 EXISTING EQUIPMENT TO REMAIN.
- 2 DISCONNECT AND REMOVE. RETAIN FOR INSTALLATION IN NEW BUILDING. NOTE LINE AND LOAD SIDE CONDUCTORS AND CONDUIT RATINGS FOR REPLACEMENT IN NEW BUILDING REMODEL.
- 3 SEE CONTRACTING OFFICER FOR DEMOLITION AND REPLACEMENT INSTRUCTIONS.
- 4 DISCONNECT AND REMOVE. STORE PER CONTRACTING OFFICER INSTRUCTIONS.
- 5 DISCONNECT AND REMOVE GENERAL ELECTRICAL RECEPTACLES, SWITCHES AND DEVICES. STORE PER CONTRACTING OFFICER INSTRUCTIONS.
- 6 SEE SHEET E13 FOR PHOTO REFERENCE OF B4981 DEMOLITION.



OPTION 2 - ELECTRICAL BORE SITE B4981 REMODEL

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

OPTION 2 - ELECTRICAL BORE SITE B4981 DEMOLITION

SCALE: 1/4"=1'-0" 2

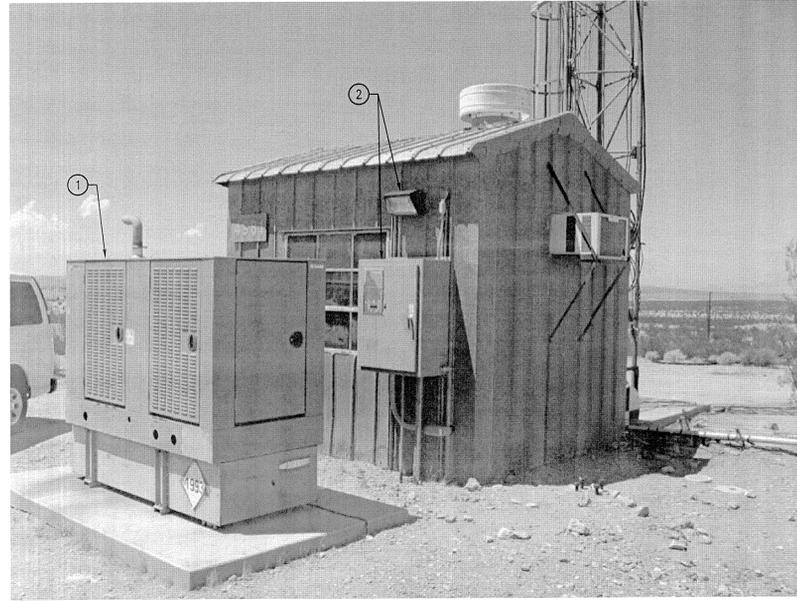
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**DONN C. GILMORE & ASSOC.**  
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DATE	SYM	REVISION	BY	A'P'D
5/9/14	E	FINAL DESIGN		
2/24/14	D	100% FINAL DESIGN		
10/27/13	C	60% DEVELOPED DESIGN		
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12/21/12	A	15% CONCEPT DESIGN		

