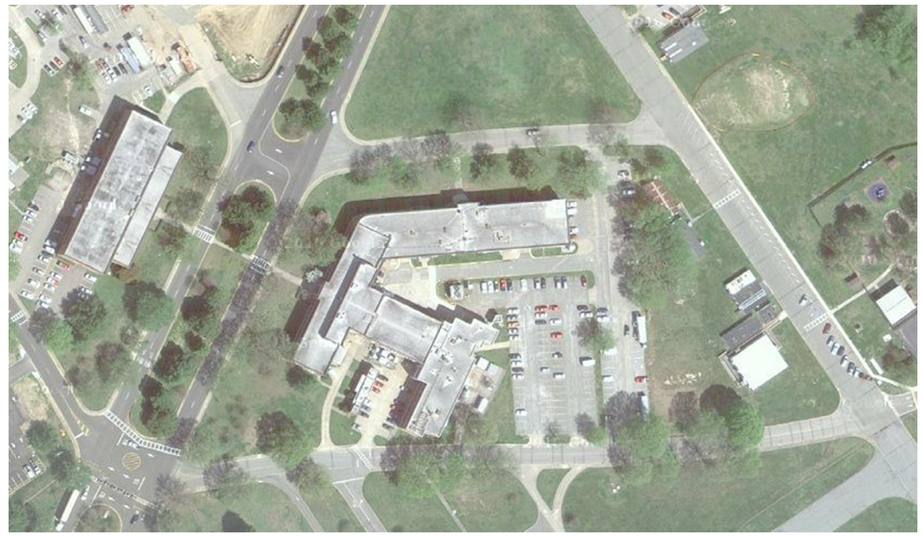

NASA LANGLEY RESEARCH CENTER

FY'14 Minor CoF Project - Repair by Renovation

B1230 East Wing - (D320) Safety-Critical Avionics System Branch

100% FINAL SUBMISSION

NOVEMBER 06, 2013

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			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: COVERSHEET

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293406 | LATEST REV.

SHEET NO. G-000

12/16/2013 8:42:49 AM

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REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

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ISSUE DATE
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			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: DRAWING LIST

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293407 | LATEST REV.:

SHEET NO.: G-001

12/16/2013 8:44:28 AM

GENERAL NOTES

1. CONSTRUCTION SHALL COMPLY WITH NASA LANGLEY RESEARCH CENTER STANDARDS AND REGULATIONS.
2. CONSTRUCTION OF WORK INDICATED ON THE DRAWINGS AS (N.I.C.) IS NOT IN CONTRACT.
3. ALL WORK SHALL BE BEST PRACTICE OF EACH TRADE.
4. DETAILS NOT SHOWN ARE SIMILAR IN NATURE TO THOSE DETAILED. TYPICAL DETAILS APPLY AT ALL SIMILAR CONDITIONS WHETHER CROSS REFERENCED OR NOT.
5. DIMENSIONS SHOWN ON FLOOR PLANS ARE TO THE FACE OF SCHEDULED PARTITIONS (FOP), FACE OF MASONRY (FOM), FACE OF CONCRETE (FOC), CENTER-LINE OF DOOR OPENINGS AND COLUMN GRID LINES UNLESS NOTED OTHERWISE. REFER TO INTERIOR ELEVATIONS AND DETAILS FOR ADDITIONAL LAYERS OF FINISH GYPSUM BOARD, STONE, TILE, WOOD OR OTHER SCHEDULED FINISH MATERIALS.
6. VERIFY DIMENSIONS IN FIELD BEFORE PROCEEDING WITH THE WORK. NOTIFY ARCHITECT OF DISCREPANCIES, CONFLICTS, AND MODIFICATIONS.
7. DO NOT SCALE DRAWINGS. WHERE DIMENSIONS OR EXACT LOCATIONS ARE REQUIRED AND NOT INCLUDED ON THE DRAWINGS, REQUEST INFORMATION FROM ARCHITECT.
8. REQUIRED EXIT DOORS, SERVING MORE THAN 50 PEOPLE, SHALL OPEN IN THE DIRECTION OF EXIT AND SHALL BE OPERABLE FROM INSIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE.
9. ALL LABELED DOORS AND DOORS IN RATED WALLS SHALL BE SELF CLOSING AND HAVE SIMILAR LABELED FRAMES.
10. DOOR OPENINGS NOT LOCATED BY DIMENSION SHALL BE CENTERED IN THE WALL SHOWN OR LOCATED 6" FROM FINISH WALL TO FINISH JAMB. ALL DOOR WIDTH DIMENSIONS ON FLOOR PLANS ARE FOR SIZE OF DOOR ONLY, AND DO NOT INCLUDE DOOR FRAME OR SHIM SPACE.
11. WHERE GYPSUM BOARD LAYERS DIFFER BETWEEN TWO ADJOINING WALLS, MAINTAIN A CONTINUOUS FINISH OF WALL.
12. PROVIDE INDEPENDENT FRAMING & ATTACHMENTS TO STRUCTURAL ADEQUATE TO SUPPORT THE CEILING SYSTEM, THE LIGHT FIXTURES, AIR CONDITIONING DIFFUSERS, DUCTWORK, SPRINKLER PIPING, AND BUS DUCTS.
13. ALL CEILING AND LIGHT FIXTURES SUSPENSION SYSTEM SHALL BE DESIGNED AND INSTALLED TO COMPLY WITH APPLICABLE LOCAL CODES, AGENCIES, AND REQUIREMENT AND SHALL RESIST A MINIMUM LATERAL FORCE PER CODE.
14. ELECTROLYTIC PROTECTION SHALL BE PROVIDED BETWEEN DISSIMILAR METALS WHENEVER THE TWO ARE IN CONTACT.
15. PIPE SLEEVES IN MECHANICAL EQUIPMENT ROOMS EXTEND 2" ABOVE THE FLOOR LINE. FILL THE ANNULAR SPACES OF PIPE SLEEVES THROUGH THE FLOOR OR THROUGH RATED WALLS AND FIRE SAFING AND SMOKE SEAL COMPOUND AS INDICATED IN THE SPECIFICATIONS. PROVIDE APPROVED RATED FIRE DAMPERS FOR ALL DUCTS PENETRATING FIRE WALLS. MANUAL RESET LEVER FOR THE FIRE DAMPER SHALL BE ACCESSIBLE AND BE PLACED ON NON-PUBLIC OR LAY-IN CEILING SIDE OF THE RATED WALL.
16. OPEN EXTERIOR JOINTS AROUND WINDOW AND DOOR FRAMES, BETWEEN WALLS AND FOUNDATIONS, BETWEEN WALLS AND ROOF, BETWEEN WALL PANELS, AT PENETRATIONS OF UTILITIES THROUGH THE BUILDING ENVELOPE SHALL BE SEALED, FLASHED OR WEATHER-STRIPPED AT REQUIRED FOR COMPATIBILITY WITH ADJACENT MATERIALS TO ELIMINATE AIR LEAKAGE & WATER INFILTRATION.
17. GLAZING SUBJECT TO HUMAN IMPACT AS IDENTIFIED IN APPLICABLE CODES SHALL BE GLAZING MATERIAL. EACH LIGHT OF LAMINATED OR TEMPERED GLAZING SHALL BE IDENTIFIED BY PERMANENT LABEL, WHICH SPECIFIES THE LABELER, OR MANUFACTURER AND THAT SAFETY GLAZING MATERIAL HAS BEEN UTILIZED.
18. CEILING HEIGHT DIMENSIONS ARE FROM DESIGNATED FINISHED FLOOR SURFACE TO FINISHED CEILING SURFACES UNLESS NOTED OTHERWISE. MINIMUM HEADROOM CLEARANCE AT STAIRS SHALL BE 6'-8" TO THE LINE OF THE TREAD NOSING. (MEASURED VERTICALLY)
19. PROVIDE CONCRETE HOUSEKEEPING PADS UNDER ALL MECHANICAL AND ELECTRICAL EQUIPMENTS.
20. PROVIDE PROPER ANCHORAGE OF ESSENTIAL EQUIPMENT IN ACCORDANCE WITH APPLICABLE CODE
21. PROVIDE ACCESS PANELS FOR MECHANICAL AND ELECTRICAL EQUIPMENT AS REQUIRED BY APPLICABLE CODES. ALL ACCESS PANELS SHALL BE CONCEALED AND LOCATIONS SHALL BE SUBMITTED TO ARCHITECT FOR REVIEW PRIOR TO START OF THE WORK.
22. COORDINATE AND PROVIDE ALL SLAB AND WALL OPENINGS REQUIRED BY MECHANICAL AND ELECTRICAL SYSTEMS.
23. ALL ELEVATOR OPENINGS SHALL BE CERTIFIED BY THE ELEVATOR SUBCONTRACTOR PRIOR TO FORMING OF STRUCTURAL DECKS.
24. MECHANICAL AIR SHAFT WALLS SHALL BE INSTALLED TO WITHSTAND AN INWARD AND OUTWARD ACTING PRESSURE OF 10LBS/SQUARE FOOT MINIMUM. ELEVATOR SHAFT WALLS SHALL BE INSTALLED TO WITHSTAND AN INWARD AND OUTWARD ACTING PRESSURE OF 10LBS/SQUARE FOOT MINIMUM.
25. PROVIDE ACOUSTICAL BLANKET INSULATION MECHANICALLY FASTENED TO WALL CAVITY AT ALL ELEVATOR SHAFTS, DUCT SHAFTS, TOILET/RESTROOM WALLS, MECHANICAL AND ELECTRICAL ROOM WALLS WHEN NEXT TO OCCUPIED SPACE.
26. PROVIDE AND INSTALL ALL STIFFENERS, BRACINGS, BACK-UP PLATES AND SUPPORTING BRACKETS REQUIRED FOR THE BEST POSSIBLE INSTALLATION OF ALL TOILET/RESTROOM ACCESSORIES AND PARTITIONS AND ALL WALL MOUNTED OR SUSPENDED MECHANICAL, ELECTRICAL OR MISCELLANEOUS EQUIPMENTS.
27. VERIFY ALL CONCRETE AND MASONRY OPENINGS IN THE FIELD PRIOR TO FABRICATIONS OF DOORS AND FRAMES.
28. PROVIDE COLLISION BARRIERS ADEQUATE TO PROTECT ALL CONTROL METERS, REGULATORS, AND PIPING FOR HAZARDOUS MATERIALS THAT ARE EXPOSED TO VEHICULAR DAMAGE.
29. ALL AISLES SHALL BE MINIMUM WIDTH OF 60 INCHES IN ORDER TO FACILITATE MOVEMENT OF EQUIPMENT IN THIS RESEARCH ENVIRONMENT.
30. FINISHED FIRST FLOOR SLAB ELEVATION OF 0'-0" = 13.36 ON CIVIL DWG. SEE CIVIL FOR SITE SPECIFIC DATUM

DOORS

1. ALL DOOR SIZES ARE JAMB OPENING SIZES.
2. ALL UNDERCUT DOOR REQUIREMENTS FOR VARYING CARPET THICKNESS, RUBBER FLOORING ETC. SHALL BE VARIED AND PROPERLY COORDINATED.
3. ALL NEW DOOR OPENINGS, DOOR FRAMES AND HARDWARE SHALL COMPLY WITH ALL APPLICABLE CODES AND UL REQUIREMENTS.
4. COORDINATE ALL DOOR AND DOOR DETAILS TO PROVIDE ADEQUATE CLEARANCE AND FRAME REINFORCEMENT FOR HARDWARE TYPES. (REFER TO SPECIFICATIONS FOR HARDWARE MOUNTING TYPES.)
5. TYPICAL DOOR BEVEL TO THE 1/8" IN 2" U.N.O. BY THE HARDWARE TEMPLATE REQUIREMENTS.
6. FIRE RATED DOOR ASSEMBLIES SHALL BE UNDERWRITERS LABORATORY LABEL FOR RATING AS REQUIRED.
7. HAND ACTIVATED DOOR OPENING HARDWARE SHALL BE CENTERED AT 38" ABOVE THE FINISHED FLOOR.
8. DOOR HARDWARE SHALL BE OPERABLE WITHOUT SPECIAL EFFORT OR REQUIRING THE ABILITY TO GRASP THE HARDWARE.
9. ALL FLOOR PIVOTS AND CLOSER PLATES ARE TO BE INSTALLED FLUSH TO SLAB BELOW FLOORING. PROVIDE ADJUSTMENT ACCESS AS REQUIRED.
10. ALL STEEL DOORS & FRAMES TO BE PAINTED UNLESS NOTED OTHERWISE.
11. DO NOT EXCEED MAXIMUM CLEARANCE FOR FIRE DOORS PERMITTED BY NFPA 80.
12. DO NOT PAINT TESTING LABORATORY LABEL ON FIRE DOORS

FIRE PROTECTION.

1. ALL FLOOR OPENINGS AT PIPES AND DUCTS NOT CONTAINED WITH 2-HR RATED ROOMS SHALL BE FILLED WITH MINERAL WOOL FIRE SAFING FULL DEPT OR SLEEVE TO WITHIN 2" OF THE SLEEVE. FILL THE TOP 2" OF THE SLEEVE WITH SMOKE SEAL SEALANT COMPLYING WITH UL TEST ASSEMBLY R-113270I.
2. DOOR OPENINGS INTO REQUIRED 1-HOUR FIRE RESISTIVE CORRIDORS SHALL BE PROTECTED WITH A SMOKE AND DRAFT FIRE ASSEMBLY HAVING A 20-MINUTE RATING.
3. ALL INTERIOR FINISHES SHALL COMPLY WITH THE REQUIREMENTS OF APPLICABLE CODES.
4. ANY DECORATIONS USED SHALL BE NON-COMBUSTIBLE OR FLAMEPROOFED IN AN APPROVED MANNER.
5. FIRE DAMPERS USED OR DOORS SHALL BE PROVIDED WHERE AIR DUCTS PENETRATE FIRE RATED WALLS AND CEILINGS PRIOR TO INSTALLATION VERIFY THAT ADEQUATE ACCESS IS AVAILABLE IN OR TO RESET FUSIBLE LINKS.
6. PROVIDE A PORTABLE FIRE EXTINGUISHER AS INDICATED ON THE LIFE SAFETY DRAWINGS
7. EXIT DOORS TO BE OPERABLE FROM INSIDE WITHOUT USE OF KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT.
8. EXIT SIGNS SHALL BE INTERNALLY ILLUMINATED BY LEDs AND HAVE BUILT-IN BATTERY BACKUP.
9. ALL EXITS SHALL BE PROVIDED WITH ILLUMINATED EXIT SIGNS.
10. PROVIDE TWO SEPARATE SOURCES OF POWER FOR EXIT SIGNS.
11. THE INSTALLATION OF AUTOMATIC FIRE SPRINKLER SYSTEMS SHALL COMPLY WITH APPLICABLE CODES.
12. FIRE DAMPER ASSEMBLIES INCLUDING SLEEVES AND INSTALLATION PROCEDURES SHALL BE APPROVED BY THE BUILDING INSPECTOR PRIOR TO INSTALLATION.
13. ALL SPACERS, FILLERS, BLOCKING, ETC. SHALL BE FIRE RATED.
14. AISLES LEADING TO REQUIRED EXITS SHALL HAVE A MINIMUM WIDTH OF 44" AND A WALKWAY WITH MINIMUM WIDTH OF 44" SHALL BE MAINTAINED CONTINUOUSLY TO PUBLIC WAY.
15. ALL PIPES DUCTS, BUS DUCTS, AND CONDUITS THAT PENETRATE FLOOR SLABS AND/OR RATED WALLS SHALL BE INSTALLED IN A MANNER THAT WILL PRESERVE THE FIRE RESISTIVE AND STRUCTURAL INTEGRITY OF THE BUILDING.
16. PROVIDE ONE HOUR RATED WALL CONSTRUCTION FOR ELEVATOR LOBBIES, ELECTRICAL AND TELEPHONE ROOMS UNLESS NOTED OTHERWISE.
17. EXIT SIGNS SHALL BE IN ACCORDANCE WITH APPLICABLE CODES.
18. PROVIDE ONLY EMERGENCY LIGHTING UNITS WITH SELF-DIAGNOSTIC/SELF-TESTING FEATURE THAT EMITS AN AUDIBLE LOCAL ALARM SHOULD MAINTENANCE BE NECESSARY. EMERGENCY LIGHTING UNITS SHALL BE PROVIDED IN ALL LABORATORIES, BULL PENS, CORRIDORS, THE BASEMENT, AND STAIR ENCLOSURES.
19. FIRE SEPARATIONS AND CONSTRUCTION REQUIREMENT SHALL BE IN ACCORDANCE WITH APPLICABLE CODES.
20. ROOF COVERING SHALL BE CLASS B FIRE RETARDANT FOR ROOFS WITH STANDING SEAM METAL ROOF AND IN ACCORDANCE WITH APPLICABLE CODES.
21. FIRE DAMPERS OR DOORS SHALL BE PROVIDED WHERE AIR DUCTS PENETRATE FIRE RATED WALLS OR CEILING IN ACCORDANCE WITH APPLICABLE CODES.
22. PROVIDE A 1-HOUR INTUMESCENT PAINT ON BEAMS AND 1-HOUR FIRE CONSTRUCTIONS FOR ALL STRUCTURAL COLUMNS FOR MECHANICAL SHAFTS.
    FOR THE 1 HOUR FIRE RATED BEAMS INDICATED IN THE STRUCTURAL DRAWINGS, PROVIDE FIRE RATED ASSEMBLY TO MEET UL 263 DESIGN NO. N613
    FOR THE 1 HOUR FIRE RATED COLUMNS INDICATED IN THE STRUCTURAL DRAWINGS, PROVIDE FIRE RATED ASSEMBLY TO MEET UL 263 DESIGN NO. X526

THROUGHOUT THE SPECIFICATIONS AND DRAWINGS FOR THE REPAIR BY RENOVATION OF B1230 PROJECT, BRAND NAME ITEMS MAY BE LISTED. WHEN BRAND NAMES ARE LISTED, THE GOVERNMENT WILL ACCEPT THE BRAND NAME OR ANY ACCEPTABLE EQUAL PRODUCT. FOR THE SALIENT CHARACTERISTICS OF AN ACCEPTABLE EQUAL PRODUCT, THE CONTRACTOR SHALL CONSULT EXHIBIT E, BRAND NAME OR EQUAL SALIENT CHARACTERISTICS.

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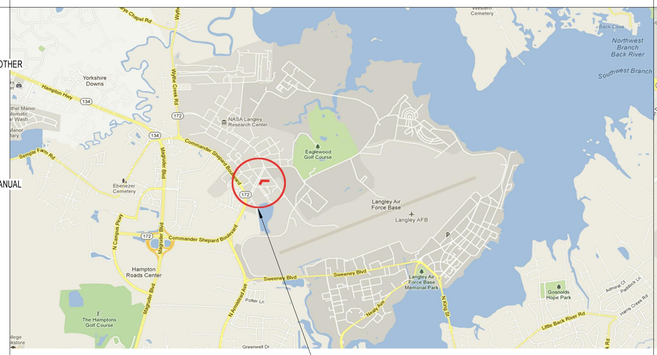
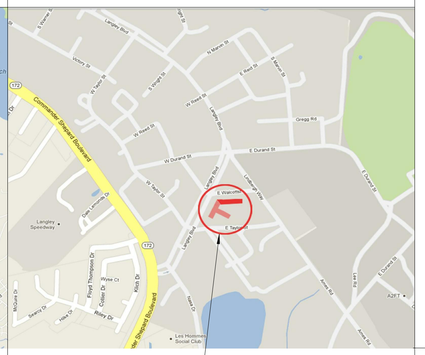
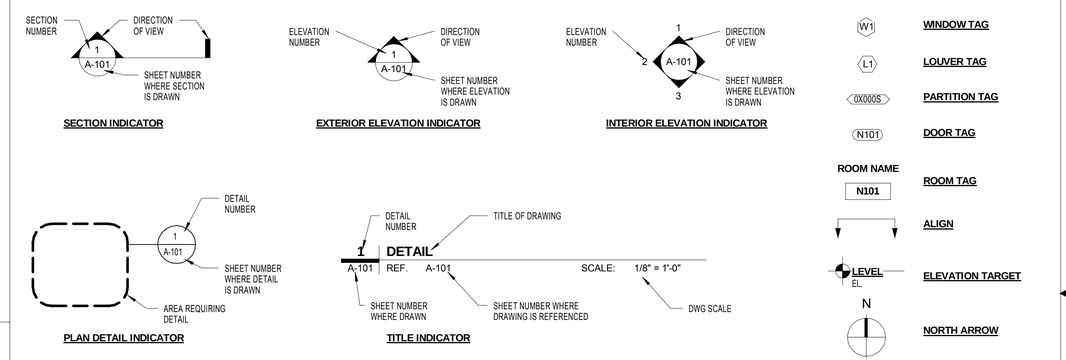
VICINITY MAP



LOCATION MAP



SYMBOLS



ABBREVIATIONS

AC	- AIR CONDITIONING
ACC	- ACCESSIBLE
ACOUS	- ACOUSTICAL
ADA	- AMERICANS WITH DISABILITIES ACT
ADJ	- ADJUSTABLE
AFF	- ABOVE FINISH FLOOR
AGGR	- AGGREGATE
AHU	- AIR HANDLING UNIT
ALT	- ALTERNATE
ALUM	- ALUMINUM
ACT	- ACOUSTICAL CEILING TILE
APPD	- APPROVED
APPROX	- APPROXIMATE
ARCH	- ARCHITECTURAL
ASST	- ASSISTANT
AV	- AUDIO VISUAL
BEJ	- BRICK EXPANSION JOINT
BD	- BOARD
BLDG	- BUILDING
BLK	- BLOCK
BM	- BEAM
BOT	- BOTTOM
BRK	- BRICK
BUR	- BUILT-UP ROOFING
CAB	- CABINET
CAT	- CATEGORY
CBU	- CEMENTITIOUS BACKER UNIT
CCTV	- CLOSED-CIRCUIT TELEVISION
CEM	- CEMENT
CER	- CERAMIC
CG	- CORNER GUARD
CH	- CHILLER
CHAN	- CHANNEL
CIP	- CAST-IN-PLACE
CJ	- CONTROL JOINT / CONSTRUCTION JOINT
CL	- CENTER LINE
CLG	- CEILING
CLR	- CLEAR
CMU	- CONCRETE MASONRY UNIT
CO	- CLEANOUT

COL	- COLUMN
CONC	- CONCRETE
COND	- CONDITION
CONN	- CONNECTION
CONT	- CONTINUOUS
CONTR	- CONTRACTOR
COORD	- COORDINATE
CORR	- CORRIDOR
CPT	- COMMON PATH OF TRAVEL
CT	- CERAMIC TILE / COOLING TOWER
CTR	- CENTER
CTSK	- COUNTER SUNK
CW	- COLD WATER (PIPING)
D	- DEEP, DEPTH
DBL	- DOUBLE
DEFL	- DEFLECTION
DEG	- DEGREE
DEPT	- DEPARTMENT
DET	- DETAIL
DF	- DRINKING FOUNTAIN
DIA	- DIAMETER
DIFF	- DIFFUSER
DIM	- DIMENSION
DIS	- DISABLED
DISP	- DISPENSER
DMPF	- DAMPPROOFING
DN	- DOWN
DO	- DOOR OPENING
DP	- DIMENSION POINT
DR	- DOOR
DRN	- DRAIN
DWG	- DRAWING
DWGS	- DRAWINGS
(E)	- EXISTING
E	- EAST
EA	- EACH
EB	- EXPANSION BOLT
EFS	- EXTERIOR FINISH SYSTEM
EJ	- EXPANSION JOINT
EL	- ELEVATION
ELEC	- ELECTRICAL

ELEV	- ELEVATOR
EMERG	- EMERGENCY
ENCLO	- ENCLOSURE
EQ	- EQUAL
EQUIP	- EQUIPMENT
EWC	- ELECTRICAL WATER COOLER
EXH	- EXHAUST
EXP	- EXPANSION
EXIST	- EXISTING
EXT	- EXTERIOR
FA	- FIRE ALARM
FB	- FACE BRICK
FC	- FACE
FD	- FLOOR DRAIN
FDC	- FIRE DEPARTMENT CONNECTION
FND	- FOUNDATION
FE	- FIRE EXTINGUISHER
FEC	- FIRE EXTINGUISHER CABINET
FF&E	- FURNITURE, FINISHES & EQUIPMENT
FFE	- FINISH FLOOR ELEVATION
FHC	- FIRE HOSE CABINET
FIN	- FINISH
FIXT	- FIXTURE
FL	- FLOOR
FLASH	- FLASHING
FO	- FACE OF
FP	- FIRE PROTECTION
FPG	- FIREPROOFING
FR	- FRAME
FT	- FEET
FRTW	- FIRE RETARDANT TREATED WOOD
FTG	- FOOTING
FURN	- FURNITURE
FURR	- FURRING
G	- GROUND
GA	- GAUGE / GAGE
GALV	- GALVANIZED
GB	- GRAB BAR
GC	- GENERAL CONTRACT(OR)

GFCI	- GROUND FAULT CIRCUIT INTERRUPTER
GRG	- GLASS FIBER REINFORCED GYPSUM
GL	- GLASS
GR	- GRADE
GYP	- GYPSUM
GYP BD, GWB	- GYPSUM WALLBOARD
HM	- HOLLOW METAL (STEEL FRAME)
HNDRL	- HANDRAIL
HORIZ	- HORIZONTAL
HR	- HOUR
HT	- HEIGHT
HVAC	- HEATING, VENTILATION, AIR CONDITIONING
HW	- HOT WATER
H	- HIGH / HEIGHT
HB	- HOSE BIB
HC	- HOLLOW CORE
HCP	- HANDICAPPED
HDW	- HARDWARE
ID	- INSIDE DIAMETER
IDS	- INTRUSION DETECTION SYSTEM
IN	- INCH
INCL	- INCLUDED / INCLUDING
INFO	- INFORMATION
INSUL	- INSULATION
INT	- INTERIOR
INTERM	- INTERMEDIATE
INV	- INVERT
JAN	- JANITOR
JT	- JOINT
KO	- KNOCKOUT
L	- LONG OR LITER (METRIC DOCS)
LAB	- LABORATORY
LCD	- LIQUID-CRYSTAL DISPLAY
LAM	- LAMINATE / LAMINATION
LAV	- LAVATORY

LB	- POUND
LF	- LINEAR FOOT
LN	- LINE
LT	- LIGHT
LV	- LOUVER
M	- METER
MACH	- MACHINE
MAINT	- MAINTENANCE
MAS	- MASONRY
MAX	- MAXIMUM
MB	- MACHINE BOLT
MBL	- MARBLE
MDF	- MEDIUM DENSITY FIBERBOARD
MEP	- MECHANICAL, ELECTRICAL, PLUMBING
MDO	- MEDIUM DENSITY OVERLAY PLYWOOD
MECH	- MECHANICAL
MEMB	- MEMBRANE
MET	- METAL
MFR	- MANUFACTURER
MIN	- MINIMUM
MISC	- MISCELLANEOUS
MM, MIL	- MILLIMETER
MO	- MASONRY OPENING
MTD	- MOUNTED
MTG	- MOUNTING
MTL	- METAL
MULL	- MULLION
N	- NORTH
NA	- NOT APPLICABLE
NC	- NOISE CRITERIA
NIC	- NOT IN CONTRACT
NO	- NUMBER
NOM	- NOMINAL
NTS	- NOT TO SCALE
OA	- OUTSIDE AIR
OC	- ON CENTER
OD	- OUTSIDE DIAMETER/DIMENSION
OFF	- OFFICE

OH	- OVER HEAD
OPNG	- OPENING
OPP	- OPPOSITE
ORD	- OVERFLOW ROOF DRAIN
OUTS	- OUTSIDE
OVHD	- OVERHEAD
P	- PAINT
PAV	- PAVING
PARTN	- PARTITION
PATD	- PAPER TOWEL DISPENSER
PBD	- PARTICLEBOARD
PC	- PRECAST CONCRETE
PERF	- PERFORATED
PERIM	- PERIMETER
PERP	- PERPENDICULAR
PL	- PLATE
PLAM	- PLASTIC LAMINATE
PLAS	- PLASTER
PLUMB	- PLUMBING
PLF	- POUNDS PER LINEAR FOOT
PLYWD	- PLYWOOD
PNL	- PANEL
PREFAB	- PREFABRICATED
PSF	- POUNDS PER SQUARE FOOT
PT, PTD	- PAINTED
PTN	- PARTITION
PTR	- PAPER TOWEL RECEPTACLE
QTY	- QUANTITY
(R)	- RELOCATED
R	- RADIUS OR RISER (PIPING)
RA	- RETURN AIR
RAD	- RADIUS
RB	- RESILIENT BASE
RCP	- REFLECTED CEILING PLAN
RD	- ROOF DRAIN
REQOM	- RECOMMENDED
RECPT	- RECEPTACLE
REC	- RECESSED

REF.	- REFERENCE
REFL	- REFLECTED / REFLECTIVE / REFLECT
REF	- REFRIGERATOR
REG	- REGISTER
REINF	- REINFORCED / REINFORCING
REL	- RELOCATE
REM	- REMOVABLE
REQ	- REQUIRE / REQUIRED
RESIL	- RESILIENT
REV	- REVISION / REVISED
RM	- ROOM
RO	- ROUGH OPENING
RTD	- RATED
RTG	- RATING
S	- SOUTH
SA	- SUPPLY AIR
SAB	- SOUND ATTENUATION BLANKET
SAN	- SANITARY
SC	- SOLID CORE
SCH, SCHED	- SCHEDULE
SD	- STORM DRAIN / SOAP DISPENSER
SECT	- SECTION
SF	- SQUARE FEET/FOOT
SH	- SPRINKLER HEAD
SHT	- SHEET
SIM	- SIMILAR
SM	- SHEET METAL
SND	- SANITARY NAPKIN DISPENSER
SP	- STANDPIPE
SPEC	- SPECIFICATION
SPR	- SPRINKLER
SPKR	- SPEAKER
SQ	- SQUARE
SSE	- STRUCTURE SLAB ELEVATION
SST	- STAINLESS STEEL
SSK	- SERVICE SINK
STC	- SOUND TRANSMISSION CLASS
STD	- STANDARD
STL	- STEEL
STO	- STORAGE
STRUCT	- STRUCTURAL

SUSP	- SUSPENDED
SYMM	- SYMMETRICAL
SYS	- SYSTEM
T	- TREAD / THERMOSTAT
TB	- TOWEL BAR
TC	- TOP OF CURB
TCONC	- TOP OF CONCRETE
TEL, TELECOM	- TELEPHONE OR TELECOM
TEMP	- TEMPERATURE
TER	- TERRAZZO
THK	- THICKNESS
THRES	- THRESHOLD
THRU	- THROUGH
TO	- TOP OF (SEE OTHER WORD)
TOS	- TOP OF SLAB, TOP OF STRUCTURE
TOSTL	- TOP OF STEEL
TP	- TOP OF PAVEMENT
TPD	- TOILET PAPER DISPENSER
TV	- TELEVISION
TW	- TOP OF WALL
TYP	- TYPICAL
UNFIN	- UNFINISHED
UNO	- UNLESS NOTED OTHERWISE
UR	- URINAL
VAC	- VENTILATION AND AIR CONDITIONING
VCT	- VINYL COMPOSITION TILE
VERT	- VERTICAL
VEST	- VESTIBULE
VIF	- VERIFY IN FIELD
VR	- VAPOR RETARDER
VT	- VINYL TILE
VTR	- VENT THRU ROOF
W/	- WITH
W	- WIDE, WIDTH/WEST
WC	- WATER CLOSET
WD	- WOOD
W/O	- WITHOUT
WP	- WATERPROOFING
WPM	- WATERPROOF MEMBRANE

WPT	- WORK POINT
WR	- WATER RESISTENT/REPELLANT
WS	- WEATHERSTRIPPING
WT	- WEIGHT
WW	- WALL TO WALL

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
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NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONICHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: GENERAL NOTES AND ABBREVIATIONS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293408 | LATEST REV.

SHEET NO. G-002

12/16/2013 8:42:26 AM

CODE AND ANALYSIS

THE LATEST EDITIONS OF THE FOLLOWING CODES AND STANDARDS AND SUPPORTING DOCUMENTS SHALL BE USED.

AMERICAN CONCRETE INSTITUTE (ACI)
ACI 318- BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE AND COMMENTARY

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
MANUAL OF STEEL CONSTRUCTION - ALLOWABLE STRESS DESIGN, NINTH EDITION

AMERICAN NATIONAL STANDARDS INSTITUTE
ANSI 117.1 ACCESSIBILITY CODE 2009
ANSI Z358.1 STANDARD FOR EMERGENCY EYEWASHES AND SHOWER EQUIPMENT 2009

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
ANSI/ASCE 7- MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
ASME A17.1, SAFETY CODE FOR ELEVATORS AND ESCALATORS 2010

AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS
ASHRAE STANDARD 55 THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY
ASHRAE STANDARD 62 VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY
ASHRAE STANDARD 90.1 ENERGY STANDARDS FOR BUILDINGS
ASHRAE STANDARD 110 METHOD OF TESTING PERFORMANCE OF LABORATORY FUME HOODS

CODE OF FEDERAL REGULATIONS (CFR)
CODE OF FEDERAL REGULATIONS, 29 CFR 1910 OCCUPATIONAL SAFETY AND HEALTH STANDARDS
CODE OF FEDERAL REGULATIONS, 10 CFR 434 AND 10 CFR 436
FM GLOBAL PROPERTY DATA SHEETS AND APPROVAL GUIDES

GENERAL SERVICES ADMINISTRATION
FACILITIES STANDARDS FOR THE PUBLIC BUILDINGS SERVICE (PBS-P100)

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)
IESNA LEM-1, RECOMMENDED PROCEDURE FOR DETERMINING INTERIOR AND EXTERIOR LIGHTING POWER ALLOWANCES
IESNA G-1-03, GUIDELINE FOR SECURITY LIGHTING FOR PEOPLE, PROPERTY, AND PUBLIC SPACES

INTERNATIONAL CODE COUNCIL (ICC)
INTERNATIONAL BUILDING CODE 2009
INTERNATIONAL MECHANICAL CODE 2009
INTERNATIONAL PLUMBING CODE
INTERNATIONAL FIRE CODE 2009

LANGLEY PROCEDURAL REQUIREMENTS (LPR)
LPR 1710.11, FIRE PROTECTION PROGRAM
LPR 1710.40, LANGLEY RESEARCH CENTER PRESSURE SYSTEMS HANDBOOK
LPR 1740.2, FACILITY SAFETY REQUIREMENTS
LPR 8500.1, ENVIRONMENTAL AND ENERGY PROGRAM MANUAL
LPR 1710.5, IONIZING RADIATION
LPR 1710.6 ELECTRICAL SAFETY
LPR 1710.8, NON-IONIZING RADIATION
LPR 1710.10, LANGLEY RESEARCH CENTER ENERGY CONTROL PROGRAM (LOCKOUT/TAG OUT)

NASA POLICY DIRECTIVES (NPD)
NPD 8710.5, POLICY FOR PRESSURE VESSELS AND PRESSURIZED SYSTEMS

NASA PROCEDURAL REQUIREMENTS (NPR)
NPR 1600.1, NASA SECURITY PROGRAM PROCEDURAL REQUIREMENTS W/ CHANGE 2 (4/01/2009)
NPR 8820.2F, FACILITY PROJECT IMPLEMENTATION GUIDE
NPR 8715.3, NASA GENERAL SAFETY PROGRAM REQUIREMENTS

NASA TECHNICAL STANDARDS
NASA-STD-8719.9, STANDARD FOR LIFTING DEVICES AND EQUIPMENT
NASA-STD-8719.11, SAFETY STANDARD FOR FIRE PROTECTION, REVISION A, NOVEMBER 2008
NASA STD 8719.7, FACILITY SYSTEM SAFETY GUIDEBOOK

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 1, FIRE PREVENTION CODE, 2009
NFPA 10, STANDARD ON PORTABLE FIRE EXTINGUISHERS, 2010
NFPA 13, STANDARD ON INSTALLATION OF SPRINKLER SYSTEMS, 2010
NFPA 17, STANDARD FOR DRY CHEMICAL EXTINGUISHING SYSTEM, 2010
NFPA 24, PRIVATE FIRE SERVICE MAINS, 2010
NFPA 30, FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE, 2012
NFPA 33, STNADARD FOR SPRAY APPLICATION USING FLAMMABLE OF COMBUSTIBLE MATERIALS, 2011
NFPA 51B, STANDARD FOR FIRE PREVENTING DURING WELDING, CUTTING, AND OTHER HOT WORK, 2009
NFPA 55, COMPRESSED GASES AND CRYOGENIC FLUIDS, 2010
NFPA 70, NATIONAL ELECTRICAL CODE, 2011
NFPA 72, NATIONAL FIRE ALARM CODE, 2010
NFPA 80, STANDARD ON FIRE DOORS AND FIRE WINDOWS, 2010
NFPA 90A, INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS, 2009
NFPA 91, STANDARD FOR EXHAUST SYSTEM FOR AIR CONVEYING OF VAPORS, GASES, MISTS, AND NONCOMBUSTIBLE PARTICULATE SOLIDS, 2010
NFPA 101, LIFE SAFETY CODE 2012
NFPA 105, STANDARD FOR THE INSTALLATION OF SMOKE DOOR ASSEMBLIES AND OTHER OPENING PROTECTIVES, 2010
NFPA 110, STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS, 2010
NFPA 241, CONSTRUCTION, ALTERATION, AND DEMOLITION OPERATIONS, 2009
NFPA 780, STANDARD FOR THE INSTALLATION OF LIGHTNING PROTECTION SYSTEMS, 2011
NFPA 2001, STANDARD ONCLEAN AGENT FIRE EXTINGUISHING SYSTEMS, 2012

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NEMA ICS 1, GENERAL STANDARDS FOR INDUSTRIAL CONTROLS AND SYSTEMS
NEMA LA 1, SURGE ARRESTERS
NEMA MG 1, MOTORS AND GENERATORS
NEMA SG 5, POWER SWITCHGEAR ASSEMBLIES
NEMA ST 20, DRY TYPE TRANSFORMERS FOR GENERAL APPLICATION
OSHA 29 CFR PART 1910, OCCUPATIONAL SAFETY AND HEALTH ADMINSTRATION (OSHA)

SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
HVAC SYSTEMS DUCT DESIGN

STEEL JOIST INSTITUTE (SJI)
STANDARD SPECIFICATIONS FOR OPEN WEB STEEL JOISTS, K-SERIES,

STEEL DECK INSTITUTE (SDI)
SDI SPECIFICATION AND COMMENTARIES FOR STEEL FORM DECK
SDI SPECIFICATION AND COMMENTARIES FOR STEEL ROOF DECK

UNDERWRITERS LABORATORIES (UL)
UL 1275, STANDARD FOR FLAMMABLE LIQUID CABINETS

U.S. ACCESS BOARD
UNIFORM FEDERAL ACCESSIBILITY STANDARDS (UFAS)

OTHER STANDARDS
EXECUTIVE ORDER 13123, GREENING THE GOVERNMENT THROUGH EFFICIENT ENERGY MANAGMENT
EXECUTIVE ORDER 13514, FEDERAL LEADERSHIP IN ENVIRONMENTAL, ENERGY, AND ECONOMIC PERFORMANCE

OCCUPANT CLASSIFICATION

PRIMARY OCCUPANCY: BUSINESS B

CLASSIFICATION (IBC - CHAPTER 3, NFPA 101)	FUNCTION (NFPA 101 TABLE 7.3.1.2)	ALLOWABLE HEIGHT/ BUILDING AREAS
MIXED USE	UNCONCENTRATED	15 SF PER PERSON - NET
BUSINESS, B	BUSINESS	100 SF PER PERSON - GROSS
STORAGE/ MECH EQUIP RM, S-2	STORAGE	500 SF PER PERSON - GROSS

BUILDING DATA

CONSTRUCTION TYPE: IIB

SPRINKLERS: (IBC SECTION 903)	YES
STANDPIPES: (IBC SECTION 905)	NO
FIRE DISTRICT: (REFERENCE LOCAL AUTHORITY)	NO
AUTOMATIC FIRE ALARM: (IBC SECTION 907)	YES

BUILDING AREAS

ACTUAL AREA:				ALLOWABLE AREA
FLOOR NO.:	USE/OCC.	ACTUAL AREA (SF) RENOVATION AREA	ACTUAL AREA (SF) EXISTING BUILDING	ALLOWABLE AREA / FL (TABLE 503 + IBC 506.3)
2ND FLOOR	A-3, B, S-2	15,506 GROSS	38,626 GROSS	69,000 SF
1ST FLOOR	B, S-2	16,922 GROSS	43,137 GROSS	69,000 SF
BASEMENT	S-2	10,920 GROSS	11,990 GROSS	69,000 SF

BUILDING HEIGHTS

ACTUAL HEIGHTS		ALLOWABLE HEIGHTS		
	HEIGHT	ALLOWABLE HEIGHT (IBC TABLE 503)	INCREASE PER SPRINKLERS (IBC 504.2)	TOTAL ALLOWABLE HEIGHT
HEIGHT IN FEET:	31'-2"	55'-0"	+ 20'-0"	75'-0"
NUMBER OF STORIES:	2	3	+ 1 STORY	4

FIRE RESISTANCE RATINGS

BUILDING ELEMENTS: (BUILDING FULLY SPRINKLERED)	FIRE RATING
STRUCTURAL FRAME	0 HR
BEARING WALLS:	
EXTERIOR	0 HR
INTERIOR	0 HR
NON-BEARING WALLS:	
EXTERIOR	0 HR
INTERIOR	0 HR
FLOOR CONSTRUCTION AND SECONDARY MEMBERS	0 HR
ROOF CONSTRUCTION AND SECONDARY MEMBERS	0 HR

FIRE SEPARATIONS (WITH SPRINKLER SYSTEM)

	FIRE RATING
CORRIDOR (TABLE 1017.1)	0 HR
EXIT STAIR (IBC 1020.1)	1 HR
ELEVATOR HOISTWAY	1 HR
MECHANICAL SHAFT (IBC 716.6.3)	1 HR
MECHANICAL ROOM	0 HR
STORAGE ROOM (OVER 100SF)	0 HR
MAIN ELECTRICAL ROOM	0 HR
ELECTRICAL ROOM	0 HR

MIXED OCCUPANCY SEPARATION:

(IBC TABLE 508.4) -
WITH AN AUTOMATIC SPRINKLER SYSTEM

	A-3	B, S-2
A-3	0 HR	0 HRS
B, S-2	-	0 HRS

PLUMBING FIXTURE :

CLASSIFICATION (IBC - CHAPTER 3, NFPA 101)	WATERCLOSET		LAVATORIES	
	MALE	FEMALE	MALE	FEMALE
1ST FLOOR: B = 167 OCCUPANT	1 PER 25 FOR THE FIRST 50 AND 1 PER 50 FOR THE REMAINDER EXCEEDING 50		1 PER 40 FOR THE FIRST 80 AND 1 PER 80 FOR THE REMAINDER EXCEEDING 80	
2ND FLOOR: B = 143 OCCUPANT				
TOTAL: B = 310 OCCUPANT	4	4	3	3
TOTAL: A-3 = 110 OCCUPANT	1 PER 125 = 1	1 PER 65 = 1	1 PER 200 = 1	1 PER 200 = 1

EGRESS CAPACITY AND NUMBER (NFPA 101)

STAIRS: 0.3 INCHES/PERSON
DOORS AND LEVEL COMPONENTS: 0.2 INCHES/PERSON

BASEMENT: 22 PERSONS	2 EXITS REQ.
LEVEL ONE: 160 PERSONS	2 EXITS REQ.
LEVEL TWO: 204 PERSONS	2 EXITS REQ.

CORRIDORS (NFPA 101)

FIRE RATING (WITH SPRINKLER)		0 HR
MINIMUM WIDTH:	OCCUPANT LOAD >50 PERSONS:	44 INCHES
	OCCUPANT LOAD <50 PERSONS:	36 INCHES
DEAD END LENGTH (WITH SPRINKLER):	BUSINESS	50 FEET
	MIXED USE	20 FEET
	STORAGE	100 FEET

TRAVEL DISTANCE (NFPA 101)

EXIT ACCESS TRAVEL DISTANCE:	MIXED USE	250 FEET MAX.
COMMON PATH OF TRAVEL DISTANCE:	MIXED USE: >50 PERSON	20 FEET
	MIXED USE: <50 PERSON	75 FEET
	MECHANICAL EQUIPMENT	150 FEET

STAIR CRITERIA (NFPA 101)

MINIMUM WIDTH:	NEW	44 INCHES
	EXISTING	36 INCHES
RISER HEIGHT:	NEW	4 INCH - 7 INCH
	EXISTING	8 INCH MAX.
TREAD DEPTH:	NEW	11 INCH MIN.
	EXISTING	9 INCH MIN.

ACCESSIBLE MEANS OF EGRESS (NFPA 101)

AREA OF REFUGE NOT REQUIRED FOR EXISTING BUILDING, PER .NFPA 101 7.5.4.1

FIRE EXTINGUISHERS

FIRE EXTINGUISHERS SHALL BE PROVIDED THROUGHOUT ALL AREAS,
SPACED IN ACCORDANCE WITH NFPA 10

CONVENIENCE OPENINGS (NFPA 101)

STAIR 1 IS CONSIDERED A CONVENIENCE OPENING PER NFPA 101, 8.6.8. THE VERTICAL OPENING IS TO BE SEPARATED FROM CORRIDORS BY 1 HOUR FIRE RATED CONSTRUCTION. STAIRS 2 AND 3 WILL SERVE AS THE REQUIRED MEANS OF EGRESS FOR THE BUILDING.

NFPA 101 LIFE SAFEY CODE (LSC) - OCCUPANCY LOAD SCHEDULE

BASEMENT

NAME	OCCUPANCY USE GROUP (LSC TABLE 7.3.1.2)	AREA (SF)	OCCUPANT LOAD FACTOR	SQFT TYPE	OCCUPANT LOAD
MECHANICAL	STORAGE	10,920	500	GROSS	22
TOTAL - BASEMENT		10,920			22

LEVEL 1

NAME	OCCUPANCY USE GROUP (LSC TABLE 7.3.1.2)	AREA (SF)	OCCUPANT LOAD FACTOR	SQFT TYPE	OCCUPANT LOAD
TEAM ROOM 128	MIXED USE - LESS CONCENTRATED USE W/O FIXED SEATING	149	15	NET	10
TEAM ROOM 129	MIXED USE - LESS CONCENTRATED USE W/O FIXED SEATING	147	15	NET	10
TEAM ROOM 140	MIXED USE - LESS CONCENTRATED USE W/O FIXED SEATING	365	15	NET	24
BUSINESS	BUSINESS	15,925	100	GROSS	159
STORAGE ROOMS	STORAGE	336	500	GROSS	1
TOTAL - LEVEL 1		16,922			204

LEVEL 2

NAME	OCCUPANCY USE GROUP (LSC TABLE 7.3.1.2)	AREA (SF)	OCCUPANT LOAD FACTOR	SQFT TYPE	OCCUPANT LOAD
CONFERENCE ROOM	MIXED USE - LESS CONCENTRATED USED W/O FIXED SEATING	897	15	NET	60
TEAM ROOM 221	MIXED USE - LESS CONCENTRATED USED W/O FIXED SEATING	145	15	NET	10
TEAM ROOM 222	MIXED USE - LESS CONCENTRATED USED W/O FIXED SEATING	149	15	NET	10
TEAM ROOM 223	MIXED USE - LESS CONCENTRATED USED W/O FIXED SEATING	150	15	NET	10
LIBRARY	MIXED USE - LESS CONCENTRATED USED W/O FIXED SEATING	338	15	NET	23
BUSINESS	BUSINESS	13,491	100	GROSS	135
STORAGE	STORAGE	336	500	GROSS	1
TOTAL - LEVEL 2		15,506			248

NOTES:
1. CONFERENCE ROOMS ARE ASSEMBLY USE FOR LOAD CALCULATIONS ONLY.
2. SEPARATIONS WILL NOT BE PROVIDED FROM CONFERENCE ROOM (ASSEMBLY USE) TO WORKSTATION AREAS (BUSINESS USE)

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	JGJC	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: CODE ANALYSIS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293409 | LATEST REV.