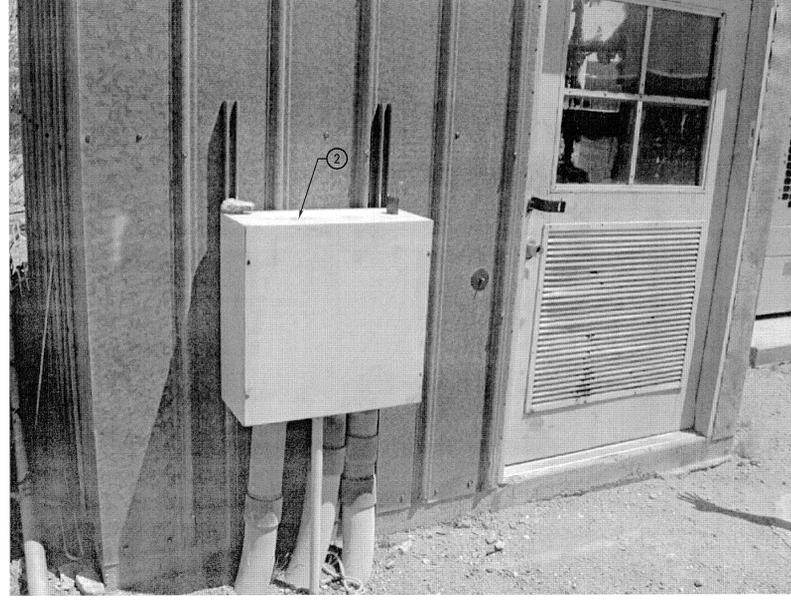
<b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b> DRYDEN FLIGHT RESEARCH CENTER EDWARDS, CA		<b>APPROVALS</b> Chief Facilities Engineering & Asset Mgmt. Office <i>Da...</i> 7-10-15 Project Manager <i>P. Ober...</i> 2-10-15 Facilities Project Manager <i>...</i> 1-27-15 Chief, Office of Protective Services <i>...</i> 1-28-15 Chief - Shared Health and Environmental Office <i>...</i> 1-27-15 DFRS Chief Information Officer <i>...</i> 3 Feb 15		DATE 5/9/14
		DRAWING TITLE BUILDING B4981 AND B4983		TRADE EDM-1728
PROJECT TITLE REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE		DATE STRTD 5/9/14	DATE PRNTD 5/9/14	
DRAWN BY ANH, MT, WAS	SCALE AS NOTED	SHEET No. E 12	SHEET No. 45 of 48	



BUILDING 4981 EXTERIOR/SITE

SCALE:  
N.T.S.

3



BUILDING 4981 EXTERIOR

SCALE:  
N.T.S.

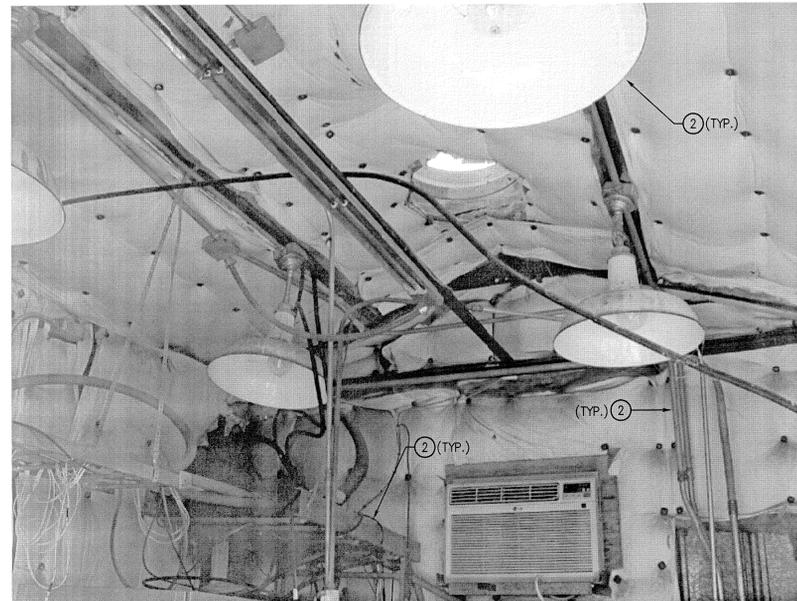
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BUILDING 4981 INTERIOR