SHEET NO. LS-001

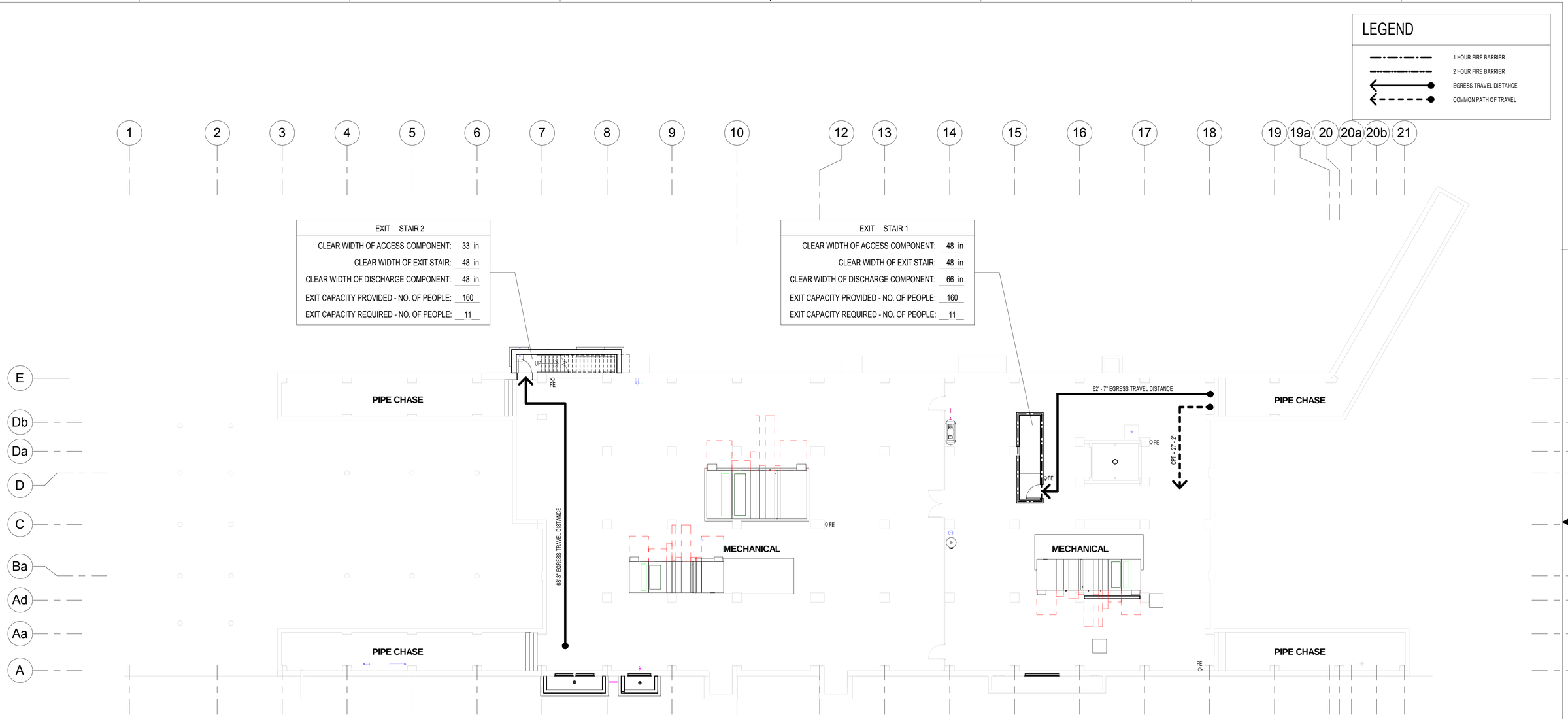
12/16/2013 8:40:34 AM

LEGEND

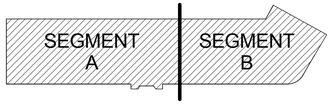
- 1 HOUR FIRE BARRIER
- 2 HOUR FIRE BARRIER
- EGRESS TRAVEL DISTANCE
- COMMON PATH OF TRAVEL

EXIT STAIR 2	
CLEAR WIDTH OF ACCESS COMPONENT:	33 in
CLEAR WIDTH OF EXIT STAIR:	48 in
CLEAR WIDTH OF DISCHARGE COMPONENT:	48 in
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	160
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	11

EXIT STAIR 1	
CLEAR WIDTH OF ACCESS COMPONENT:	48 in
CLEAR WIDTH OF EXIT STAIR:	48 in
CLEAR WIDTH OF DISCHARGE COMPONENT:	66 in
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	160
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	11



1 BASEMENT LIFE SAFETY PLAN
LS-100 REF: A-200 SCALE: 3/32" = 1'-0"



KEY PLAN

N

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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EDWARD D. WEAVER
Lic. No. 011003
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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT LIFE SAFETY PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293410 | LATEST REV.

SHEET NO. LS-100

12/16/2013 8:40:38 AM

LEGEND

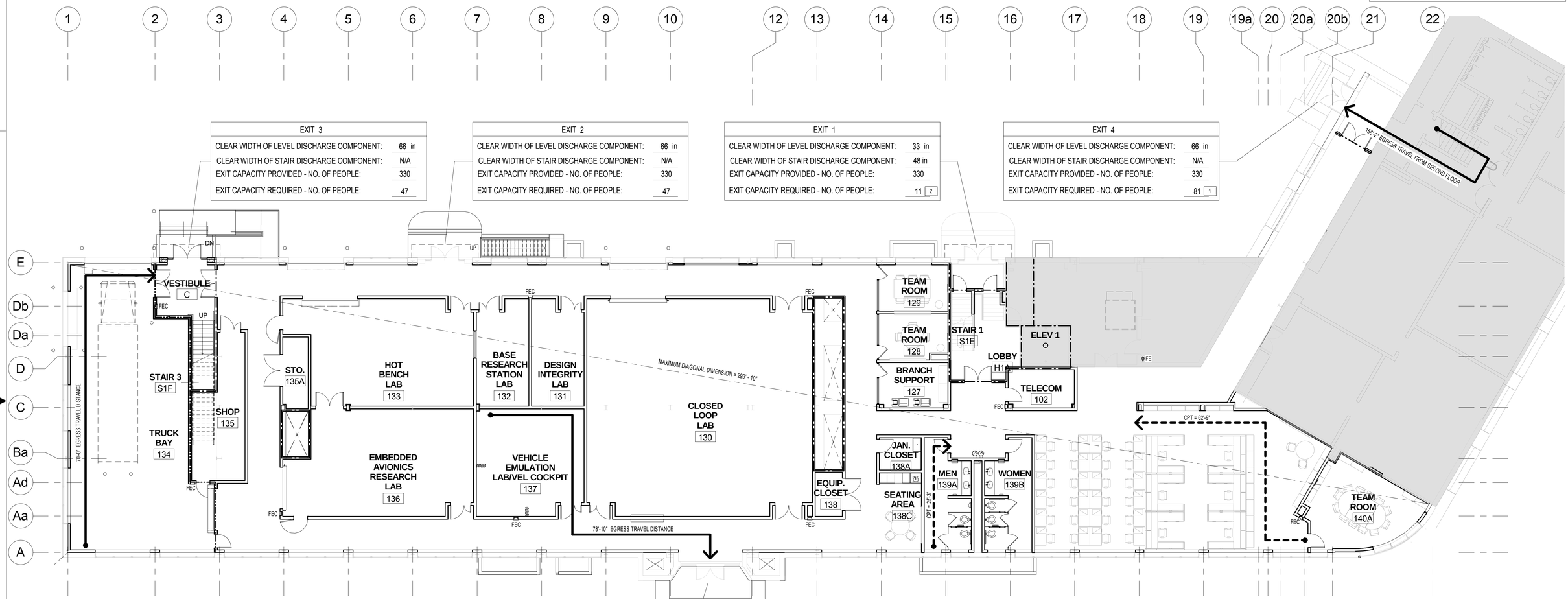
- 1 HOUR FIRE BARRIER
- 2 HOUR FIRE BARRIER
- EGRESS TRAVEL DISTANCE
- COMMON PATH OF TRAVEL

EXIT 3	
CLEAR WIDTH OF LEVEL DISCHARGE COMPONENT:	66 in
CLEAR WIDTH OF STAIR DISCHARGE COMPONENT:	N/A
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	330
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	47

EXIT 2	
CLEAR WIDTH OF LEVEL DISCHARGE COMPONENT:	66 in
CLEAR WIDTH OF STAIR DISCHARGE COMPONENT:	N/A
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	330
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	47

EXIT 1	
CLEAR WIDTH OF LEVEL DISCHARGE COMPONENT:	33 in
CLEAR WIDTH OF STAIR DISCHARGE COMPONENT:	48 in
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	330
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	11 [2]

EXIT 4	
CLEAR WIDTH OF LEVEL DISCHARGE COMPONENT:	66 in
CLEAR WIDTH OF STAIR DISCHARGE COMPONENT:	N/A
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	330
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	81 [1]

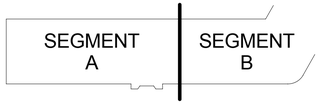


EXIT 5	
CLEAR WIDTH OF LEVEL DISCHARGE COMPONENT:	66 in
CLEAR WIDTH OF STAIR DISCHARGE COMPONENT:	N/A
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	330
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	47

1 FIRST FLOOR LIFE SAFETY PLAN
LS-101 REF: A-200 SCALE: 3/32" = 1'-0"

KEYNOTE:

1. EXISTING OCCUPANT LOAD FOR EXIT #4 ASSUMES OCCUPANT LOAD OF UNRENOVATED PORTION BASED ON 23,593 BUSINESS GROSS SQUARE FOOTAGE AND 2,622 ASSEMBLY NET SQUARE FOOTAGE FOR A TOTAL OCCUPANT LOAD OF 411. THIS OCCUPANT LOAD DIVIDED OVER 12 EXISTS EQUALS 34 PERSONS PER EXIT. (47+34 EXISTING = 81)
2. EXIT 1 ONLY TO SERVE AS AN EGRESS FROM BASEMENT LEVEL.



KEY PLAN

N

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

REVISIONS									
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

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EDWARD D. WEAVER
Lic. No. 011003
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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED JG/JC	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR LIFE SAFETY PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293411 | LATEST REV.

SHEET NO. LS-101

12/16/2013 8:40:44 AM

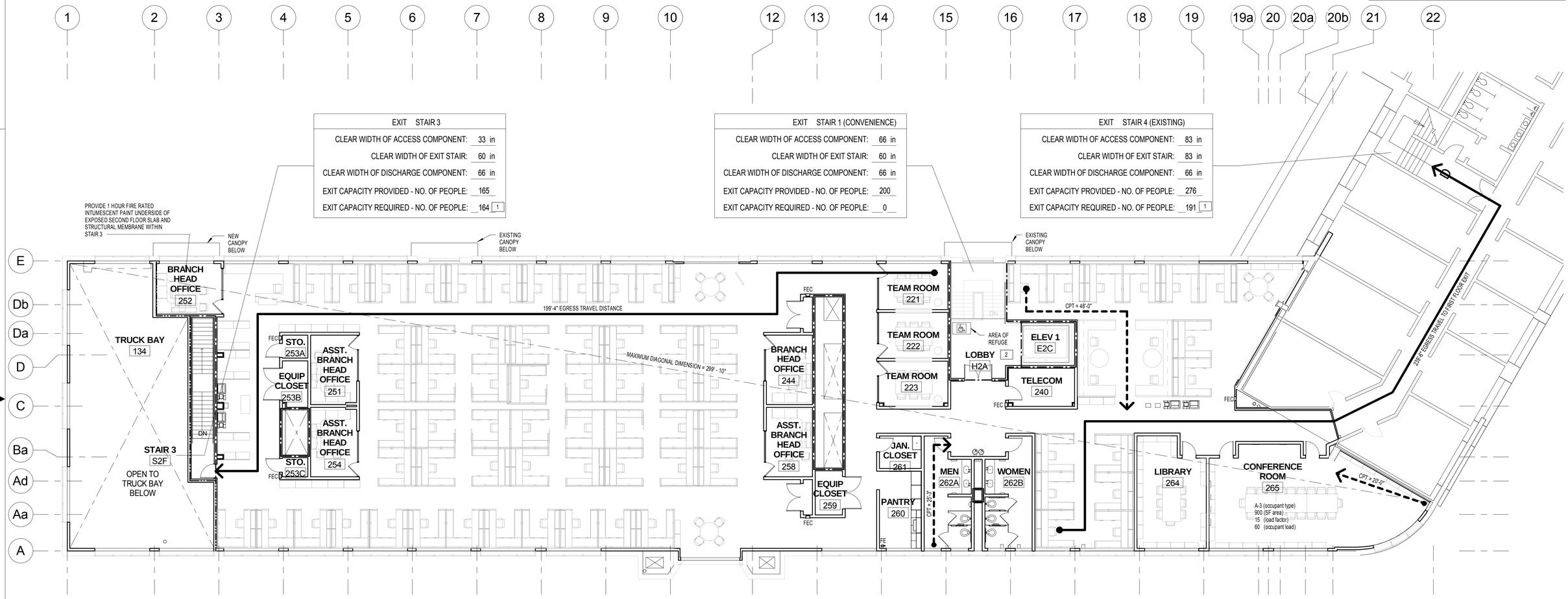
LEGEND

- 1 HOUR FIRE BARRIER
- 2 HOUR FIRE BARRIER
- EGRESS TRAVEL DISTANCE
- COMMON PATH OF TRAVEL

EXIT STAIR 3	
CLEAR WIDTH OF ACCESS COMPONENT:	33 in
CLEAR WIDTH OF EXIT STAIR:	60 in
CLEAR WIDTH OF DISCHARGE COMPONENT:	66 in
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	165
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	164 [1]

EXIT STAIR 1 (CONVENIENCE)	
CLEAR WIDTH OF ACCESS COMPONENT:	66 in
CLEAR WIDTH OF EXIT STAIR:	60 in
CLEAR WIDTH OF DISCHARGE COMPONENT:	66 in
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	200
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	0

EXIT STAIR 4 (EXISTING)	
CLEAR WIDTH OF ACCESS COMPONENT:	83 in
CLEAR WIDTH OF EXIT STAIR:	83 in
CLEAR WIDTH OF DISCHARGE COMPONENT:	66 in
EXIT CAPACITY PROVIDED - NO. OF PEOPLE:	276
EXIT CAPACITY REQUIRED - NO. OF PEOPLE:	191 [1]

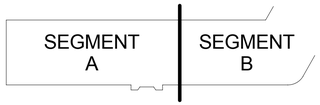


1 SECOND FLOOR LIFE SAFETY PLAN

LS-102 REF: A-200 SCALE: 3/32" = 1'-0"

KEYNOTE:

1. EXISTING OCCUPANT LOAD FOR STAIR 3 AND STAIR 4 ASSUMES OCCUPANT LOAD OF UNRENOVATED PORTION BASED ON 20,808 BUSINESS GROSS SQUARE FOOTAGE AND 2,312 ASSEMBLY NET SQUARE FOOTAGE FOR A TOTAL OCCUPANT LOAD OF 362. THIS OCCUPANT LOAD DIVIDED OVER 6 EXITS EQUAL 61 PER EXIT. (FOR STAIR 3 = 103 + 61 EXISTING = 164) (FOR STAIR 4 = 130 + 61 EXISTING = 191)
2. STAIR 1 IS CLASSIFIED AS A CONVENIENCE OPENING AND SHALL BE ENCLOSED IN ACCORDANCE WITH NFPA 101, SECTION 38.3.1.1 AND SECTION 8.6.9.



KEY PLAN

N

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

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SEAL AREA

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EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR LIFE SAFETY PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293412 | LATEST REV.

SHEET NO. LS-102

12/16/2013 8:40:50 AM

C. ALLAN BAMFORTH, JR.
ENGINEER–SURVEYOR, LTD.
NORFOLK, VIRGINIA

LEGEND:

	EXISTING (E.)	NEW
TOP OF CURB OR CONCRETE (TC) ELEVATION / ELEVATION OF GUTTER, PAVEMENT OR GROUND	TC 32.60 / 32.10	TC13.00 / 12.50
TOP OF WALL (TW)	+TW40.26	TW13.35 / 13.00
SPOT ELEVATION	+20.0	13.35
BITUMINOUS PAVEMENT (ASPHALT)	ASPHALT	
CONCRETE (CONC. OR PCC)	CONC	
CONCRETE PAVEMENT		
CONCRETE SIDEWALK		
TREE OR BUSH		
ABANDONED (ABAND) AIR LINE	1 1/2"AIR ABAND	
ABANDONED (ABAND) WATER (W.) MAIN	8" WA ABAND	
AIR LINE	1/2"GM AIR(125 PSI)	
LIQUID NITROGEN (LN2)	LN_2 SUPPLY	
SANITARY (SA.) SEWER	6"PVC SA	
STORM (ST.) SEWER	10" ST	4" S.
UNDER GROUND (UG.) COMMUNICATIONS (COMM.)	4"PVC CND	
UNDER GROUND (UG.) ELECTRICAL (ELEC.)	2"CND	
WATER (WA) MAIN	6"PVC WA	8" W.
CATCH BASIN (C.B.)	TOP 12.67 INV 10.37	
CLEANOUT (CO.)	CO	
ELECTRIC (ELEC.) MANHOLE (MH.)	RIM 12.22 INV 5.30	
FIRE DEPARTMENT CONNECTION		
FIRE HYDRANT (F.H.)		
POST INDICATOR VALVE (P.I.V.)		
STORM MANHOLE (MH.)	RIM 11.44 INV 7.44	
SWALE		
TELEPHONE (TEL.) PEDESTAL (PED.)	TEL PED	
UTILITY POLE W/ LIGHT		
UTILITY CONNECTION		
WATER VALVE (W.V.)		
ABOVEGROUND (AG)		
BELOW GRADE (BG)		
BOTTOM OF CURB (BOC)		
CONDUIT (CND)		
COOLING TOWER (CT)		
ELEVATION (EL)		

LEGEND:

INVERT (INV)

JUNCTION BOX (JB)

MATCH EXISTING GRADE (M.E.)

OVERHANG (OVHG)

OVERHEAD (OVHD)

UNKNOWN (UNK)

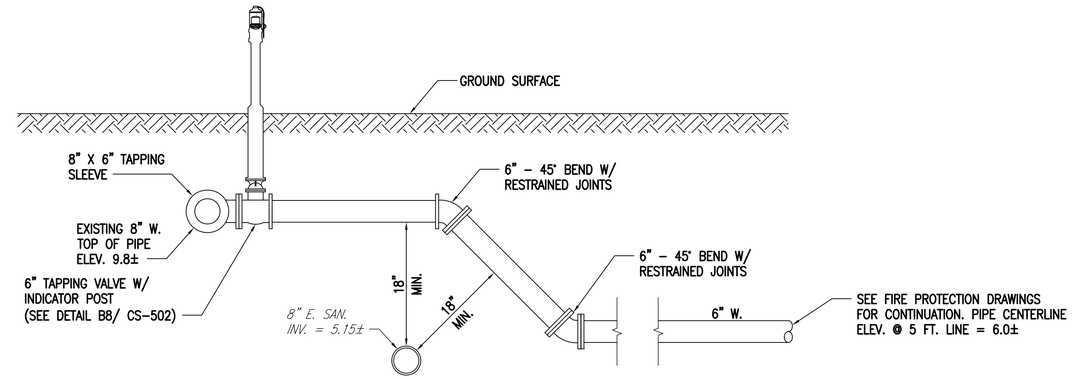
UTILITY (UTIL)

SURVEY NOTES :

1. TOPOGRAPHIC SURVEY IS SUPPLIED BY NASA LANGLEY GIS DEPARTMENT.
2. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY NASA LANGLEY GIS DEPARTMENT. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
3. ELEVATIONS ARE IN FEET.

GENERAL NOTES:

1. EXISTING CONDITIONS / DEMOLITION PLAN WAS DEVELOPED FROM GIS DRAWINGS (TOPOGRAPHIC AND UTILITY) AND ARE INTENDED TO DEPICT EXISTING CONDITIONS. THE CONTRACTOR SHALL VERIFY CONDITIONS PRIOR TO COMMENCING DEMOLITION OR PROVIDING NEW WORK.
2. RE–ESTABLISH ALL TURF AREAS DISTURBED DURING CONSTRUCTION UNLESS INDICATED TO RECEIVE SITE IMPROVEMENTS.
3. ALL FINISH GRADES TO MATCH EXISTING, UNLESS NOTED OTHERWISE.



SPRINKLER SUPPLY LINE DETAIL

N.T.S.

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA — C. ALLAN BAMFORTH, JR. — Lic. No. 4587 — 11/06/13 — PROFESSIONAL ENGINEER

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Arlington, Va. 22201

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ISSUE DATE
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APPROVALS				
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED CAB	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED ALB	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

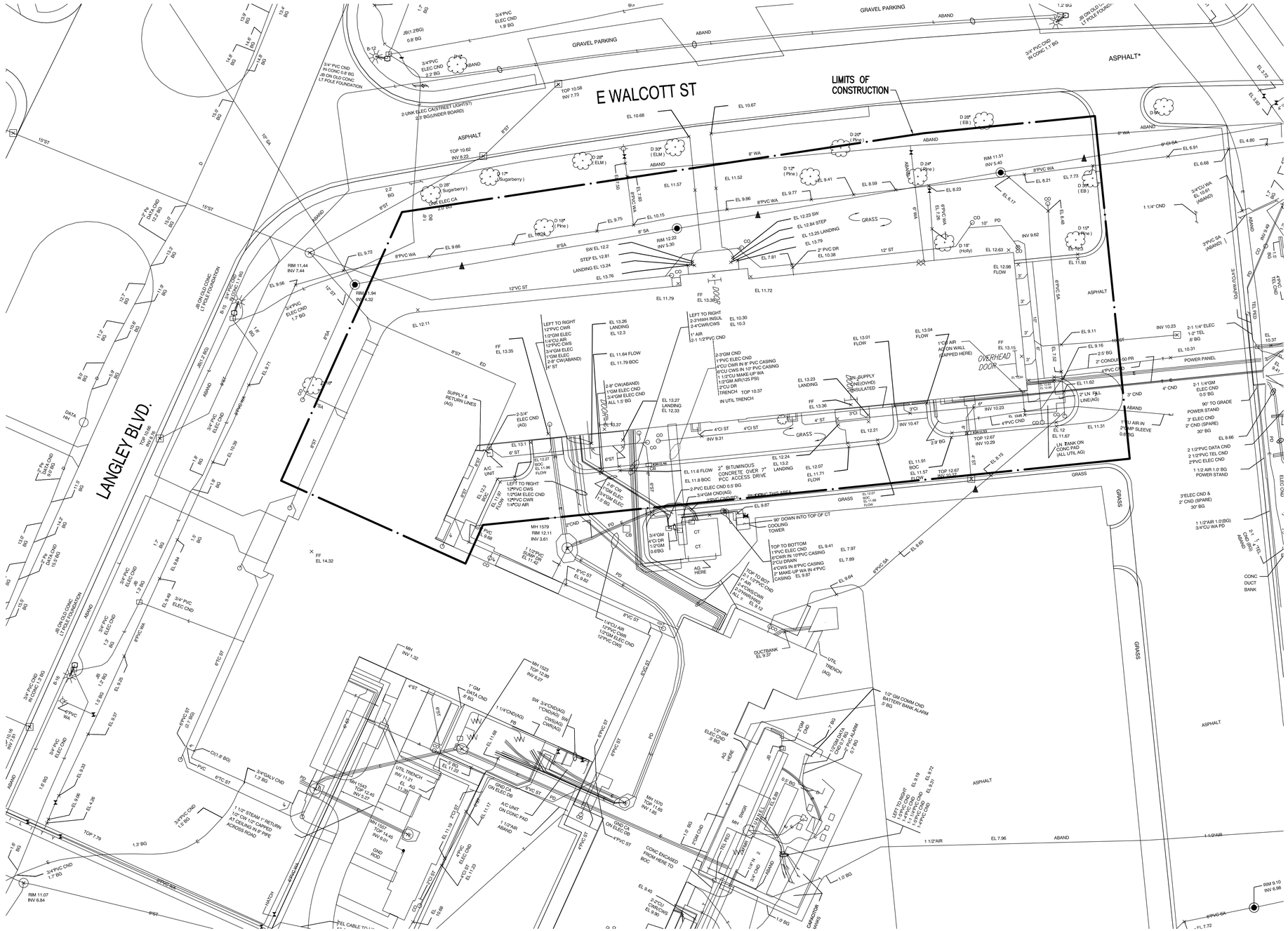
PROJECT TITLE: FY'14 Minor CoF Project- Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: LEGEND AND NOTES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293413 | LATEST REV.

SHEET NO. CD-001

C. ALLAN BAMFORTH, JR.
ENGINEER–SURVEYOR, LTD.
NORFOLK, VIRGINIA



GRAPHIC SCALES

1" = 25' 0 25' 50' 75' 100'

REVISIONS					REVISIONS				
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SEAL AREA

COMMONWEALTH OF VIRGINIA
C. ALLAN BAMFORTH, JR.
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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project- Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: EXISTING CONDITIONS

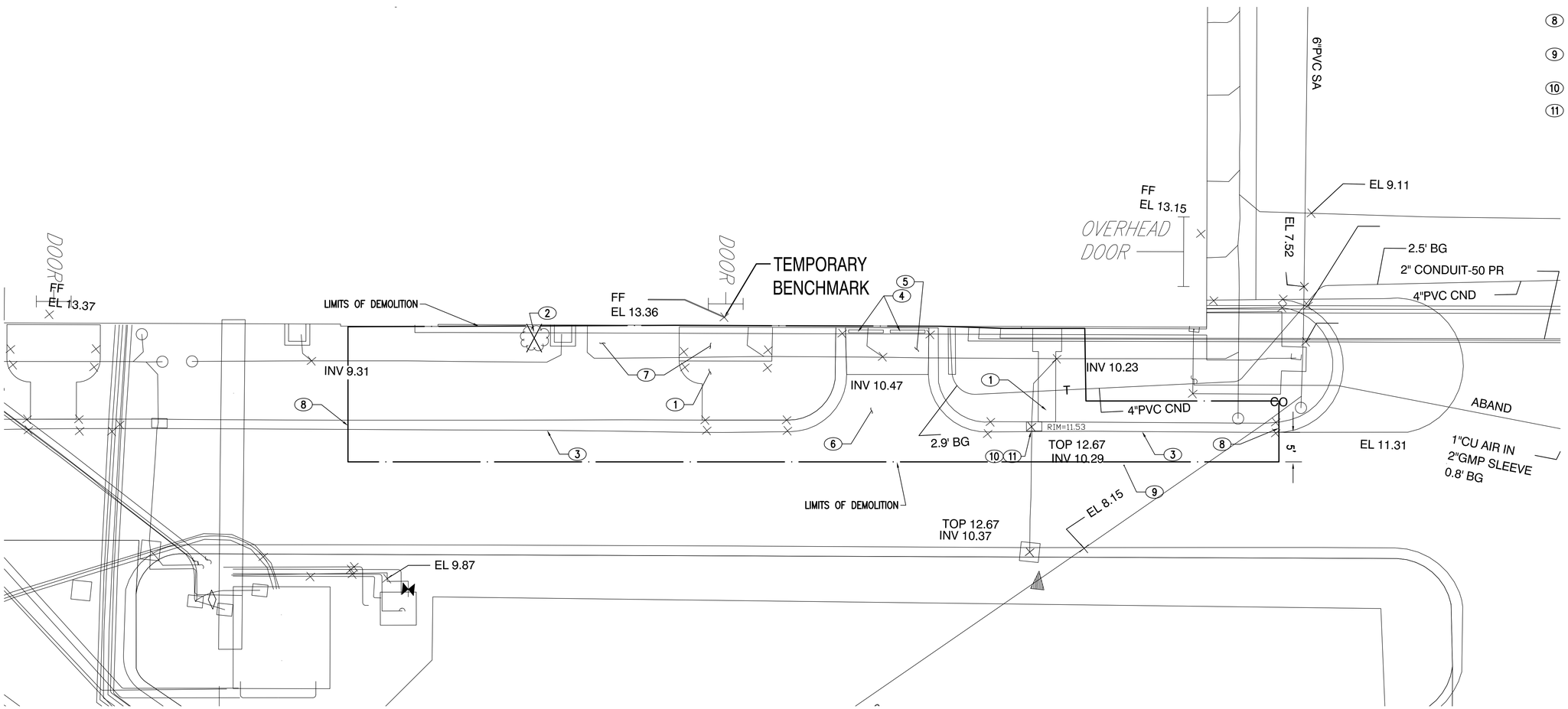
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293414 | LATEST REV.

SHEET NO. CD-101

C. ALLAN BAMFORTH, JR.
ENGINEER–SURVEYOR, LTD.
NORFOLK, VIRGINIA

DEMOLITION NOTES

1. REMOVE CONCRETE SIDEWALK (5" THICK)
2. REMOVE TREE & STUMP. BACKFILL HOLE.
3. REMOVE CURB AND GUTTER
4. REMOVE PARKING STALL CURB BUMPERS
5. REMOVE CONCRETE (8" THICK)
6. REMOVE 2" BITUMINOUS CONCRETE OVER 8" CONCRETE
7. FOR DEMOLITION AT NEW STAIRWELL AND DOOR LANDINGS SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
8. SAWCUT CONCRETE CURB & GUTTER AT NEAREST JOINT
9. SAWCUT BITUMINOUS PAVEMENT & MILL SEE DETAIL B6 / CS501
10. EXISTING CATCH BASIN TO REMAIN
11. USE CAUTION TO NOT DAMAGE CATCH BASIN STRUCTURE WHEN MILLING



DEMOLITION PLAN

SCALE: 1" = 10'

GRAPHIC SCALES

1" = 10' 0 10' 20' 30' 40'

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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COMMONWEALTH OF VIRGINIA
C. ALLAN BAMFORTH, JR.
Lic. No. 4587
11/06/13
PROFESSIONAL ENGINEER

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% FINAL SUBMISSION

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN CAD	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED CAB	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED ALB	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02, X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

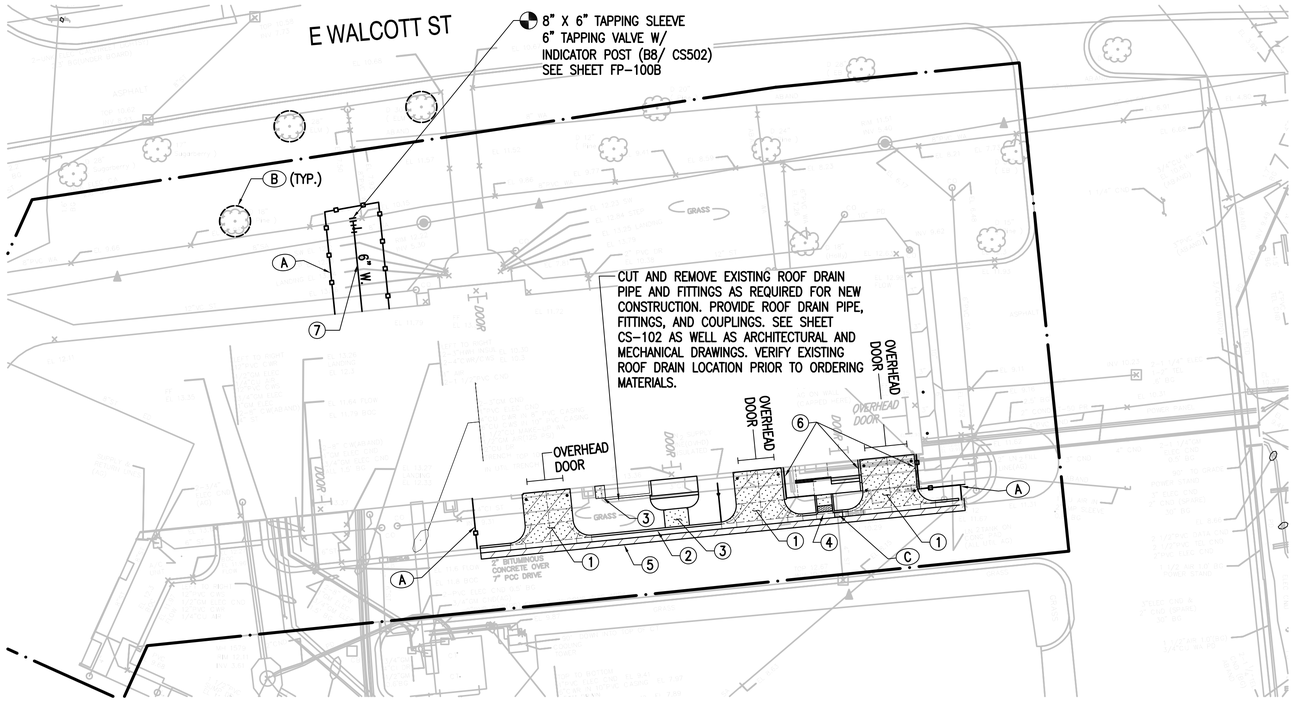
PROJECT TITLE: FY'14 Minor CoF Project- Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: DEMOLITION PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293415 | LATEST REV.

SHEET NO. CD-102

C. ALLAN BAMFORTH, JR.
ENGINEER–SURVEYOR, LTD.
NORFOLK, VIRGINIA



NEW WORK PLAN

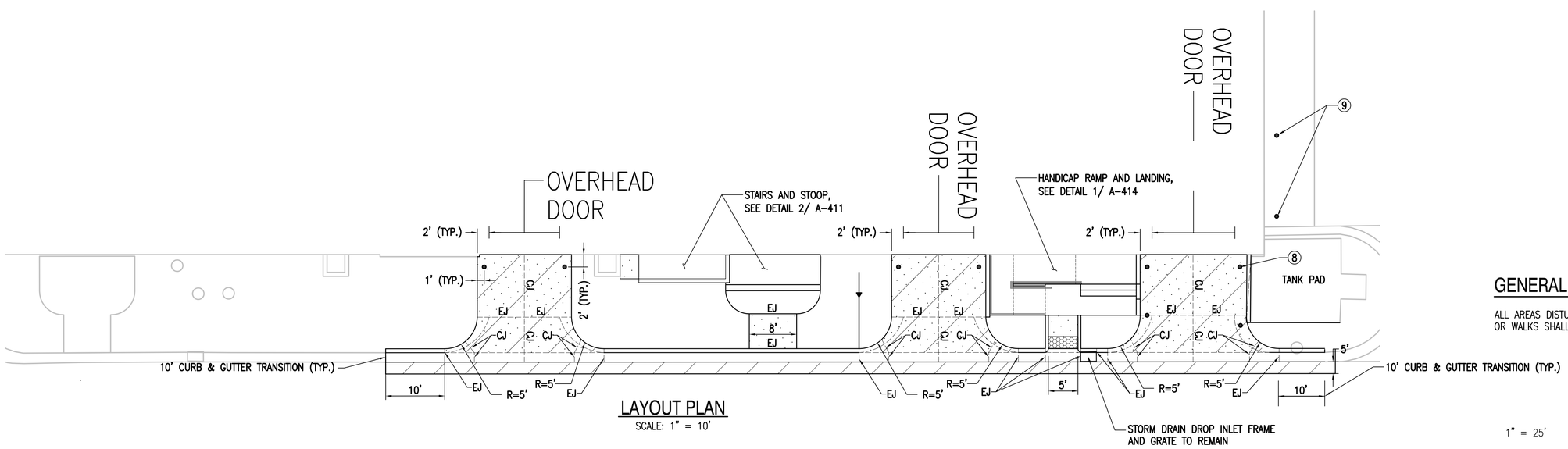
SCALE: 1" = 25'

EROSION & SEDIMENT CONTROL MEASURES

A	TEMPORARY SILT FENCE	C8/CS–501
B	TEMPORARY TREE PROTECTION	B8/CS–501
C	TEMPORARY CURB INLET PROTECTION	C6/CS–501

WORK NOTES

1	CONCRETE ENTRANCE APRON	A2/CS–501
2	CONCRETE CURB AND GUTTER	C2/CS–501
3	CONCRETE WALK	D4/CS–502
4	HANDICAP RAMP	C5/CS–502
5	BITUMINOUS PAVEMENT	B6/CS–501
6	CONCRETE WALL	B4 & A6/CS–502
7	6" WATER PIPE (SEE SHEET CD–001 AND A8/ CS–501)	
8	BOLLARD IN NEW PCC (TYP. FOR 8)	A3/CS–502
9	SAW CUT 8" THICK CONCRETE AND PROVIDE BOLLARD. SEE DETAIL 4/A–704. PROVIDE 1/2" EXPANSION JOINT AT PERIMETER OF NEW CONCRETE. (TYP. FOR 2)	



LAYOUT PLAN

SCALE: 1" = 10'

GENERAL NOTE:

ALL AREAS DISTURBED AND NOT BEING PROVIDED PAVEMENT OR WALKS SHALL RECEIVE TOPSOIL, SEED AND FERTILIZER.

GRAPHIC SCALES

1" = 25' 0 25' 50' 75' 100'

1" = 10' 0 10' 20' 30' 40'

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project- Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: CIVIL SITE IMPROVEMENT PLANS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293416 | LATEST REV.

SHEET NO. CS-101

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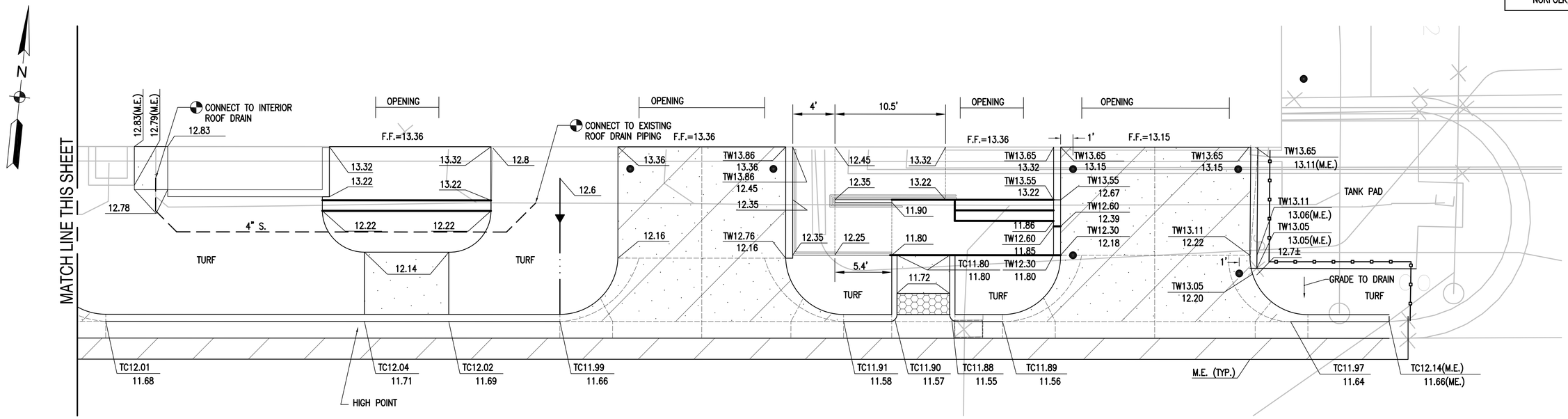
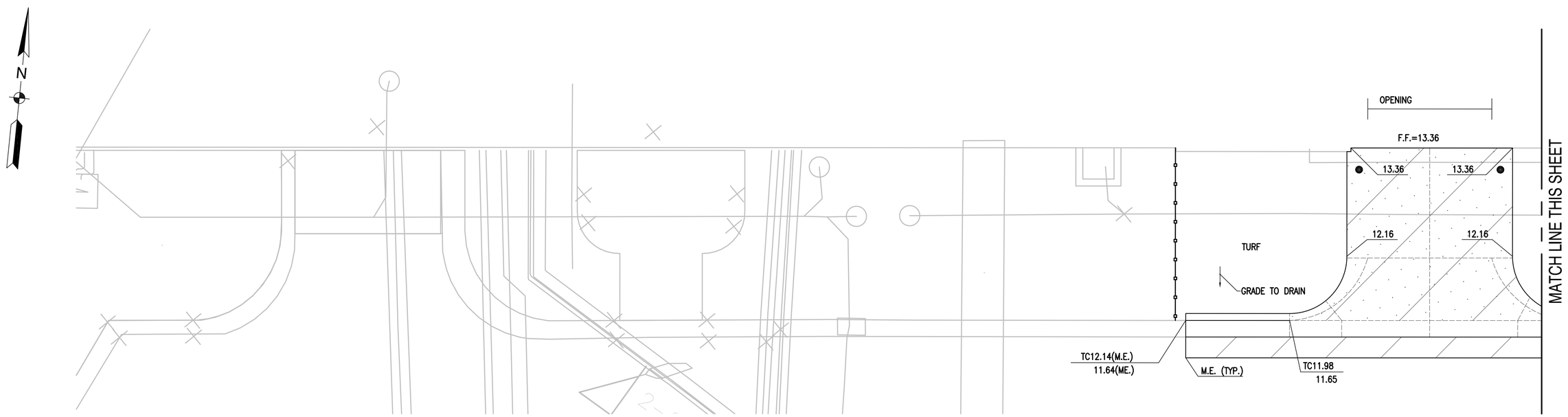
NORFOLK, VIRGINIA



GRADING PLAN

SCALE: 1" = 5'



GRADING PLAN

SCALE: 1" = 5'

GRAPHIC SCALES

1" = 5' 0 5' 10' 15' 20'

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PROJECT TITLE: FY'14 Minor CoF Project- Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: GRADING & DRAINAGE PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293417 | LATEST REV.

SHEET NO. CS-102

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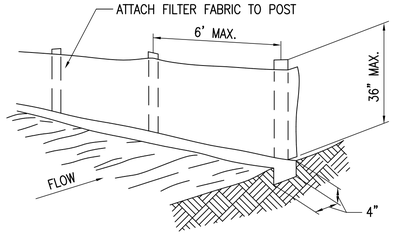

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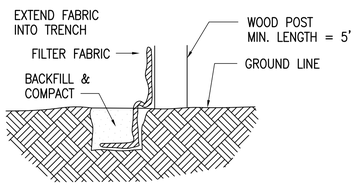
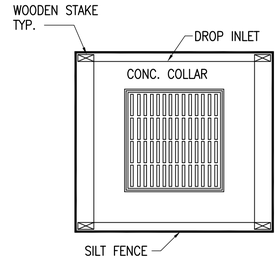


SECTION AT BASE

C8 SILT FENCE

SF–3.05
N.T.S.



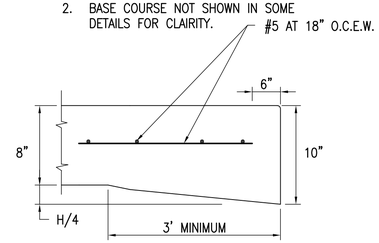
REFER TO SILT FENCE DETAIL, SF–3.05
FOR SETTING AND ANCHORING OF SILT FENCE

C6 STORM DRAIN INLET PROTECTION

(FOR DROP INLET)
IP–3.07
N.T.S.

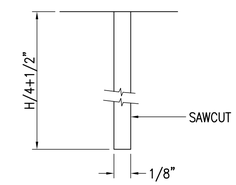
GENERAL NOTES:

1. ALL CONCRETE FOR EXTERIOR WORK SHALL MEET REQUIRMENTS FOR VDOT CLASS A4 GENERAL.
2. BASE COURSE NOT SHOWN IN SOME DETAILS FOR CLAIRITY.



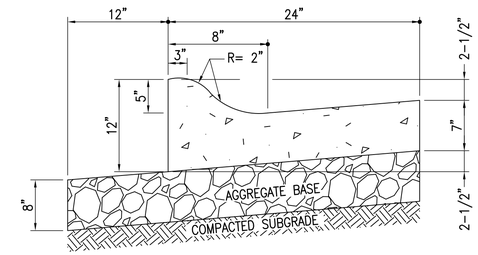
C5 THICKENED EDGE

N.T.S.



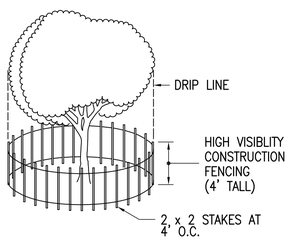
C4 SAWED JOINT DETAIL

N.T.S.



C2 STANDARD ROLL-TYPE CURB AND GUTTER

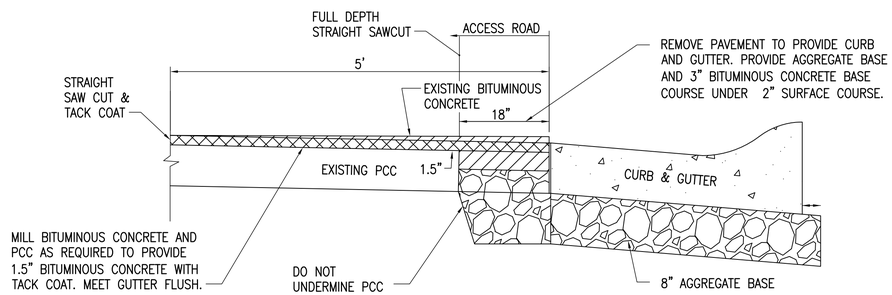
N.T.S.



NOTE:
DRIVE STAKES FIRMLY INTO GROUND (12" MIN.).

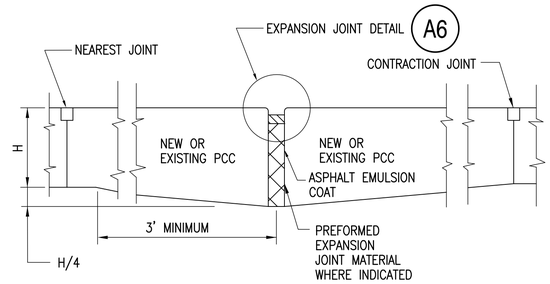
B8 TREE PROTECTION DETAIL

TP–3.38
N.T.S.



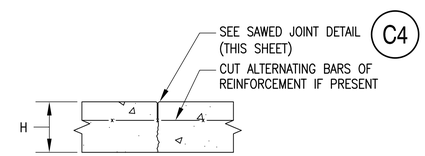
B6 PAVEMENT REPAIR AT ENTRANCE APRON

N.T.S.



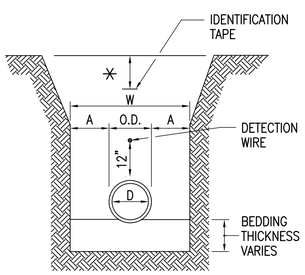
B3 THICKENED EDGE EXPANSION JOINT

N.T.S.



B2 CONTRACTION JOINT (CJ)

N.T.S.



FOR NON–PLASTIC PIPES

PIPE DIA. "D"	MAXIMUM "A"
6" TO 15"	8"

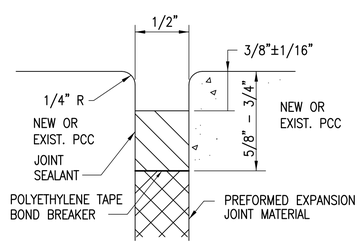
MAXIMUM TRENCH WIDTH "W" TAKEN AT TOP OF PIPE

NOTE:
PROVIDE BEDDING IN ACCORDANCE WITH THE SPECIFICATIONS.

✳ 12" BELOW FINISHED GRADE IN UNPAVED AREAS.
6" BELOW TOP OF SUBGRADE IN PAVED AREAS.

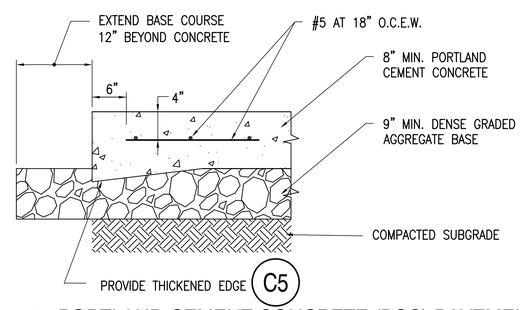
A8 PIPE TRENCH WIDTH DETAIL

N.T.S.



A6 EXPANSION JOINT DETAIL (EJ)

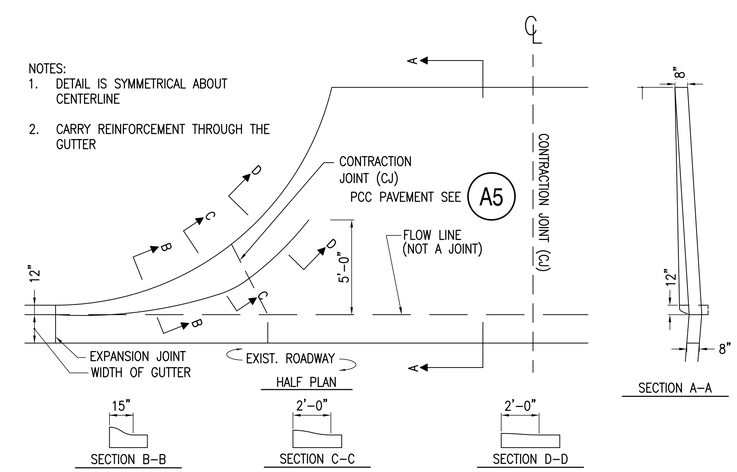
N.T.S.



A5 PORTLAND CEMENT CONCRETE (PCC) PAVEMENT

N.T.S.

NOTES:
1. DETAIL IS SYMMETRICAL ABOUT CENTERLINE
2. CARRY REINFORCEMENT THROUGH THE GUTTER



A2 CONCRETE ENTRANCE APRON

N.T.S.

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project- Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293418 | LATEST REV.
SHEET NO. CS-501

C. ALLAN BAMFORTH, JR.
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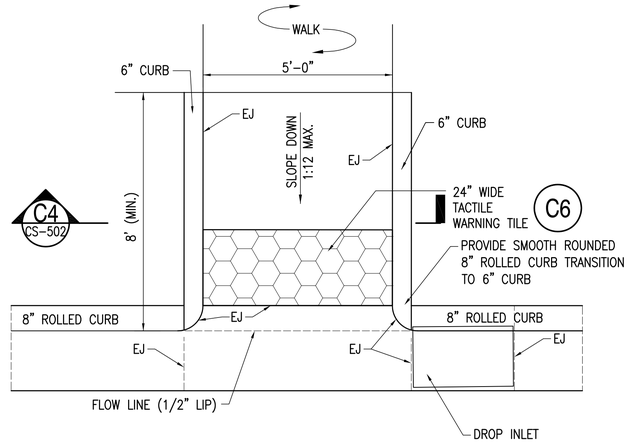
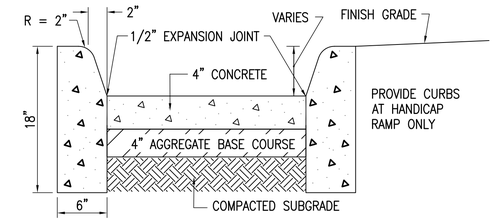
NORFOLK, VIRGINIA



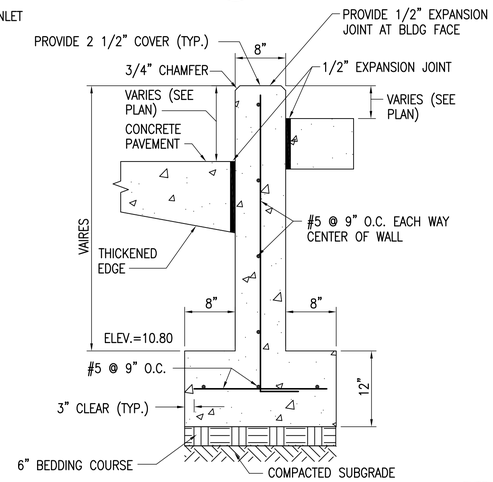
C5 HANDICAP RAMP
(TYPE 1)
N.T.S.