SCALE:  
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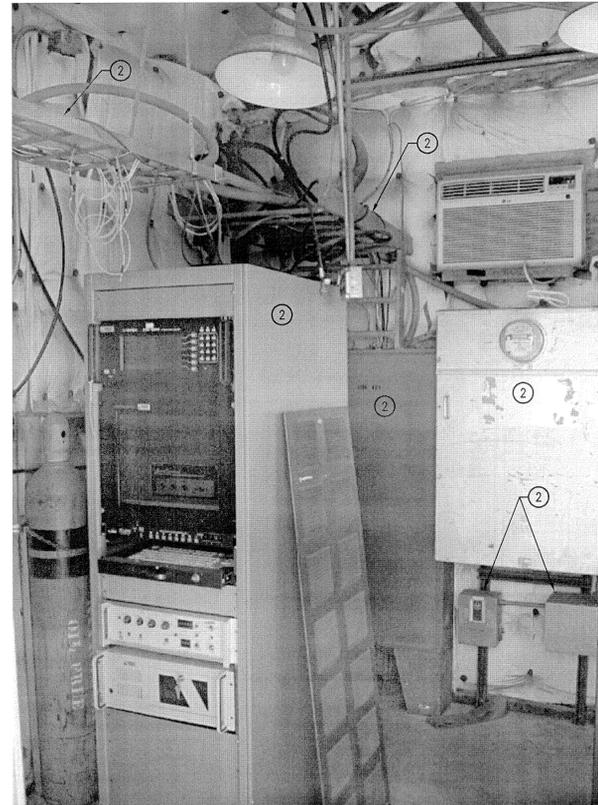
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BUILDING 4981 INTERIOR

SCALE:  
N.T.S.

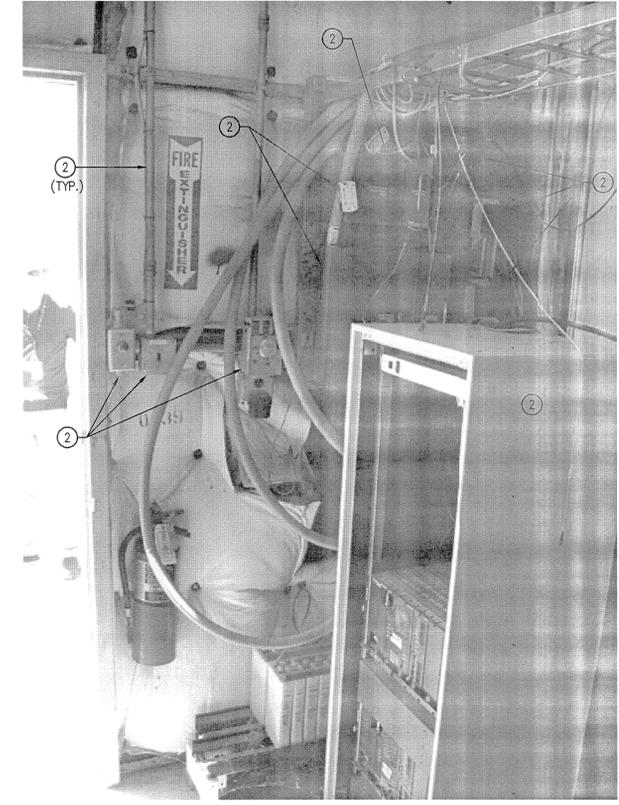
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BUILDING 4981 INTERIOR

SCALE:  
N.T.S.

5



BUILDING 4981 INTERIOR

SCALE:  
N.T.S.

4

NOTES:

- ① EQUIPMENT TO REMAIN.
- ② DISCONNECT AND REMOVE PER DEMOLITION PLAN INSTRUCTIONS. SEE SHEET E12.