NOTES: (UNLESS SHOWN OTHERWISE)
PROVIDE CONTROL JOINTS @ SPACING EQUAL TO WIDTH OF SIDEWALK AND 1/2" EXPANSION JOINTS, AT CHANGES IN DIRECTION AND AGAINST ALL STRUCTURES AND EXISTING CONCRETE, UNLESS NOTED OTHERWISE.

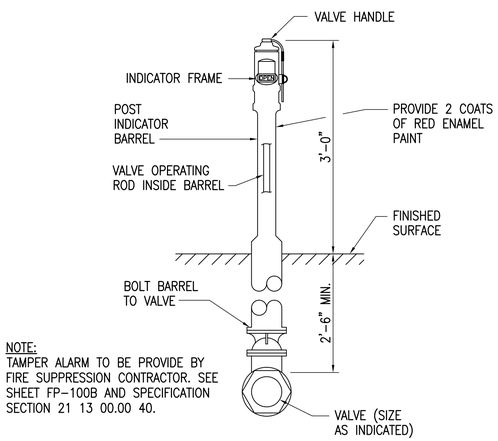


C4 CONCRETE WALK SECTION
N.T.S.

NOTES:
1. ALL CAST–IN–PLACE CONCRETE WALLS EXPOSED TO PUBLIC VIEW SHALL HAVE A SMOOTH FINISH WITH NO EXPOSED AGGREGATES.

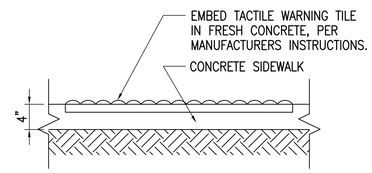


B4 CONCRETE WALL SECTION
N.T.S.



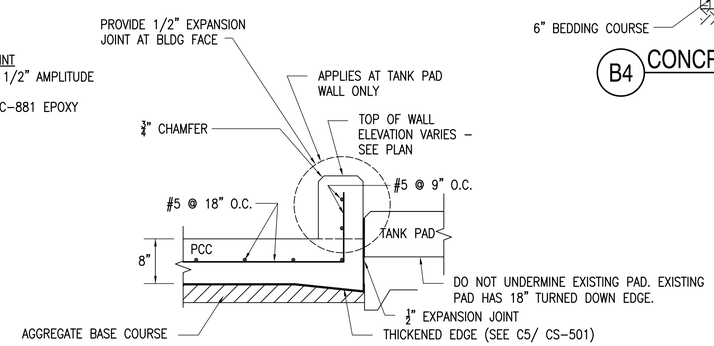
NOTE:
TAMPER ALARM TO BE PROVIDE BY FIRE SUPPRESSION CONTRACTOR. SEE SHEET FP–100B AND SPECIFICATION SECTION 21 13 00.00 40.

B8 POST INDICATOR VALVE DETAIL
N.T.S.

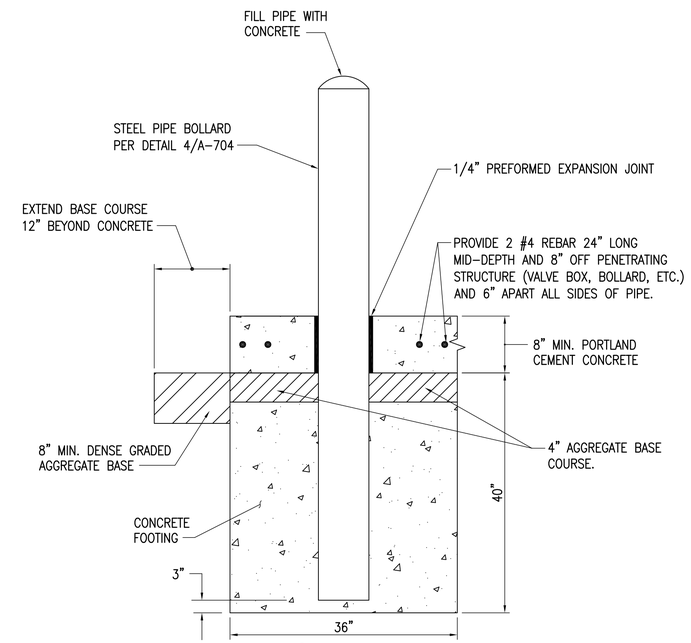


C6 TACTILE WARNING TILE DETAIL
N.T.S.

CONSTRUCTION JOINT
1. ROUGHEN TO 1/2" AMPLITUDE
2. APPLY ASTM C–881 EPOXY



A6 ENTRANCE APRON AT TANK PAD WALL
N.T.S.



A3 BOLLARD
N.T.S.

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X.XXX (3 DECIMAL PLACES) ±.005
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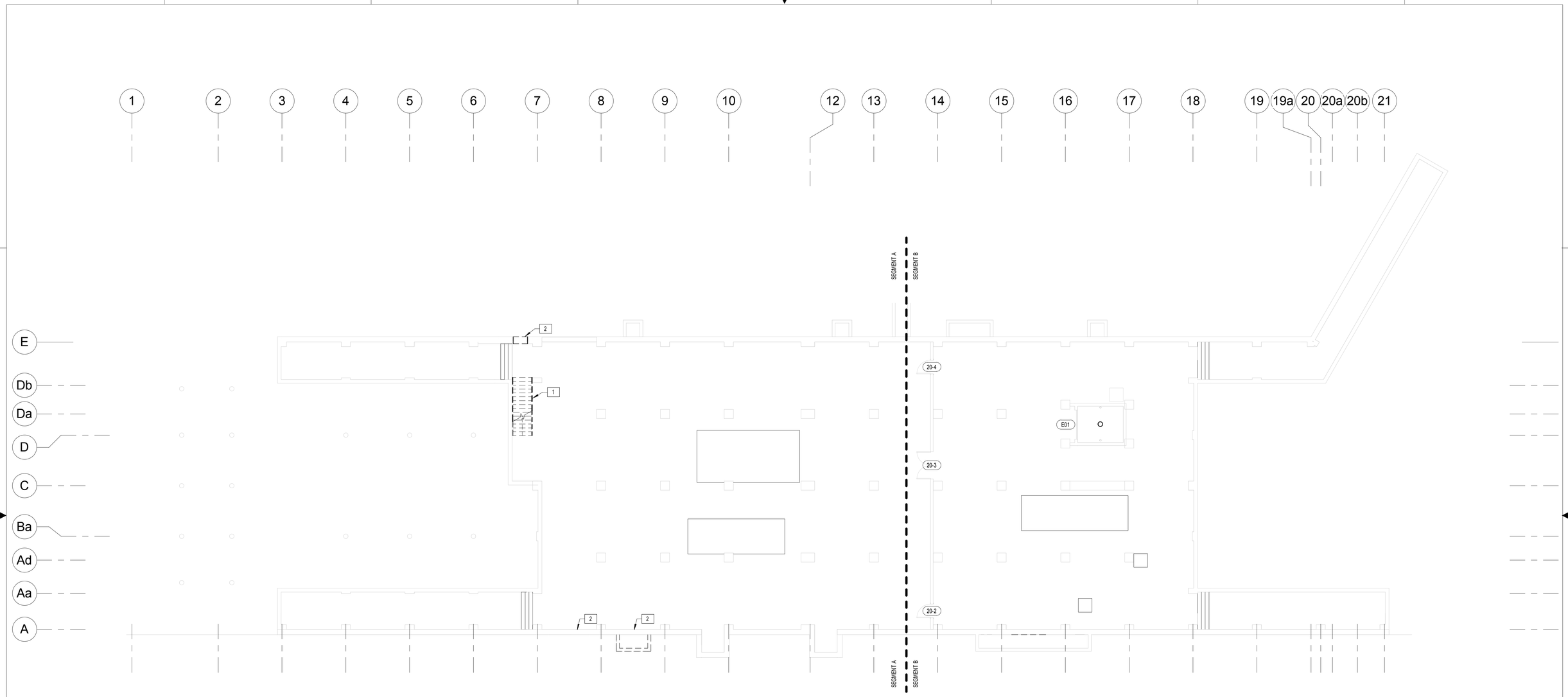
DRAWING TITLE: DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293419 | LATEST REV.
SHEET NO. CS-502

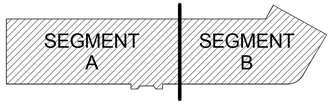


DEMOLITION PLAN GENERAL NOTES:

1. REFER TO A-100 SERIES DRAWING FOR NEW CONSTRUCTION PLANS.
2. DEMOLITION PLANS WERE CREATED FROM EXISTING WORKING DRAWINGS AND ARE INTENDED TO SHOW EXISTING CONDITIONS. VERIFY ALL CONDITIONS PRIOR TO PROCEEDING WITH THE DEMOLITION WORK IN ANY AREA. DEMOLITION OF WINDOWS, PARTITIONS, DOORS OR ANY NON-STRUCTURAL ITEMS MAY PROCEED AS INDICATED. WHERE ISSUES ARISE INVOLVING STRUCTURAL ITEMS, THEY MUST BE REPORTED TO THE A/E AND INSTRUCTIONS SECURED BEFORE PROCEEDING IN THE AFFECTED AREA.
3. REMOVE EXISTING WALLS AND OTHER ASSOCIATED CONSTRUCTION INDICATED WITH DASHED LINES.
4. PROTECT ALL EXISTING CONSTRUCTION FOR THE DURATION OF THE WORK, REPAIR AND DAMAGE CAUSED TO EXISTING CONSTRUCTION TO REMAIN.
5. REFER TO CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, TELECOM DRAWINGS FOR ANY ADDITIONAL DEMOLITION INFORMATION.

DEMOLITION PLAN KEYNOTES:

1. REMOVE AND DISPOSE OF EXISTING STEEL STAIR/ HANDRAIL AND ANY ASSOCIATED ITEMS. PATCH AND INFILL EXISTING FLOOR SLAB AT STAIR OPENING. REFER TO STRUCTURAL DRAWINGS FOR DETAIL.
2. SAW CUT CONCRETE WALL. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.



KEY PLAN

N

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT OVERALL DEMOLITION PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293420 | LATEST REV.

SHEET NO. AD-100

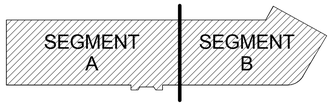
12/16/2013 8:01:06 AM

DEMOLITION PLAN GENERAL NOTES:

1. REFER TO A-100 SERIES DRAWING FOR NEW CONSTRUCTION PLANS.
2. DEMOLITION PLANS WERE CREATED FROM EXISTING WORKING DRAWINGS AND ARE INTENDED TO SHOW EXISTING CONDITIONS. VERIFY ALL CONDITIONS PRIOR TO PROCEEDING WITH THE DEMOLITION WORK IN ANY AREA. DEMOLITION OF WINDOWS, PARTITIONS, DOORS OR ANY NON-STRUCTURAL ITEMS MAY PROCEED AS INDICATED. WHERE ISSUES ARISE INVOLVING STRUCTURAL ITEMS, THEY MUST BE REPORTED TO THE A/E AND INSTRUCTIONS SECURED BEFORE PROCEEDING IN THE AFFECTED AREA.
3. REMOVE EXISTING WALLS AND OTHER ASSOCIATED CONSTRUCTION INDICATED WITH DASHED LINES.
4. PROTECT ALL EXISTING CONSTRUCTION FOR THE DURATION OF THE WORK, REPAIR AND DAMAGE CAUSED TO EXISTING CONSTRUCTION TO REMAIN.
5. REFER TO CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, TELECOM DRAWINGS FOR ANY ADDITIONAL DEMOLITION INFORMATION.

FIRST FLOOR DEMOLITION PLAN KEYNOTES:

1. REMOVE AND DISPOSE OF EXISTING STEEL STAIR/ HANDRAIL AND ANY ASSOCIATED ITEMS. PATCH AND INFILL EXISTING FLOOR SLAB AT STAIR OPENING. REFER TO STRUCTURAL DRAWINGS FOR DETAIL.
2. REMOVE AND DISPOSE OF EXISTING DOOR AND ANY ASSOCIATED ITEMS.
3. REMOVE AND DISPOSE OF EXISTING PARTITION/ WALL AND ANY ASSOCIATED ITEMS.
4. REMOVE AND DISPOSE WOOD TRIMS AT WINDOW FRAME OPENING.
5. PATCH AND INFILL EXISTING FLOOR SLAB. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
6. SAW CUT OPENING IN EXISTING CONCRETE SLAB. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
7. REMOVE EXISTING TERRAZZO FLOORING, AND PREP THE SUBFLOORING TO RECEIVE NEW TERRAZZO FINISH. REFER TO FINISH PLANS FOR EXTENT OF NEW FLOOR FINISH.
8. REMOVE EXISTING WINDOW, AND CREATE AN OPENING FOR OVERHEAD COILING DOOR. REFER TO A-600 FOR DOOR SIZE
9. REMOVE EXISTING BRICK INFILL, AND CREATE AN OPENING FOR OVERHEAD COILING DOOR. REFER TO A-600 FOR DOOR SIZE.



KEY PLAN

N

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

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EDWARD D. WEAVER
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

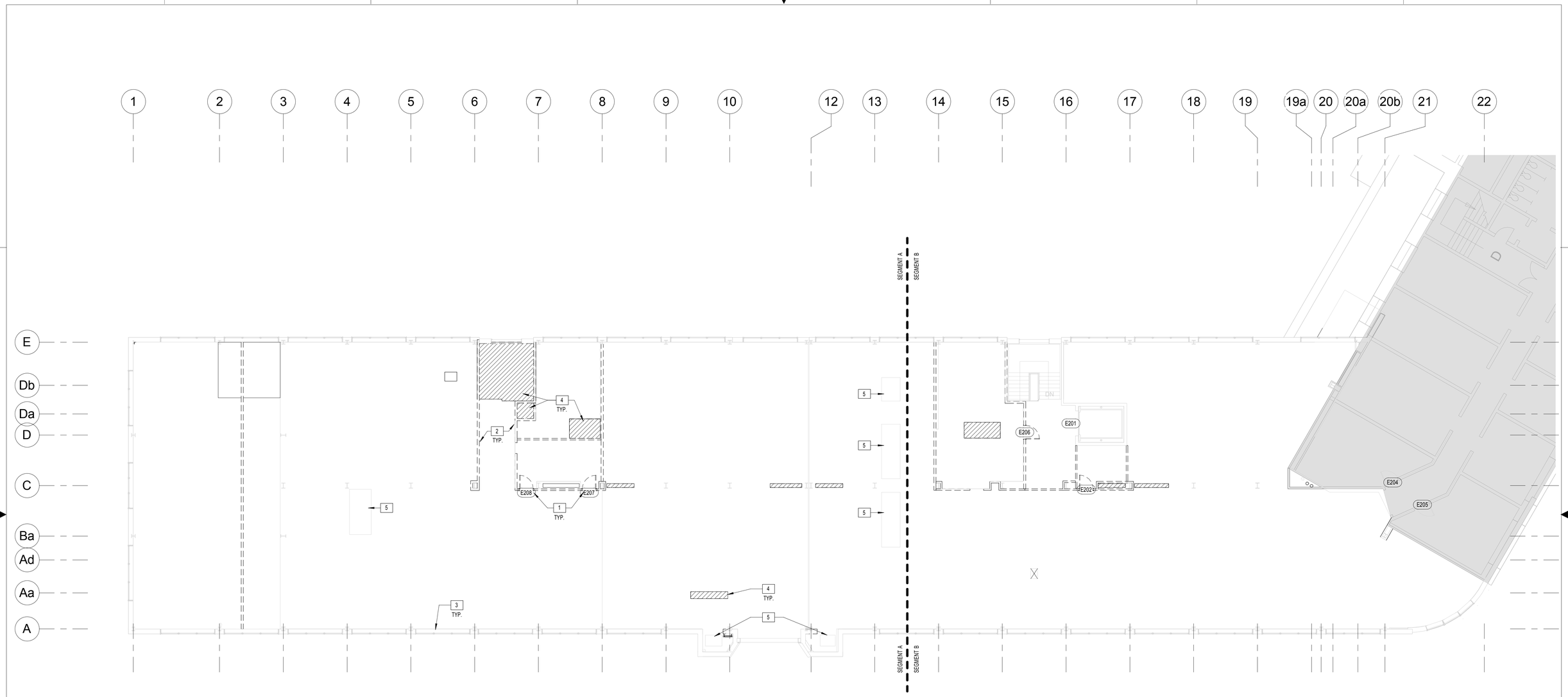
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR OVERALL DEMOLITION PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293421 | LATEST REV.

SHEET NO. AD-101

12/16/2013 8:01:10 AM

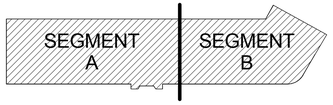


DEMOLITION PLAN GENERAL NOTES:

1. REFER TO A-100 SERIES DRAWING FOR NEW CONSTRUCTION PLANS.
2. DEMOLITION PLANS WERE CREATED FROM EXISTING WORKING DRAWINGS AND ARE INTENDED TO SHOW EXISTING CONDITIONS. VERIFY ALL CONDITIONS PRIOR TO PROCEEDING WITH THE DEMOLITION WORK IN ANY AREA. DEMOLITION OF WINDOWS, PARTITIONS, DOORS OR ANY NON-STRUCTURAL ITEMS MAY PROCEED AS INDICATED. WHERE ISSUES ARISE INVOLVING STRUCTURAL ITEMS, THEY MUST BE REPORTED TO THE A/E AND INSTRUCTIONS SECURED BEFORE PROCEEDING IN THE AFFECTED AREA.
3. REMOVE EXISTING WALLS AND OTHER ASSOCIATED CONSTRUCTION INDICATED WITH DASHED LINES.
4. PROTECT ALL EXISTING CONSTRUCTION FOR THE DURATION OF THE WORK. REPAIR AND DAMAGE CAUSED TO EXISTING CONSTRUCTION TO REMAIN.
5. REFER TO CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, TELECOM DRAWINGS FOR ANY ADDITIONAL DEMOLITION INFORMATION.

SECOND FLOOR DEMOLITION PLAN KEYNOTES:

1. REMOVE AND DISPOSE OF EXISTING DOOR AND ANY ASSOCIATED ITEMS.
2. REMOVE AND DISPOSE OF EXISTING PARTITION/ WALL AND ANY ASSOCIATED ITEMS.
3. REMOVE AND DISPOSE WOOD TRIMS AT WINDOW FRAME OPENING.
4. PATCH AND INFILL EXISTING FLOOR SLAB. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.
5. SAW CUT OPENING IN EXISTING CONCRETE SLAB. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.



KEY PLAN

N

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

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SEAL AREA

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

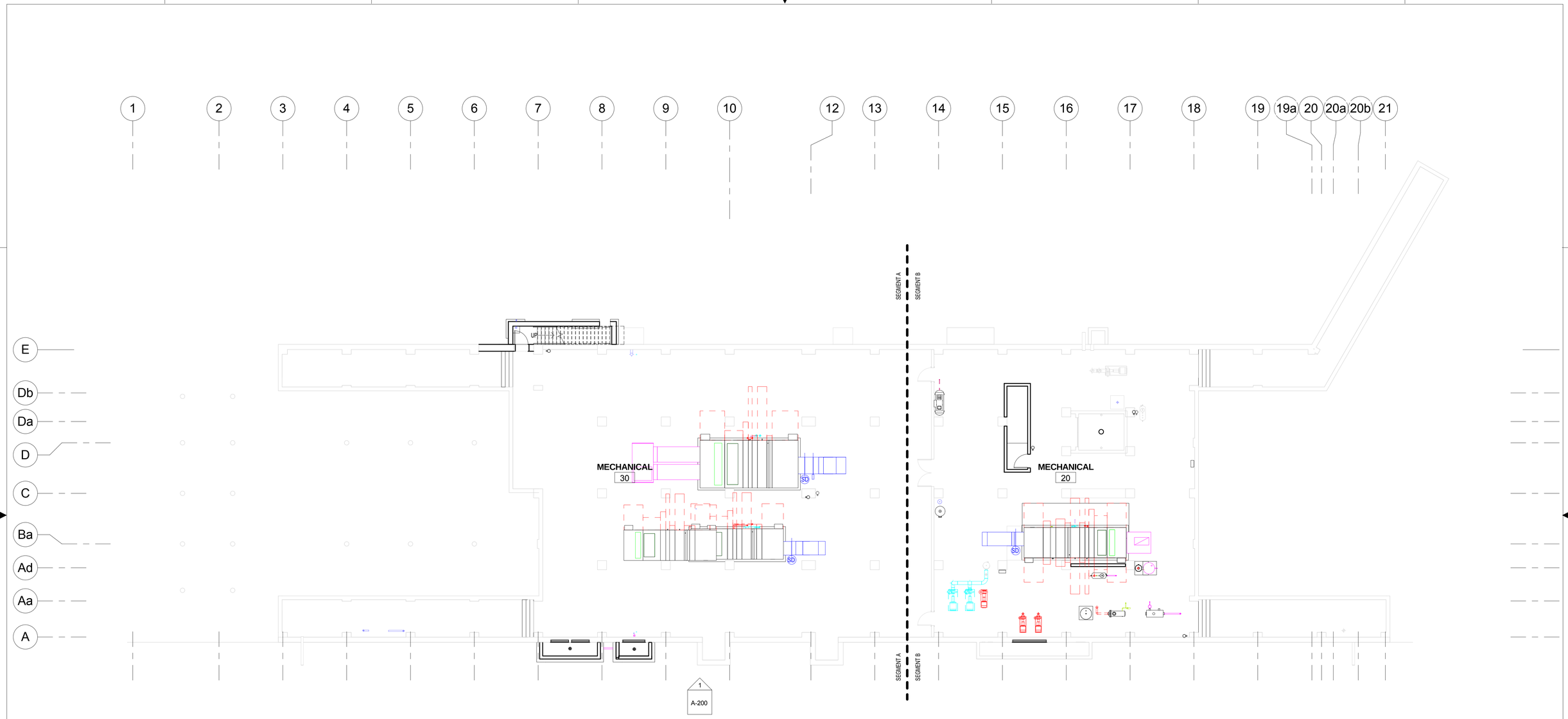
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

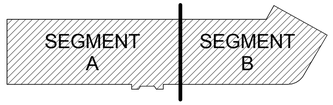
DRAWING TITLE: SECOND FLOOR OVERALL DEMOLITION PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293422 | LATEST REV.

SHEET NO. AD-102

12/16/2013 8:01:13 AM





KEY PLAN

N

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

REVISIONS					REVISIONS				
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SEAL AREA

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	TSGG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

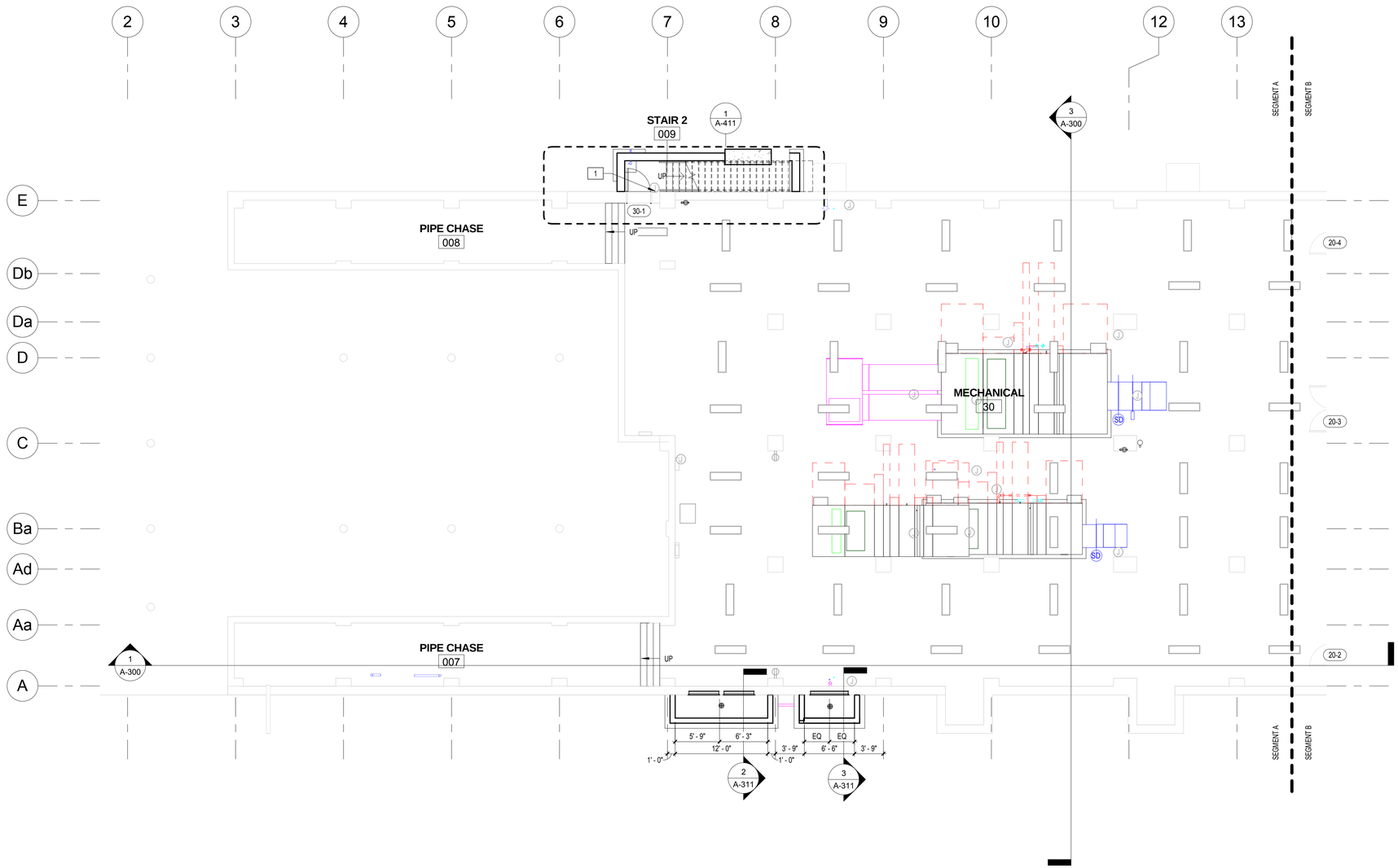
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT OVERALL FLOOR PLAN

BUILDING NO. 1230
SIZE D
DRAWING NO. 1293423
LATEST REV.
SHEET NO. A-100

12/16/2013 7:18:21 AM

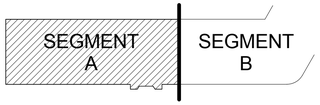


BASEMENT FLOOR PLAN GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES.
2. REGULATIONS AND REQUIREMENTS OF ALL GOVERNING AUTHORITIES. REFER TO THE GENERAL NOTES SHEETS FOR APPLICABLE CODES.
3. REFER TO SHEET LS-100 SERIES FOR LIFE SAFETY FIRE SEPARATION, OCCUPANT LOAD, EXIT CAPACITY, FIRE EXTINGUISHER AND EGRESS PLAN.
4. REFER TO STRUCTURAL DRAWINGS FOR LOCATIONS AND SIZE OF STRUCTURAL ELEMENTS.
5. REFER TO MECHANICAL DRAWINGS FOR ALL PENETRATIONS AND INSTALL FIRESTOP AS REQUIRED TO MAINTAIN FIRE RATING.
6. ALL DIMENSIONS SHALL BE VERIFIED WITH FIELD CONDITIONS. THE G.C. SHALL INFORM THE CLIENT BEFORE PROCEEDING WITH ANY DIMENSIONAL MODIFICATION DUE TO FIELD CONDITIONS.
7. MANUFACTURER'S OR VENDOR'S NAMEPLATE TRADEMARKS, LOGOS OR OTHER IDENTIFICATIONS SHALL NOT BE VISIBLE WITHIN ANY PUBLIC OR TENANT AREA OF THE PROJECT. EXCEPTED AREA REQUIRED LABELS FROM TESTING AGENCIES OR MARKINGS REQUIRED BY CODE OR GOVERNING AUTHORITY.
8. ALL INTERIOR DIMENSIONS ARE TO FACE OF UNFINISHED GYPSUM BOARD UNLESS NOTED OTHERWISE.
9. ALL INTERIOR DOOR DIMENSIONS NOTED ON FLOOR PLAN ARE TO DOOR OPENING. IF NO DIMENSION IS NOTED ON FLOOR PLAN, REFER TO SHEET A-600
10. PARTITIONS ALONG COLUMN LINES TO BE CENTERED ON COLUMN LINE, UNLESS NOTED OTHERWISE.
11. CENTER PARTITION ON WINDOW MULLION, UNO.
12. COOR DRILL NOTE: AVOID EXISTING STRUCTURAL MEMBERS, THE MAXIMUM DIAMETER OF CORE DRILL IS 6". A MINIMUM OF 1'-0" MUST BE MAINTAINED BETWEEN OPENINGS, REFER TO ELECTRICAL AND TELECOM DRAWINGS FOR LOCATION. .

BASEMENT FLOOR PLAN KEYNOTES:

1. CARD READER. SURFACE WALL MOUNTED, 42" ABOVE AFF.
2. CCTV CONNECTION @ COLUMN OPPOSITE DOOR, 12"-18" BELOW UNDERSIDE OF SLAB.



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
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Arlington, Va. 22201

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LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
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WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TSGG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

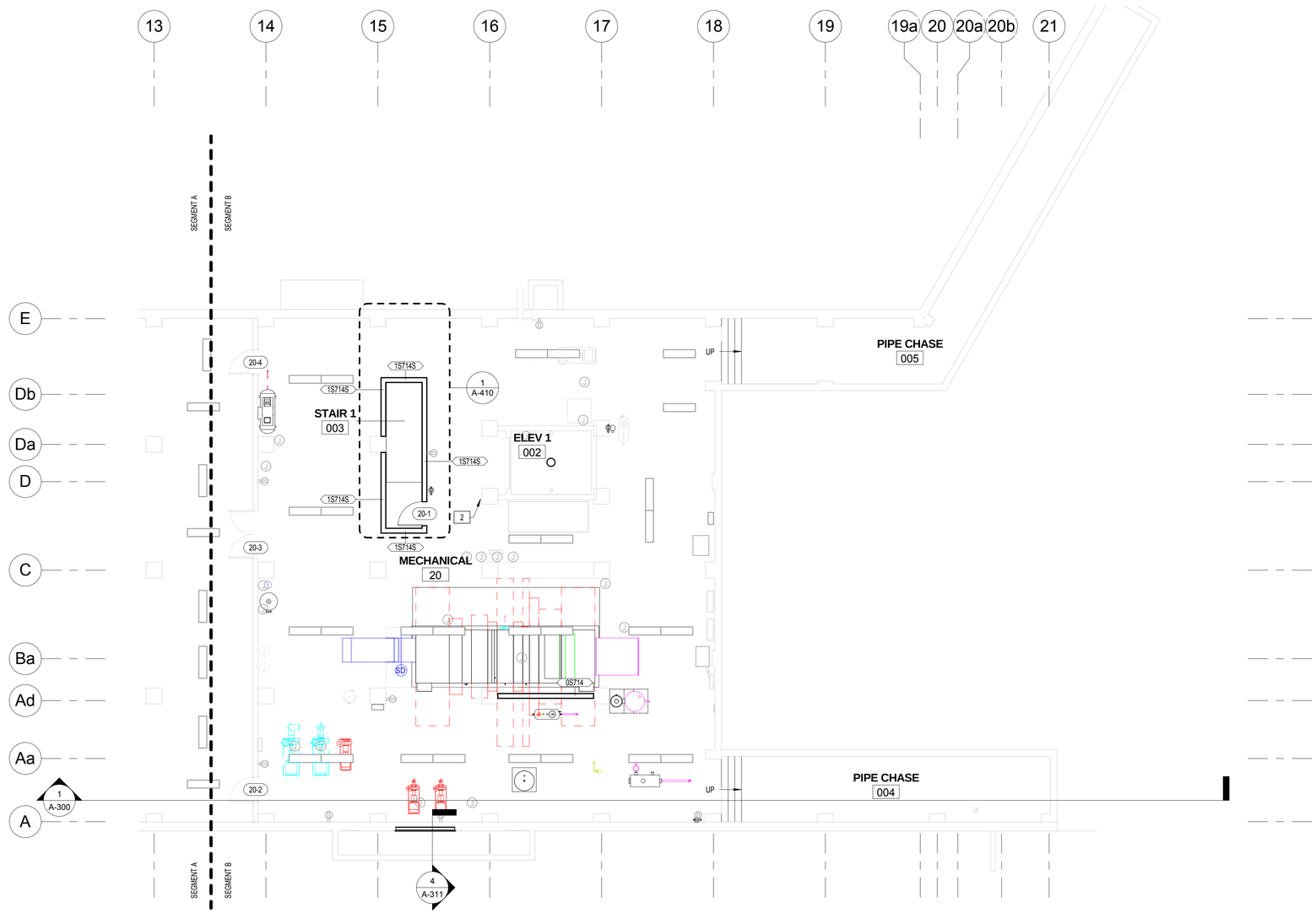
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT A FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293424 | LATEST REV.

SHEET NO. A-100a

12/16/2013 7:19:13 AM

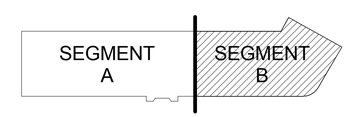


BASEMENT FLOOR PLAN GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES.
2. REGULATIONS AND REQUIREMENTS OF ALL GOVERNING AUTHORITIES. REFER TO THE GENERAL NOTES SHEETS FOR APPLICABLE CODES.
3. REFER TO SHEET LS-100 SERIES FOR LIFE SAFETY FIRE SEPARATION, OCCUPANT LOAD, EXIT CAPACITY, FIRE EXTINGUISHER AND EGRESS PLAN.
4. REFER TO STRUCTURAL DRAWINGS FOR LOCATIONS AND SIZE OF STRUCTURAL ELEMENTS.
5. REFER TO MECHANICAL DRAWINGS FOR ALL PENETRATIONS AND INSTALL FIRESTOP AS REQUIRED TO MAINTAIN FIRE RATING.
6. ALL DIMENSIONS SHALL BE VERIFIED WITH FIELD CONDITIONS. THE G.C. SHALL INFORM THE CLIENT BEFORE PROCEEDING WITH ANY DIMENSIONAL MODIFICATION DUE TO FIELD CONDITIONS.
7. MANUFACTURER'S OR VENDOR'S NAMEPLATE TRADEMARKS, LOGOS OR OTHER IDENTIFICATIONS SHALL NOT BE VISIBLE WITHIN ANY PUBLIC OR TENANT AREA OF THE PROJECT. EXCEPTED AREA REQUIRED LABELS FROM TESTING AGENCIES OR MARKINGS REQUIRED BY CODE OR GOVERNING AUTHORITY.
8. ALL INTERIOR DIMENSIONS ARE TO FACE OF UNFINISHED GYPSUM BOARD UNLESS NOTED OTHERWISE.
9. ALL INTERIOR DOOR DIMENSIONS NOTED ON FLOOR PLAN ARE TO DOOR OPENING. IF NO DIMENSION IS NOTED ON FLOOR PLAN, REFER TO SHEET A-600
10. PARTITIONS ALONG COLUMN LINES TO BE CENTERED ON COLUMN LINE, UNLESS NOTED OTHERWISE.
11. CENTER PARTITION ON WINDOW MULLION, UNO.
12. COOR DRILL NOTE: AVOID EXISTING STRUCTURAL MEMBERS, THE MAXIMUM DIAMETER OF CORE DRILL IS 6". A MINIMUM OF 1'-0" MUST BE MAINTAINED BETWEEN OPENINGS, REFER TO ELECTRICAL AND TELECOM DRAWINGS FOR LOCATION. .

BASEMENT FLOOR PLAN KEYNOTES:

1. CARD READER. SURFACE WALL MOUNTED, 42" ABOVE AFF.
2. CCTV CONNECTION @ COLUMN OPPOSITE DOOR, 12"-18" BELOW UNDERSIDE OF SLAB.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
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SEAL AREA

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT B FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293425 | LATEST REV.

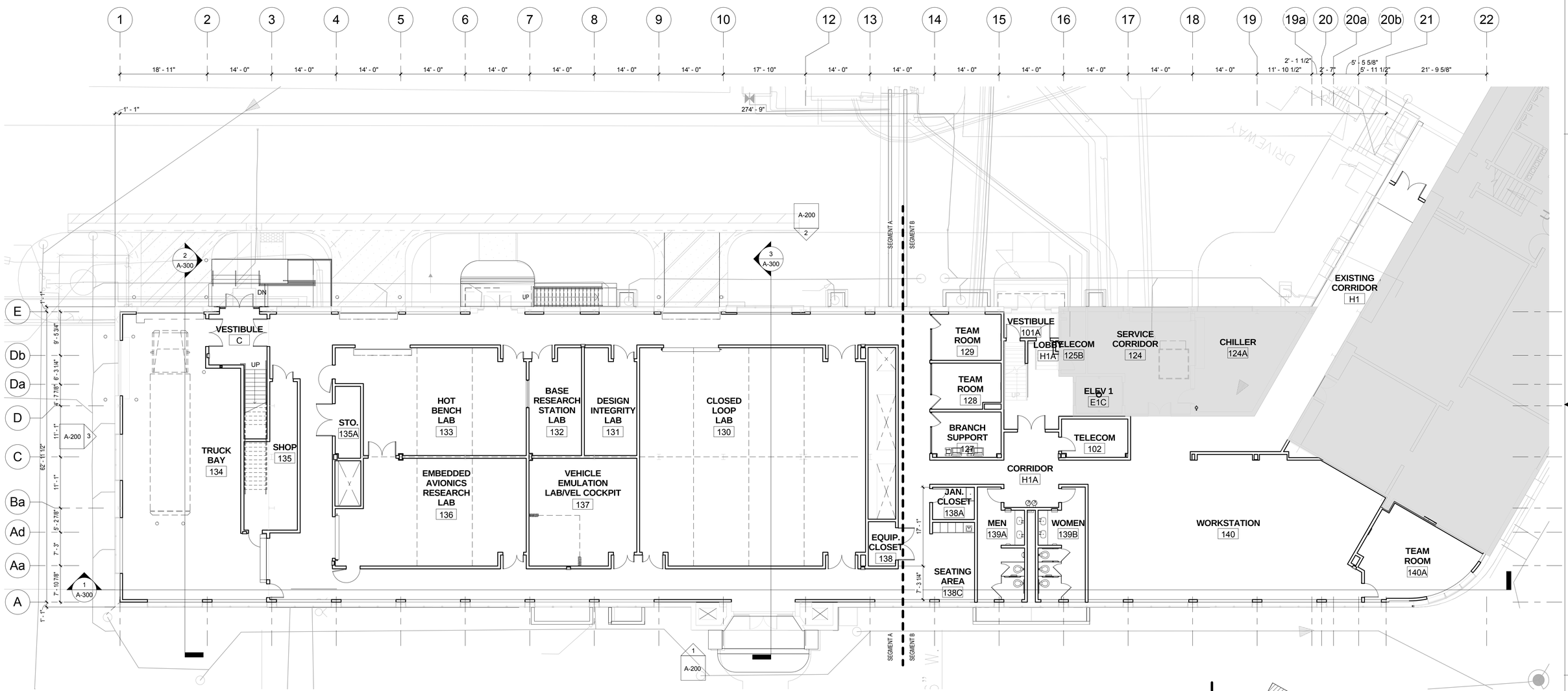
SHEET NO. A-100b

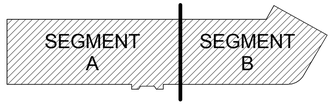
12/16/2013 7:20:34 AM

FLOOR PLAN LEGEND

EXISTING CONSTRUCTION TO REMAIN (NIC)

CONSTRUCTION IN SCOPE OF WORK





KEY PLAN

N

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR OVERALL FLOOR PLAN

BUILDING NO. 1230

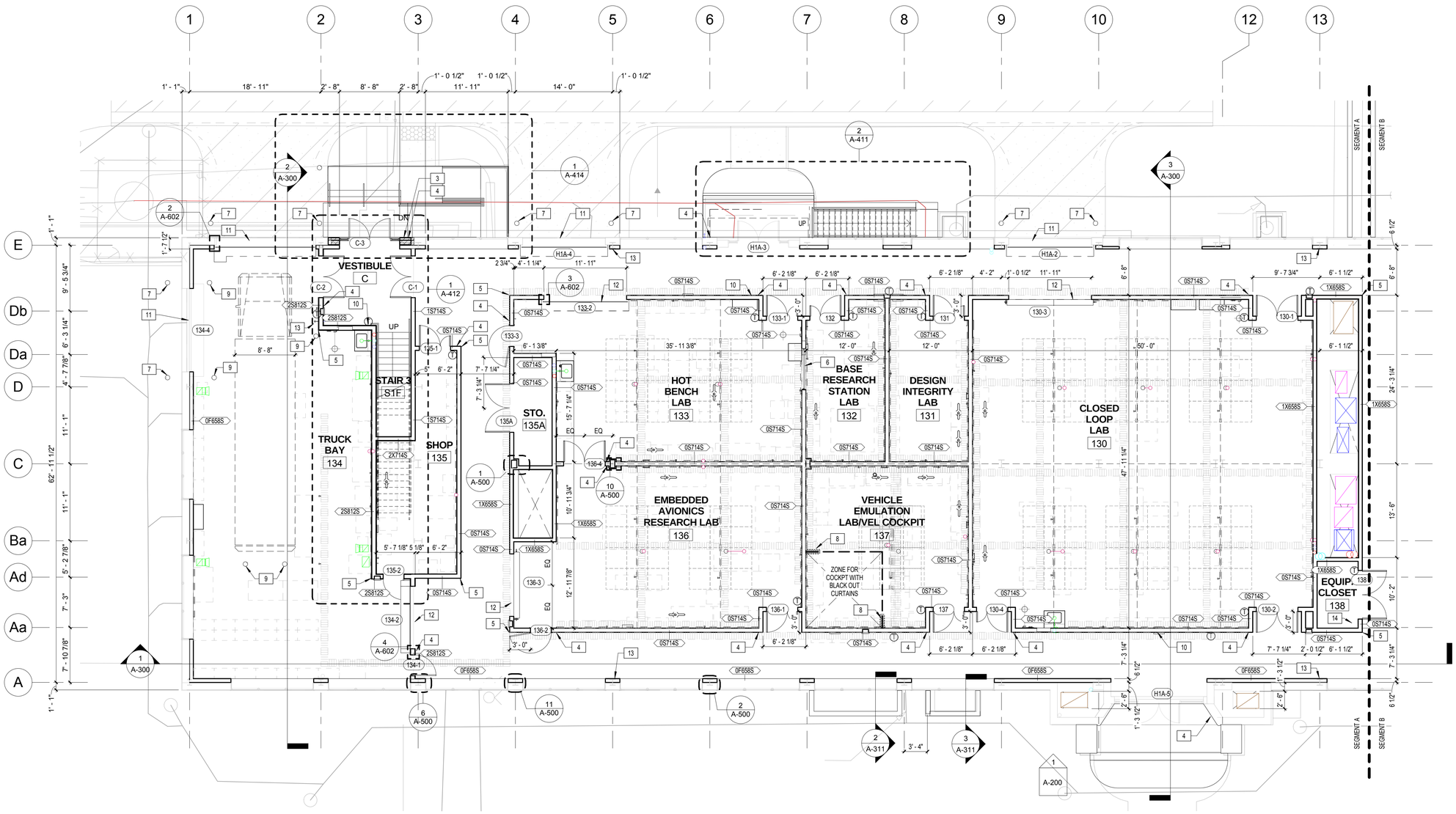
SHEET NO. A-101

SIZE D

DRAWING NO. 1293426

LATEST REV.

12/16/2013 7:21:09 AM



FLOOR PLAN LEGEND

	EXISTING CONSTRUCTION TO REMAIN (NIC)
	CONSTRUCTION IN SCOPE OF WORK

FLOOR PLAN GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES.
2. REGULATIONS AND REQUIREMENTS OF ALL GOVERNING AUTHORITIES. REFER TO LS-001 FOR APPLICABLE CODES.
3. REFER TO SHEET LS-100 SERIES FOR LIFE SAFETY FIRE SEPARATION, OCCUPANT LOAD, EXIT CAPACITY, FIRE EXTINGUISHER AND EGRESS PLAN.
4. REFER TO STRUCTURAL DRAWINGS FOR LOCATIONS AND SIZE OF STRUCTURAL ELEMENTS.
5. REFER TO MECHANICAL DRAWINGS FOR ALL PENETRATIONS AND INSTALL FIRESTOP AS REQUIRED TO MAINTAIN FIRE RATING.
6. ALL DIMENSIONS SHALL BE VERIFIED WITH FIELD CONDITIONS. THE CONTRACTOR SHALL INFORM THE CONTRACTING OFFICER BEFORE PROCEEDING WITH ANY DIMENSIONAL MODIFICATION DUE TO FIELD CONDITIONS.
7. MANUFACTURER'S OR VENDOR'S NAMEPLATE TRADEMARKS, LOGOS OR OTHER IDENTIFICATIONS SHALL NOT BE VISIBLE WITHIN ANY PUBLIC OR TENANT AREA OF THE PROJECT. EXCEPTED AREA REQUIRED LABELS FROM TESTING AGENCIES OR MARKINGS REQUIRED BY CODE OR GOVERNING AUTHORITY.
8. ALL INTERIOR DIMENSIONS ARE TO FACE OF UNFINISHED GYPSUM BOARD UNLESS NOTED OTHERWISE.
9. ALL INTERIOR DOOR DIMENSIONS NOTED ON FLOOR PLAN ARE TO DOOR OPENING. IF NO DIMENSION IS NOTED ON FLOOR PLAN, REFER TO SHEET A-601
10. REFER TO A-900 SHEETS FOR ADDITIONAL FINISHES AND FINISH INSTALLATIONS.
11. PARTITIONS ALONG COLUMN LINES TO BE CENTERED ON COLUMN LINE, UNLESS NOTED OTHERWISE.
12. G.C. TO PROVIDE BLOCKING WITHIN SCHEDULED PARTITION FOR FLAT SCREEN ON ARTICULATING ARM.
13. CENTER PARTITION ON WINDOW MULLION, UNO.
14. COOR DRILL NOTE: AVOID EXISTING STRUCTURAL MEMBERS, THE MAXIMUM DIAMETER OF CORE DRILL IS 6", A MINIMUM OF 1'-0" MUST BE MAINTAINED BETWEEN OPENINGS, REFER TO ELECTRICAL AND TELECOM DRAWINGS FOR LOCATION.
15. REFINISHED EXISTING TERRAZZO FLOORING AT STAIR S2E.

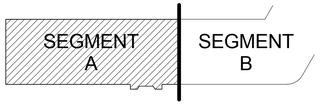
FLOOR PLAN KEYNOTES:

1. FURRING WALL AROUND THE EXISTING CHILLER WATER PIPES. CONTRACTOR TO VERIFY IN FIELD.
2. FLAT SCREEN, WALL MOUNTED AT 5'-0" AFF. (NIC)
3. DOOR ACTUATOR, SURFACE WALL MOUNTED, 42" ABOVE AFF.
4. CARD READER. SURFACE WALL MOUNTED, 42" ABOVE AFF.
5. CORNER GUARDS.
6. 3'-0" x 6'-0" CLEAR WINDOW WITH HORIZONTAL BLINDS.
7. 4'-0" H x 6" DIA CONCRETE BOLLARD. SEE DETAIL 4/A-414
8. 10' MANUAL BLACKOUT CURTAIN SUSPENDED FROM UNDERSIDE OF SLAB. (NIC)
9. 3'-6" H x 6" DIA CONCRETE BOLLARD. SEE DETAIL 5/A-414
10. CCTV CONNECTION @ WALL OPPOSITE DOOR, 12"-18" BELOW UNDERSIDE OF SLAB.
11. IDS DOOR CONTACTS
12. DOOR EQUIPPED WITH BMS
13. 1 HR FIRE RATED BEAM. PROVIDE WALL ASSEMBLY TO MEET UL 263 DESIGN NO. X526. REFER TO FEW TYPICAL DETAILS 1, 10 & 11/A-500
14. FIRE EXTINGUISHER, SURFACE MOUNTED ON BRACKETS AT 4'-0" AFF
15. CLEAN AND POLISH EXISTING TERRAZZO TREADS AND LANDING IN STAIR 1.

OPTIONS:

A. STOREFRONT @ TEAM ROOMS AND BRANCH SUPPORT

B. SOUND PANEL @ LABS AND OPEN WORKSTATIONS



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TSGG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02, X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

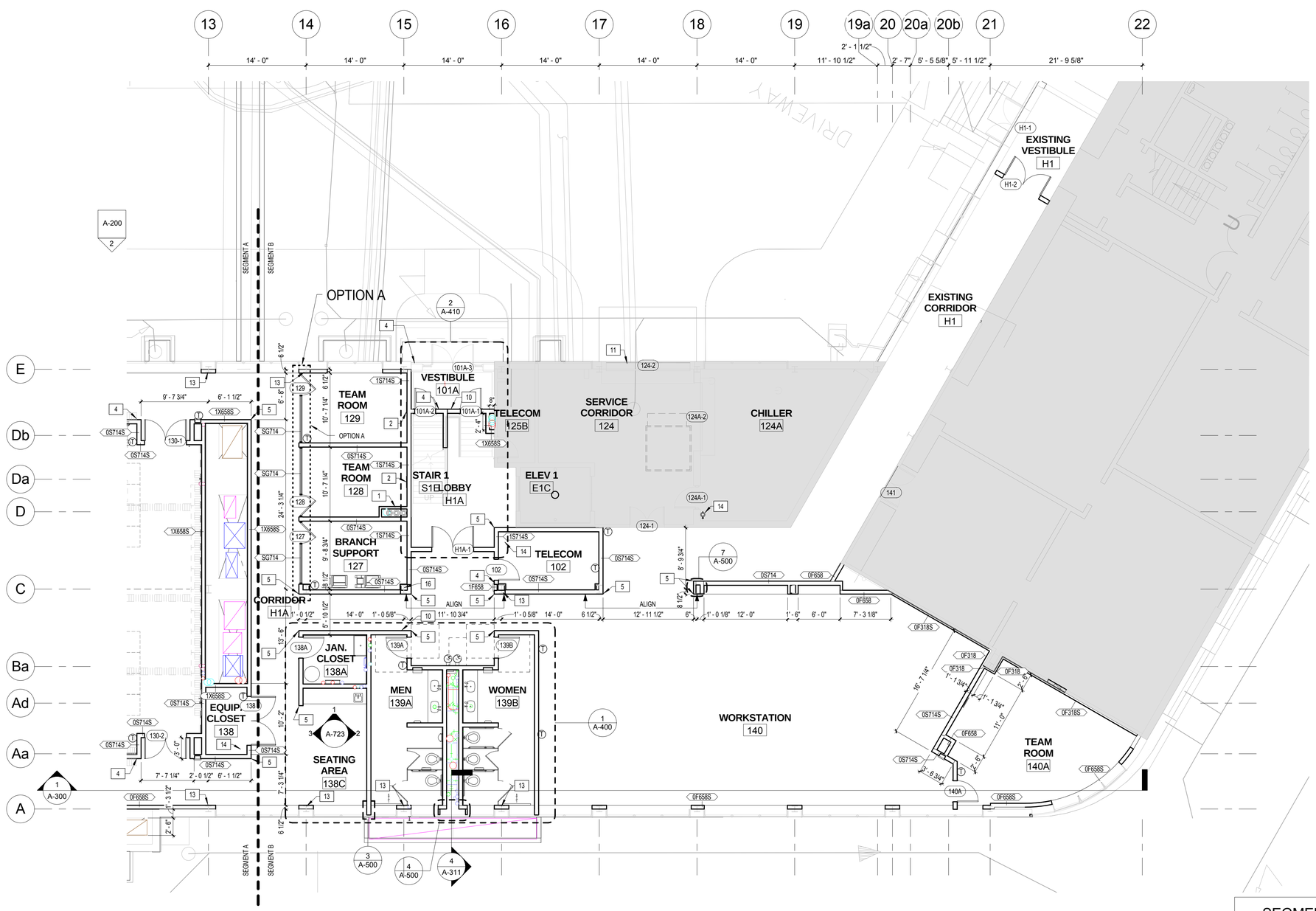
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT A FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293427 | LATEST REV.

SHEET NO. A-101a

12/16/2013 7:22:24 AM



FLOOR PLAN LEGEND

	EXISTING CONSTRUCTION TO REMAIN (NIC)
	CONSTRUCTION IN SCOPE OF WORK

FLOOR PLAN GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES.
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10. REFER TO A-900 SHEETS FOR ADDITIONAL FINISHES AND FINISH INSTALLATIONS.
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15. REFINISHED EXISTING TERRAZZO FLOORING AT STAIR S2E.

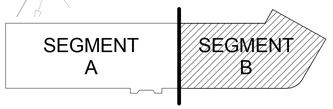
FLOOR PLAN KEYNOTES:

1. FURRING WALL AROUND THE EXISTING CHILLER WATER PIPES. CONTRACTOR TO VERIFY IN FIELD.
2. FLAT SCREEN, WALL MOUNTED AT 5'-0" AFF. (NIC)
3. DOOR ACTUATOR, SURFACE WALL MOUNTED, 42" ABOVE AFF.
4. CARD READER. SURFACE WALL MOUNTED, 42" ABOVE AFF.
5. CORNER GUARDS.
6. 3'-0" x 6'-0" CLEAR WINDOW WITH HORIZONTAL BLINDS.
7. 4'-0" H x 6" DIA CONCRETE BOLLARD. SEE DETAIL 4/A-414
8. 10' MANUAL BLACKOUT CURTAIN SUSPENDED FROM UNDERSIDE OF SLAB. (NIC)
9. 3'-6" H x 6" DIA CONCRETE BOLLARD. SEE DETAIL 5/A-414
10. CCTV CONNECTION @ WALL OPPOSITE DOOR, 12"-18" BELOW UNDERSIDE OF SLAB.
11. IDS DOOR CONTACTS
12. DOOR EQUIPPED WITH BMS
13. 1 HR FIRE RATED BEAM. PROVIDE WALL ASSEMBLY TO MEET UL 263 DESIGN NO. X526. REFER TO FEW TYPICAL DETAILS 1, 10 & 11/A-500
14. FIRE EXTINGUISHER, SURFACE MOUNTED ON BRACKETS AT 4'-0" AFF
15. CLEAN AND POLISH EXISTING TERRAZZO TREADS AND LANDING IN STAIR 1.

OPTIONS:

A. STOREFRONT @ TEAM ROOMS AND BRANCH SUPPORT

B. SOUND PANEL @ LABS AND OPEN WORKSTATIONS



KEY PLAN

N

1/8"=1'-0"

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

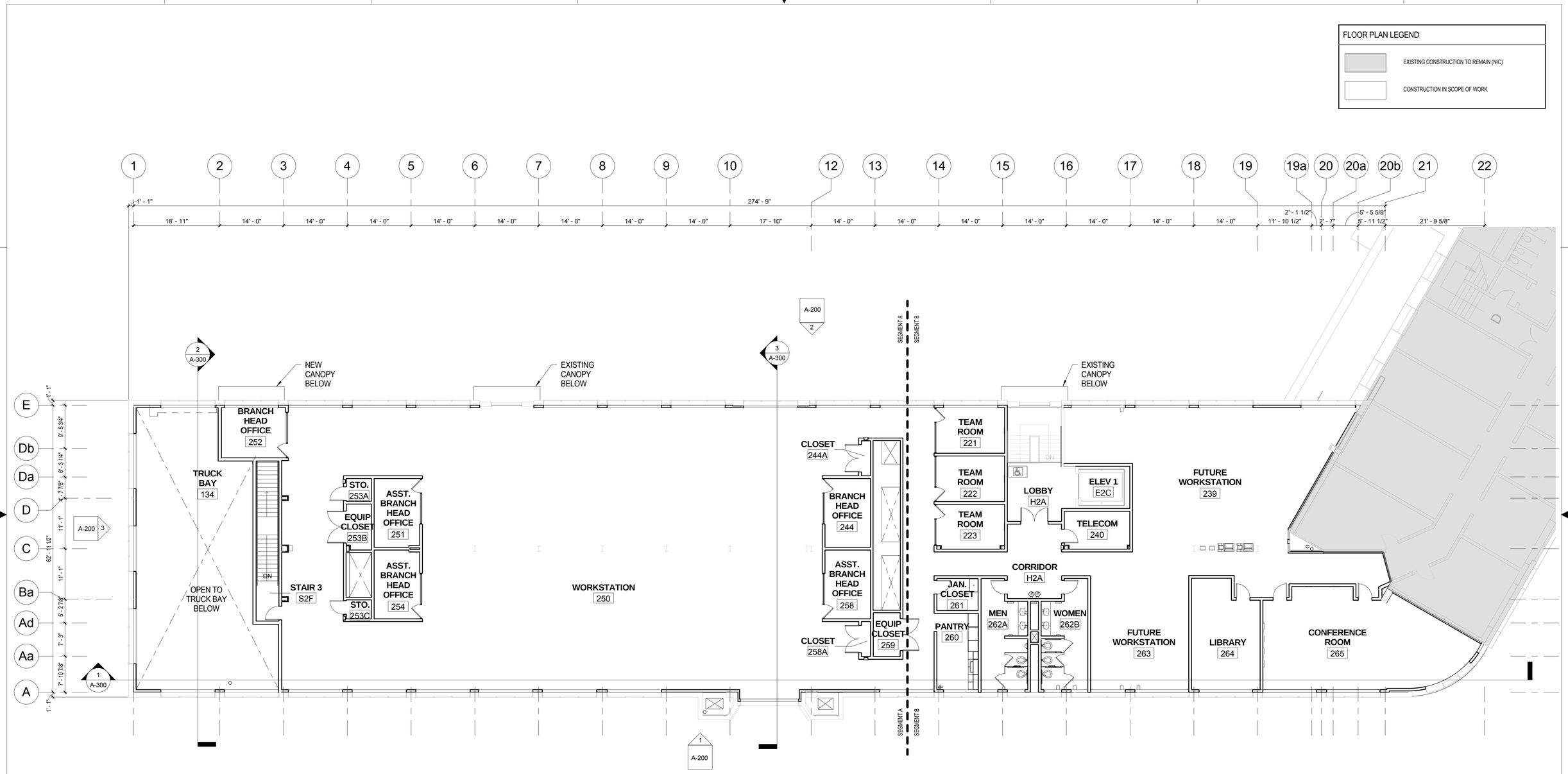
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

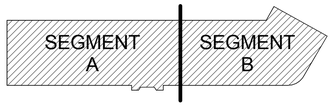
DRAWING TITLE: FIRST FLOOR SEGMENT B FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293428 | LATEST REV.

SHEET NO. A-101b

12/16/2013 7:22:37 AM





KEY PLAN

N

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

REVISIONS					REVISIONS				
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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

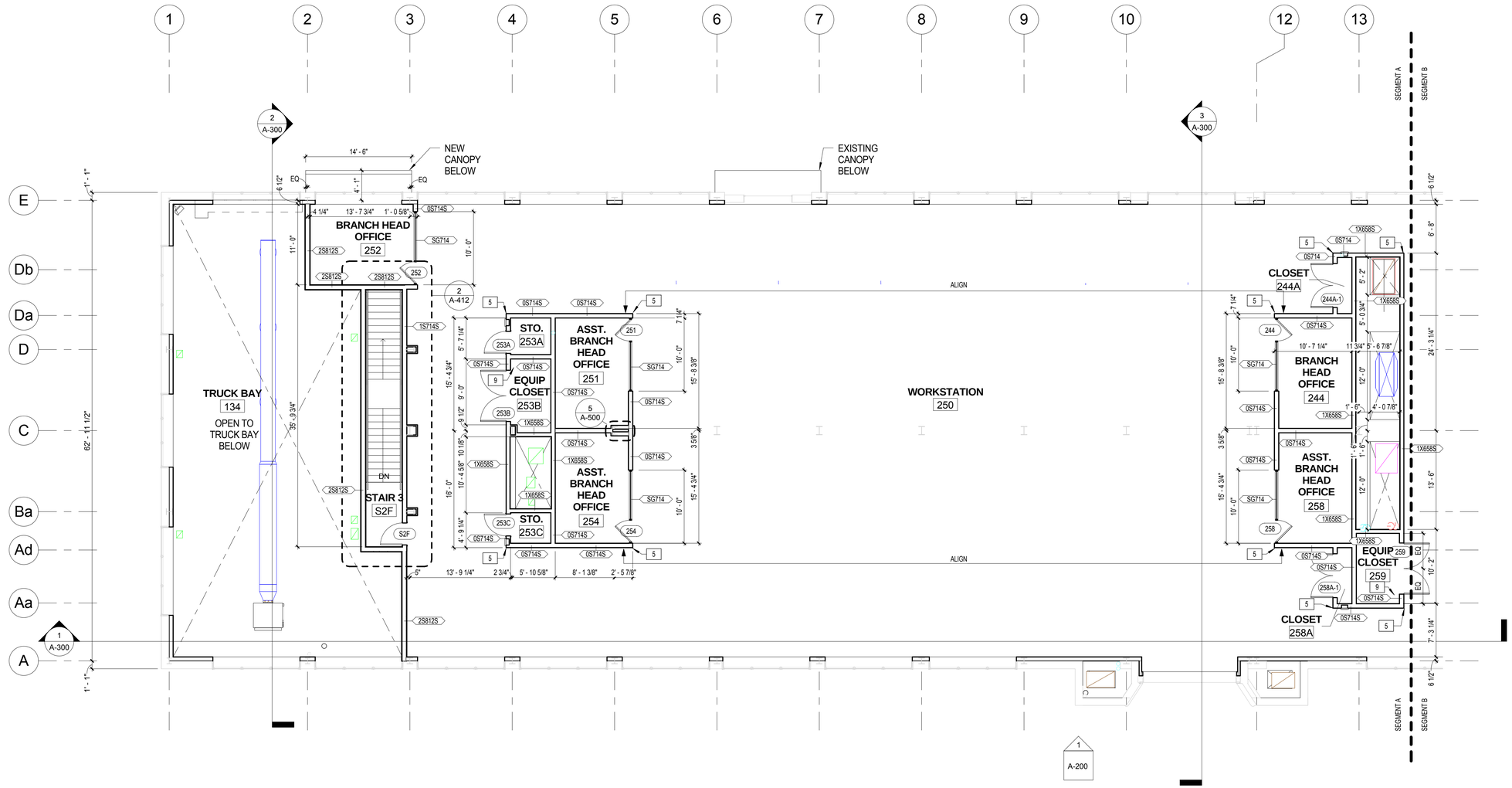
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR OVERALL FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293429 | LATEST REV.

SHEET NO. A-102

12/16/2013 7:22:48 AM



FLOOR PLAN LEGEND

	EXISTING CONSTRUCTION TO REMAIN (NIC)
	CONSTRUCTION IN SCOPE OF WORK

FLOOR PLAN GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES.
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10. REFER TO A-900 SHEETS FOR ADDITIONAL FINISHES AND FINISH INSTALLATIONS.
11. PARTITIONS ALONG COLUMN LINES TO BE CENTERED ON COLUMN LINE, UNLESS NOTED OTHERWISE.
12. G.C. TO PROVIDE BLOCKING WITHIN SCHEDULED PARTITION FOR FLAT SCREEN ON ARTICULATING ARM.
13. CENTER PARTITION ON WINDOW MULLION, UNO.
14. COOR DRILL NOTE: AVOID EXISTING STRUCTURAL MEMBERS, THE MAXIMUM DIAMETER OF CORE DRILL IS 6", A MINIMUM OF 1'-0" MUST BE MAINTAINED BETWEEN OPENINGS, REFER TO ELECTRICAL AND TELECOM DRAWINGS FOR LOCATION.
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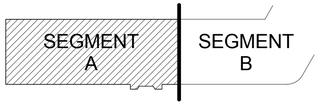
FLOOR PLAN KEYNOTES:

1. CEILING MOUNTED PROJECTION SCREEN (NIC)
2. FLAT SCREEN, WALL MOUNTED AT 5'-0" AFF. (NIC)
3. DOOR ACTUATOR, SURFACE WALL MOUNTED, 42" ABOVE AFF.
4. CARD READER. SURFACE WALL MOUNTED, 42" ABOVE AFF.
5. CORNER GUARDS.
6. APPLY TRANSLUCENT FILM ON INTERIOR SIDE OF THE GLAZING @ RESTROOM 262A & 262B.
7. FIRE EXTINGUISHER, SURFACE MOUNTED ON BRACKETS AT 4'-0" AFF
8. CLEAN AND POLISH EXISTING TERRAZZO TREADS AND LANDING IN STAIR 1.
9. 1 HR FIRE RATED BEAM. PROVIDE WALL ASSEMBLY TO MEET UL 263 DESIGN NO. X526. REFER TO FEW TYPICAL DETAILS 1, 10 & 11/A-500.

OPTIONS:

A. STOREFRONT @ TEAM ROOMS AND BRANCH SUPPORT

B. SOUND PANEL @ LABS AND OPEN WORKSTATIONS



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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EDWARD D. WEAVER
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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

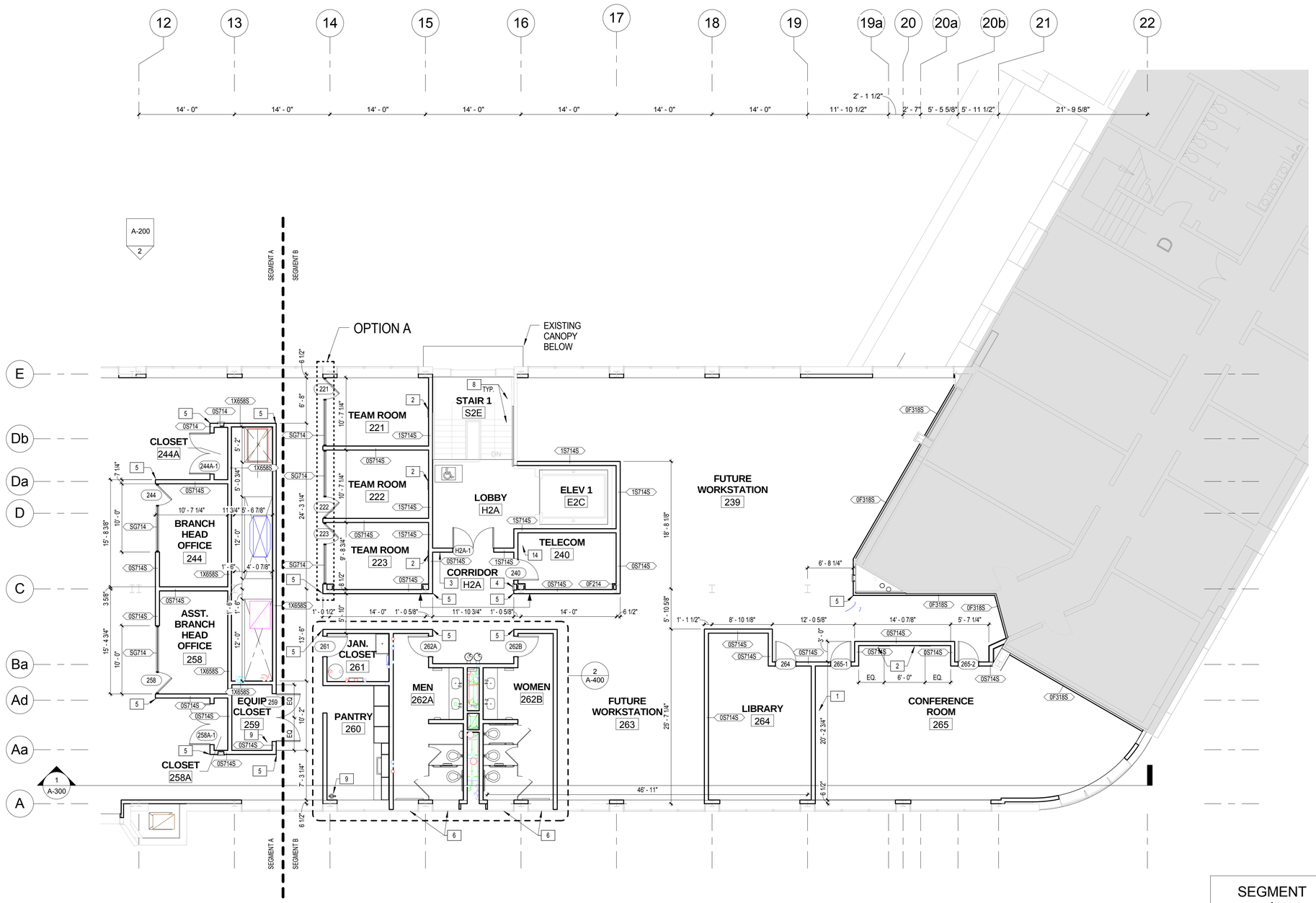
PROJECT TITLE: FY"14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT A FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293430 | LATEST REV.

SHEET NO. A-102a

12/16/2013 7:22:59 AM



FLOOR PLAN LEGEND

	EXISTING CONSTRUCTION TO REMAIN (NIC)
	CONSTRUCTION IN SCOPE OF WORK

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14. COOR DRILL NOTE: AVOID EXISTING STRUCTURAL MEMBERS, THE MAXIMUM DIAMETER OF CORE DRILL IS 6", A MINIMUM OF 1'-0" MUST BE MAINTAINED BETWEEN OPENINGS, REFER TO ELECTRICAL AND TELECOM DRAWINGS FOR LOCATION.
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FLOOR PLAN KEYNOTES:

1. CEILING MOUNTED PROJECTION SCREEN (NIC)
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3. DOOR ACTUATOR, SURFACE WALL MOUNTED, 42" ABOVE AFF.
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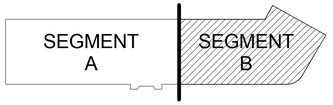
OPTIONS:

A. STOREFRONT @ TEAM ROOMS AND BRANCH SUPPORT

B. SOUND PANEL @ LABS AND OPEN WORKSTATIONS



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT B FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293431 | LATEST REV.

SHEET NO. A-102b

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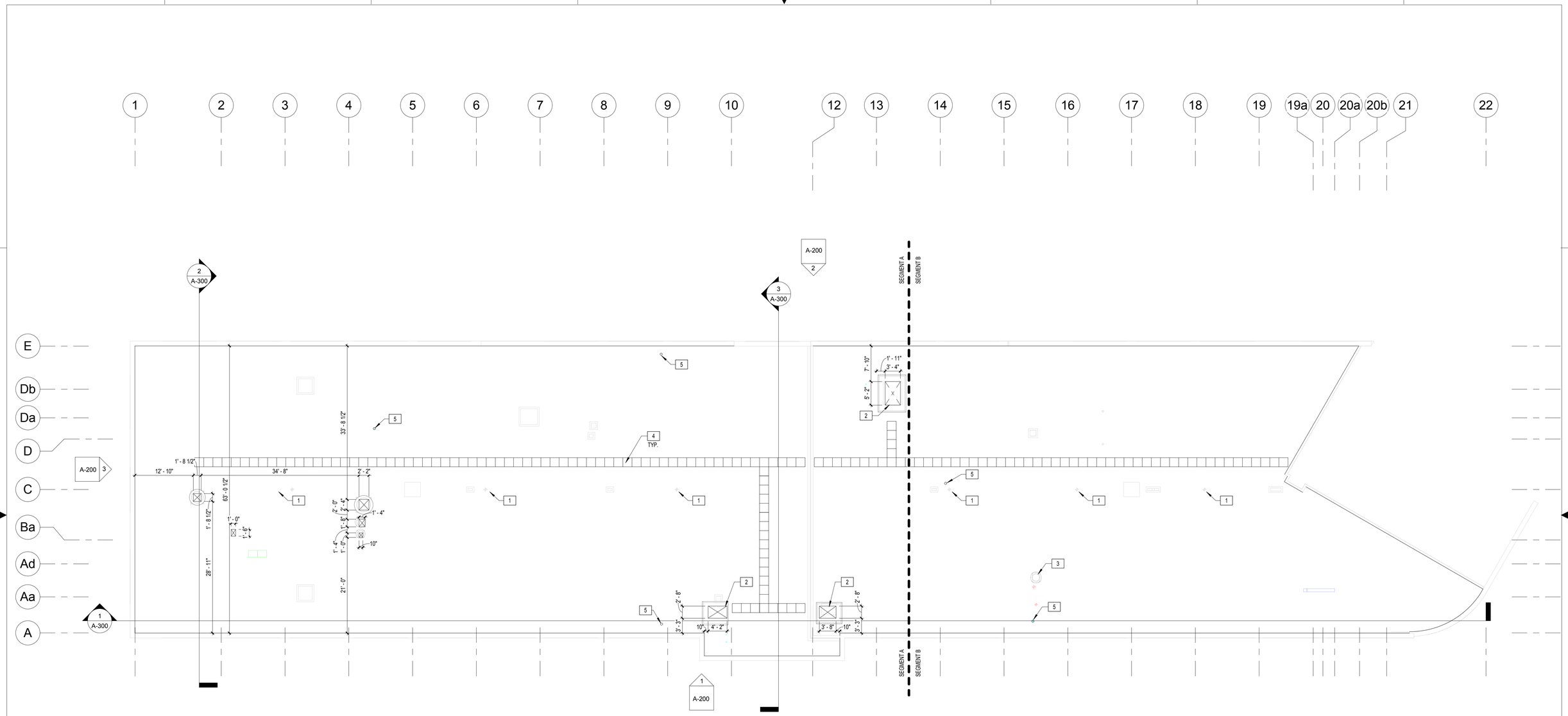
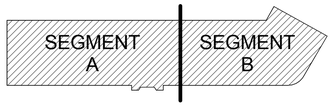


ROOF PLAN GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES.
2. REGULATIONS AND REQUIRMENTS OF ALL GOVERNING AUTHORITIES. REFER TO SHEET LS-001 FOR APPLICABLE CODE.
3. REFER TO SHEET LS-100 SERIES FOR LIFE SAFETY FIRE SEPARATION, OCCUPANT LOAD, EXIT CAPACITY, FIRE EXTINGUISHER AND EGRESS PLAN.
4. REFER TO STRUCTURAL DRAWINGS FOR LOCATIONS AND SIZE OF STRUCTURAL ELEMENTS.
5. REFER TO MECHANICAL DRAWINGS FOR ALL PENETRATIONS AND INSTALL FIRESTOPS AS REQUIRED TO MAINTAIN FIRE RATING.
6. ALL DIMENSIONS SHALL BE VERIFIED WITH FIELD CONDITIONS. THE G.C. SHALL INFORM THE CLIENT BEFORE PROCEEDING WITH ANY DIMENSIONAL MODIFICATIONDUE TO FIELD CONDITIONS.
7. MANUFACTURER'S OR VENDOR'S NAMEPLATE TRADEMARKS, LOGOS OR OTHER IDENTIFICATIONS SHALL NOT BE VISIBLE WITHIN ANY PUBLIC OR TENANT AREA OF THE PROJECT. EXCEPTED AREA REQUIRED LABELS FROM TESTING AGENCIES OR MARKINGS REQUIRED BY CODE OR GOVERNING AUTHORITY.
8. CONTRACTOR TO VERIFY THE EXISTING ROOF MEMBRANE TYPE.

ROOF PLAN KEYNOTES:

1. EXISTING ROOF DRAIN
2. OUTSIDE AIR INTAKE LOUVER ON 18" HIGH CURB. COORD WITH MECH & STRUCT DWGS. REFER TO DETAIL 3/A-512
3. EXHAUST FAN ON 12" HIGH CURB, COORDINATE WITH MECH & STRUCT DWGS. REFER TO DETAIL 3/A-512
4. WALKPADS
5. 3" VTR, COORDINATE WITH PLUMB DWGS. REFER TO DETAIL 2/A-512



KEY PLAN

N

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TSGG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

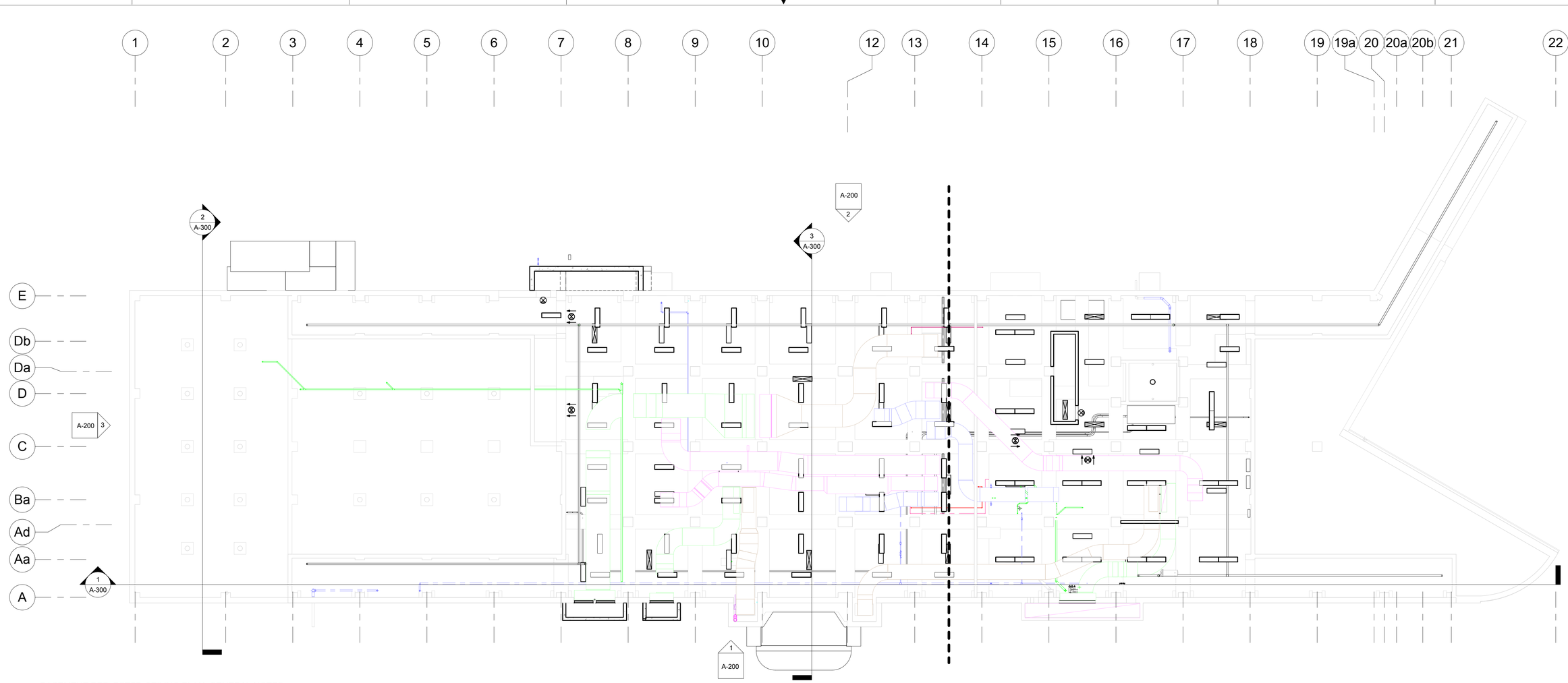
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF OVERALL PLAN

BUILDING NO. 1230 — SIZE D — DRAWING NO. 1293432 — LATEST REV.

SHEET NO. A-103

12/16/2013 7:24:01 AM

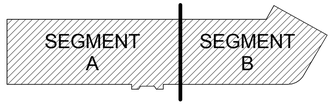


BASEMENT REFLECTED CEILING PLAN GENERAL NOTES:

1. ALL MECHANICAL, ELECTRICAL AND PLUMBING WORK LOCATED ABOVE GYP. BOARD CEILINGS SHALL BE LOCATED TO MINIMIZE REQUIRED ACCESS TO INACCESSIBLE CEILING. GC TO SUBMIT COORDINATED LAYOUT DRAWINGS OF ALL LOCATIONS OF LIGHTING, DIFFUSERS, FIRE PROTECTION DEVICES, SPRINKLERS, AV SECURITY ITEMS AND REQUIRED ACCESS PANELS TO ARCHITECT FOR REVIEW PRIOR TO FRAMING.
2. ALL CEILING HEIGHTS ARE FROM TOP FINISHED FLOOR. U.N.O.
3. REFER TO ELECTRICAL DRAWINGS FOR LIGHT FIXTURES DESIGNATIONS AND SCHEDULE.
4. GANG SWITCHES UNDER ONE COVER PLATE WHEN POSSIBLE. PLACE LIGHT SWITCH(S) PER DRAWINGS.
5. REFER TO MECHANICAL DRAWINGS FOR HVAC WORK AS REQUIRED. MECHANICAL ELEMENTS SHOWN ARE FOR LOCATION ONLY.

CEILING LEGEND

- ACT-1 SUSPENDED 2'-0" x 2'-0" ACOUSTICAL CEILING PANELS
- GWB-1 GWB ON METAL STUD COMPOUND CEILING
- GWB-2 GWB ON METAL STUD COMPOUND CEILING (1HR RATED)
- GWB-3 GWB ON METAL STUD COMPOUND CEILING (2-HR RATED)
- CLG-1 SOUND PANEL (NIC) OPTION B
- EXPOSED UNDERSIDE OF FLOOR OR ROOF STRUCTURE
- RECESSED LIGHT FIXTURE 2'-0" x 2'-0"
- HIGH BAY LIGHT FIXTURE 4'-0" x 2'-0"
- SUSPENDED PENDENT LIGHT FIXTURES 4'-0" x 1'-0"
- SUPPLY DIFFUSER 2'-0" x 2'-0"
- RETURN AIR 2'-0" x 2'-0"
- EXHAUST 2'-0" x 2'-0"
- 1'-0"x1'-0" SUPPLY DIFFUSER
- 1'-0"x1'-0" EXHAUST GRILL
- ACCESS PANEL
- FAN COIL UNIT
- SUPPLY DIFFUSER 4'-0" X 6"
- MANUAL ROLLER SHADE
- STROBE SPEAKER - CEILING MOUNTED
- STROBE - CEILING MOUNTED
- OCCUPANCY SENSOR
- SPRINKLER - CEILING MOUNTED (130 SF/ SP. HEAD FOR ORDINARY HAZARD AREA, MIN. 6' APART)
- LCD DISPLAY
- RECESSED DOWNLIGHTS
- WALL-MOUNTED/ CEILING-MOUNTED EXIT SIGN
- CEILING MOUNTED PROJECTOR & CEILING RECESSED PROJECTION SCREEN (GFCI)



KEY PLAN

N

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

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HAMPTON, VIRGINIA 23681-2199

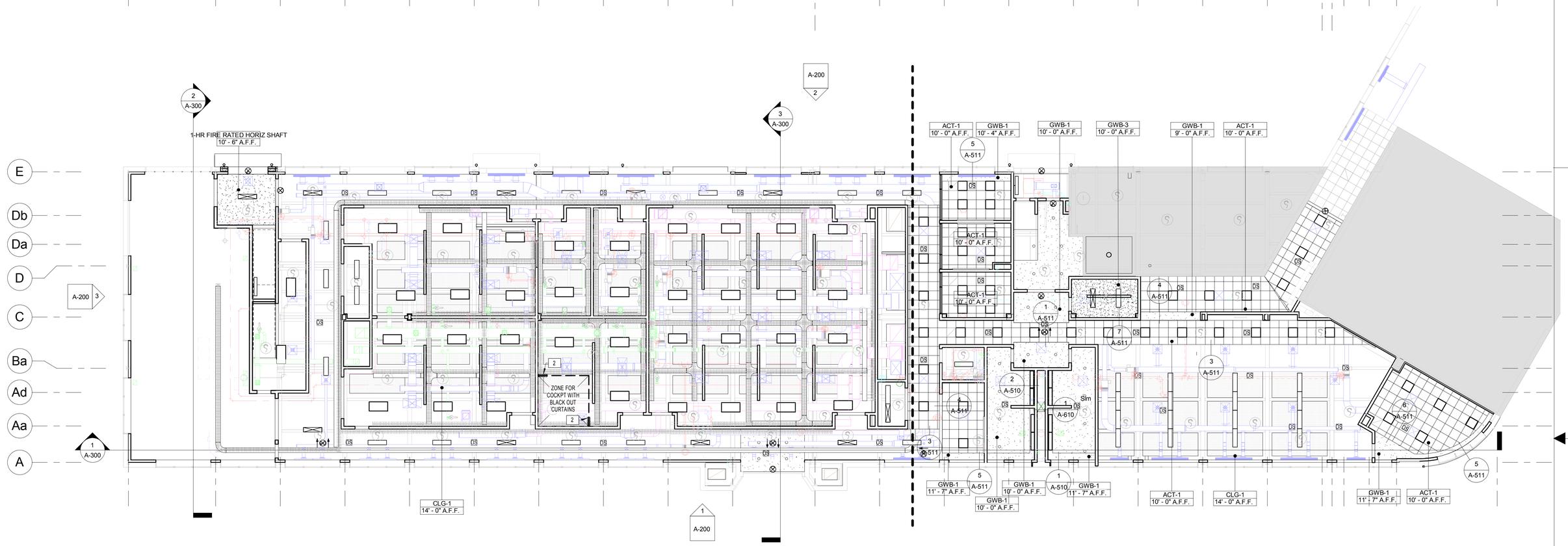
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT OVERALL REFLECTED CEILING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293433 | LATEST REV.

SHEET NO. A-110

12/16/2013 7:24:24 AM



REFLECTED CEILING PLAN GENERAL NOTES:

1. ALL CEILINGS TO BE @ 9'-0" U.N.O.
2. ALL MECHANICAL, ELECTRICAL AND PLUMBING WORK LOCATED ABOVE GYP. BOARD CEILINGS SHALL BE LOCATED TO MINIMIZE REQUIRED ACCESS TO INACCESSIBLE CEILING. GC TO SUBMIT COORDINATED LAYOUT DRAWINGS OF ALL LOCATIONS OF LIGHTING, DIFFUSERS, FIRE PROTECTION DEVICES, SPRINKLERS, AV SECURITY ITEMS AND REQUIRED ACCESS PANELS TO ARCHITECT FOR REVIEW PRIOR TO FRAMING.
3. ALL SUSPENDED ACOUSTICAL CEILING TILE AND GRIDS TO BE ACT-1 U.N.O.
4. ALL CEILING HEIGHTS ARE FROM TOP FINISHED FLOOR. U.N.O.
5. REFER TO ELECTRICAL DRAWINGS FOR LIGHT FIXTURES DESIGNATIONS AND SCHEDULE.
6. PROVIDE MOTION SENSOR LIGHT SWITCHES IN EACH OFFICE AND TEAM ROOM PER APPLICABLE CODES AND REGULATIONS. REFER TO ELECTRICAL DRAWINGS.
7. GANG SWITCHES UNDER ONE COVER PLATE WHEN POSSIBLE. PLACE LIGHT SWITCH(S) PER DRAWINGS.
8. REFER TO MECHANICAL DRAWINGS FOR HVAC WORK AS REQUIRED. MECHANICAL ELEMENTS SHOWN ARE FOR LOCATION ONLY.
9. ALL SPRINKLER HEADS TO BE CENTERED IN ACOUSTICAL PANELS, U.N.O.
10. CENTER ALL CEILING DEVICES IN CENTER LINE OF LIGHT FIXTURES WHERE GWB-1 CEILING IS INDICATED.
11. WHERE SMOKE DAMPER REQUIRES ACCESS ABOVE GYP. BOARD CEILING, PROVIDE 12"X12" ACCESS DOOR. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
12. ALL ACCESS DOORS TO BE 18" x 18" U.N.O.

REFLECTED CEILING PLAN KEYNOTES:

1. CEILING MOUNTED PROJECTOR SCREEN.
2. 10' BLACKOUT CURTAIN, SUSPENDED FROM UNDERSIDE OF SLAB. (NIC)

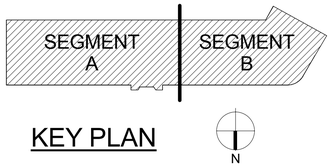
OPTIONS:

A. STOREFRONT @ TEAM ROOMS AND BRANCH SUPPORT

B. SOUND PANEL @ LABS AND OPEN WORKSTATIONS

CEILING LEGEND

ACT-1 SUSPENDED 2'-0" x 2'-0" ACOUSTICAL CEILING PANELS	HIGH BAY LIGHT FIXTURE 4'-0" x 2'-0"	MANUAL ROLLER SHADE
GWB-1 GWB ON METAL STUD COMPOUND CEILING	SUSPENDED PENDENT LIGHT FIXTURES 4'-0" x 1'-0"	STROBE SPEAKER - CEILING MOUNTED
GWB-2 GWB ON METAL STUD COMPOUND CEILING (1HR RATED)	SUPPLY DIFFUSER 2'-0" x 2'-0"	STROBE - CEILING MOUNTED
GWB-3 GWB ON METAL STUD COMPOUND CEILING (2-HR RATED)	RETURN AIR 2'-0" x 2'-0"	OCCUPANCY SENSOR
CLG-1 SOUND PANEL. (NIC) OPTION B	EXHAUST 2'-0" x 2'-0"	SPRINKLER - CEILING MOUNTED (130 SF/ SP. HEAD FOR ORDINARY HAZARD AREA, MIN. 6' APART)
EXPOSED UNDERSIDE OF FLOOR OR ROOF STRUCTURE	1'-0"x1'-0" SUPPLY DIFFUSER	LCD DISPLAY
RECESSED LIGHT FIXTURE 2'-0" x 2'-0"	1'-0"x1'-0" EXHAUST GRILL	RECESSED DOWNLIGHTS
	ACCESS PANEL	WALL-MOUNTED/ CEILING-MOUNTED EXIT SIGN
	FAN COIL UNIT	CEILING MOUNTED PROJECTOR & CEILING RECESSED PROJECTION SCREEN (GFCI)
	SUPPLY DIFFUSER 4'-0" X 6"	



KEY PLAN

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE √

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

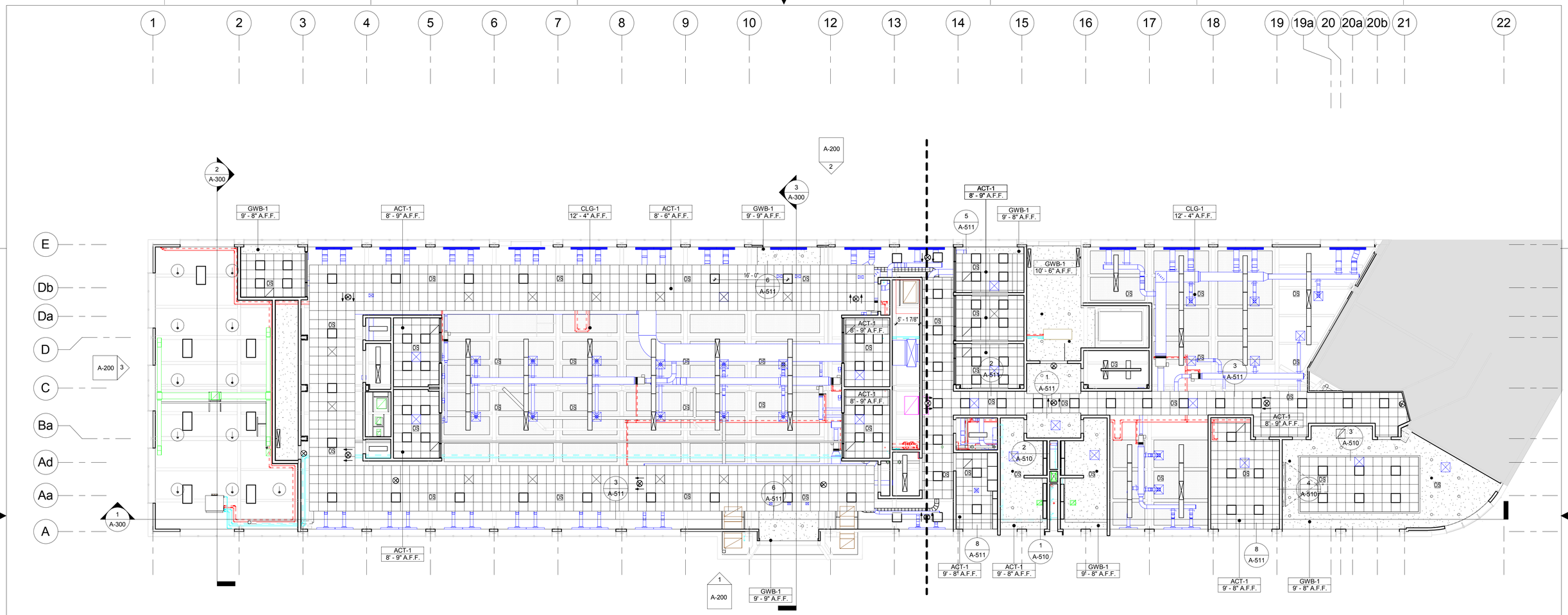
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR OVERALL REFLECTED CEILING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293434 | LATEST REV.

SHEET NO. A-111

12/16/2013 7:57:09 AM



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12. ALL ACCESS DOORS TO BE 18" x 18" U.N.O.

REFLECTED CEILING PLAN KEYNOTES:

1. CEILING MOUNTED PROJECTOR SCREEN.
2. 10' BLACKOUT CURTAIN, SUSPENDED FROM UNDERSIDE OF SLAB. (NIC)

OPTIONS:

A. STOREFRONT @ TEAM ROOMS AND BRANCH SUPPORT

B. SOUND PANEL @ LABS AND OPEN WORKSTATIONS

CEILING LEGEND

- ACT-1 SUSPENDED 2'-0" x 2'-0" ACOUSTICAL CEILING PANELS
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- GWB-2 GWB ON METAL. STUD COMPOUND CEILING (1HR RATED)
- GWB-3 GWB ON METAL. STUD COMPOUND CEILING (2-HR RATED)
- CLG-1 SOUND PANEL. (NIC) OPTION B
- EXPOSED UNDERSIDE OF FLOOR OR ROOF STRUCTURE
- RECESSED LIGHT FIXTURE 2'-0" x 2'-0"
- HIGH BAY LIGHT FIXTURE 4'-0" x 2'-0"
- SUSPENDED PENDENT LIGHT FIXTURES 4'-0" x 1'-0"
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- RETURN AIR 2'-0" x 2'-0"
- EXHAUST 2'-0" x 2'-0"
- 1'-0"x1'-0" SUPPLY DIFFUSER
- 1'-0"x1'-0" EXHAUST GRILL
- ACCESS PANEL
- FAN COIL UNIT
- SUPPLY DIFFUSER 4'-0" X 6"
- MANUAL ROLLER SHADE
- STROBE SPEAKER - CEILING MOUNTED
- STROBE - CEILING MOUNTED
- OCCUPANCY SENSOR
- SPRINKLER - CEILING MOUNTED (130 SF/ SP. HEAD FOR ORDINARY HAZARD AREA, MIN. 6' APART)
- LCD DISPLAY
- RECESSED DOWNLIGHTS
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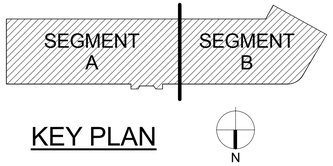
- CEILING MOUNTED PROJECTOR & CEILING RECESSED PROJECTION SCREEN (GFCI)



KEY PLAN

3/32"=1'-0"

8' 4' 0 12' 24'

GRAPHIC SCALE

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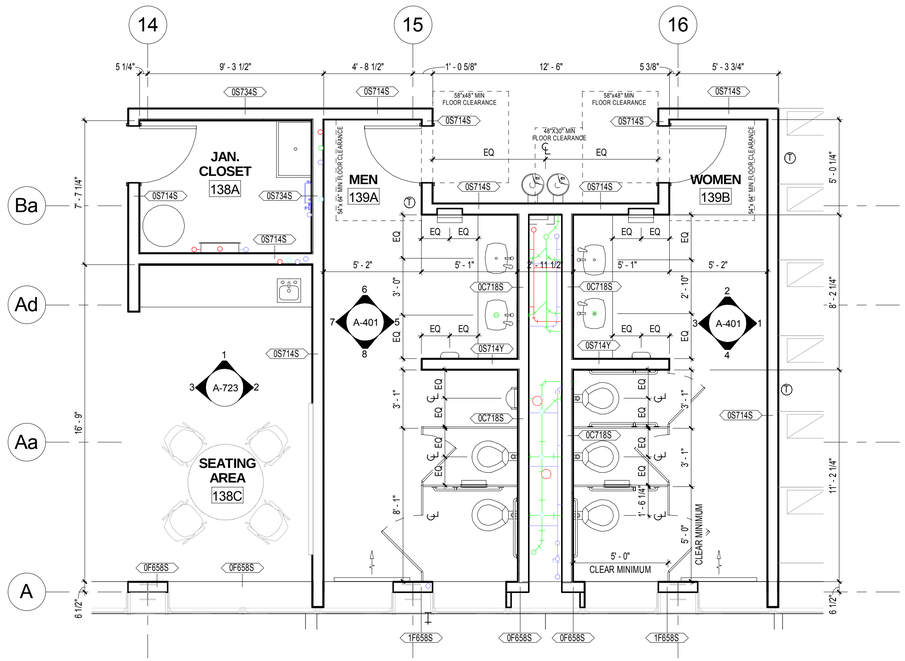
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR OVERALL REFLECTED CEILING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293435 | LATEST REV.