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DATE	SYM	REVISION	BY	A'PD
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12/21/12	A	15% CONCEPT DESIGN		

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
DRYDEN FLIGHT RESEARCH CENTER  
EDWARDS, CA

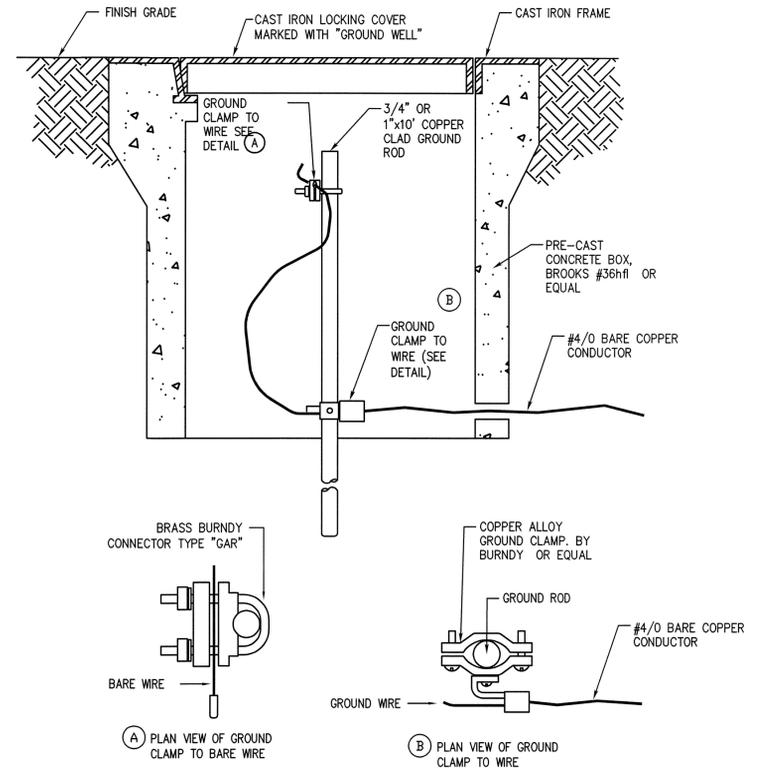
DRAWING TITLE  
BUILDING B4981  
DEMOLITION PHOTO DETAILS

PROJECT TITLE  
REVITALIZE RADAR AND TELEMETRY  
TRACKING INFRASTRUCTURE

APPROVALS	DATE
Chief, Facilities Engineering & Asset Mgmt. Office <i>K. Gandy</i>	7-10-15
Project Regulator/Customer <i>J. K. Bennett</i>	2-10-15
Facilities Project Manager <i>Stanford Jackson</i>	1-27-15
Chief, Office of Protective Services <i>K. Smith</i>	1-28-15
Chief - Safety, Health and Environmental Office <i>John Smith</i>	1-27-15
DR/CR Chief Information Officer <i>La Cy</i>	3 Feb 15

DATE STRTD: 5/9/14 DATE PRINTD: 5/9/14  
DRAWN BY: ANH, MT, WAS TRADE: EDM-1728  
SCALE: AS NOTED SHEET No. 46 of 48  
FILE NAME: E13





SCALE: 2  
NTS

GROUND WELL DETAIL

SCALE: 1  
NTS E15/E15

DWG: P:\12088 NASA AFDD\012088 E15.dwg USER: Alex Hernandez DATE: Sep 09, 2014 9:05am XREFS: ATBLOCK.d IMAGES:

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**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
 DRYDEN FLIGHT RESEARCH CENTER  
 EDWARDS, CA  
 DRAWING TITLE  
**ELECTRICAL DETAILS**  
 PROJECT TITLE  
**REVITALIZE RADAR AND TELEMETRY TRACKING INFRASTRUCTURE**

APPROVALS		DATE
Chief, Facilities Engineering & Asset Mgmt. Office	<i>W. Coyle</i>	7-10-15
Project Registrar/Customer	<i>J. P. Deberet</i>	7-10-15
Facilities Project Manager	<i>Stanford Wilson</i>	1-20-15
Chief, Office of Protective Services	<i>RM</i>	1-28-15
Chief - Safety, Health and Environmental Office	<i>W. Coyle</i>	1/27/15
Chief, Civil Information Office	<i>J. Coyle</i>	3-26-15
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