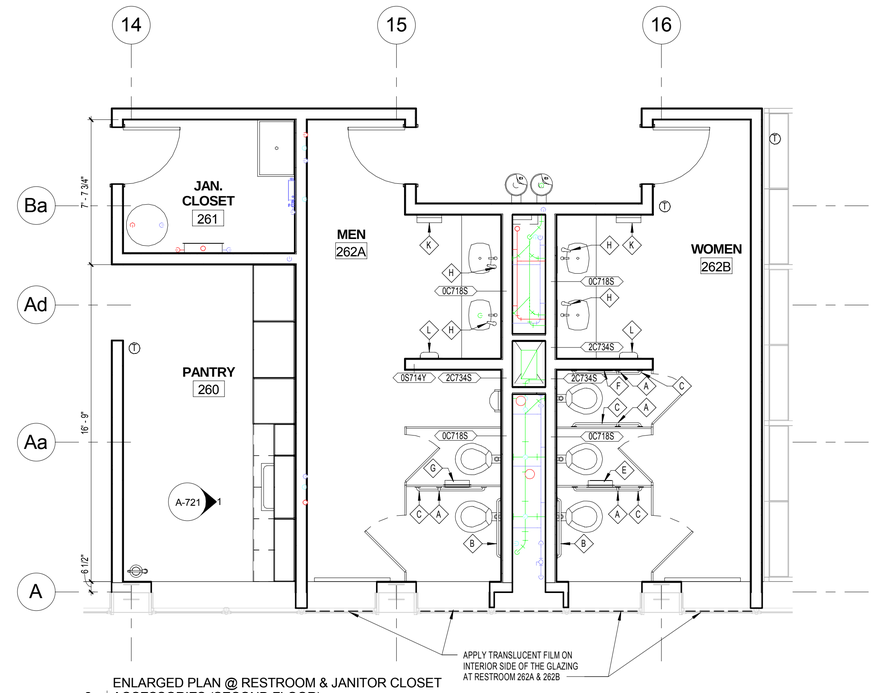
SHEET NO. A-112

12/16/2013 7:57:32 AM



1 ENLARGED PLAN @ RESTROOM & JANITOR CLOSET (FIRST FLOOR)
A-400 REF: A-101a SCALE: 1/4" = 1'-0"

NOTE: REFER TO DETAIL 2/A-400 FOR RESTROOM & JANITOR CLOSET ACCESSORIES



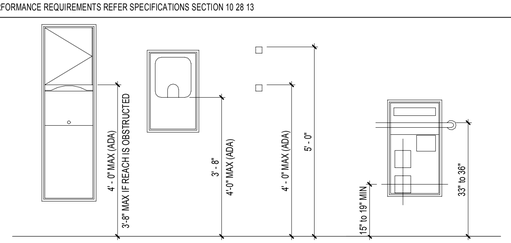
2 ENLARGED PLAN @ RESTROOM & JANITOR CLOSET ACCESSORIES (SECOND FLOOR)
A-400 REF: A-102a SCALE: 1/4" = 1'-0"

NOTE: REFER TO DETAIL 1/A-400 FOR DIMENSIONS, WALL TAGS, INTERIOR ELEVATIONS

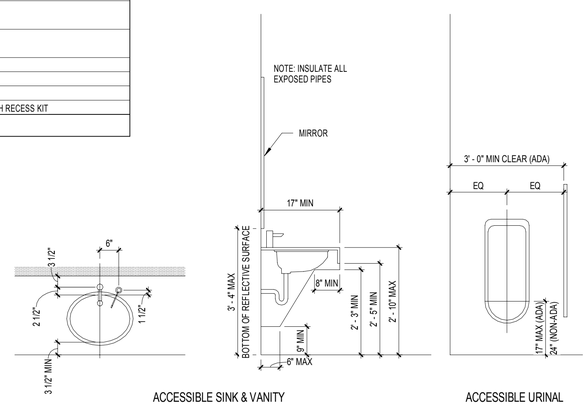
TOILET ACCESSORIES SCHEDULE

TYPE	DISCRIPTION		MODEL NO.	COMMENTS
A	18" GRAB BAR		B-5806-18	-
B	36" GRAB BAR		B-5806-36	-
C	42" GRAB BAR		B-5806-42	-
D	NOT USED			-
E	WOMEN'S ADA PARTITION-MOUNTED TOILET SEAT-COVER DISPENSER, SANITARY NAPKIN DISPOSAL, AND TOILET TISSUE DISPENSER		B-3571	-
F	WOMEN'S RECESSED SEAT-COVER DISPENSER, SANITARY NAPKIN DISPOSAL, AND TOILET TISSUE DISPENSER		B-3574	-
G	MEN'S ADA PARTITION-MOUNTED TOILET SEAT COVER DISPENSER, AND TOILET TISSUE DISPENSER.		B-3471	-
H	ELECTRONIC HAND SOAP DISPENSER		DESD-250	-
J	24" X 60" FRAMELESS MIRROR		747-2460	-
K	RECESSED PAPER TOWEL DISPENSER AND WASTE RECEPTACLE		B-43944	-
L	SURFACE MOUNTED AUTOMATIC HAND DRYER		XL-SB	WITH RECESS KIT

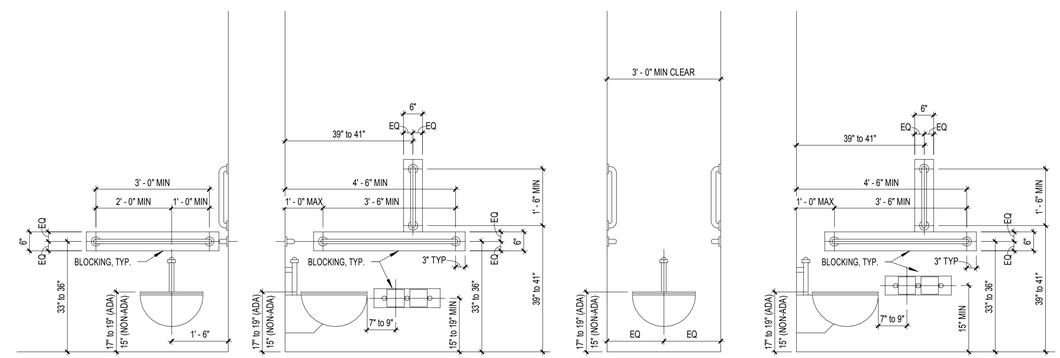
NOTE: FOR TOILET ACCESSORIES PERFORMANCE REQUIREMENTS REFER SPECIFICATIONS SECTION 10 28 13



PAPER TOWEL DISPENSERS COAT HOOK SANITARY NAPKIN DISPOSAL, TOILET TISSUE DESPENSER AND SEAT COVER DISPENSER



ACCESSIBLE SINK & VANITY ACCESSIBLE URINAL



ACCESSIBLE TOILET AMBULATORY ACCESSIBLE TOILET STALL

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

N

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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

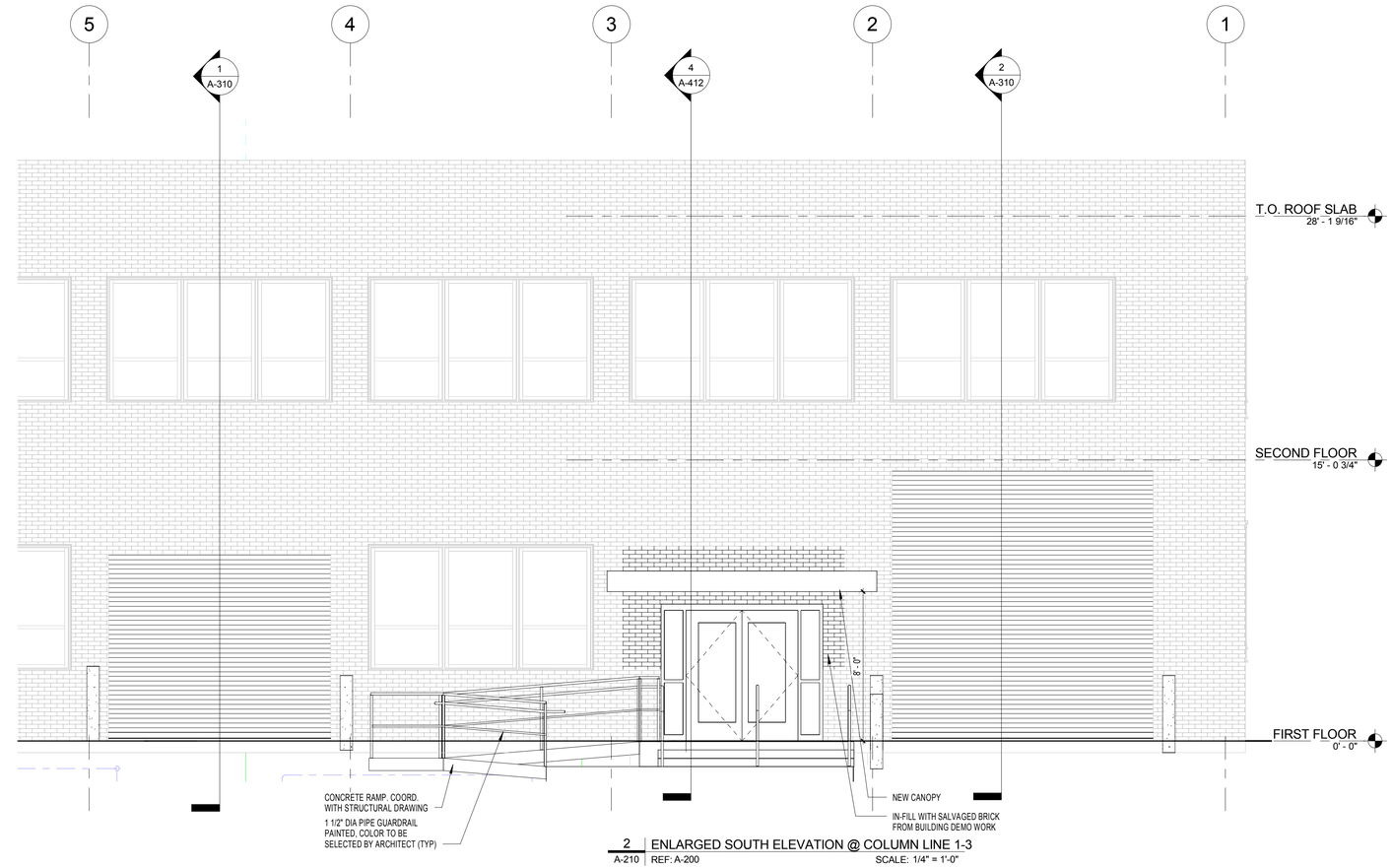
DRAWING TITLE: ENLARGED PLANS - RESTROOM & JANITOR CLOSET

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293441 | LATEST REV.

SHEET NO. A-400

12/16/2013 7:58:52 AM

1 | ENLARGED SOUTH ELEVATION @ COLUMN LINE 6-7
A-210 | REF: A-200 SCALE: 1/4" = 1'-0"



2 | ENLARGED SOUTH ELEVATION @ COLUMN LINE 1-3
A-210 | REF: A-200 SCALE: 1/4" = 1'-0"

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

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APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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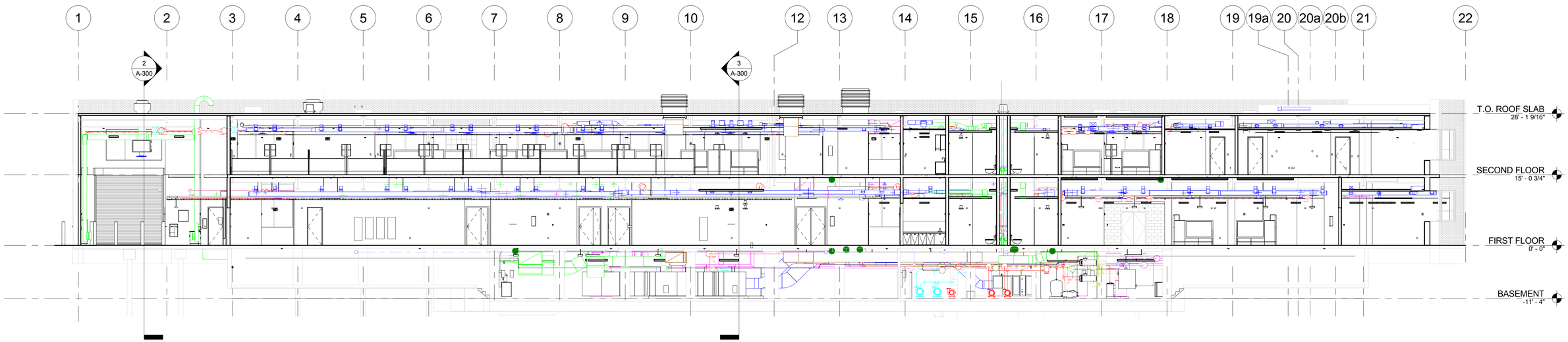
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

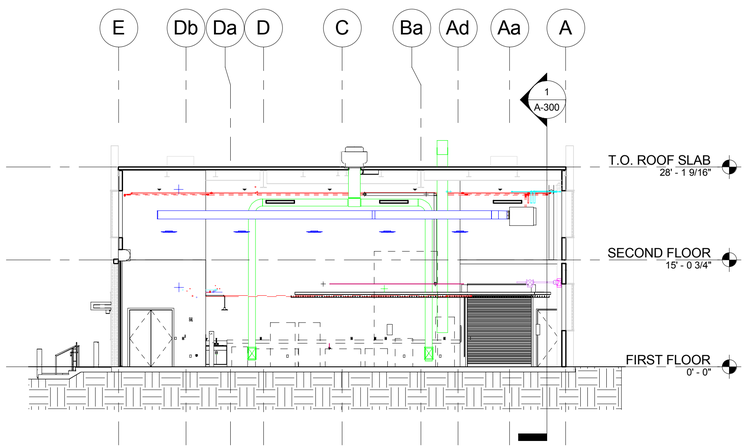
DRAWING TITLE: ENLARGED BUILDING ELEVATIONS

BUILDING NO. 1230
SHEET NO. A-210
SIZE D
DRAWING NO. 1293437
LATEST REV.

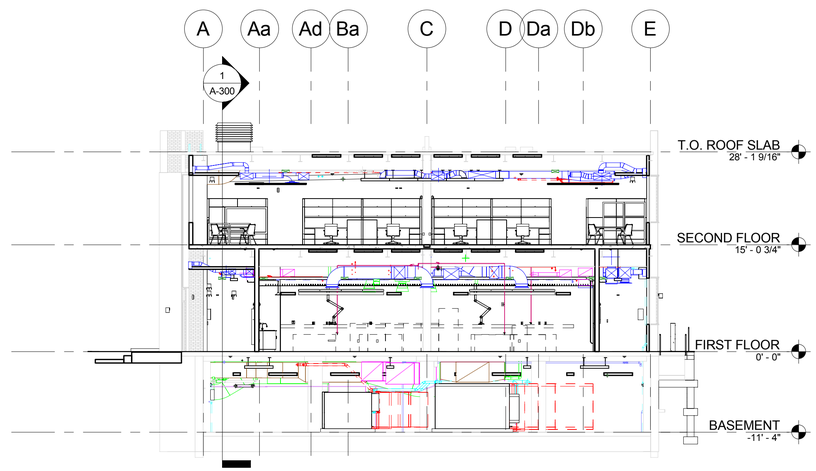
12/16/2013 7:58:01 AM



1 BUILDING SECTION @ COLUMN LINE A & Aa
A-300 REF: A-100a SCALE: 3/32" = 1'-0"



2 BUILDING SECTION @ COLUMN LINE 1 & 2
A-300 REF: A-101 SCALE: 3/32" = 1'-0"



3 BUILDING SECTION @ COLUMN LINE 10 & 11
A-300 REF: A-100a SCALE: 3/32" = 1'-0"

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONICHES RMS UNLESS SHOWN OTHERWISE

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HAMPTON, VIRGINIA 23681-2199

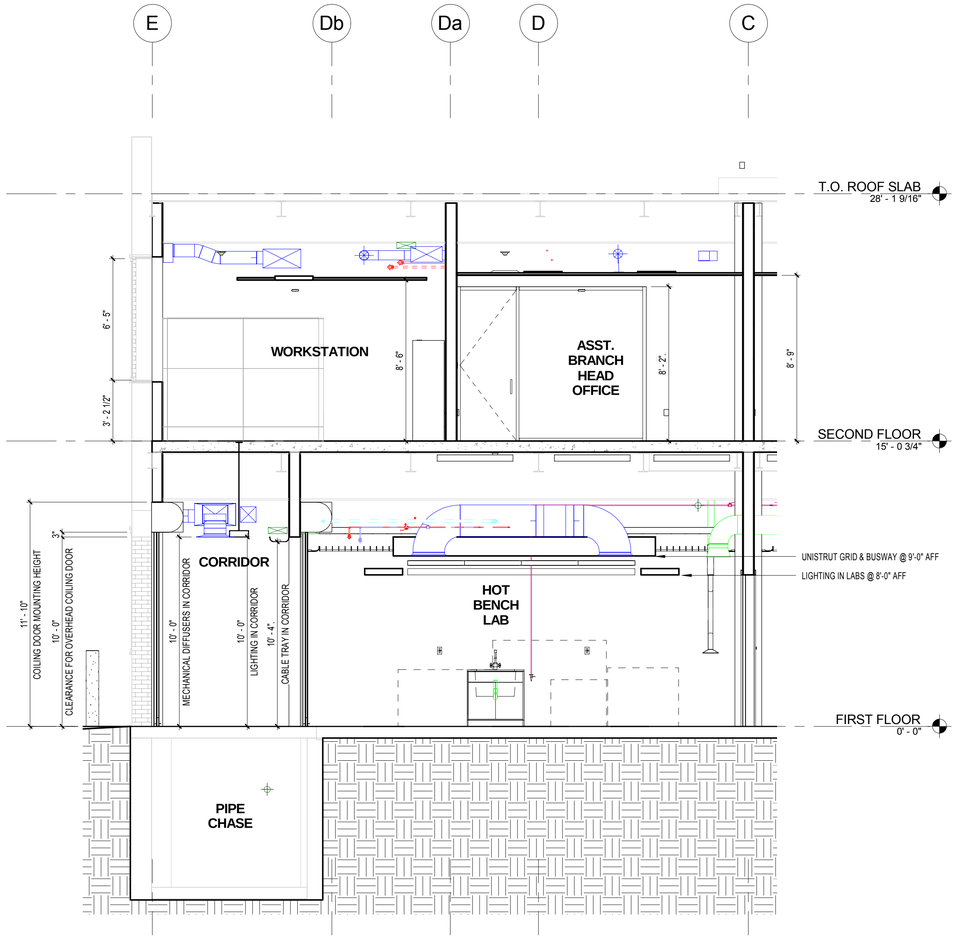
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BUILDING SECTIONS

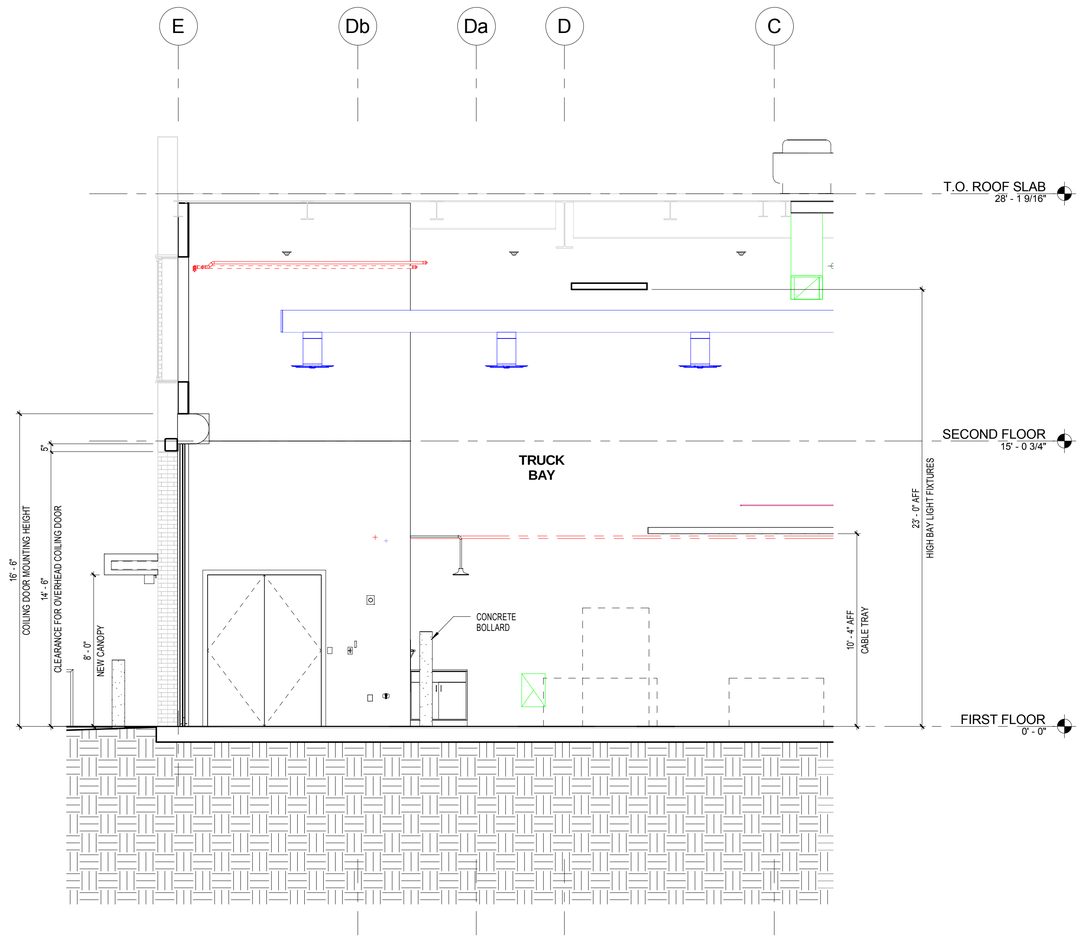
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293438 | LATEST REV.

SHEET NO. A-300

12/16/2013 7:58:31 AM



1 SECTION - MOUNTING HEIGHT @ TYPICAL LAB
A-310 REF: A-210 SCALE: 1/4" = 1'-0"



2 SECTION - MOUNTING HEIGHT @ TRUCK BAY
A-310 REF: A-210 SCALE: 1/4" = 1'-0"

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

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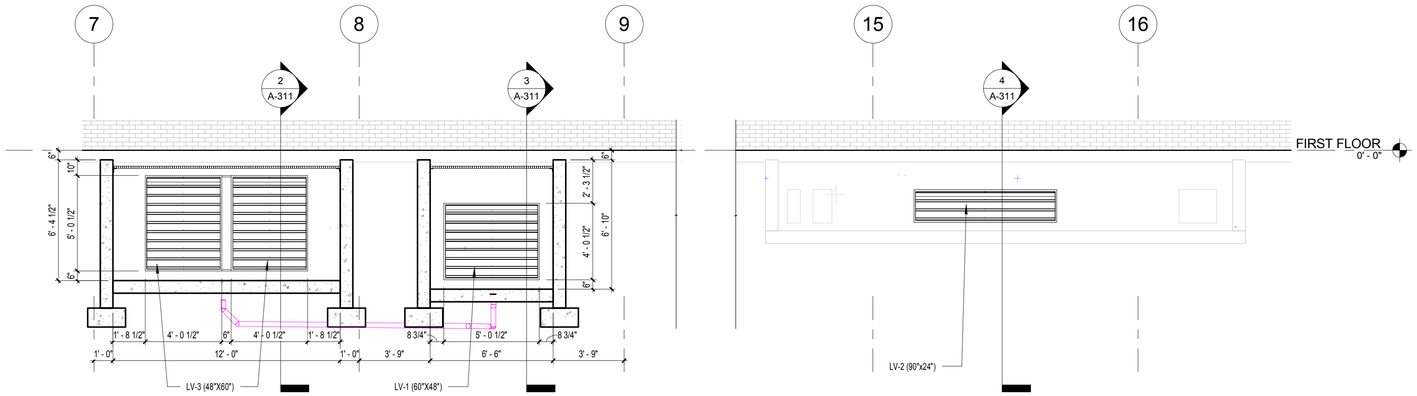
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: WALL SECTIONS

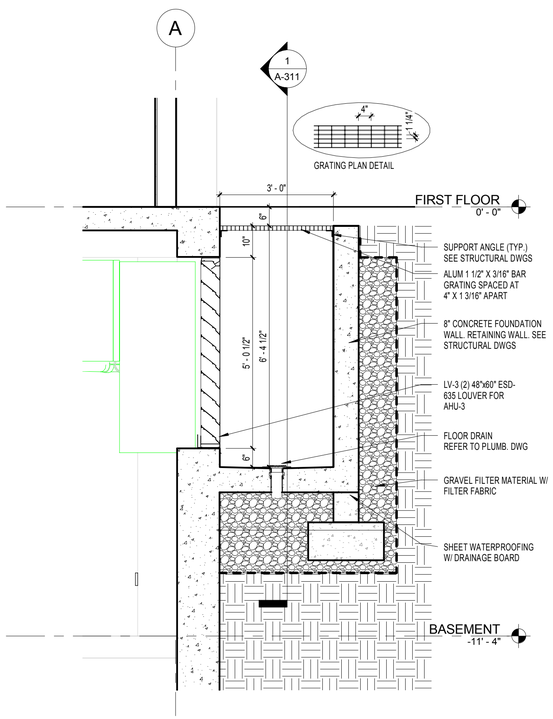
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293439 | LATEST REV.
SHEET NO. A-310

12/16/2013 7:58:39 AM

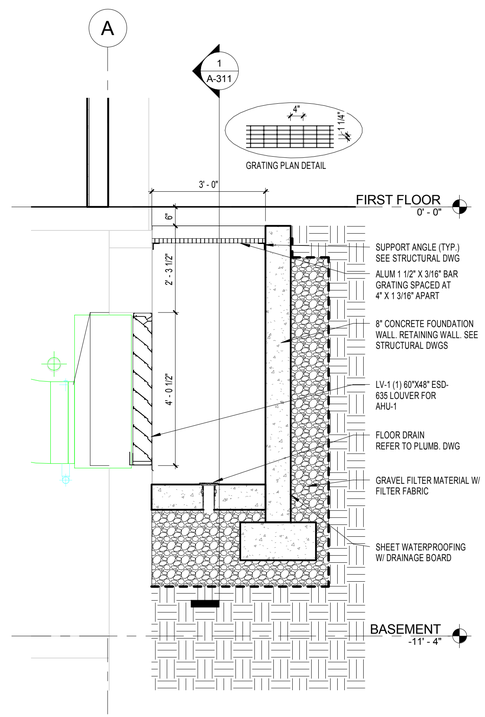
LOUVER SCHEDULE						
Level	Mark	Height	Width	Free Area (Based on Greenheck Model ESD-635)	Description	Comments
BASEMENT	LV-1	4' - 0"	5' - 0"	11.59 Sq. Ft	6 inch Drainable Louver	Louver for AHU-1
BASEMENT	LV-2	1' - 8"	7' - 6"	6.82 Sq. Ft	6 inch Drainable Louver	Louver for AHU-2
BASEMENT	LV-3	5' - 0"	4' - 0"	12.16 Sq. Ft	6 inch Drainable Louver	Louver for AHU-3
BASEMENT	LV-3	5' - 0"	4' - 0"	12.16 Sq. Ft	6 inch Drainable Louver	Louver for AHU-3



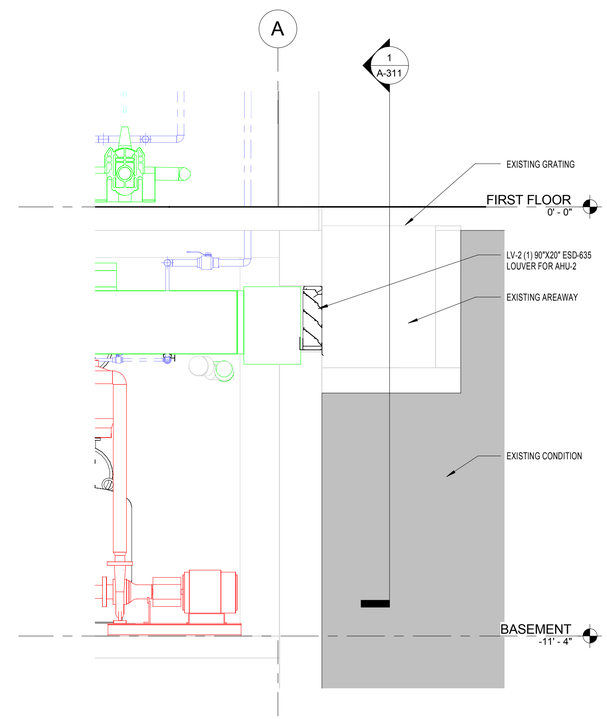
1 AREAWAY SECTION @ BASEMENT
A-311 REF: A-311 SCALE: 1/4" = 1'-0"



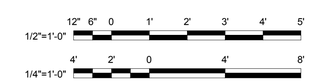
2 SECTION @ AREAWAY FOR AHU-3
A-311 REF: A-100a SCALE: 1/2" = 1'-0"



3 SECTION @ AREAWAY FOR AHU-1
A-311 REF: A-100a SCALE: 1/2" = 1'-0"



4 SECTION @ EXISTING AREAWAY FOR AHU-2
A-311 REF: A-100b SCALE: 1/2" = 1'-0"



GRAPHIC SCALE

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED (Designer)	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
			TECH. PROJ. ENG.	
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SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE √

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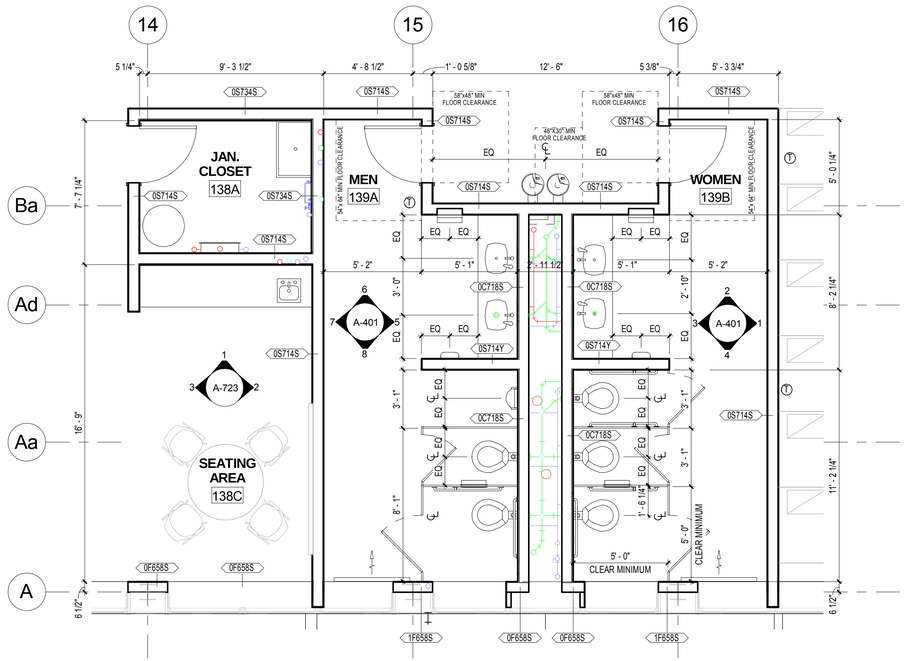
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: WALL SECTIONS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293440 | LATEST REV.

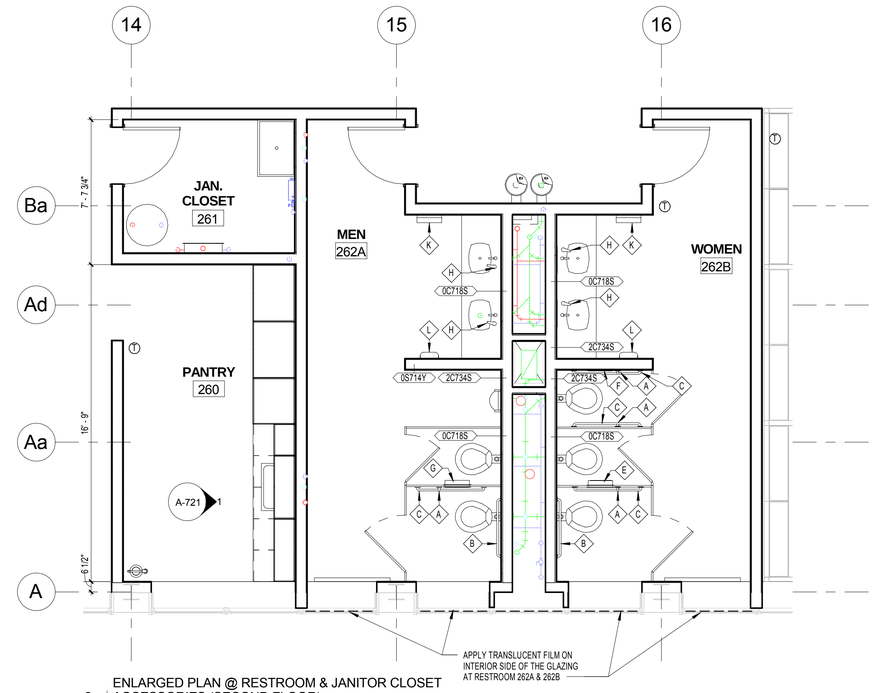
SHEET NO. A-311

12/16/2013 7:58:46 AM



1 ENLARGED PLAN @ RESTROOM & JANITOR CLOSET (FIRST FLOOR)
A-400 | REF: A-101a SCALE: 1/4" = 1'-0"

NOTE: REFER TO DETAIL 2/A-400 FOR RESTROOM & JANITOR CLOSET ACCESSORIES



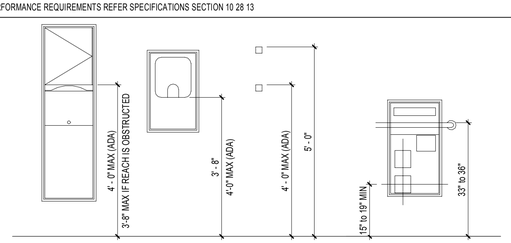
2 ENLARGED PLAN @ RESTROOM & JANITOR CLOSET ACCESSORIES (SECOND FLOOR)
A-400 | REF: A-102a SCALE: 1/4" = 1'-0"

NOTE: REFER TO DETAIL 1/A-400 FOR DIMENSIONS, WALL TAGS, INTERIOR ELEVATIONS

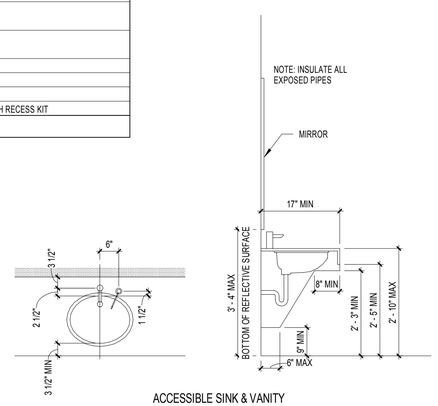
TOILET ACCESSORIES SCHEDULE

TYPE	DISCRIPTION	MANUFACTURER	MODEL NO.	COMMENTS
A	18" GRAB BAR	BOBRICK	B-5806-18	.
B	36" GRAB BAR	BOBRICK	B-5806-36	.
C	42" GRAB BAR	BOBRICK	B-5806-42	.
D	NOT USED			.
E	WOMEN'S ADA PARTITION-MOUNTED TOILET SEAT-COVER DISPENSER, SANITARY NAPKIN DISPOSAL, AND TOILET TISSUE DISPENSER	BOBRICK	B-3571	.
F	WOMEN'S RECESSED SEAT-COVER DISPENSER, SANITARY NAPKIN DISPOSAL, AND TOILET TISSUE DISPENSER	BOBRICK	B-3574	.
G	MEN'S ADA PARTITION-MOUNTED TOILET SEAT COVER DISPENSER, AND TOILET TISSUE DISPENSER.	BOBRICK	B-3471	.
H	ELECTRONIC HAND SOAP DISPENSER	DELTA	DESD-250	.
J	24" X 60" FRAMELESS MIRROR	BRADLEY	747-2460	.
K	RECESSED PAPER TOWEL DISPENSER AND WASTE RECEPTACLE	BOBRICK	B-43944	.
L	SURFACE MOUNTED AUTOMATIC HAND DRYER	EXCEL DRYER INC.	XL-SB	WITH RECESS KIT

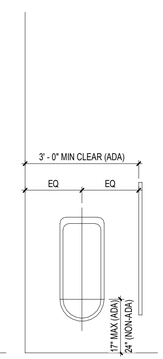
NOTE: FOR TOILET ACCESSORIES PERFORMANCE REQUIREMENTS REFER SPECIFICATIONS SECTION 10 28 13



PAPER TOWEL DISPENSERS COAT HOOK SANITARY NAPKIN DISPOSAL, TOILET TISSUE DESPENSER AND SEAT COVER DISPENSER



ACCESSIBLE SINK & VANITY



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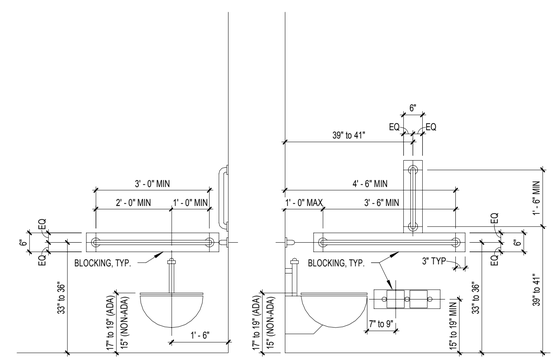
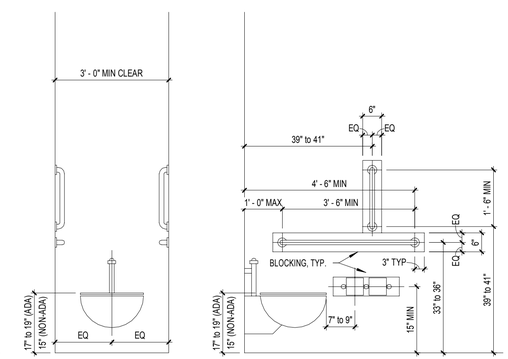


ACCESSIBLE TOILET



AMBULATORY ACCESSIBLE TOILET STALL

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

N

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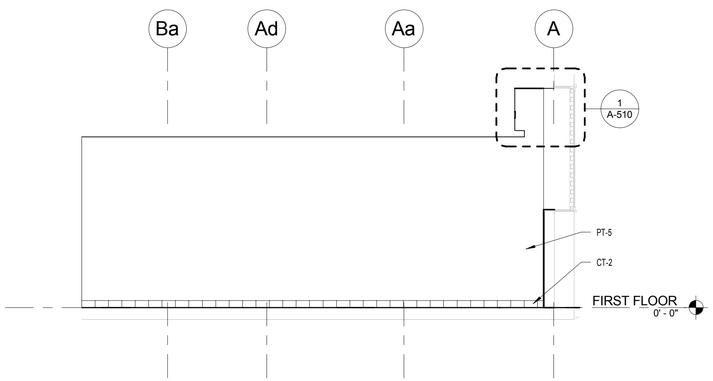
DRAWING TITLE: ENLARGED PLANS - RESTROOM & JANITOR CLOSET

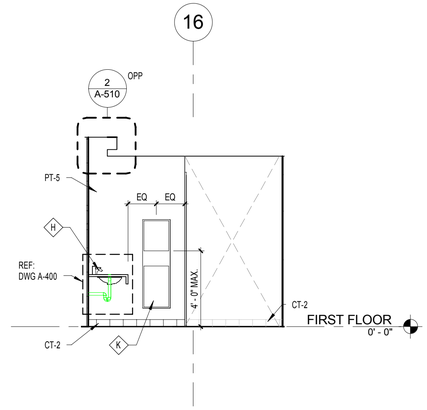
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293441 | LATEST REV.

SHEET NO. A-400

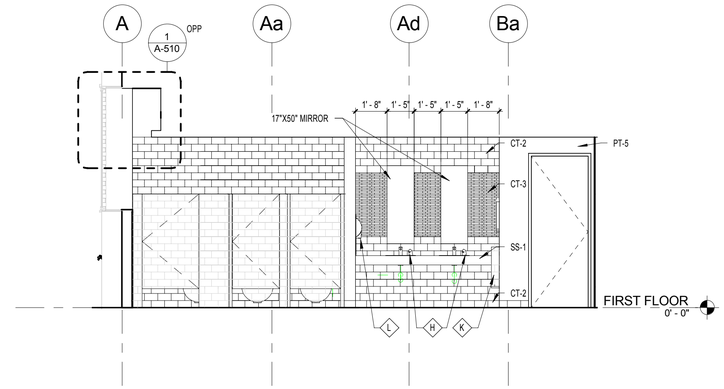
12/16/2013 7:58:52 AM



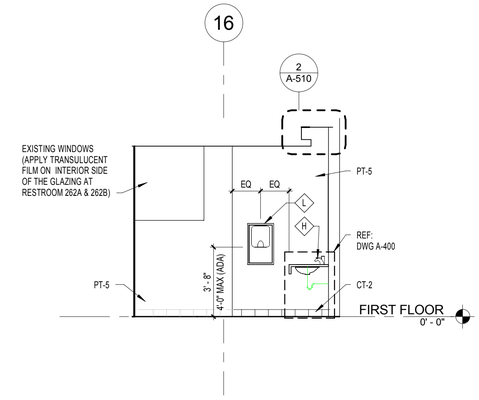
1 A-401 105 WOMEN'S RESTROOM - WEST ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262B WOMEN'S RESTROOM SIMILAR



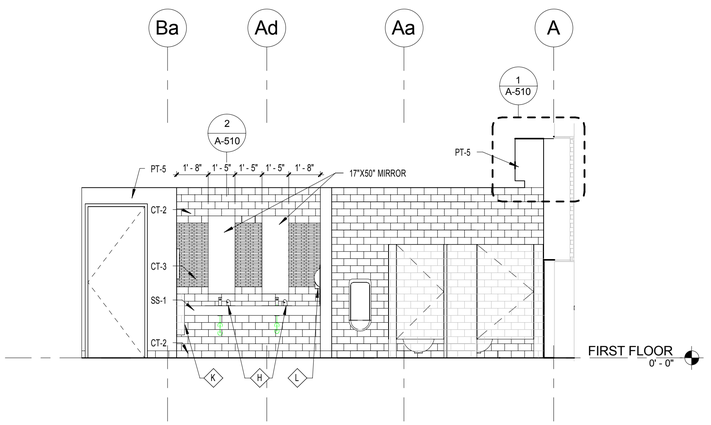
2 A-401 105 WOMEN'S RESTROOM - SOUTH ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262B WOMEN'S RESTROOM SIMILAR



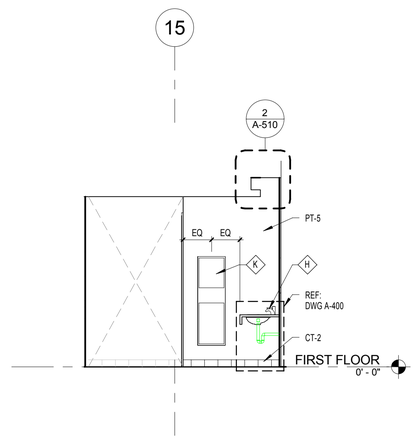
3 A-401 139B WOMEN'S RESTROOM - EAST ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262B WOMEN'S RESTROOM SIMILAR



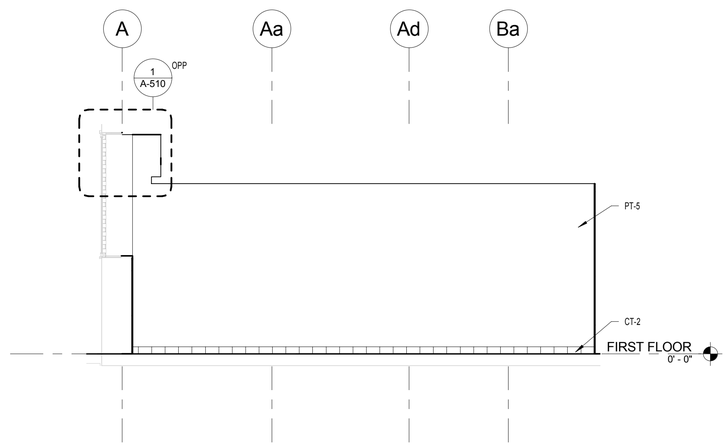
4 A-401 139B WOMEN'S RESTROOM - NORTH ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262B WOMEN'S RESTROOM SIMILAR



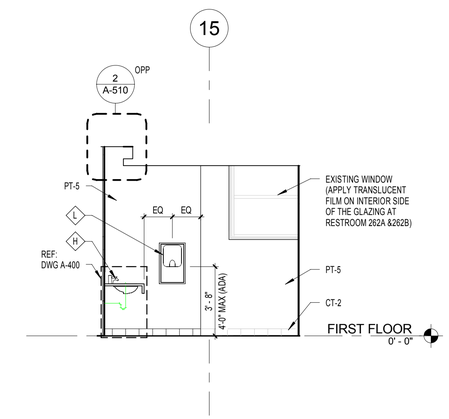
5 A-401 106 MEN'S RESTROOM - WEST ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262A MEN'S RESTROOM SIMILAR



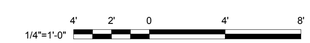
6 A-401 106 MEN'S RESTROOM - SOUTH ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262A MEN'S RESTROOM SIMILAR



7 A-401 106 MEN'S RESTROOM - EAST ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262A MEN'S RESTROOM SIMILAR



8 A-401 139A MEN'S RESTROOM - NORTH ELEVATION
REF: A-400 SCALE: 1/4" = 1'-0"
NOTE: 262A MEN'S RESTROOM SIMILAR



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2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

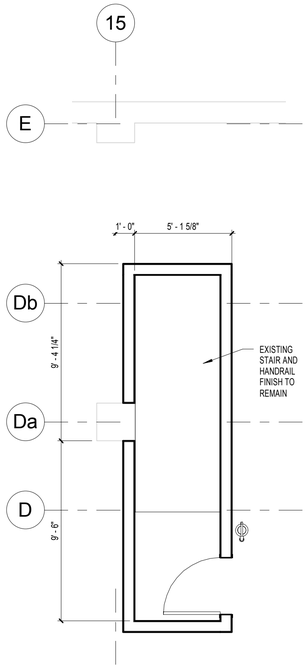
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

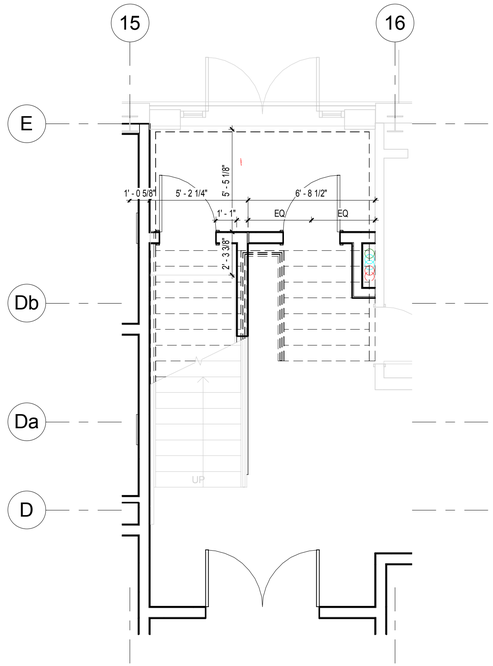
DRAWING TITLE: ENLARGED RESTROOM ELEVATION

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293442 | LATEST REV.
SHEET NO. A-401

12/16/2013 7:58:57 AM



1 ENLARGED PLAN @ STAIR 1 - BASEMENT
A-410 REF: A-100a SCALE: 1/4" = 1'-0"



2 ENLARGED PLAN @ STAIR 1 - FIRST FLOOR
A-410 REF: A-101a SCALE: 1/4" = 1'-0"

N

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

REVISIONS					REVISIONS				
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SEAL AREA

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EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

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Arlington, Va. 22201

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED (Designer)	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

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X.XXX (3 DECIMAL PLACES) ±.005
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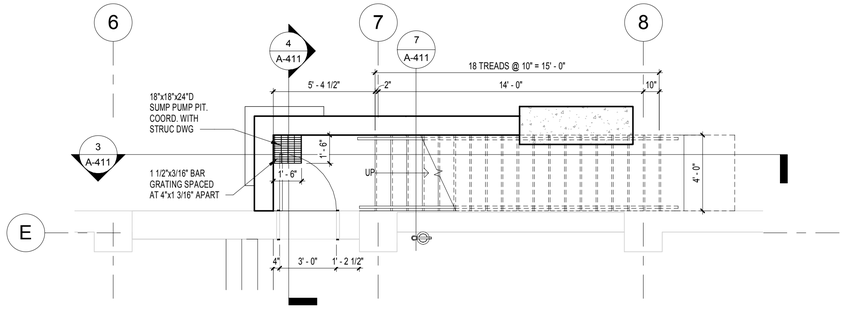
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: STAIR 1

BUILDING NO.: 1230
SIZE: D
DRAWING NO.: 1293443
SHEET NO.: A-410
LATEST REV.

12/16/2013 7:59:00 AM



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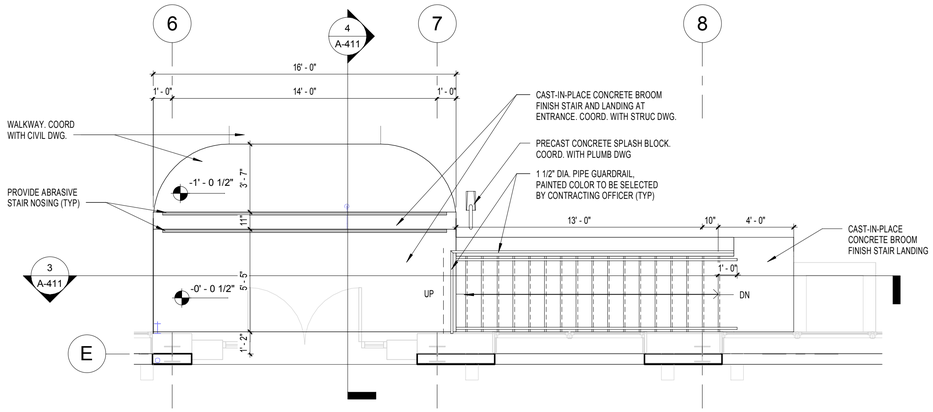
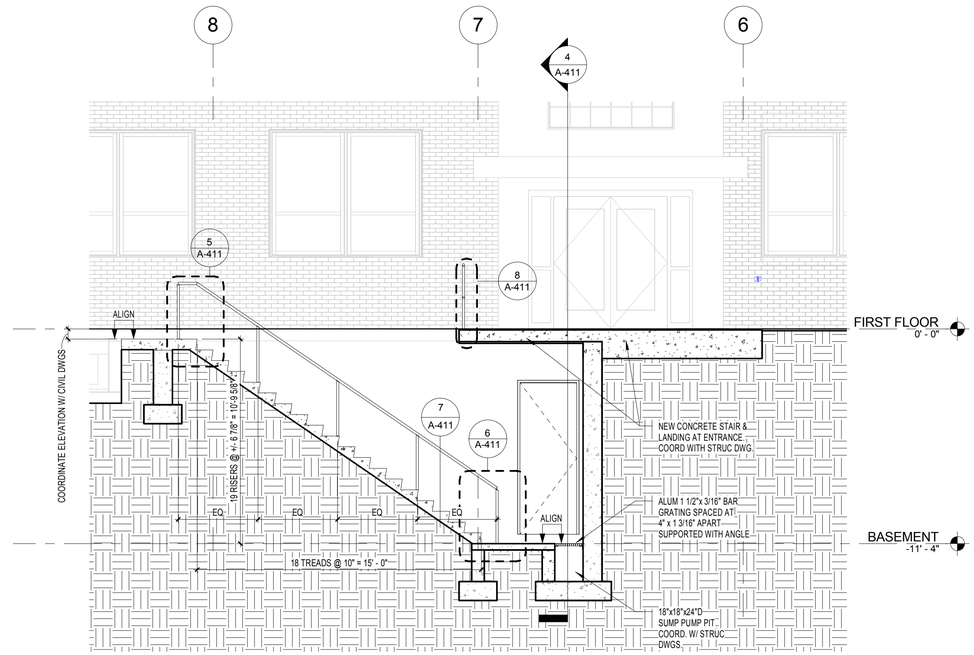
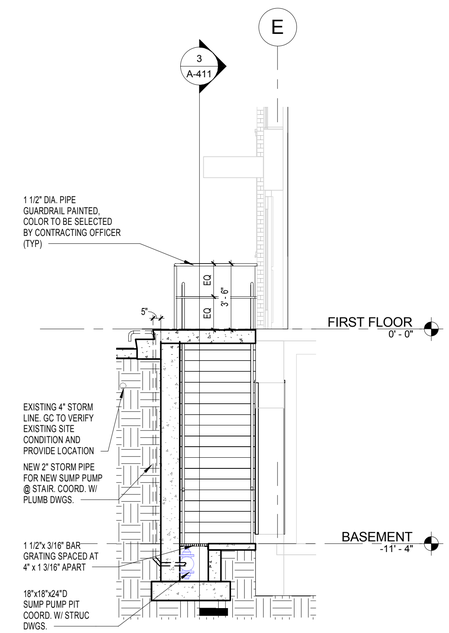
A-411 REF: A-100a SCALE: 1/4" = 1'-0"



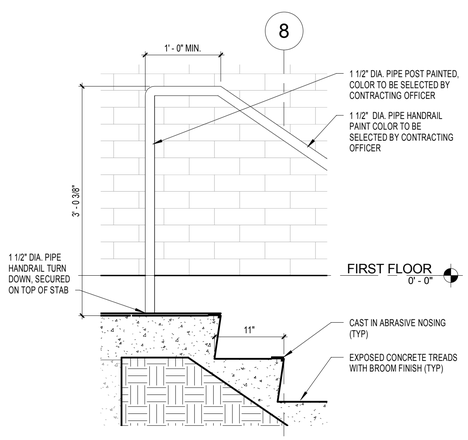
2 ENLARGED PLAN @ STAIR 2 - FIRST FLOOR
A-411 REF: A-101a SCALE: 1/4" = 1'-0"



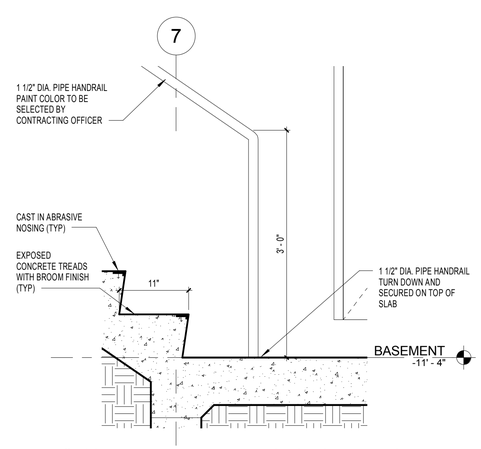
3 SECTION @ STAIR 2 EAST-WEST
A-411 REF: A-411 SCALE: 1/4" = 1'-0"



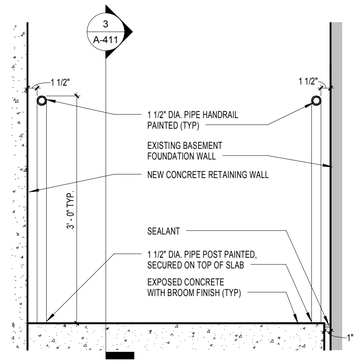
4 SECTION @ STAIR 2 NORTH-SOUTH
A-411 REF: A-210 SCALE: 1/4" = 1'-0"



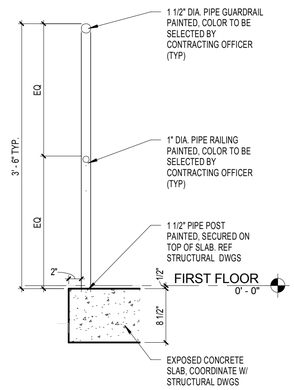
5 STAIR 2 - HANDRAIL DETAIL @ TOP LANDING
A-411 REF: A-411 SCALE: 1" = 1'-0"



6 STAIR 2 - HANDRAIL DETAIL @ BOTTOM LANDING
A-411 REF: A-411 SCALE: 1" = 1'-0"



7 STAIR 2 - HANDRAIL DETAIL
A-411 REF: A-411 SCALE: 1" = 1'-0"



8 STAIR 2 - GUARDRAIL SECTION
A-411 REF: A-411 SCALE: 1" = 1'-0"

N

1"=1'-0" 12" 9" 6" 3" 0 1' 2'

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

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EDWARD D. WEAVER
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ARCHITECT

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

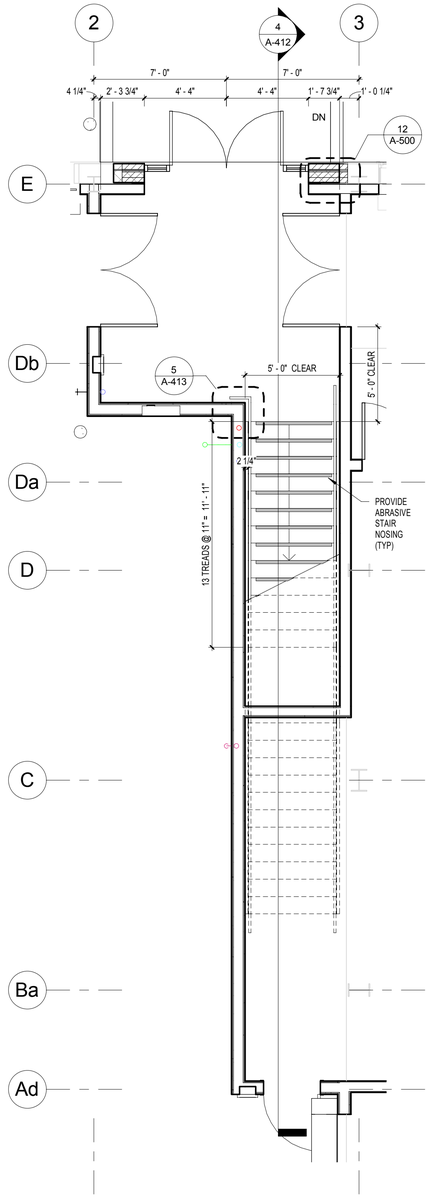
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: STAIR 2

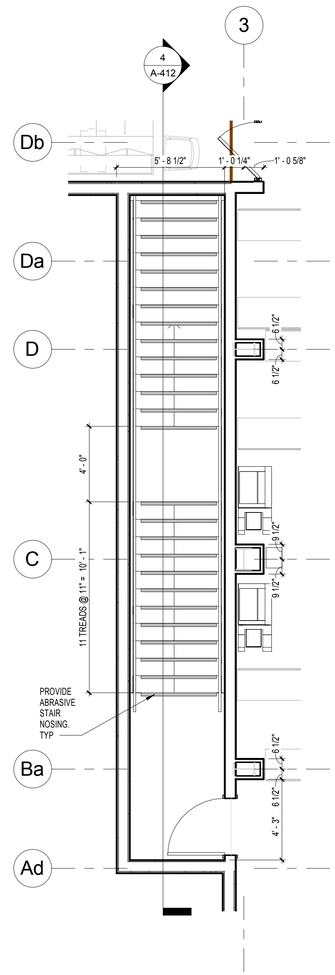
BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293444 | LATEST REV.

SHEET NO.: A-411

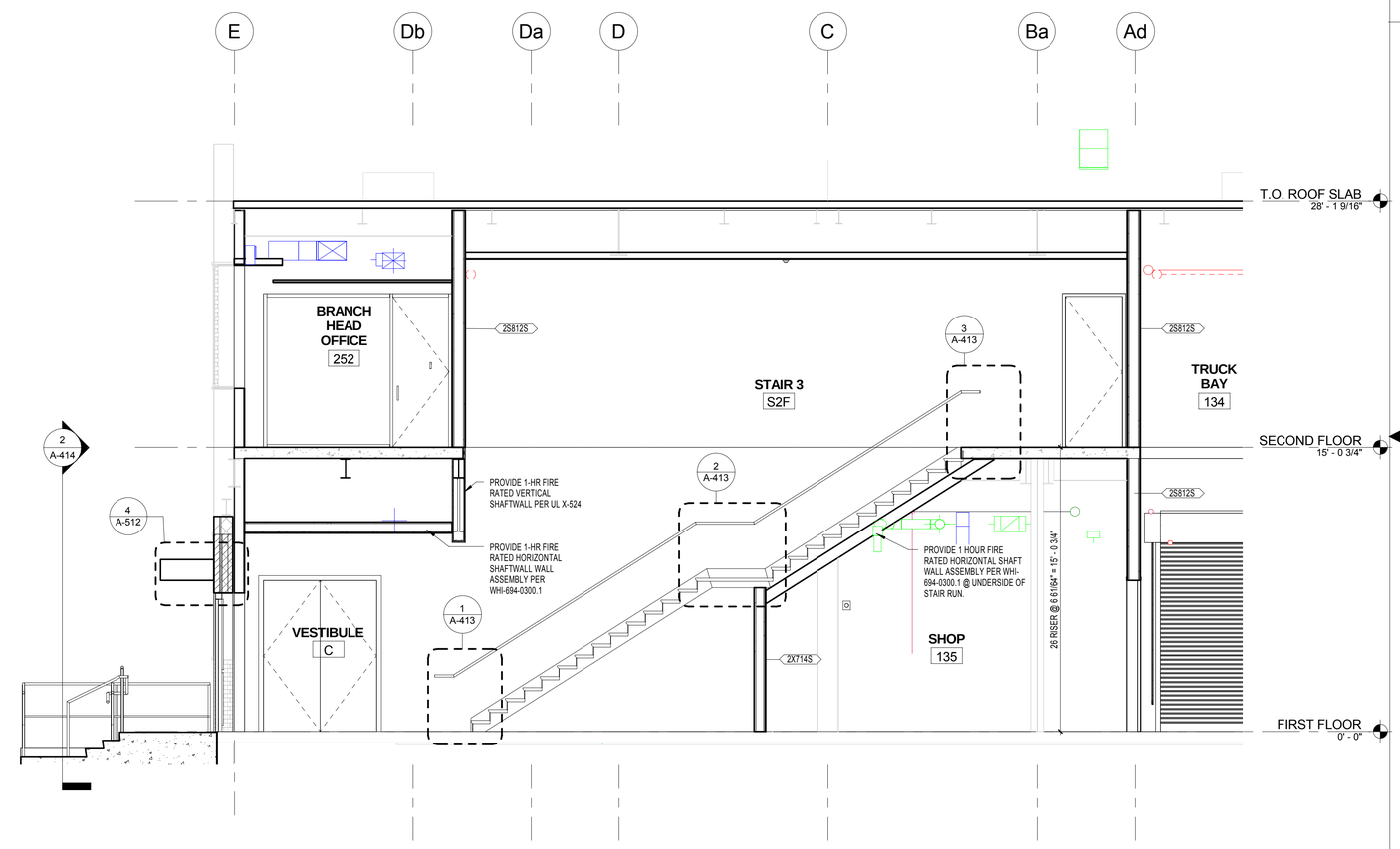
12/16/2013 7:59:05 AM



1 A-412 ENLARGED PLAN @ STAIR 3 - FIRST FLOOR
REF: A-101a SCALE: 1/4" = 1'-0"



2 A-412 ENLARGED PLAN @ STAIR 3 - SECOND FLOOR
REF: A-102a SCALE: 1/4" = 1'-0"



4 A-412 SECTION @ STAIR 3 NORTH-SOUTH
REF: A-210 SCALE: 1/4" = 1'-0"

N

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
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HAMPTON, VIRGINIA 23681-2199

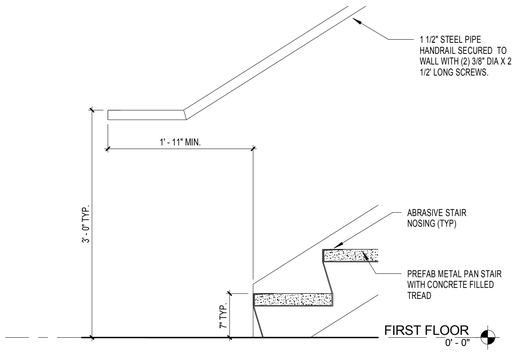
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: STAIR 3

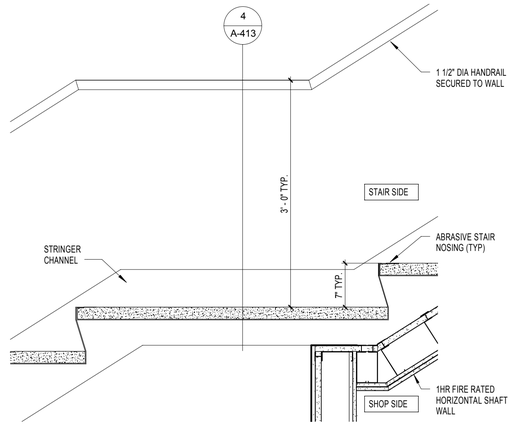
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293445 | LATEST REV.

SHEET NO. A-412

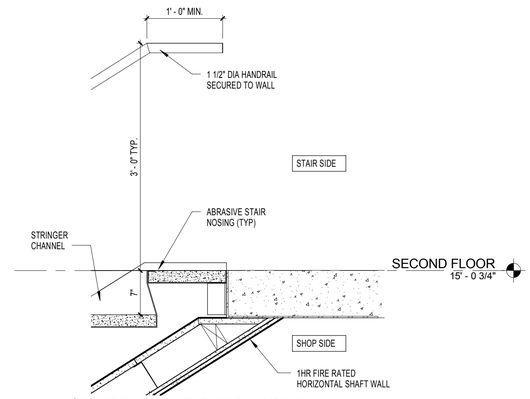
12/16/2013 7:59:09 AM



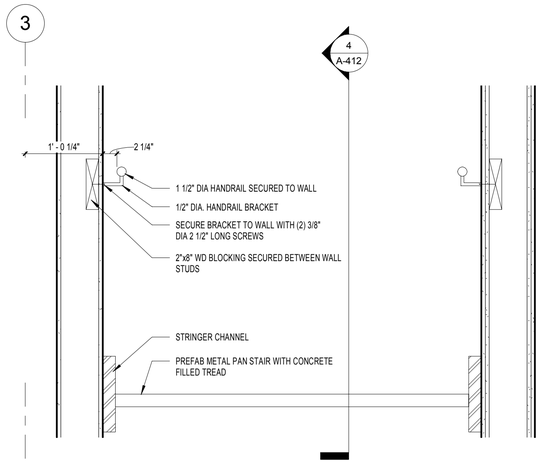
1 STAIR 3 - FIRST FLOOR LANDING
A-413 REF: A-412 SCALE: 1" = 1'-0"



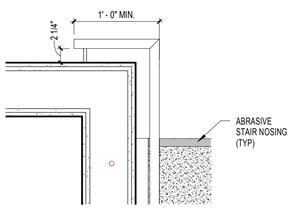
2 STAIR 3 - INTERMEDIATE LANDING
A-413 REF: A-412 SCALE: 1" = 1'-0"



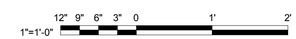
3 STAIR 3 - SECOND FLOOR LANDING
A-413 REF: A-412 SCALE: 1" = 1'-0"



4 STAIR 3 - HANDRAIL DETAIL
A-413 REF: A-413 SCALE: 1" = 1'-0"



5 STAIR 3 - HANDRAIL TERMINATION PLAN @ BOTTOM LANDING
A-413 REF: A-412 SCALE: 1" = 1'-0"



GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
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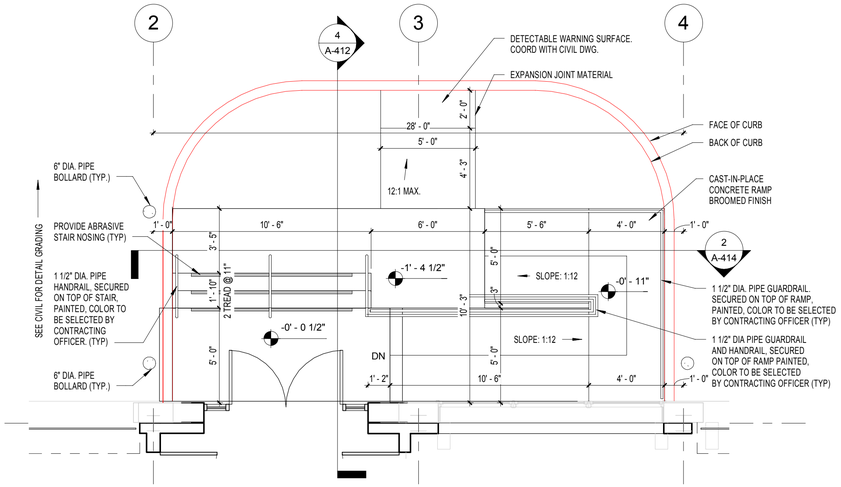
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

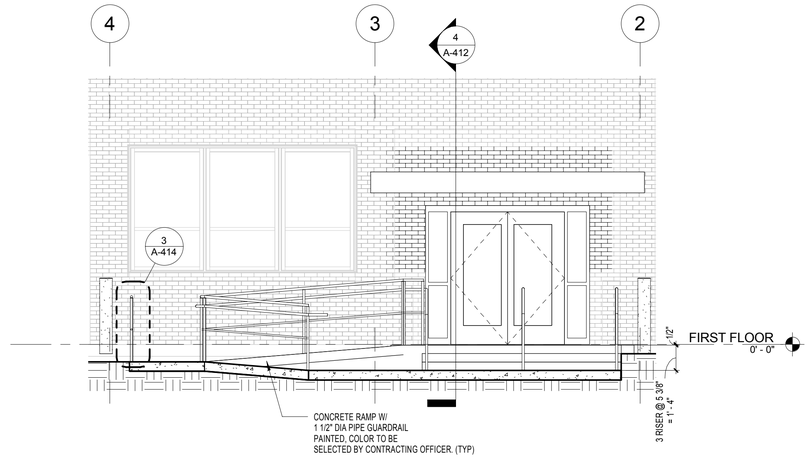
DRAWING TITLE: STAIR DETAILS

BUILDING NO. 1230
SHEET NO. A-413
SIZE D
DRAWING NO. 1293446
LATEST REV.

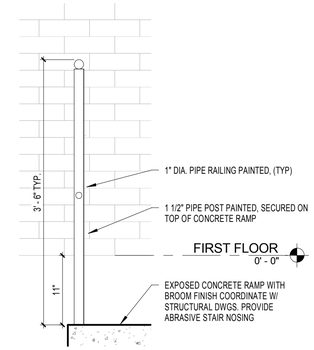
12/16/2013 7:59:13 AM



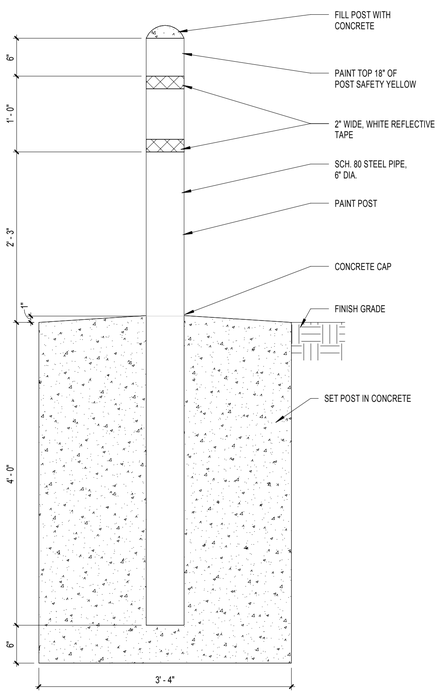
1 ENLARGED PLAN @ RAMP - FIRST FLOOR
A-414 REF: A-101a SCALE: 1/4" = 1'-0"



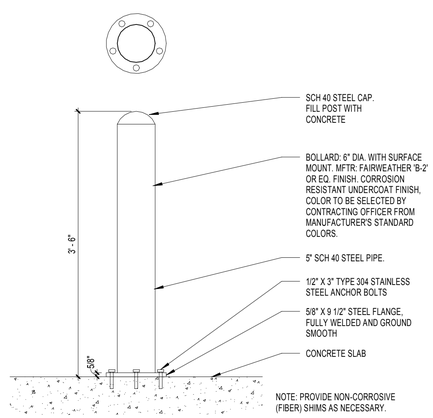
2 SECTION @ RAMP EAST-WEST
A-414 REF: A-412 SCALE: 1/4" = 1'-0"



3 RAMP - GUARDRAIL SECTION
A-414 REF: A-414 SCALE: 1" = 1'-0"



4 SECTION - PIPE BOLLARD (EXTERIOR)
A-414 REF: SCALE: 1" = 1'-0"



5 SECTION -PIPE BOLLARD (INTERIOR)
A-414 REF: SCALE: 1" = 1'-0"

N

1"=1'-0" 12" 9" 6" 3" 0 1' 2'
1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
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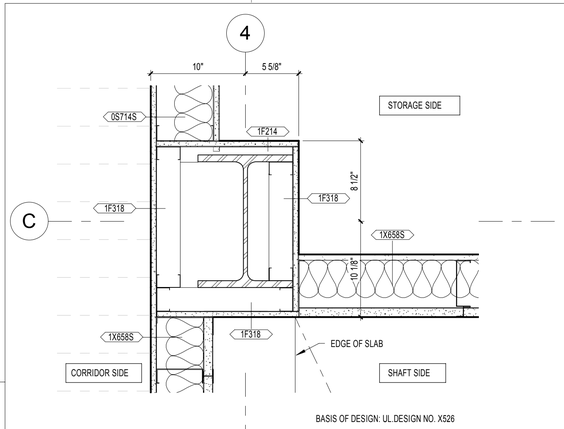
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: RAMP

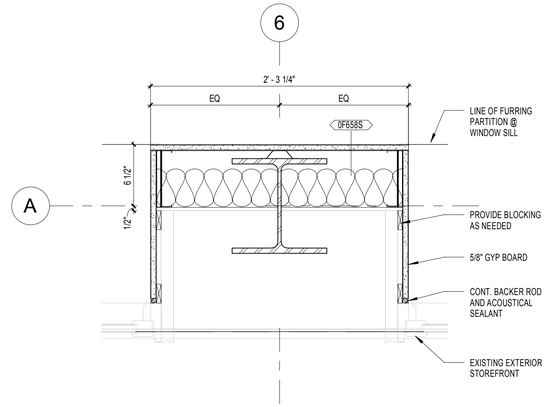
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293447 | LATEST REV.

SHEET NO. A-414

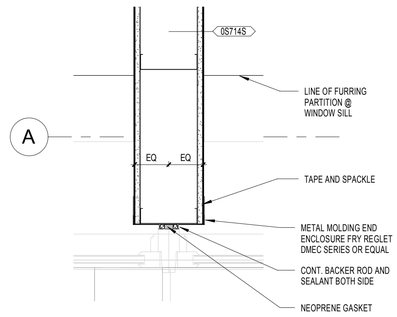
12/16/2013 7:59:16 AM



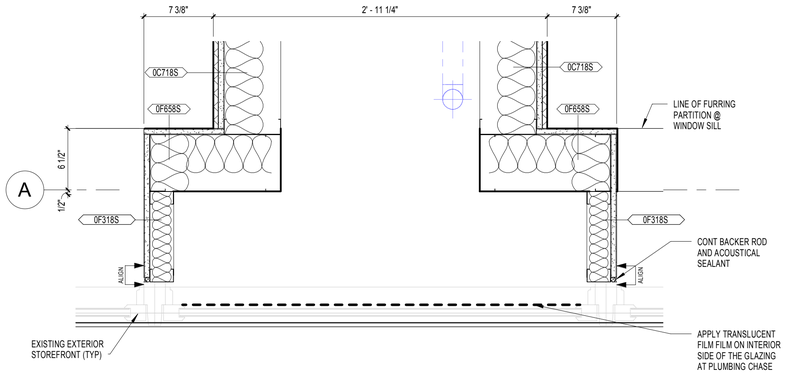
1 | PLAN DETAIL - 1 HR FIRE RATED SHAFT WALL
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



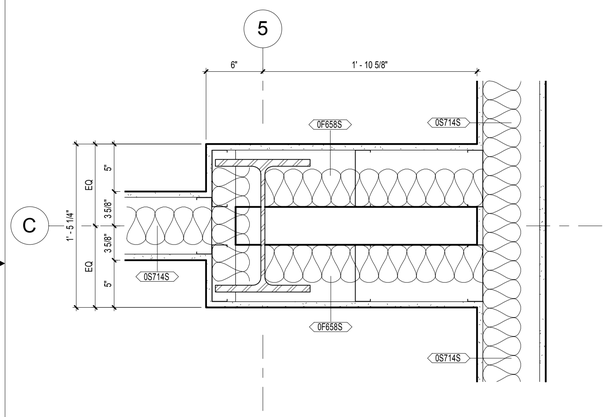
2 | PLAN DETAIL - TYPICAL PERIMETER COLUMN
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



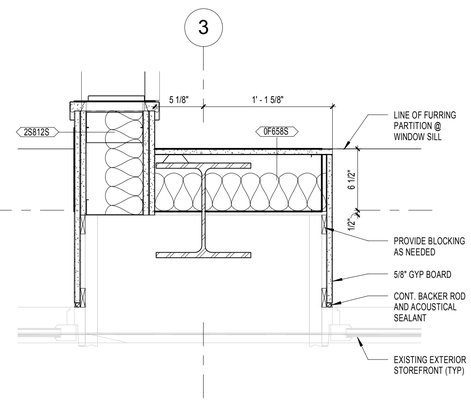
3 | PLAN DETAIL - TYPICAL PERIMETER WALL
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



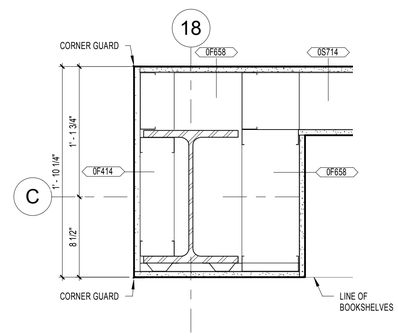
4 | PLAN DETAIL - TYPICAL RESTROOM SHAFT @ STOREFRONT
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



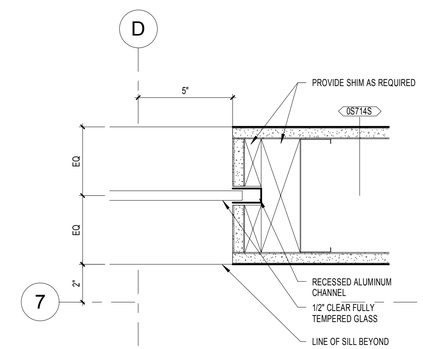
5 | PLAN DETAIL - COLUMN FURRING IN OFFICE
A-500 | REF: A-102a | SCALE: 1 1/2" = 1'-0"



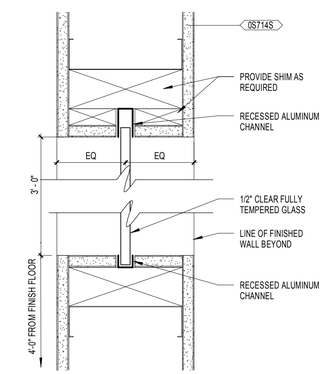
6 | PLAN DETAIL - TYPICAL 2HR FIRE RATED WALL @ PERIMETER COLUMN
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



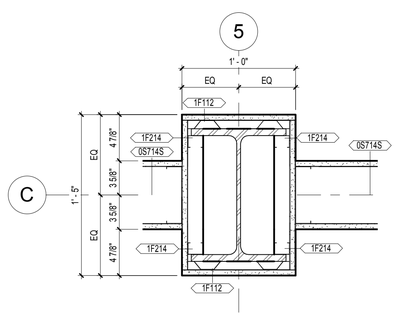
7 | PLAN DETAIL - COLUMN FURRING
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



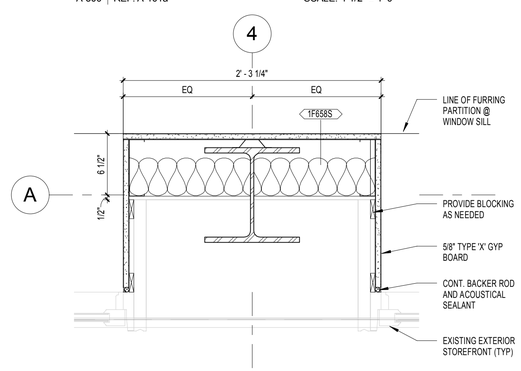
8 | PLAN DETAIL - JAMB DETAIL FOR FIXED WINDOW @ LAB
A-500 | REF: A-722 | SCALE: 3" = 1'-0"



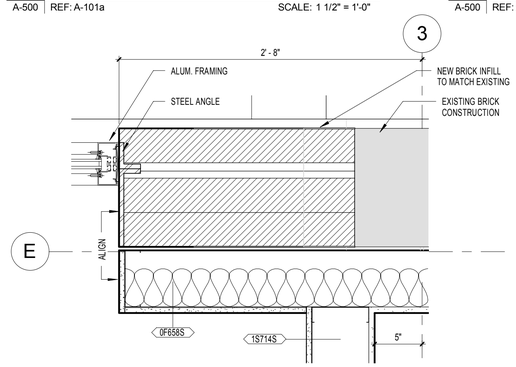
9 | SECTION DETAIL - FIXED WINDOW @ LAB
A-500 | REF: A-701a | SCALE: 3" = 1'-0"



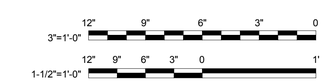
10 | PLAN DETAIL - 1 HR FIRE RATED COLUMN
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



11 | PLAN DETAIL - 1 HR FIRE RATED PERIMETER COLUMN
A-500 | REF: A-101a | SCALE: 1 1/2" = 1'-0"



12 | PLAN DETAIL - EXTERIOR STOREFRONT JAMB DETAIL
A-500 | REF: A-412 | SCALE: 1 1/2" = 1'-0"



GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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EDWARD D. WEAVER
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LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONICHES RMS UNLESS SHOWN OTHERWISE

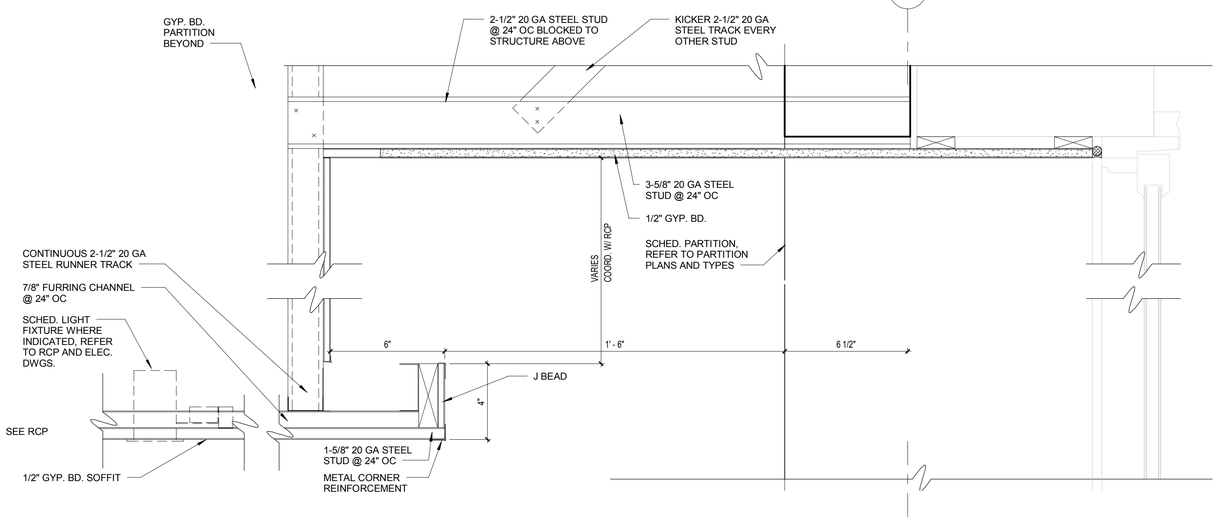
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

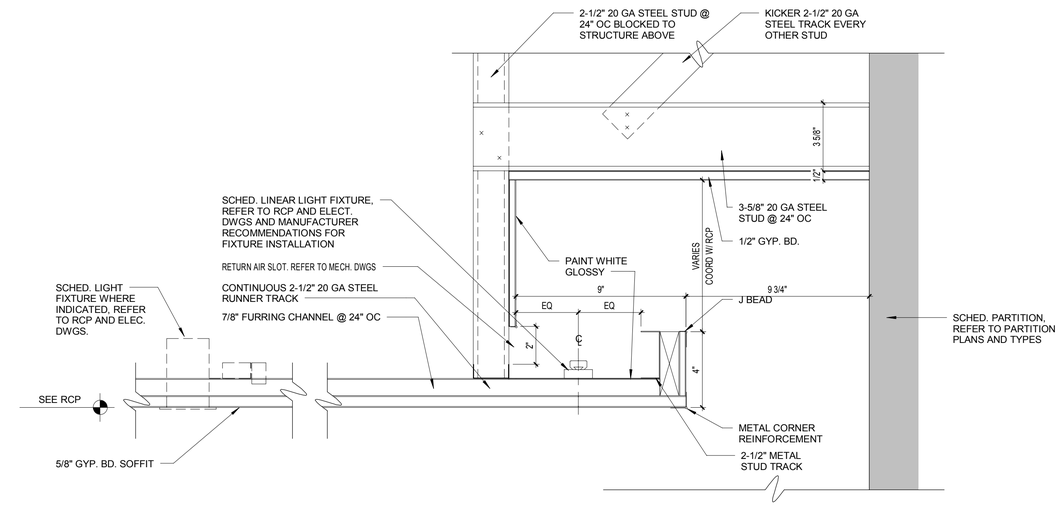
DRAWING TITLE: PARTITION DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293448 | LATEST REV.
SHEET NO. A-500

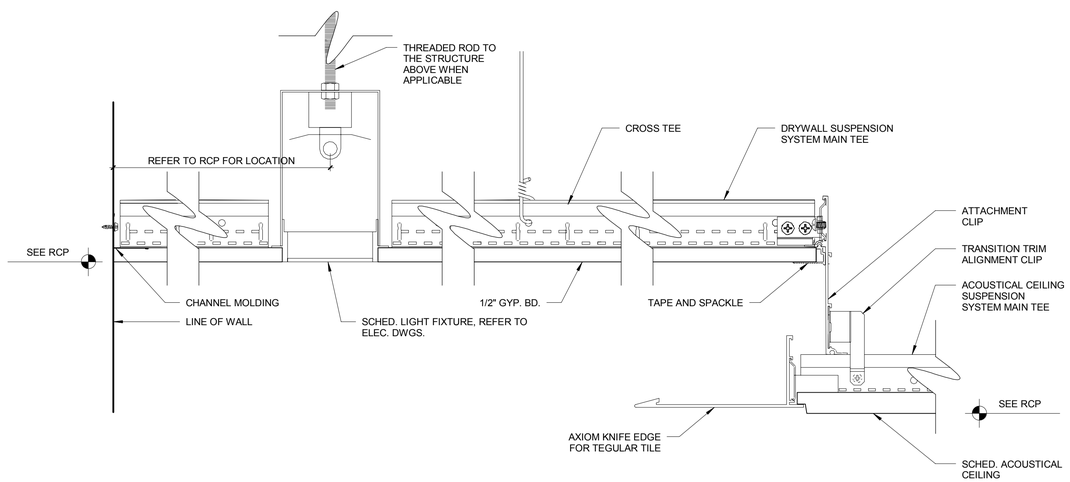
12/16/2013 7:59:26 AM



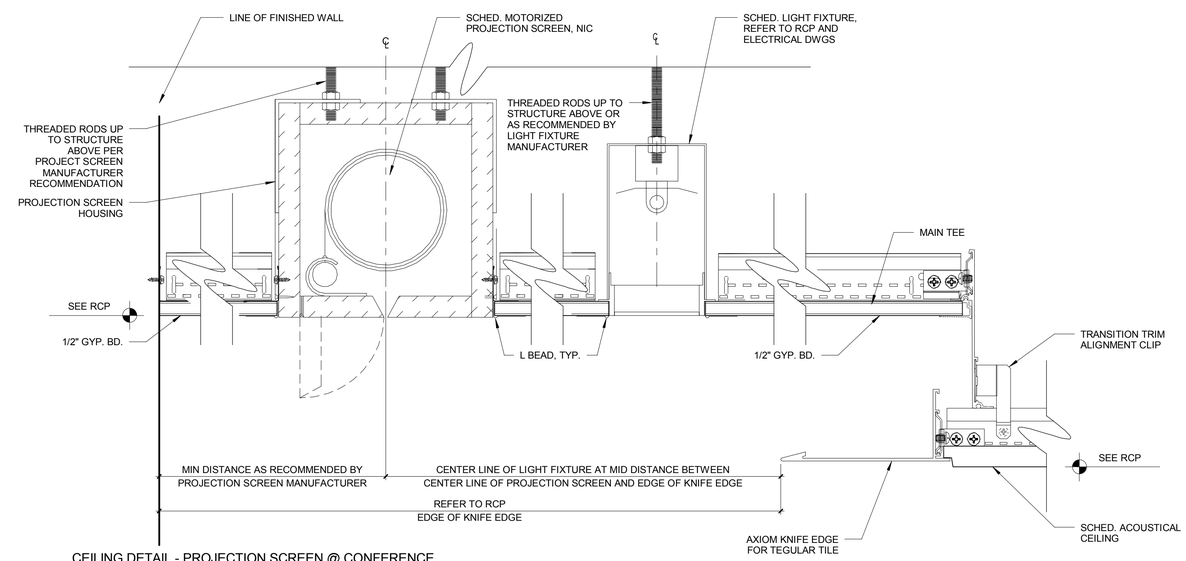
1 | CEILING DETAIL - WINDOW HEAD @ RESTROOM
A-510 | REF: A-111 SCALE: 3" = 1'-0"



2 | CEILING DETAIL - SOFFIT @ RESTROOM
A-510 | REF: A-111 SCALE: 3" = 1'-0"



3 | CEILING DETAIL - DROP CEILING @ CONFERENCE ROOM
A-510 | REF: A-112 SCALE: 6" = 1'-0"



4 | CEILING DETAIL - PROJECTION SCREEN @ CONFERENCE ROOM
A-510 | REF: A-112 SCALE: 6" = 1'-0"

GRAPHIC SCALE

REVISIONS					REVISIONS				
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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
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			RES. PROJ. ENG.	

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

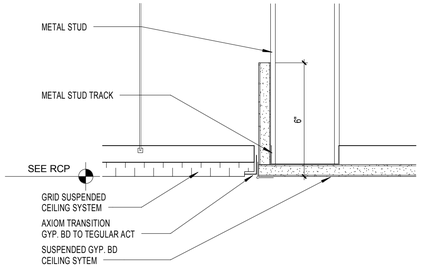
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: CEILING DETAILS

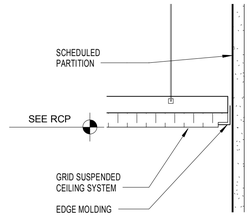
BUILDING NO. 1230 | SIZE D | DRAWING NO 1293449 | LATEST REV.

SHEET NO. A-510

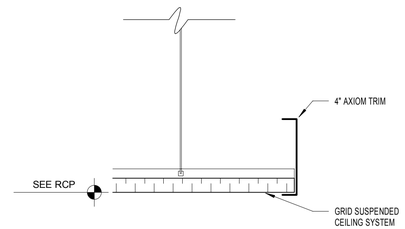
12/16/2013 7:59:30 AM



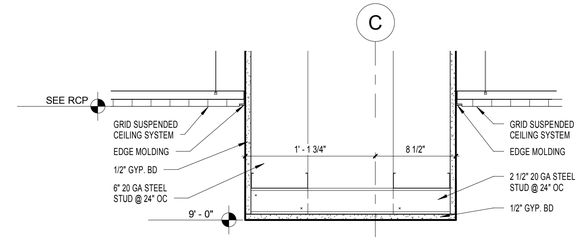
1 CEILING DETAIL - TYPICAL CEILING TRANSITION
A-511 REF: A-111 SCALE: 3" = 1'-0"



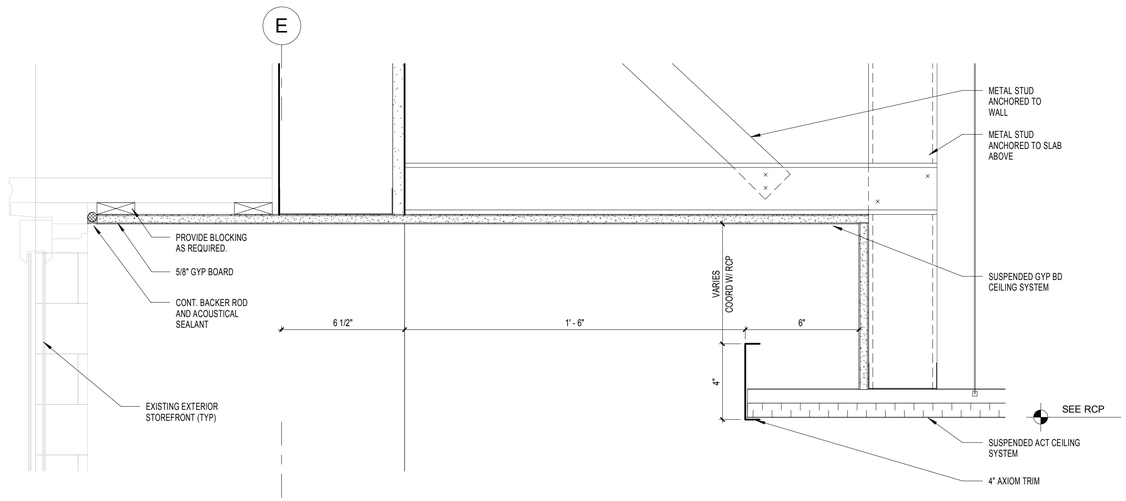
2 CEILING DETAIL - TYPICAL EDGE MOLDING
A-511 REF: A-112 SCALE: 3" = 1'-0"



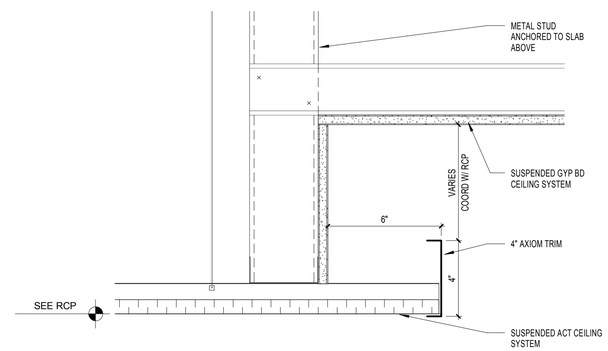
3 CEILING DETAIL - TYPICAL SUSPENDED ACT
A-511 REF: A-111 SCALE: 3" = 1'-0"



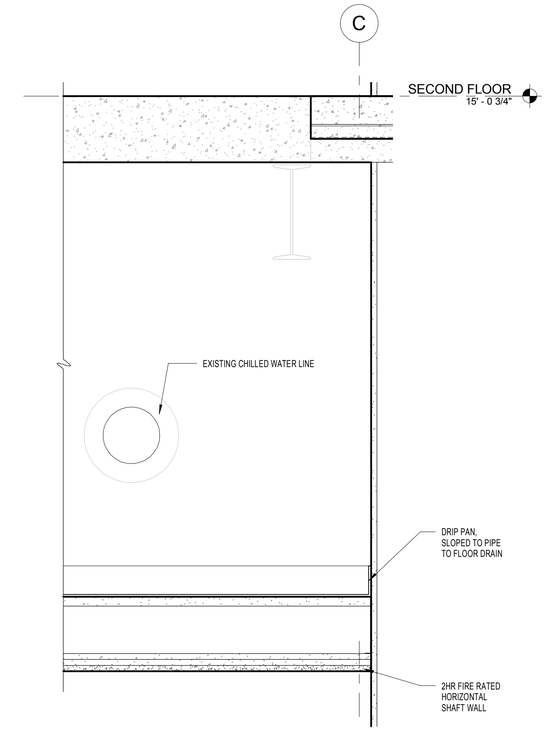
4 CEILING DETAIL - TYPICAL BULKHEAD
A-511 REF: A-111 SCALE: 1 1/2" = 1'-0"



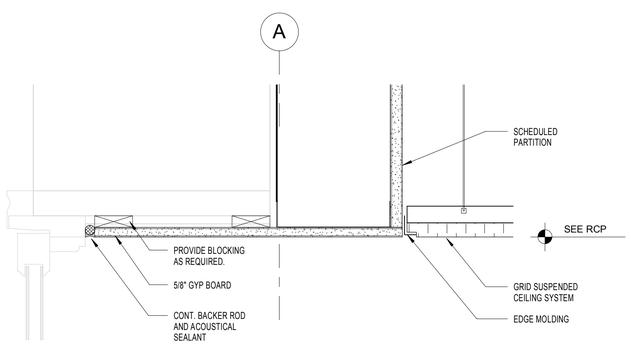
5 CEILING DETAIL - WINDOW HEAD @ TEAM ROOM
A-511 REF: A-111 SCALE: 3" = 1'-0"



6 CEILING DETAIL - TYPICAL CEILING TRANSITION 2
A-511 REF: A-111 SCALE: 3" = 1'-0"



7 CEILING DETAIL - TELECOM ROOM DRIP PAN
A-511 REF: A-111 SCALE: 1 1/2" = 1'-0"



8 CEILING DETAIL - WINDOW HEAD @ LIBRARY
A-511 REF: A-112 SCALE: 3" = 1'-0"

GRAPHIC SCALE

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED Checker	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED Approver	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

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X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
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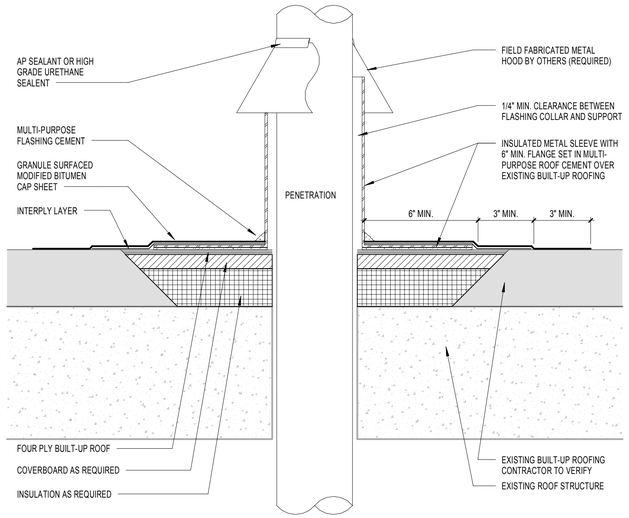
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

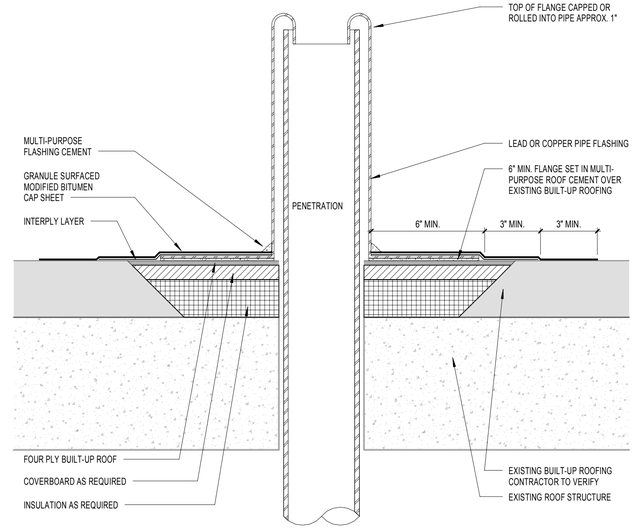
DRAWING TITLE: CEILING DETAILS

BUILDING NO. 1230
SHEET NO. A-511
SIZE D
DRAWING NO. 1293450
LATEST REV.

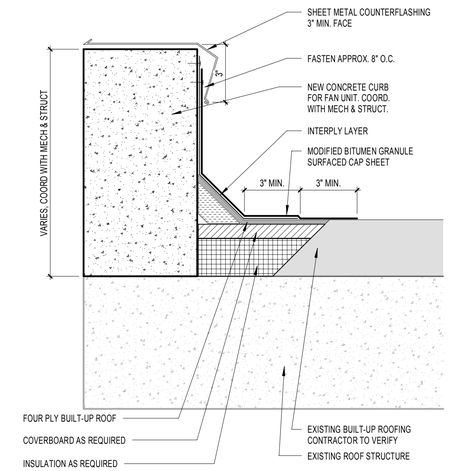
12/16/2013 7:59:34 AM



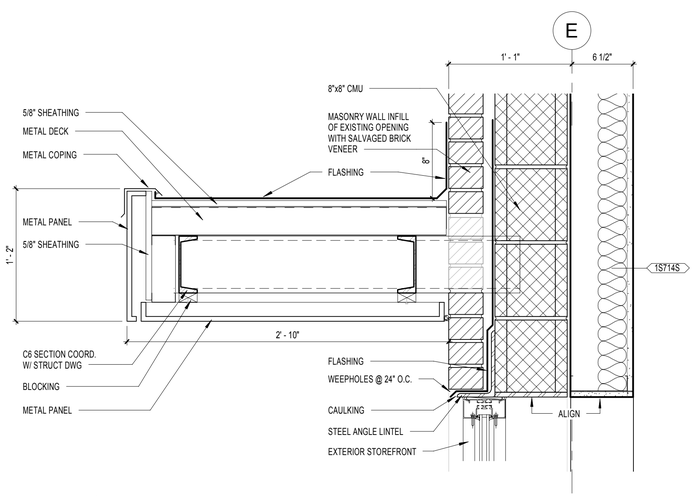
1 | ROOF DETAIL - TYP. AT STEAM VENT PENETRATION
A-512 | REF: SCALE: 3" = 1'-0"



2 | ROOF DETAIL - TYP. AT PLUMBING VENT PENETRATION
A-512 | REF: SCALE: 3" = 1'-0"



3 | ROOF DETAIL - TYP. AT ROOF FAN AND EXHAUST
A-512 | REF: SCALE: 3" = 1'-0"



4 | CANOPY DETAIL
A-512 | REF: A-412 SCALE: 1 1/2" = 1'-0"

3"=1'-0" 12" 9" 6" 3" 0

GRAPHIC SCALE

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED (Designer)	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
			TECH. PROJ. ENG.	
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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF PENETRATION DETAIL

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293451 | LATEST REV.
SHEET NO. A-512

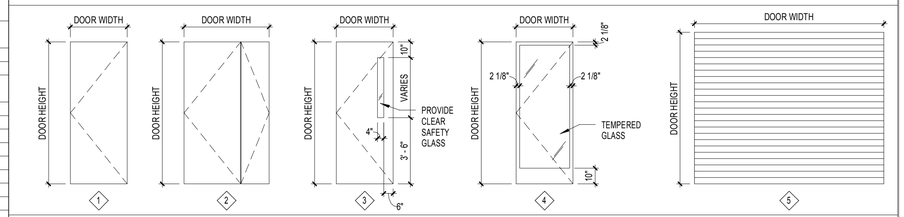
12/16/2013 7:59:37 AM

Door Schedule

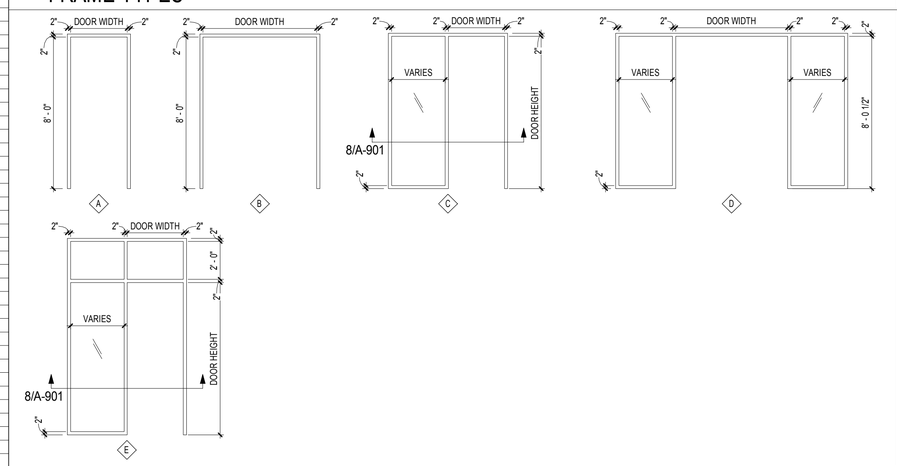
NO.	ROOM NAME	DOOR TYPE	DOOR WIDTH	DOOR HEIGHT	DOOR THICKNESS	DOOR MATERIAL	DOOR FINISH	HARDWARE	FRAME TYPE	FRAME HEAD	FRAME JAMB	FRAME SILL	FRAME MATERIAL	FRAME FINISH	FIRE RATING	COMMENT
BASEMENT																
20-1	MECHANICAL	1	3' - 0"	8' - 0"	0' - 1 3/4"	METAL	PT-4	114	A	2/A-901	1/A-901		HM	PT-4	90 MIN	
30-1	STAIR 2	1	3' - 0"	8' - 0"	0' - 1 3/4"	METAL	PT-4	816	A	10/A-901	9/A-901		HM	PT-4		EQUIPPED WITH CARD READER
FIRST FLOOR																
101A-1	VESTIBULE	3	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	314	A	2/A-601	1/A-601		HM	PT-4	60 MIN	
101A-2	VESTIBULE	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	813	A	2/A-601	1/A-601		HM	PT-4	60 MIN	EXISTING, EQUIPPED WITH CARD READER
101A-3	VESTIBULE	EXISTING	6' - 0"	7' - 0"	0' - 1 3/4"	EXISTING	EXISTING	441	EXISTING	EXISTING	EXISTING		EXISTING	EXISTING	-	EXISTING, EQUIPPED WITH CARD READER
102	TELECOM	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	815	A	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
124-2	SERVICE CORRIDOR	EXISTING	12' - 0"	11' - 4"	0' - 2"	EXISTING	EXISTING	402	EXISTING	EXISTING	EXISTING		EXISTING	EXISTING		EXISTING, PROVIDE IDS DOOR CONTACTS
127	BRANCH SUPPORT	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	710	E	6/A-601	7/A-601		ALUM			
128	TEAM ROOM	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	710	E	6/A-601	7/A-601		ALUM			
129	TEAM ROOM	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	710	E	6/A-601	5/A-601		ALUM			DOOR UNDERCUT - 3/4"
130-1	CLOSED LOOP LAB	1	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
130-2	CLOSED LOOP LAB	1	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	A	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
130-3	CORRIDOR	5	11' - 11"	9' - 9"	0' - 0 1/2"	METAL	NOTE 2	400		5/A-602	3/A-602		METAL	NOTE 2		EQUIPPED WITH BMS
130-4	CLOSED LOOP LAB	2	4' - 6"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
131	DESIGN INTEGRITY LAB	2	4' - 6"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
132	BASE RESEARCH STATION LAB	2	4' - 6"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
133-1	HOT BENCH LAB	2	4' - 6"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
133-2	HOT BENCH LAB	5	11' - 11"	11' - 10"	0' - 0 1/32"	METAL	NOTE 2	400		5/A-602	3/A-602		METAL	NOTE 2		EQUIPPED WITH BMS
133-3	HOT BENCH LAB	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	817	B	4/A-601	3/A-601		ALUM			EQUIPPED WITH CARD READER
134-1	TRUCK BAY	1	3' - 0"	8' - 0"	0' - 1 3/4"	METAL	PT-4	814	A	2/A-601	1/A-601		HM	PT-4	90 MIN	EQUIPPED WITH CARD READER
134-2	TRUCK BAY	5	9' - 0"	10' - 0"	0' - 0 1/2"	METAL	NOTE 2	400		5/A-602	4/A-602		METAL	NOTE 2	90 MIN	EQUIPPED WITH BMS
134-3	TRUCK BAY	5	14' - 0"	16' - 6"	0' - 0 1/32"	METAL	NOTE 3	402		5/A-602	2/A-602		METAL	NOTE 3		PROVIDE IDS DOOR CONTACTS
134-4	TRUCK BAY	EXISTING	12' - 0"	11' - 4"	0' - 2"	EXISTING	EXISTING	402	EXISTING	EXISTING	EXISTING		EXISTING	EXISTING		EXISTING, PROVIDE IDS DOOR CONTACTS
135-1	SHOP	2	4' - 6"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
135-2	SHOP	1	3' - 0"	8' - 0"	0' - 1 3/4"	HM	PT-4	814	A	2/A-601	1/A-601		HM	PT-4	90 MIN	EQUIPPED WITH CARD READER
135A	STO.	1	7' - 0"	9' - 0"	0' - 1 3/4"	WOOD	PT-4	820	B	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
136-1	EMBEDDED AVIONICS RESEARCH LAB	2	4' - 6"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
136-2	EMBEDDED AVIONICS RESEARCH LAB	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	817	A	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
136-3	CORRIDOR	5	9' - 0"	9' - 9"	0' - 0 1/2"	METAL	NOTE 2	400		5/A-602	3/A-602		METAL	NOTE 2		EQUIPPED WITH BMS
136-4	EMBEDDED AVIONICS RESEARCH LAB	1	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
137	VEHICLE EMULATION LAB/VEL COCKPIT	2	4' - 6"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	825	B	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
138	EQUIP. CLOSET	1	7' - 0"	9' - 0"	0' - 1 3/4"	WOOD	PT-4	820	B	2/A-601	1/A-601		HM			
138A	JAN. CLOSET	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	810	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
139A	MEN	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	210	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
139B	WOMEN	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	210	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
140A	TEAM ROOM	3	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	710	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
C-1	VESTIBULE	3	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	124	B	2/A-601	1/A-601		HM	PT-4	60 MIN	
C-2	VESTIBULE	1	6' - 0"	8' - 0"	0' - 1 3/4"	METAL	PT-4	826	B	2/A-601	1/A-601		HM	PT-4	90 MIN	EQUIPPED WITH CARD READER
C-3	VESTIBULE	4	6' - 0"	7' - 0"	0' - 1 3/4"	GLASS		442	D		12/A600		ALUM		-	EQUIPPED WITH CARD READER AND POWER OPERATOR
H1-1	EXISTING VESTIBULE	EXISTING	6' - 0"	8' - 0"	0' - 1 3/4"	EXISTING	EXISTING	441	EXISTING	EXISTING	EXISTING		EXISTING	EXISTING		EXISTING, EQUIPPED WITH CARD READER
H1-2	EXISTING CORRIDOR	3	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	123	B	2/A-601	1/A-601		HM	PT-4	60 MIN	ELECTRIC HOLD OPEN
H1A-1	LOBBY	3	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	324	B	2/A-601	1/A-601		HM	PT-4	60 MIN	
H1A-2	CORRIDOR	5	11' - 11"	11' - 10"	0' - 0 1/32"	METAL	NOTE 3	402		5/A-602	2/A-602		METAL	NOTE 3		PROVIDE IDS DOOR CONTACTS
H1A-3	CORRIDOR	EXISTING	6' - 0"	7' - 0"	0' - 1 3/4"	EXISTING	EXISTING	441	EXISTING	EXISTING	EXISTING		EIXSTING	EXISTING	-	EXISTING, EQUIPPED WITH CARD READER
H1A-4	CORRIDOR	5	11' - 11"	11' - 10"	0' - 0 1/32"	METAL	NOTE 3	402		5/A-602	2/A-602		METAL	NOTE 3		PROVIDE IDS DOOR CONTACTS
H1A-5	CORRIDOR	E XISTING	6' - 0"	7' - 0"	0' - 1 3/4"	EXISTING	EXISTING	441	EXISTING	EXISTING	EXISTING		EXISTING	EXISTING		EXISTING, EQUIPPED WITH CARD READER
SECOND FLOOR																
221	TEAM ROOM	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	710	C	6/A-601	5/A-601		ALUM			DOOR UNDERCUT - 3/4"
222	TEAM ROOM	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	710	C	6/A-601	7/A-601		ALUM			
223	TEAM ROOM	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	710	C	6/A-601	7/A-601		ALUM			
240	TELECOM	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	815	A	2/A-601	1/A-601		HM			EQUIPPED WITH CARD READER
244	BRANCH HEAD OFFICE	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	510	C	6/A-601	5/A-601		ALUM			DOOR UNDERCUT - 3/4"
244A-1	CLOSET	1	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	120	B	2/A-601	1/A-601		HM			
251	ASST. BRANCH HEAD OFFICE	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	510	C	6/A-601	5/A-601		ALUM			DOOR UNDERCUT - 3/4"
252	BRANCH HEAD OFFICE	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	510	C	6/A-601	5/A-601		ALUM			DOOR UNDERCUT - 3/4"
253A	STO.	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	810	A	2/A-601	1/A-601		HM			
253B	EQUIP CLOSET	1	7' - 0"	9' - 0"	0' - 1 3/4"	WOOD	PT-4	820	B	2/A-601	1/A-601		HM			
253C	STO.	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	810	A	2/A-601	1/A-601		HM			
254	ASST. BRANCH HEAD OFFICE	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	510	C	6/A-601	5/A-601		ALUM			DOOR UNDERCUT - 3/4"
258	ASST. BRANCH HEAD OFFICE	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	510	C	6/A-601	5/A-601		ALUM			DOOR UNDERCUT - 3/4"
258A-1	CLOSET	1	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	120	B	2/A-601	1/A-601		HM			
259	EQUIP CLOSET	1	7' - 0"	9' - 0"	0' - 1 3/4"	WOOD	PT-4	820	B	2/A-601	1/A-601		HM			
261	JAN. CLOSET	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	810	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
262A	MEN	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	210	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
262B	WOMEN	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	210	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 3/4"
264	LIBRARY	3	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	711	A	2/A-601	1/A-601		HM			
265-1	CONFERENCE ROOM	3	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	711	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 1/2"
265-2	CONFERENCE ROOM	3	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	711	A	2/A-601	1/A-601		HM			DOOR UNDERCUT - 1/2"
H2A-1	LOBBY	3	6' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	324	B	2/A-601	1/A-601		HM		60 MIN	
S2F	STAIR 3	1	3' - 0"	8' - 0"	0' - 1 3/4"	WOOD	PT-4	114	A	2/A-601	1/A-601		HM		60 MIN	

NOTE:
1. PUSH/PULL FORCE REQUIRED FOR ADA DOORS
2. ALL INTERIOR OVERHEAD COILING DOORS TO BE PAINTED BY MANUFACTURER TO MATCH ADJACENT WALL PAINT.
3. ALL EXTERIOR OVERHEAD COILING DOORS, EXTERIOR FACE TO BE PAINTED BY MANUFACTURER TO MATCH EXISTING EXTERIOR WINDOW FRAME. INTERIOR FACE TO BE PAINTED BY MANUFACTURER TO MATCH ADJACENT INTERIOR WALL PAINT.

DOOR TYPES



FRAME TYPES



REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
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NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

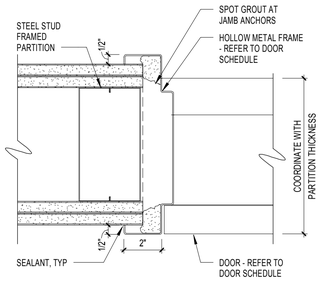
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

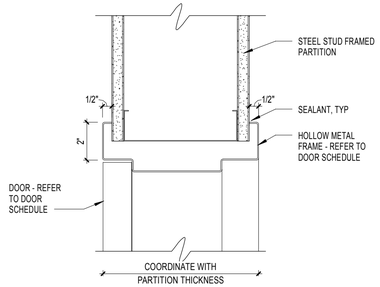
DRAWING TITLE: DOOR SCHEDULE

BUILDING NO. 1230
SHEET NO. A-600
SIZE D
DRAWING NO. 1293452
LATEST REV.

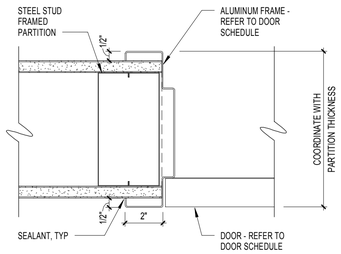
12/16/2013 7:59:39 AM



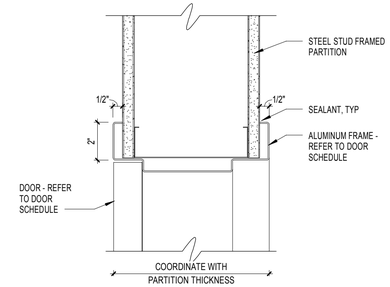
1 DOOR JAMB DETAIL - HM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



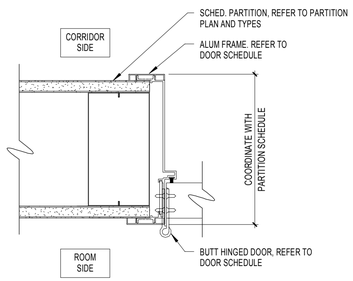
2 DOOR HEAD DETAIL - HM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



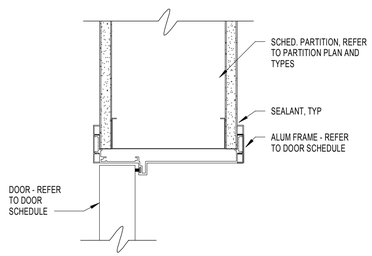
3 DOOR JAMB DETAIL - ALUM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



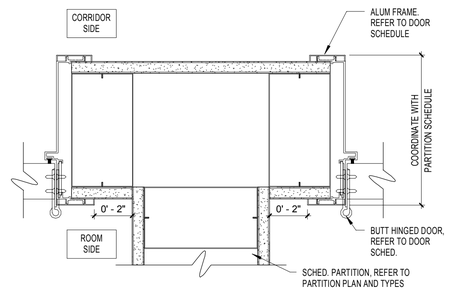
4 DOOR HEAD DETAIL - ALUM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



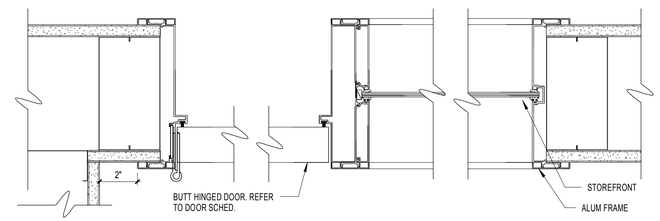
5 STOREFRONT DOOR JAMB DETAIL - ALUM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



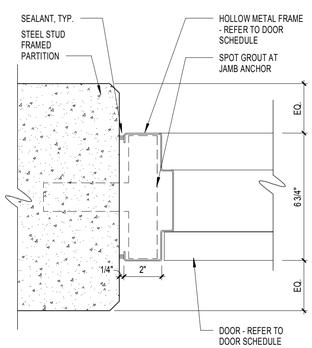
6 STOREFRONT DOOR HEAD DETAIL - ALUM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



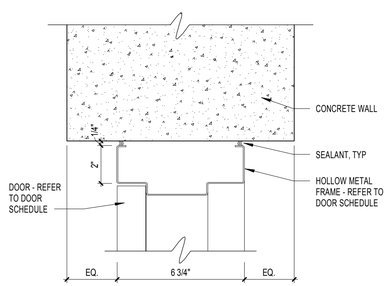
7 DOOR JAMB @ STOREFRONT DETAIL - ALUM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



8 DOOR STRIKE & STOREFRONT SIDELIGHT DETAIL -ALUM - METAL STUD 2"
A-601 REF: SCALE: 3" = 1'-0"



9 DOOR JAMB DETAIL - HM - CONCRETE 2"
A-601 REF: SCALE: 3" = 1'-0"



10 DOOR HEAD DETAIL - HM - CONCRETE 2"
A-601 REF: SCALE: 3" = 1'-0"

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

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3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONICHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

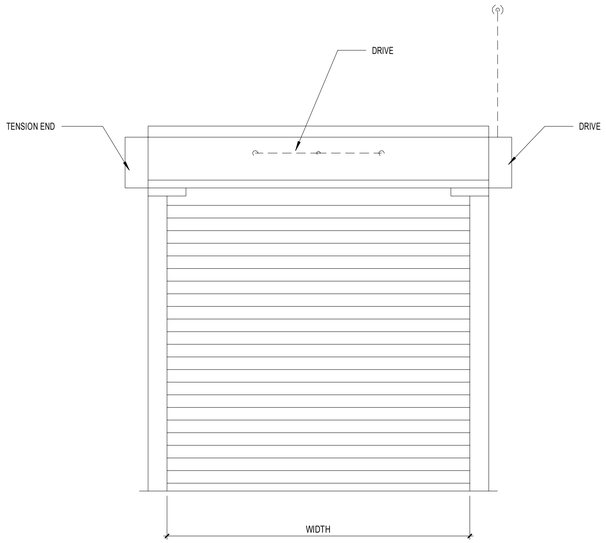
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: DOOR DETAILS

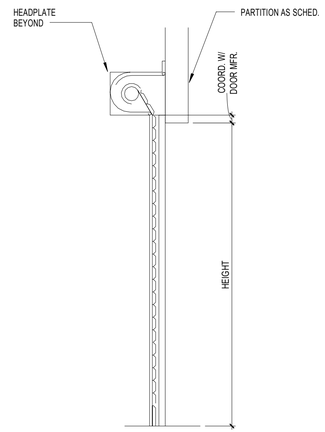
BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293453 | LATEST REV.:

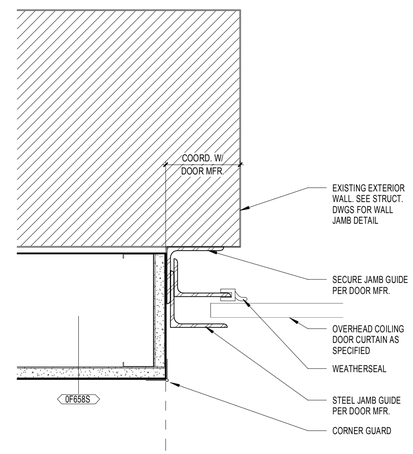
SHEET NO.: A-601

12/16/2013 7:59:42 AM

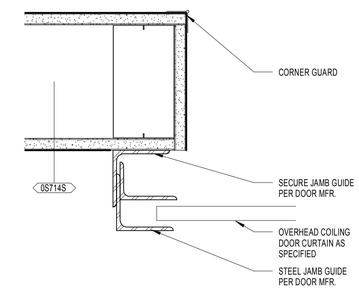


1 Overhead Door - Fire rated - Elevation
A-602 REF: SCALE: 1/2" = 1'-0"

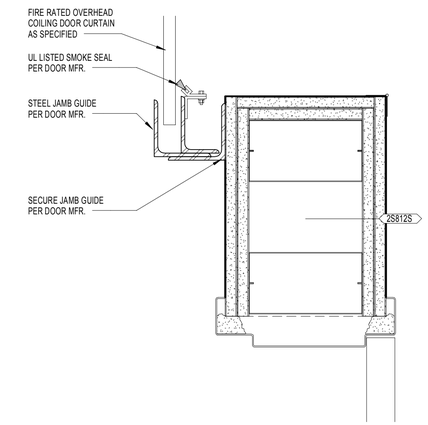




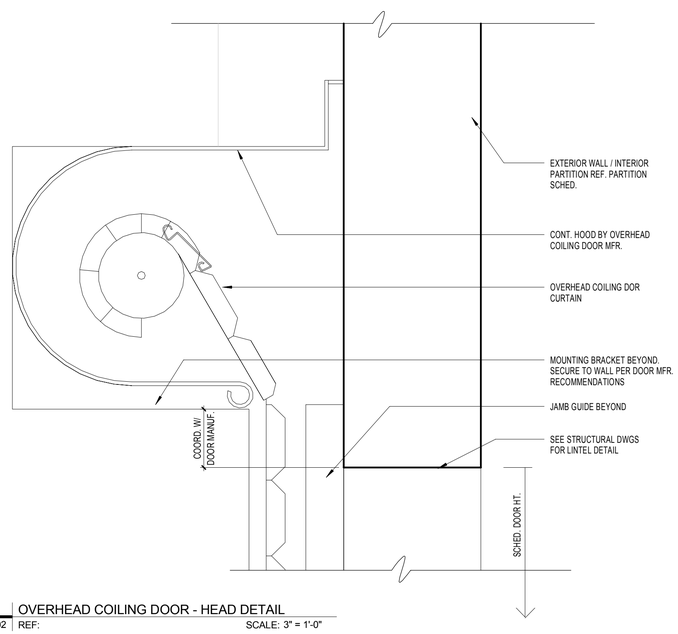
2 EXTERIOR COILING DOOR JAMB DETAIL
A-602 REF: A-101a SCALE: 3" = 1'-0"



3 INTERIOR COILING DOOR JAMB DETAIL
A-602 REF: A-101a SCALE: 3" = 1'-0"



4 FIRE RATED COILING DOOR JAMB DETAIL
A-602 REF: A-101a SCALE: 3" = 1'-0"



5 OVERHEAD COILING DOOR - HEAD DETAIL
A-602 REF: SCALE: 3" = 1'-0"

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
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APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN (Author)	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED (Designer)	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: DOOR DETAIL

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293454 | LATEST REV.

SHEET NO. A-602

12/16/2013 7:59:46 AM

STEEL STUD PARTITIONS

GENERAL NOTES

1. LIMITING HEIGHT, STUD GAUGE AND SPACING INFORMATION PROVIDED IN PARTITION SCHEDULES ARE ABBREVIATED AND MAY NOT ADDRESS ALL CONDITIONS OF THE PROJECT. THIS INFORMATION IS PROVIDED FOR USE AS A GUIDE AND DOES NOT ALLEVIATE THE CONTRACTOR FROM PROVIDING WALL ASSEMBLIES THAT MEET THE DESIGN CRITERIA FOR EACH CONDITION. CONTRACTOR SHALL COORDINATE WITH PROJECT CONDITIONS AND PROVIDE WALL ASSEMBLIES BASED ON MANUFACTURER'S STANDARD SPAN TABLES THAT MEET DESIGN CRITERIA INCLUDING: LOADS, DEFLECTION LIMITS, FIRE TEST RATINGS AND SOUND TEST CLASSIFICATIONS.

2. SOUND TRANSMISSION CLASS (STC) INDICATED IS BASED ON MATERIALS AND CONSTRUCTION IDENTICAL TO THOSE IN SOUND TEST ASSEMBLY SCHEDULED. IF CHANGES IN THE ASSEMBLY ARE NECESSARY DUE TO CONTRACTOR'S SELECTION OF PRODUCTS / MANUFACTURER OR DUE TO REQUIRED PARTITION HEIGHT, DEFLECTION CRITERIA OR DESIGN PRESSURE, CONTRACTOR SHALL SUBMIT FOR APPROVAL AND PROVIDE ALTERNATE PARTITION ASSEMBLIES THAT MEET SPECIFIED DESIGN CRITERIA. FIELD SOUND TRANSMISSION (FSTC) IS PERMITTED TO BE 5 POINTS LOWER THAN SPECIFIED STC.

3. IF THE SELECTED STEEL STUD MANUFACTURER'S THICKNESS OF STEEL COMPONENT VARIES FROM THE BASIS OF DESIGN (AS DEFINED BELOW) OR HAS OTHER ATTRIBUTES THAT VARY FROM THE BASIS OF DESIGN, PROVIDE MANUFACTURER'S STANDARD THICKNESS WITH LIMITING HEIGHT SPAN TABLES THAT MEETS OR EXCEEDS THE SPECIFIED DESIGN CRITERIA.

4. PARTITIONS SHALL EXTEND TO AND TERMINATE AT THE UNDERSIDE OF STRUCTURE ABOVE, UNLESS NOTED OTHERWISE.

5. RATED PARTITIONS SHALL BE PERMANENTLY IDENTIFIED IN CONCEALED SPACES EITHER AS REQUIRED BY CODE OR WITH 2" HIGH LETTERING IN A COLOR / VALUE CONTRASTING WITH THE BACKGROUND AND SPACE NO MORE THAN 12 FEET ON CENTER. TEXT SHALL READ AS REQUIRED BY CODE OFFICIAL OR AS "_____ HOUR FIRE & SMOKE BARRIER - PROTECT ALL OPENINGS." (FILL IN APPROPRIATE HOURLY RATING)

6. GYPSUM WALL BOARD IS TO BE TYPE 'X' FIRE RESISTANT BOARD UNLESS OTHERWISE NOTED.

7. DOOR OPENING FRAMING (WHETHER RATED OR NON-RATED) SHALL BE MINIMUM 20 GAGE STUDS WITH SINGLE STUD JAMB FOR STANDARD WEIGHT DOORS AND DOUBLE STUD JAMB FOR HEAVY WEIGHT DOORS IN ACCORDANCE WITH GYPSUM ASSOCIATION STANDARD GA-219.

DESIGN CRITERIA

DESIGN PRESSURE	PARTITION PURPOSE / LOCATION
5 / 7.5 / 10 / 15 PSF	ELEVATOR HOIST WAYS (REFERENCE USG RECOMMENDATIONS BELOW)
10 PSF	STAIRS, OTHER VERTICAL SHAFTS
15 PSF	GROUND FLOOR LOBBIES & ATRIUMS
5 PSF	OTHER WALLS

DEFLECTION LIMIT	CLADDING MATERIAL
5 / 7.5 / 10 / 15 PSF	ELEVATOR HOIST WAYS (REFERENCE USG RECOMMENDATIONS BELOW)
10 PSF	STAIRS, OTHER VERTICAL SHAFTS
15 PSF	GROUND FLOOR LOBBIES & ATRIUMS
5 PSF	OTHER WALLS

USG HOIST WAY CHART - PROVIDED FOR REFERENCE ONLY

USG RECOMMENDS DESIGN PRESSURES FOR SHAFT WALL CONSTRUCTION IN ACCORDANCE WITH THE FOLLOWING TABLE.:

ELEVATOR VELOCITY; FMP (M/S)	ONE OR TWO ELEVATORS PER SHAFT	THREE OR MORE ELEVATORS PER SHAFT
0 (0) TO 180 (0.91)	5.0 PSF (239 PA)	5.0 PSF (239 PA)
180 (0.91) TO 1000 (5.08)	7.5 PSF (359 PA)	5.0 PSF (239 PA)
1000 (5.08) TO 1800 (9.14)	10.0 PSF (479 PA)	7.5 PSF (359 PA)
1800 (9.14) TO 3000 (15.24)	15.0 PSF (718 PA)	5.0 PSF (239 PA)

BASIS OF DESIGN

MINIMUM METAL THICKNESS

IF THE SELECTED MANUFACTURER'S THICKNESS OF STEEL COMPONENTS VARIES FROM THE BASIS OF DESIGN INDICATED BELOW, PROVIDE MANUFACTURER'S STANDARD THICKNESS AND SPAN TABLES THAT MEETS OR EXCEEDS THE PERFORMANCE REQUIREMENTS INDICATED.

STEEL FRAME PARTITIONS — STEEL FRAME PARTITIONS ARE BASED ON INFORMATION PROVIDED IN THE STEEL STUD MANUFACTURER'S ASSOCIATION (SSMA) PUBLICATION "PRODUCT TECHNICAL INFORMATION" DATED 07/2001

METAL THICKNESS - STEEL COMPONENTS

REFERENCE GAGE	DESIGN THICKNESS (IN.)	MINIMUM THICKNESS (MIL.)
25	0.0188	18
22	0.0283	27
20	0.0346	33
18	0.0451	43

SHAFT WALLS — SHAFT WALLS ARE BASED ON UNITED STATES GYPSUM COMPANY PRODUCT LITERATURE SA 926 / REV. 06/2006

METAL THICKNESS - STEEL COMPONENTS

REFERENCE GAGE	DESIGN THICKNESS (IN.)	MINIMUM THICKNESS (IN.)
25	0.0188	0.0179
24	0.0283	0.0227
20	0.0359	0.0341

CHASE WALLS — CHASE WALLS ARE BASED ON UNITED STATES GYPSUM COMPANY PRODUCT LITERATURE SA 923 / REV. 03/2002

METAL THICKNESS - STEEL COMPONENTS

REFERENCE GAGE	DESIGN THICKNESS (IN.)	MINIMUM THICKNESS (IN.)
25	0.0188	0.0179
22	0.0284	0.0270
20	0.0359	0.0341
18	0.0478	0.0454

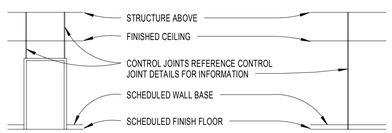
GYPSUM BOARD CONTROL JOINTS

MAXIMUM SPACING - CONTROL JOINTS

CONSTRUCTION AND LOCATION	MAXIMUM SINGLE DIMENSION	MAXIMUM SINGLE AREA
PARTITION - INTERIOR	30' - 0"	
CEILING - INTERIOR		
WITH PERIMETER RELIEF	50' - 0"	2,500 S.F.
WITHOUT PERIMETER RELIEF	30' - 0"	900 S.F.

NOTE: ANY REQUIRED CONTROL JOINTS NOT SHOWN OR LOCATED IN THE DRAWINGS SHALL BE FIELD COORDINATED WITH THE ARCHITECT PRIOR TO FINAL INSTALLATION

GYPSUM BOARD CONTROL JOINT PLACEMENT DIAGRAMS



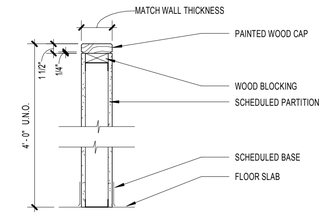
PARTITION NUMBERING SYSTEM

PARTITION TYPE MARKER

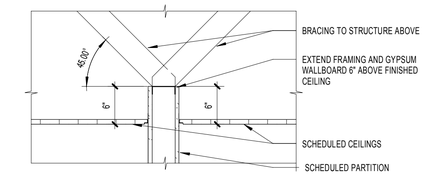
HOURLY RATING		CORE STRUCTURE	
0	0 HOUR	S	STEEL STUD
1	1 HOUR	W	WOOD STUD
2	2 HOUR	M	CONCRETE MASONRY UNIT
3	3 HOUR	F	FURRING
4	4 HOUR	X	SHAFT WALL - STEEL STUD
S	SMOKE	C	CHASE WALL

MODIFICATION CODES

C	ADD 1/2" CEMENT BOARD LAYER TO SURFACE OF SCHEDULED PARTITION IN AREAS TO RECEIVE TILE
I	SUBSTITUTE THE OUTSIDE FACE LAYER OF SCHEDULED GYPSUM BOARD WITH IMPACT RESISTANT GYPSUM BOARD OF EQUAL THICKNESS AND FIRE RATING
P	PARTIAL HEIGHT WALL - REFER TO "P" MODIFIER DETAIL
S	SOUND ATTENUATION REQUIRED -COMPLY WITH SCHEDULED STC RATING & TESTING ASSEMBLY REQUIREMENTS
T	EXTEND GYPSUM WALL BOARD TO ABOVE FINISH CEILING - REFER TO "T" MODIFIER DETAIL BELOW FOR ADDITIONAL INFORMATION
X	EXTEND PARTITION TO ABOVE FINISH CEILING AND BRACE TO STRUCTURE - REFER TO "X" MODIFIER DETAIL BELOW FOR ADDITIONAL INFORMATION
Y	EXTEND PARTITION TO UNDERSIDE OF FINISH CEILING, ADD SOUND ATTENUATION ABOVE CEILING - REFER TO "Y" MODIFIER DETAIL BELOW FOR ADDITIONAL INFORMATION
+58	ADDITIONAL LAYER OF 5/8" GYPSUM WALL BOARD ON ONE SIDE

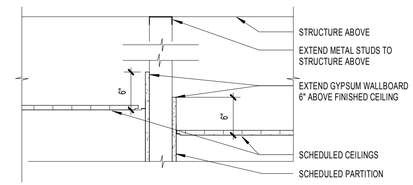


P "P" MODIFIER - PARTIAL HEIGHT WALL

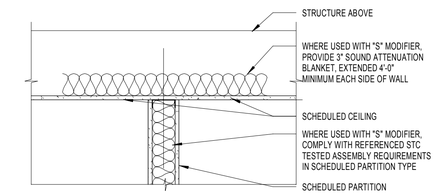


X "X" MODIFIER - PARTIAL HEIGHT PARTITION

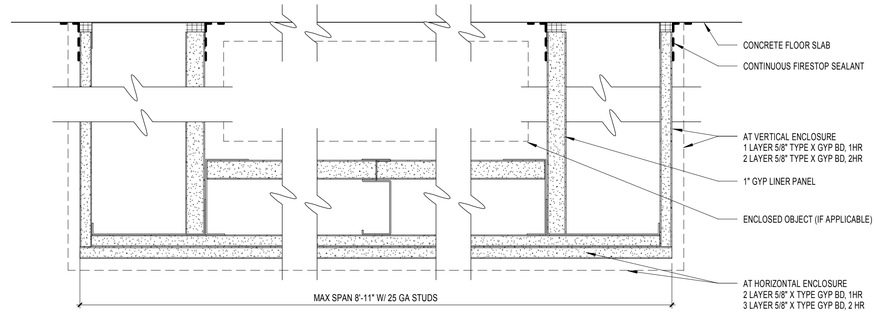
BRACE TO STRUCTURE



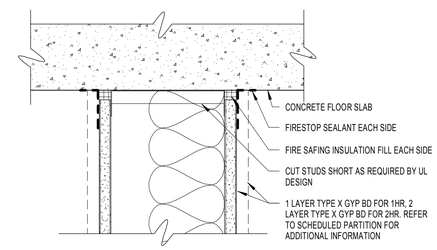
T "T" MODIFIER - PARTIAL HEIGHT FINISH



Y "Y" MODIFIER - PARTITION TO FINISH CEILING

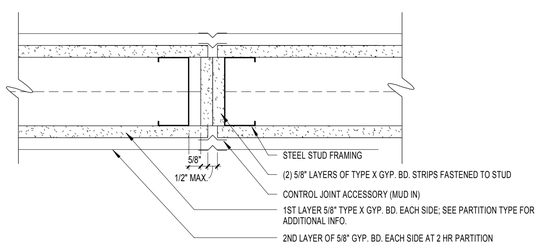


1 HORIZONTAL MEMBRANE - 1 & 2 HR
A-610 REF: A-111 SCALE: 3" = 1'-0"



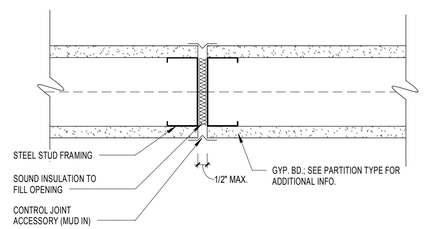
BASIS OF DESIGN: U.L. NO. HW-D-0094

2 HEAD WALL DETAIL AT CONCRETE - 1 & 2 HR
A-610 REF: SCALE: 3" = 1'-0"

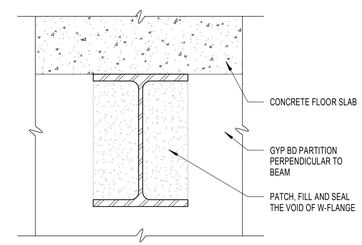


BASIS OF DESIGN: GA-234-08, WHI-647-3024

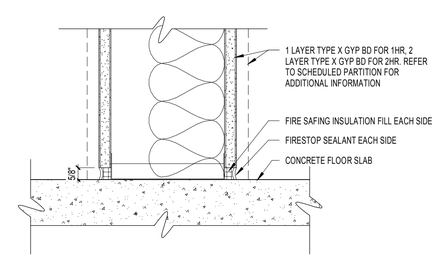
3 CONTROL JOINT DETAIL - 1 & 2 HR RATED
A-610 REF: SCALE: 3" = 1'-0"



4 CONTROL JOINT DETAIL - NON RATED
A-610 REF: SCALE: 3" = 1'-0"



5 HEAD WALL DETAIL AT BEAM
A-610 REF: SCALE: 1 1/2" = 1'-0"



BASIS OF DESIGN: U.L. NO. BW-S-0013

6 BASE WALL DETAIL AT CONCRETE - 1 & 2 HR
A-610 REF: SCALE: 3" = 1'-0"

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
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NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ± .02 ; X.XXX (3 DECIMAL PLACES) ± .005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

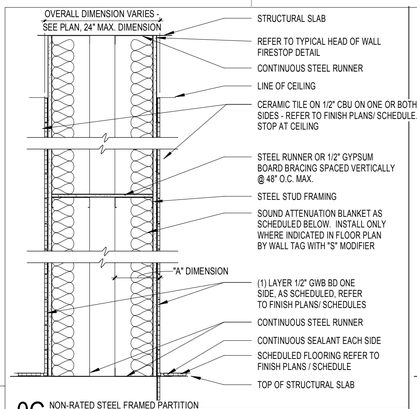
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: INTERIOR PARTITION

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293455 | LATEST REV.

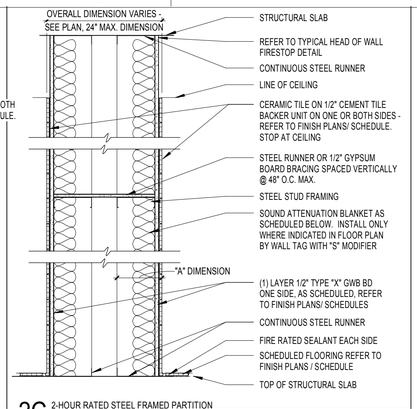
SHEET NO. A-610

12/16/2013 7:59:48 AM



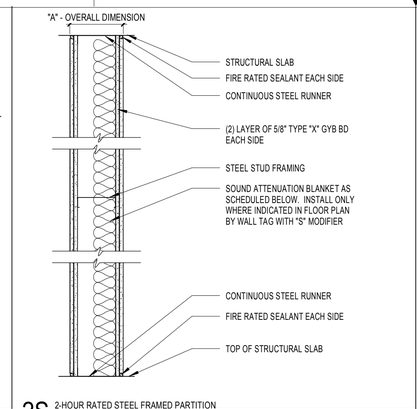
0C NON-RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - TILE ON 1/2" CEMENT BACKER BOARD, ONE SIDE ONLY

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
0C718	6"	7-3/4"											
			25	16"		19'-9"				L/360	60	SA-840524	3"



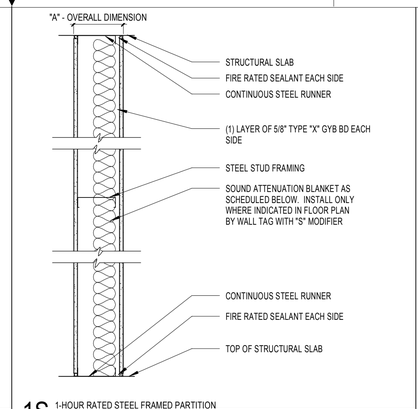
2C 2-HOUR RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - TILE ON 1/2" CEMENT BACKER BOARD, ONE SIDE ONLY

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
2C734	6"	7-3/4"											
			25	16"	U444	19'-9"				L/360	60	SA-840524	3"



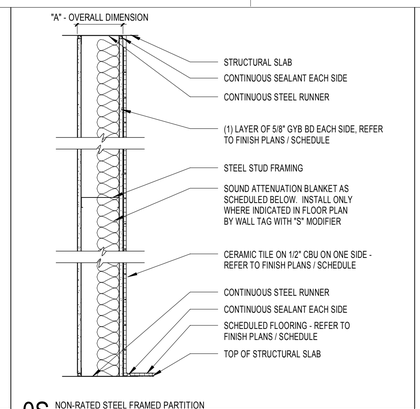
2S 2-HOUR RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - (2) LAYER 5/8" TYPE 'X' GYB BD, EACH SIDE

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
2S812	6"	8-1/2"	25	24"	U419	16'-9"	13'-5"	11'-5"		L/240	56	USG-840818	3"
			20	16"	U419	21'-4"	18'-9"	17'-0"	15'-1"	L/360			



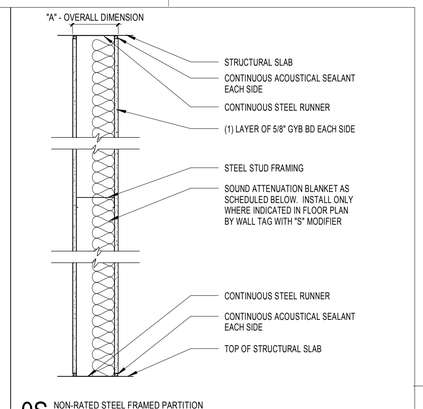
1S 1-HOUR RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - (1) LAYER 5/8" TYPE 'X' GYB BD, EACH SIDE

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
1S714	6"	7-1/4"	25	24"	U419	16'-9"	13'-5"	11'-5"		L/240	51	RAL-LT-90-166	3"
			20	16"	U419	21'-4"	18'-9"	17'-0"	15'-1"	L/360			



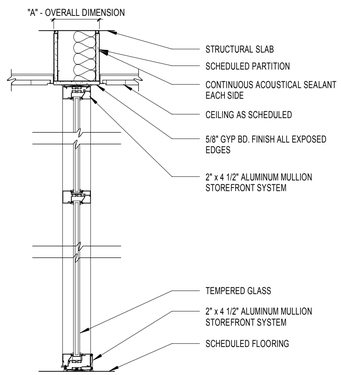
0S NON-RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - TILE ON 1/2" CEMENT BACKER BOARD

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
0S734	6"	7-3/4"											
			20	16"		21'-4"	18'-9"	17'-0"	15'-1"	L/360	48	SA-840321	3"



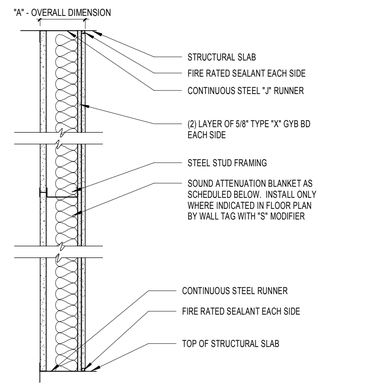
0S NON-RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - (1) LAYER 5/8" GYB BD, EACH SIDE

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
0S714	6"	7-1/4"	25	24"		16'-9"	13'-5"	11'-5"		L/240	51	RAL-LT-90-166	3"
			20	16"		21'-4"	18'-9"	17'-0"	15'-1"	L/360			



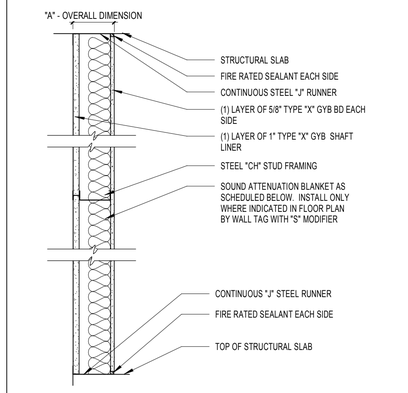
SG STOREFRONT
NON-LOAD BEARING - WITH SCHEDULED PARTITION ABOVE

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
SG714	6"	7-1/4"	20	24"		25'-1"	21'-11"	19'-11"	17'-5"	L/240			3"
			20	24"		21'-11"	19'-2"	17'-5"	15'-2"	L/360			



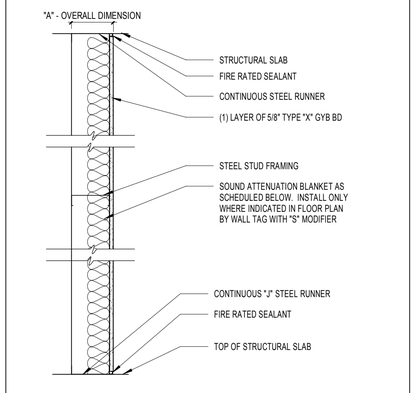
2X 2-HOUR RATED STEEL FRAMED SHAFT WALL
NON-LOAD BEARING - (2) LAYER 5/8" TYPE 'X' GYB BD, EACH SIDE

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
2X714	6"	7-1/4"	20	24"	U415 SYS "B"	25'-1"	21'-11"	19'-11"	17'-5"	L/240			
			20	24"	U415 SYS "B"	21'-11"	19'-2"	17'-5"	15'-2"	L/360			



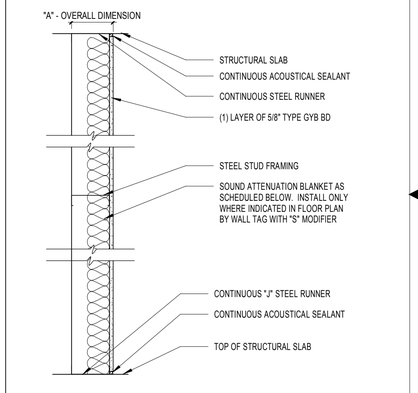
1X 1-HOUR RATED STEEL FRAMED SHAFT WALL
NON-LOAD BEARING - (1) LAYER 5/8" TYPE 'X' GYB BD, EACH SIDE

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
1X318	2-1/2"	3-1/8"	25	24"	U415 SYS "A"	9'-9"	8'-6"	7'-9"	6'-0"	L/240			
			20	24"	U415 SYS "A"	12'-3"	10'-8"	9'-0"	8'-6"	L/360			
1X658	6"	6-5/8"	20	24"	U415 SYS "A"	24'-3"	21'-2"	19'-3"	13'-6"	L/240			
			20	24"	U415 SYS "A"	21'-2"	18'-6"	16'-9"	13'-6"	L/360			



1F 1-HOUR RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - (1) LAYER 5/8" TYPE 'X' GYB BD, ONE SIDE ONLY

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
1F214	1-5/8"	2-1/4"	25	24"		7'-11"				L/240			
			20	16"		8'-5"				L/360			
1F318	2-1/2"	3-1/8"	25	24"		9'-9"	8'-6"	7'-9"	6'-0"	L/240			3"
			20	16"		12'-3"	10'-8"	9'-0"	8'-6"	L/360			
1F658	6"	6-5/8"	25	24"		16'-9"	13'-5"	11'-5"		L/240			3"
			20	16"		21'-4"	18'-9"	17'-0"	15'-1"	L/360			



0F NON-RATED STEEL FRAMED PARTITION
NON-LOAD BEARING - (1) LAYER 5/8" GYB BD, ONE SIDE ONLY

DESIGNATION NO.	STUD SIZE	"A" DIM.	GA	O.C. (MAX)	FIRE TEST	LIMITING HEIGHT 5 psf	7.5 psf	10 psf	15 psf	DEFL.	"S" MODIFIER STC CLASS (NOTE 2)	SOUND TEST	SAB
0F214	1-5/8"	2-1/4"	25	24"		7'-11"				L/240			
			20	16"		8'-5"				L/360			
0F318	2-1/2"	3-1/8"	25	24"		9'-9"	8'-6"	7'-9"	6'-0"	L/240			3"
			20	16"		12'-3"	10'-8"	9'-0"	8'-6"	L/360			
0F658	6"	6-5/8"	25	24"		16'-9"	13'-5"	11'-5"		L/240			3"
			20	16"		21'-4"	18'-9"	17'-0"	15'-1"	L/360			

GRAPHIC SCALE

REVISIONS Date	No.	Description	BY	Issued to

REVISIONS Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
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Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

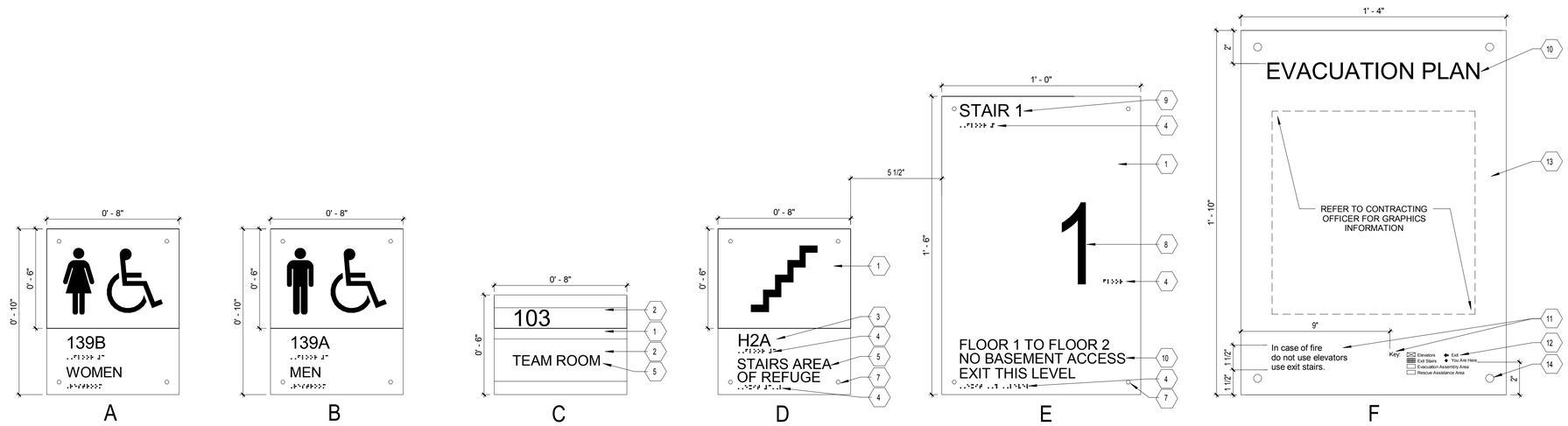
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: INTERIOR PARTITION SCHEDULE

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293456 | LATEST REV.
SHEET NO. A-611

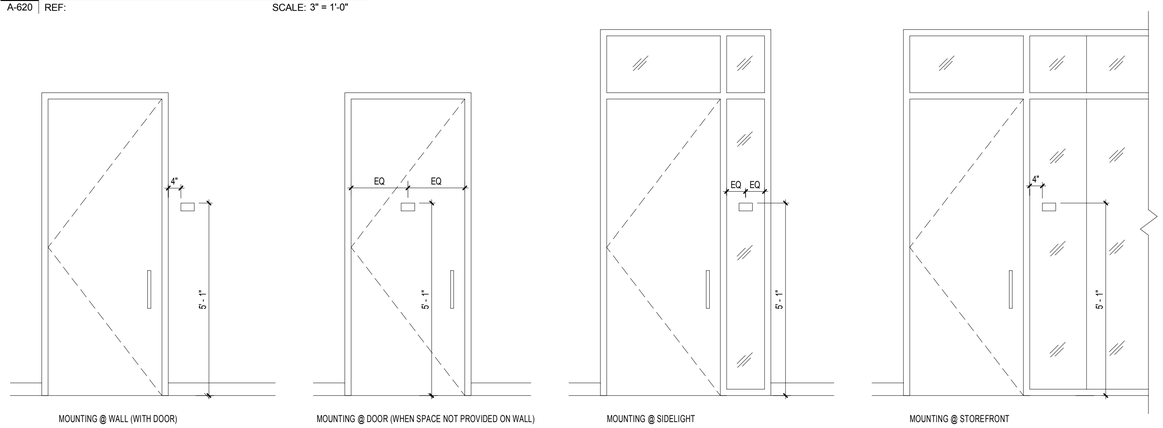
12/16/2013 7:59:52 AM

SIGNAGE TYPE SCHEDULE		
Mark	ROOM NAME	SIGNAGE TYPE
20-1	MECHANICAL	E,F
20-2	MECHANICAL	C
20-3	MECHANICAL	C
20-4	MECHANICAL	C
30-1	STAIR 2	E
E01	ELEV 1	C
101A-1	VESTIBULE	E
101A-2	VESTIBULE	E
102	TELECOM	C
124-1	SERVICE CORRIDOR	C
124-2	SERVICE CORRIDOR	C
124A-1	CHILLER	C
124A-2	SERVICE CORRIDOR	C
127	BRANCH SUPPORT	C
128	TEAM ROOM	C
129	TEAM ROOM	C
130-1	CLOSED LOOP LAB	C
130-2	CLOSED LOOP LAB	C
130-4	CLOSED LOOP LAB	C
131	DESIGN INTEGRITY LAB	C
132	BASE RESEARCH STATION LAB	C
133-1	HOT BENCH LAB	C
133-3	HOT BENCH LAB	C
134-1	TRUCK BAY	C
135-1	SHOP	C
135-2	SHOP	C
135A	STO.	C
136-1	EMBEDDED AVIONICS RESEARCH LAB	C
136-2	EMBEDDED AVIONICS RESEARCH LAB	C
136-4	EMBEDDED AVIONICS RESEARCH LAB	C
137	VEHICLE EMULATION LAB/VEL COCKPIT	C
138	EQUIP. CLOSET	C
138A	JAN. CLOSET	C
139A	MEN	B
139B	WOMEN	A
140A	TEAM ROOM	C
141		C
C-1	VESTIBULE	E
C-2	VESTIBULE	C
E102	TELECOM	C
E103A	ELEV 1	C
E103B	ELEV 1	C
H1-2	EXISTING CORRIDOR	C
H1A-1	LOBBY	E
221	TEAM ROOM	C
222	TEAM ROOM	C
223	TEAM ROOM	C
240	TELECOM	C
244	BRANCH HEAD OFFICE	C
244A-1	CLOSET	C
251	ASST. BRANCH HEAD OFFICE	C
252	BRANCH HEAD OFFICE	C
253A	STO.	C
253B	EQUIP CLOSET	C
253C	STO.	C
254	ASST. BRANCH HEAD OFFICE	C
258	ASST. BRANCH HEAD OFFICE	C
258A-1	CLOSET	C
259	EQUIP CLOSET	C
261	JAN. CLOSET	C
262A	MEN	B
262B	WOMEN	A
264	LIBRARY	C
265-1	CONFERENCE ROOM	C
265-2	CONFERENCE ROOM	C
E201	ELEV 1	C
H2A-1	LOBBY	D,E
S2F	STAIR 3	E

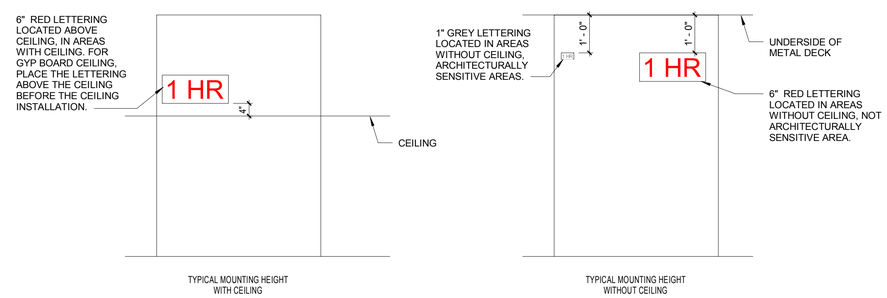


1 INTERIOR ROOM SIGN TYPES
A-620 REF: SCALE: 3" = 1'-0"

2 EVACUATION PLAN SIGN TYPE
A-620 REF: SCALE: 3" = 1'-0"



3 INTERIOR SIGNAGE MOUNTING CONDITIONS
A-620 REF: SCALE: 1/2" = 1'-0"



4 SIGNAGE FOR FIRE RATED CONSTRUCTION
A-620 REF: SCALE: 1/2" = 1'-0"

GENERAL NOTE FOR SIGNAGE FOR FIRE RATED CONSTRUCTION :

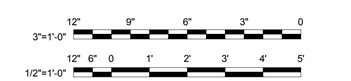
PLACE SIGNAGE FOR LABELING THE FIRE RATED CONSTRUCTION, AS INDICATED ON THE LS DRAWINGS, AT A MAXIMUM SPACING OF 20'-0", TYPICAL ON EACH FACE OF THE PARTITION UNOBSTRUCTED FROM VIEW. REQUIRE MINIMUM OF ONE LABEL PER WALL.

SIGNAGE GENERAL NOTES:

1. CHECK LIFE SAFETY DRAWINGS FOR EXIT LOCATIONS.
2. SUBMIT ALL SIGNS FOR APPROVAL OF DESIGN PRIOR TO CONSTRUCTION.
3. SIGNAGE TYPE F, PROVIDE UNIQUE SIGN FOR EACH LOCATION, INDICATING APPLICABLE FLOOR LEVEL, BUILDING PLAN, AND "YOU ARE HERE" LOCATION.
4. WHERE SIGN IS APPLIED TO GLASS, PROVIDE MASKING VINYL; PROVIDE ACRYLIC SIGN PANEL AT OPPOSITE GLASS SURFACE TO ALIGN.
5. APPLY VPH TAPE TO BACK OF SIGN AS REQUIRED; OFFSET 1/8" FROM EDGE OF SIGN TO ENSURE TAPE WOULD NOT BE EXPOSED.
6. FONT: HELVETICA MEDIUM US, ULC TEXT.
7. PROVIDE 1 EVACUATION PLAN SIGN PER ELEVATOR LOBBY, 1 PER EXTERIOR BUILDING ENTRANCES AND 1 PER STAIRWELL ENTRY.

SIGNAGE KEY NOTES:

1. ACRYLIC SIGN PANEL: ACRYLIC SHEET NON-GLARE, ABRASION RESISTANT. ALL VISIBLE SURFACE TO BE PAINTED WITH MATTHEWS PAINT LOW VOC LINE TO MATCH PT-1. THE ACRYLIC SHEET SHALL BE0.080" (2.03mm) THICK.
2. ACRYLIC SIGN PANEL: CLEAR ACRYLIC SHEET NON-GLARE, ABRASION RESISTANT IN FRONT OF KEYNOTE 1 FOR REMOVABLE COPY. THE ACRYLIC SHEET SHALL BE 0.080" (2.03mm) THICK.
3. 1" ROOM NUMBER, RAISED 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
4. GRADE II BRAILLE TO MEET ADA GUIDELINES. PAINTED TO MATCH CORRESPONDING SIGN FACE.
5. 5/8" UPPERCASE ROOM NAME, RAISED 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
6. SILKSCREENED SYMBOL RAISED TO 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
7. (4) #6 SCREWS, 3/4" FROM EDGE OF SIGN.
8. 5" UPPERCASE FLOOR NUMBER, RAISED 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
9. 1-1/2" STAIR NUMBER, RAISED 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
10. 1" UPPERCASE TEXT, RAISED 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
11. 1/4" TEXT, RAISED 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
12. 3/16" TEXT, RAISED 1/32" TO MEET ADA GUIDELINES. ALL VISIBLE SURFACES TO BE PAINTED BLACK.
13. 1/8" STAINLESS STEEL PANEL ON STAINLESS STEEL STAND-OFFS, SEPERATE 1/4" FROM REAR SURFACE.
14. 1/4" DIA. STAINLESS STEEL STAND-OFFS.



GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SIGNAGE TYPES & DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293457 | LATEST REV.
SHEET NO. A-620

12/16/2013 7:59:56 AM

ROOM FINISH SCHEDULE

LEVEL	ROOM NO.	ROOM NAME	FINISHES FLOOR	FINISHES BASE	NORTH	EAST	SOUTH	WEST	CEILING TYPE	CEILING FINISH	KEYNOTE
BASEMENT	002	ELEV 1	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING ELEVATOR
BASEMENT	003	STAIR 1	EXISTING	EXISTING	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-6	EXISTING STAIR
BASEMENT	004	PIPE CHASE	EXISTING	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	EXISTING	EXISTING
BASEMENT	005	PIPE CHASE	EXISTING	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	EXISTING	EXISTING
BASEMENT	007	PIPE CHASE	EXISTING	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	EXISTING	EXISTING
BASEMENT	008	PIPE CHASE	EXISTING	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	EXISTING	EXISTING
BASEMENT	009	STAIR 2	CONCRETE	CONCRETE	CONCRETE	CONCRETE	CONCRETE	CONCRETE			EXTERIOR STAIR
BASEMENT	20	MECHANICAL	SC	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED		
BASEMENT	30	MECHANICAL	SC	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED		
FIRST FLOOR	101A	VESTIBULE	TZ-1	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	
FIRST FLOOR	102	TELECOM	SC	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	
FIRST FLOOR	124	SERVICE CORRIDOR	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING
FIRST FLOOR	124A	CHILLER	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING
FIRST FLOOR	125B	TELECOM	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING
FIRST FLOOR	127	BRANCH SUPPORT	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1		
FIRST FLOOR	128	TEAM ROOM	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1		
FIRST FLOOR	129	TEAM ROOM	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1		
FIRST FLOOR	130	CLOSED LOOP LAB	EF-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	131	DESIGN INTEGRITY LAB	EF-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	132	BASE RESEARCH STATION LAB	EF-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	133	HOT BENCH LAB	EF-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	134	TRUCK BAY	SC	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	
FIRST FLOOR	135	SHOP	EF-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	135A	STO.	SC	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	
FIRST FLOOR	136	EMBEDDED AVIONICS RESEARCH LAB	EF-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	137	VEHICLE EMULATION LAB/VEL COCKPIT	EF-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	138	EQUIP. CLOSET	SC	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	
FIRST FLOOR	138A	JAN. CLOSET	SC	RB-1	PT-5	PT-5	PT-5	PT-5	EXPOSED	PT-3	
FIRST FLOOR	138C	SEATING AREA	TZ-1	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	
FIRST FLOOR	139A	MEN	CT-1	CT-2	PT-5	PT-5	PT-5	CT-2	GWB-1	PT-5	
FIRST FLOOR	139B	WOMEN	CT-1	CT-2	PT-5	CT-2	PT-5	PT-5	GWB-1	PT-5	
FIRST FLOOR	140	WORKSTATION	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	CLG-1	PT-3	
FIRST FLOOR	140A	TEAM ROOM	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1 & GWB-1	PT-1	
FIRST FLOOR	C	VESTIBULE	TZ-1	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	
FIRST FLOOR	E1C	ELEV 1	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING ELEVATOR
FIRST FLOOR	H1	EXISTING CORRIDOR	EXISTING	EXISTING	PT-1	PT-1	PT-1	PT-1	EXISTING		
FIRST FLOOR	H1	EXISTING VESTIBULE									
FIRST FLOOR	H1A	LOBBY	TZ-1	RB-1	PT-1	PT-1	PT-1	PT-1	GWB-1		
FIRST FLOOR	H1A	CORRIDOR	TZ-1	RB-1	PT-1	PT-1	PT-1	PT-1	EXPOSED	PT-3	ACCENT WALLS WITH PT-2
FIRST FLOOR	S1E	STAIR 1	EXISTING	EXISTING	PT-1	PT-1	PT-1	PT-1	GWB-1	PT-6	EXISTING STAIR
FIRST FLOOR	S1F	STAIR 3	SC	RB-1	PT-1	PT-1	PT-1	PT-1	GWB-1	PT-6	
SECOND FLOOR	221	TEAM ROOM	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	222	TEAM ROOM	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	223	TEAM ROOM	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	239	FUTURE WORKSTATION	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	CLG-1	PT-3	
SECOND FLOOR	240	TELECOM	SC	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	244	BRANCH HEAD OFFICE	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	244A	CLOSET	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	250	WORKSTATION	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	CLG-1	PT-3	
SECOND FLOOR	251	ASST. BRANCH HEAD OFFICE	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	252	BRANCH HEAD OFFICE	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	253A	STO.	SC	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	253B	EQUIP CLOSET	SC	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	253C	STO.	SC	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	254	ASST. BRANCH HEAD OFFICE	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	258	ASST. BRANCH HEAD OFFICE	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	258A	CLOSET	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	259	EQUIP CLOSET	SC	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	260	PANTRY	TZ-1	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	261	JAN. CLOSET	SC	RB-1	PT-6	PT-6	PT-6	PT-6	EXPOSED	PT-3	
SECOND FLOOR	262A	MEN	CT-1	CT-2	PT-5	PT-5	PT-5	CT-2	GWB-1	PT-5	
SECOND FLOOR	262B	WOMEN	CT-1	CT-2	PT-5	CT-2	PT-5	PT-5	GWB-1	PT-5	
SECOND FLOOR	263	FUTURE WORKSTATION	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	CLG-1	PT-3	
SECOND FLOOR	264	LIBRARY	CPT-2	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	265	CONFERENCE ROOM	CPT-2	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1 & GWB-1	PT-1	
SECOND FLOOR	E2C	ELEV 1	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING ELEVATOR
SECOND FLOOR	H2A	LOBBY	TZ-1	RB-1	PT-6	PT-6	PT-6	PT-6	GWB-1	PT-1	
SECOND FLOOR	H2A	CORRIDOR	CPT-1	RB-1	PT-6	PT-6	PT-6	PT-6	ACT-1		
SECOND FLOOR	S2E	STAIR 1	EXISTING	RB-1	PT-1	PT-1	PT-1	PT-1	GWB-1	PT-1	EXISTING STAIR
SECOND FLOOR	S2F	STAIR 3	SC	RB-1	PT-6	PT-6	PT-6	PT-6	GWB-1	PT-1	

TERRAZZO NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 09 66 23

TZ-1
RESIN SYSTEM MFG:
NO: TM 10-2392
THICKNESS: 3/8" THICK
CONTACT: MARTY FISCHER (410) 790-5373

CERAMIC TILE NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 09 30 00

CT-1 (PORCELAIN FLOOR TILE)
MFG:
NAME: CONCRETE CONNECTIONS
NO: CN91
COLOR: STEEL STRUCTURE
SIZE: 6 1/2" x 6 1/2"
NOTE: CAN EMPLOY A 1/8" GROUT JOINT USING EITHER SAND GROUT OR EPOXY GROUT
CONTACT: JEFF EASSA (443) 286-9769

CT-2 (GLAZED WALL TILE)
MFG:
NAME: MODERN DIMENSIONS
NO: 0190
COLOR: ARTIC WHITE
SIZE: 4 1/2" x 8 1/2" x 5/16"
NOTE: UN-SANDED GROUT
CONTACT: JEFF EASSA (443) 286-9769

CT-3 (GLASS AND STONE ACCENT TILE)
MFG:
NAME: INTERTWINE
NO: F177
COLOR: OCEAN
NOTE: NO GROUT NEEDED; GLASS AND STONE ARE ON MESH TIGHT TOGETHER. GLASS IS TO BE SET WITH WHITE LATEX MORTAR. BE SURE OF FULL COVERAGE WITHOUT HAVING THE MORTAR BLEED TO THE FRONT. HAVE THE GLASS ACCENT ALIGN WITH FULL TILE OF CERAMIC FIELD BOTH AT TOP AND BOTTOM OF ACCENT BAND.
CONTACT: JEFF EASSA (443) 286-9769

TROWELED EPOXY FLOOR 23.13 NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 09 67

EF-1
MFG:
NAME: SIKAFLOOR 200 ESD
NO: 122
COLOR: LIGHT GRAY
NOTE: SUBSTRATE MUST BE PROPERLY PREPARED PER MANUFACTURER'S INSTRUCTIONS AND BE INSTALLED BY QUALIFIED INSTALLER.
CONTACT: KELLY OTTS (678) 630-0274

CARPET NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 09 68 00

CPT-1
MFG:
COLLECTION: THE SIX DIMENSIONS
NAME: STRAIGHT
COLOR: 040 BOSONIC STRING
NOTE: MONOLITHIC INSTALLATION; EIGHT (8) WEEKS AFTER CARPET INSTALLATION GC TO SCHEDULE AN INSPECTION WITH THE MILLIKEN REP., ANDREA WARD. MILLIKEN WILL BE RESPONSIBLE FOR TRIMMING EDGES AND ANY INSTALLATION ISSUES WHICH MAY OCCURE, PER THE MILLIKEN WARRANTY
CONTACT: ANDREA WARD (202) 286-9769

CPT-2
MFG:
COLLECTION: THE SIX DIMENSIONS
NAME: UP AND UP
COLOR: 040 BOSONIC STRING
NOTE: TILED, MONOLITHIC INSTALLATION; EIGHT (8) WEEKS AFTER CARPET INSTALLATION GC TO SCHEDULE AN INSPECTION WITH THE MILLIKEN REP., ANDREA WARD. MILLIKEN WILL BE RESPONSIBLE FOR TRIMMING EDGES AND ANY INSTALLATION ISSUES WHICH MAY OCCURE, PER THE MILLIKEN WARRANTY
CONTACT: ANDREA WARD (202) 286-9769

RUBBER WALL BASE NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 09 65 00

RB-1
MFG:
TYPE: 4" HIGH RUBBER BASE
NO: 08
COLOR: ICICLE
LOCATION: TO BE USED WITH PAINT COLOR PT-1
NOTE: STRAIGHT TO BE USED AT CARPET; COVE BASE AT HARD SURFACE FLOORING. USE CONTINUOUS LENGHTS, NO SMALL PIECES ACCEPTABLE.

RB-2
MFG:
TYPE: 4" HIGH RUBBER BASE
NO: 139
COLOR: GLACIER
LOCATION: TO BE USED WITH PAINT COLOR PT-2
NOTE: STRAIGHT TO BE USED AT CARPET; COVE BASE AT HARD SURFACE FLOORING. USE CONTINUOUS LENGHTS, NO SMALL PIECES ACCEPTABLE.

GLAZING NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 08 81 00

GL-1
TYPE: CLEAR GLASS, TEMPERED
THICKNESS: 1/2"
LOCATION: CLEARSTORY & FIXED WINDOW @ LAB

PAINT NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 09 90 00

PT-1
MFG:
NO: SW7102
COLOR: WHITE FLOUR
TYPE: PRO INDUSTRIAL K45 SERIES
LOCATION: GENERAL WALL PAINT ON FIRST FLOOR
NOTE: EGGSHELL FINISH AT WALLS

PT-2
MFG:
NO: SW6522
COLOR: SPORTY BLUE
TYPE: PRO INDUSTRIAL K45 SERIES
LOCATION: ACCENT PAINT; SEE FINISH PLAN FOR SPECIFICLOCATION
NOTE: EGGSHELL FINISH AT WALLS

PT-3
MFG:
NO: 1475
COLOR: GRAYSTONE
LOCATION: CEILING, DUCTS AND STRUCTURE AT ALL OPEN CEILING AREAS
NOTE: FLAT FINISH AT CEILING

PT-4
MFG:
NO: SW7663
COLOR: MONORAIL SILVER
LOCATION: DOORS AND FRAMES U.O.N.
NOTE: SEMI-GLOSS FINISH

PT-5
MFG:
NO: SW7006
COLOR: EXTRA WHITE
LOCATION: RESTROOMS
NOTE: EGGSHELL FINISH AT WALLS

PT-6
MFG:
NO: SW7102
COLOR: WHITE FLOUR
LOCATION: GENERAL WALL PAINT ON SECOND FLOOR
NOTE: EGGSHELL FINISH AT WALLS

PLASTIC LAMINATE NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 06 41 16.0010

PL-1
MFG:
NO: 933-58
COLOR: MISSION WHITE
FINISH: MATTE
LOCATION: UPPER CABINETS

PL-2
MFG:
NO: AB291
COLOR: BRIDE OF THE SEA
FINISH: SUEDE
LOCATION: FULL-HEIGHT BACKSPLASH

PL-3
MFG:
NO: PM6006
COLOR: STAINLESS BRUSH
LOCATION: 3 1/2" POWER BELT-LINE BACKSPLASH TO ACCEPT HORIZONTALLY AND CENTER IN BACKSPLASH DECORA GRAY OUTLET ELECTRICAL OUTLETS AND SWITCHES WITH STAINLESS STEEL COVER PLATES

PL-5
MFG:
NO: SG224
COLOR: STONEDUST
FINISH: SUEDE
LOCATION: LOWER CABINETS

CEILING NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTIONS 09 29 00 (GYPSUM BOARD) & 09 83 13 (ACOUSTICAL DIRECTLY ADHERED CEILING PANELS)

ACT-1
MFG:
COLLETION: OPTIMA TEGULAR FINE TEXTURE
NO: 3354
COLOR: WHITE
SIZE: 2'x2'x1"
GRID: ARMSTRONG SUSPENSION SYSTEM 15/16" PRELUDE

CLG-1
MFG:
COLLECTION: ACOUSTICAL WALL PANELS
TYPE: 2" PANEL TYPE WITH D-20 MOUNTING TYPE.
NOTE: TO BE SPRAY PAINTED P-3; COORDINATE WITH ARCHITECT FOR SIZE, LOCATIONS AND AMOUNT OF CEILING PANELS REQUIRED.
CONTACT: KENT DAMSCHRODER (410-224-5665)

GWB-1
MFG:
COLOR: COLOR TO MATCH PT-1

SOLID SURFACE NOTE: FOR PERFORMANCE REQUIREMENTS REFER SPEC SECTION 06 61 16

SS-1
MFG:
COLOR: NEGRO STELLAR

SS-2
MFG:
COLOR: STELLAR SNOW 2008

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Date	No.	Description	BY	Issued to

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Date	No.	Description	BY	Issued to

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EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	LA	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	DM	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

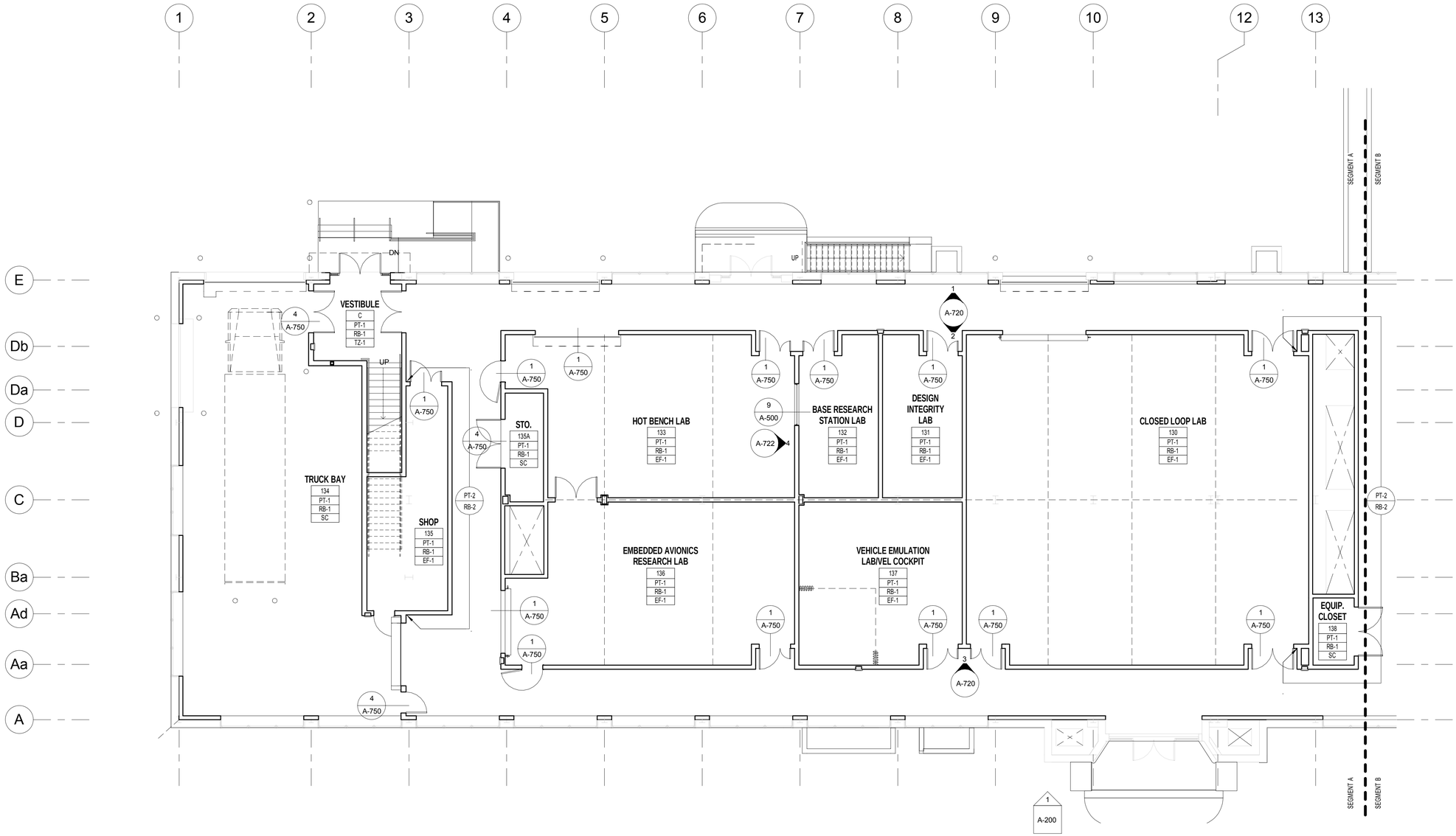
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOM FINISH SCHEDULE & MATERIAL LEGEND

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293458 | LATEST REV.

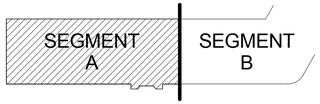
SHEET NO. A-700

12/16/2013 7:59:59 AM



FINISH PLAN GENERAL NOTES:

1. PROVIDE LEVELING OF CONCRETE @ CARPET FINISHES



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
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			RES. PROJ. ENG.	

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HAMPTON, VIRGINIA 23681-2199

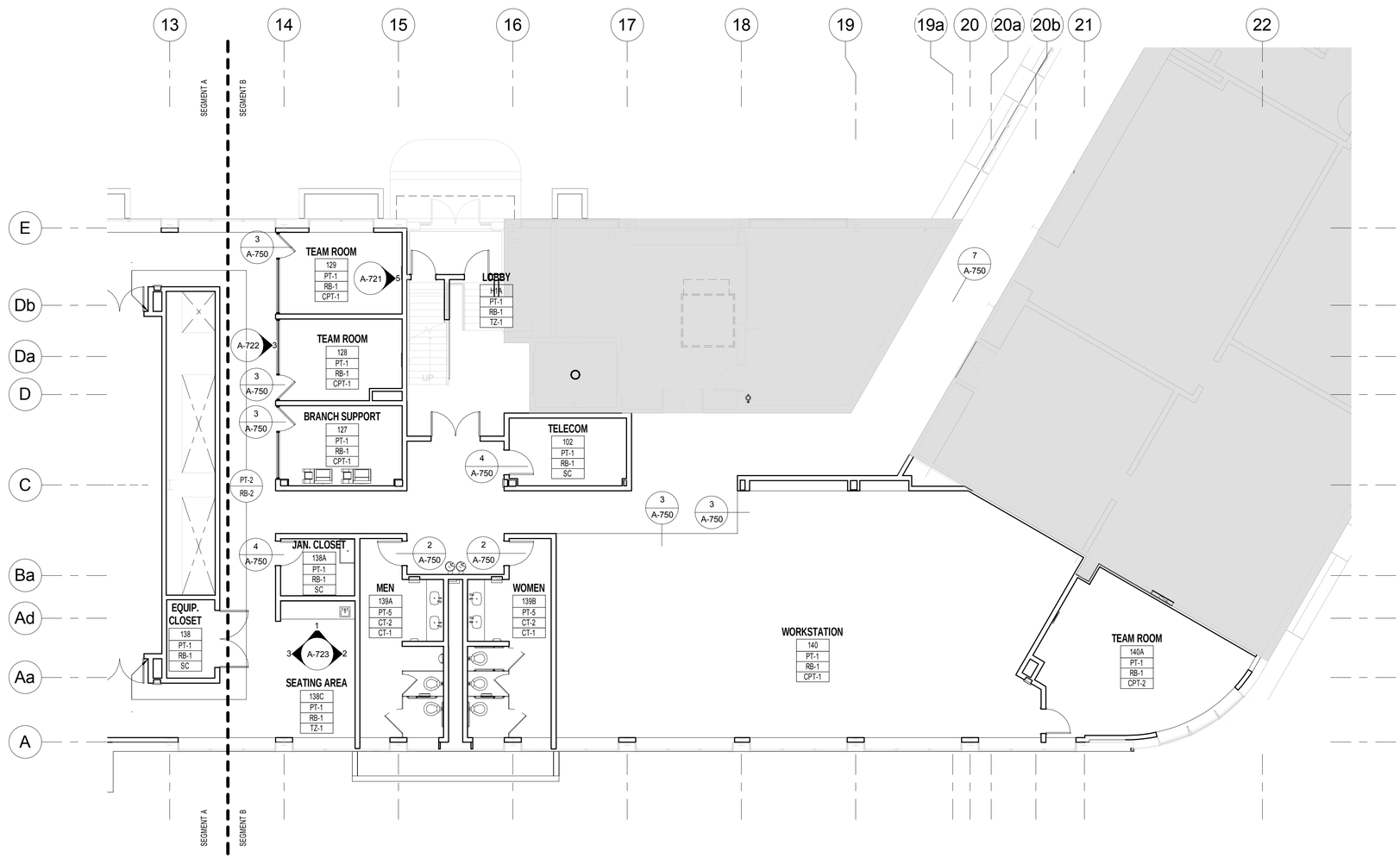
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT A FINISH PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293459 | LATEST REV.

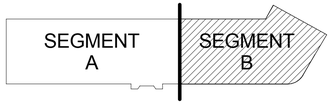
SHEET NO. A-701a

12/16/2013 8:00:02 AM



FINISH PLAN GENERAL NOTES:

1. PROVIDE LEVELING OF CONCRETE @ CARPET FINISHES



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

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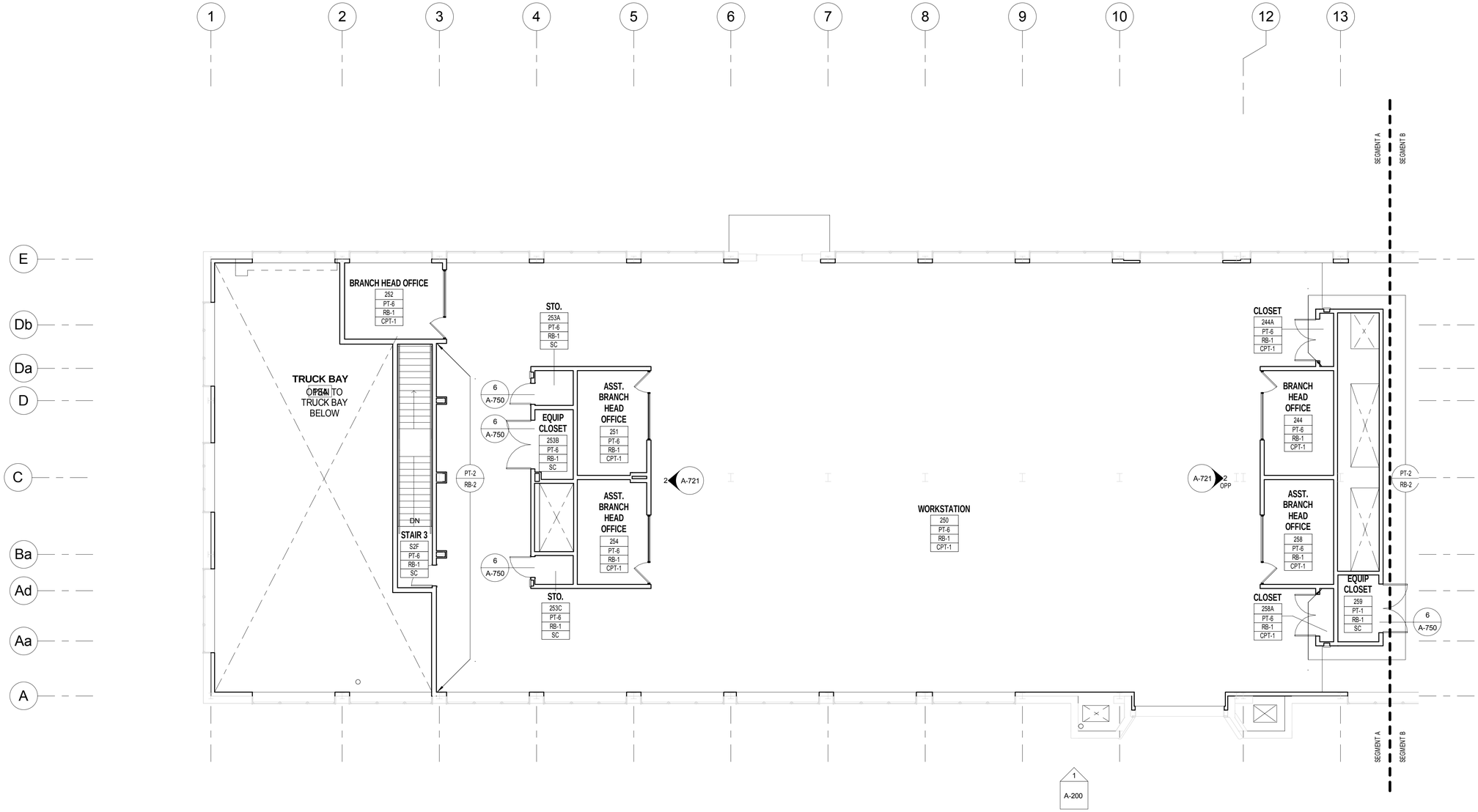
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT B FINISH PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293460 | LATEST REV.

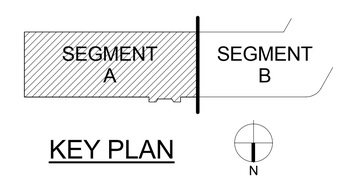
SHEET NO. A-701b

12/16/2013 8:00:05 AM



FINISH PLAN GENERAL NOTES:

1. PROVIDE LEVELING OF CONCRETE @ CARPET FINISHES



KEY PLAN

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

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HAMPTON, VIRGINIA 23681-2199

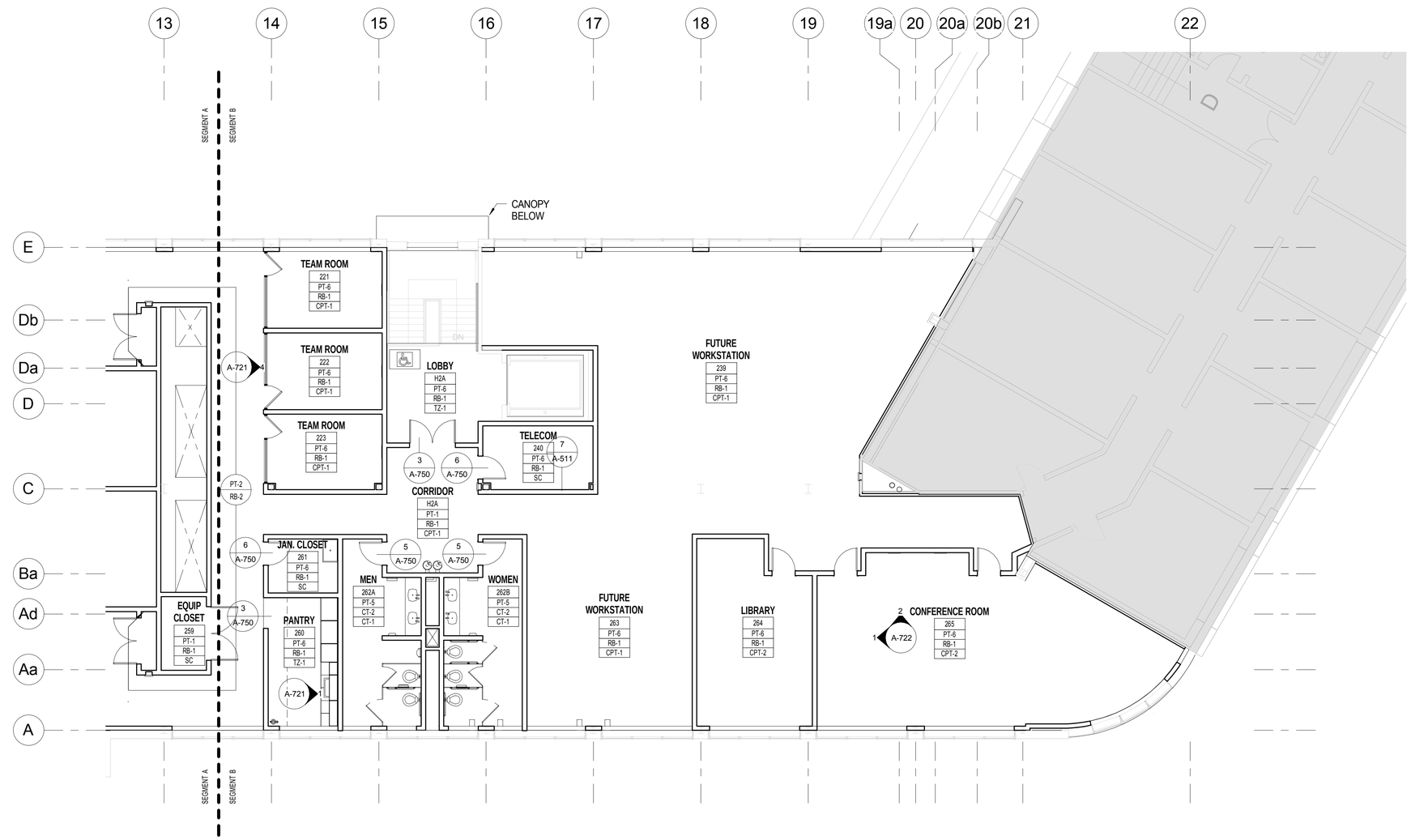
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT A FINISH PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293461 | LATEST REV.

SHEET NO. A-702a

12/16/2013 8:00:08 AM



FINISH PLAN GENERAL NOTES:

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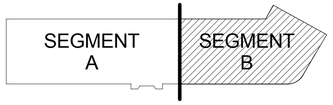

KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

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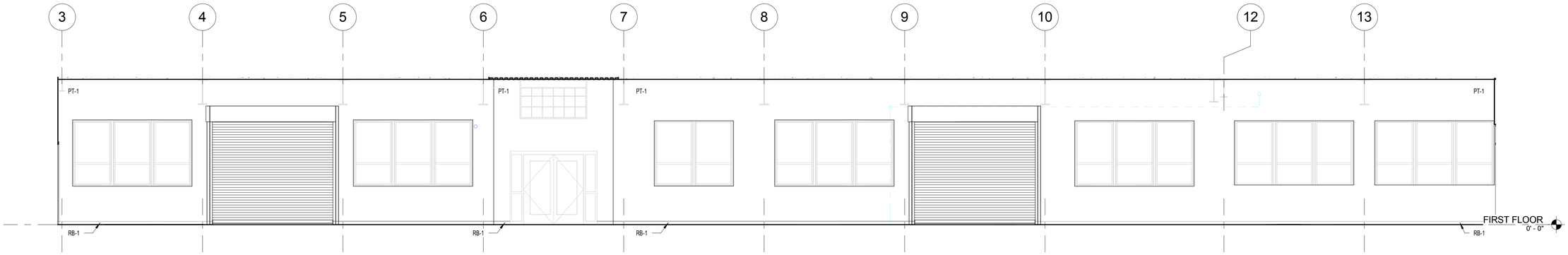
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT B FINISH PLAN

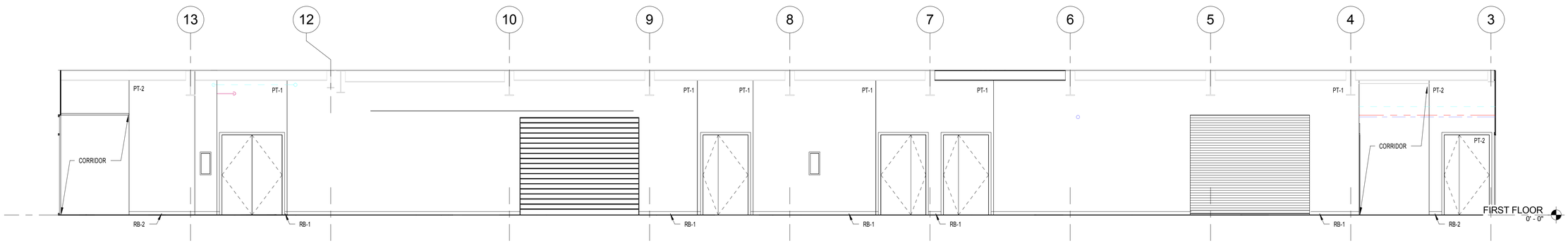
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293462 | LATEST REV.

SHEET NO. A-702b

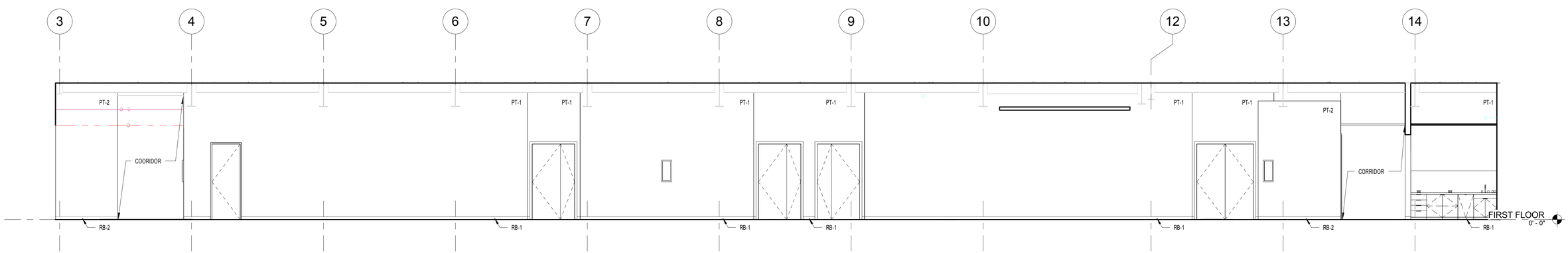
12/16/2013 8:00:11 AM



1 Elevation 2 - a
A-720 REF: A-101b SCALE: 3/16" = 1'-0"



2 Elevation 2 - c
A-720 REF: A-101b SCALE: 3/16" = 1'-0"



3 Elevation 3 - a
A-720 REF: A-101b SCALE: 3/16" = 1'-0"

3/16"=1'-0" 4' 3' 2' 1' 0 4' 8' 12'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

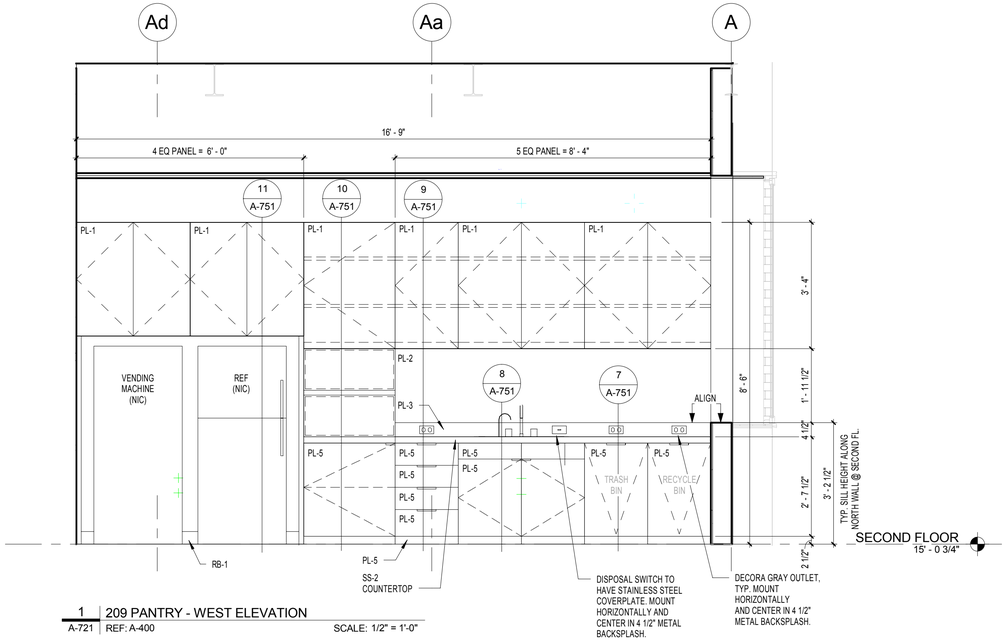
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: INTERIOR ELEVATION

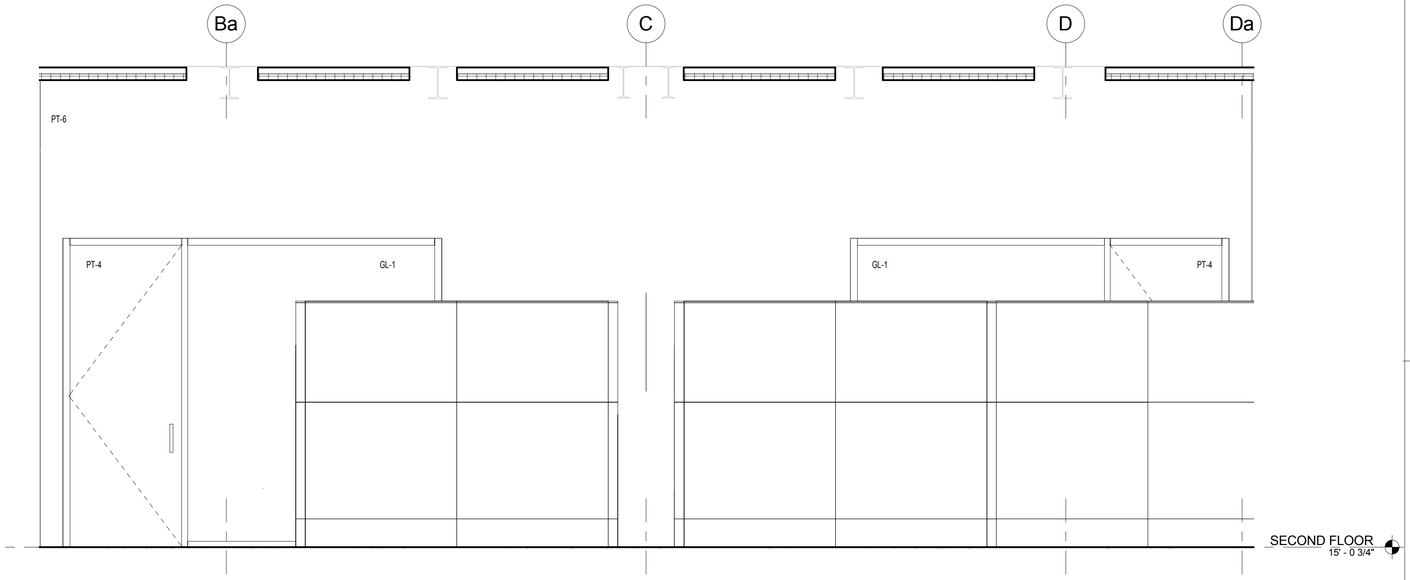
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293463 | LATEST REV.

SHEET NO. A-720

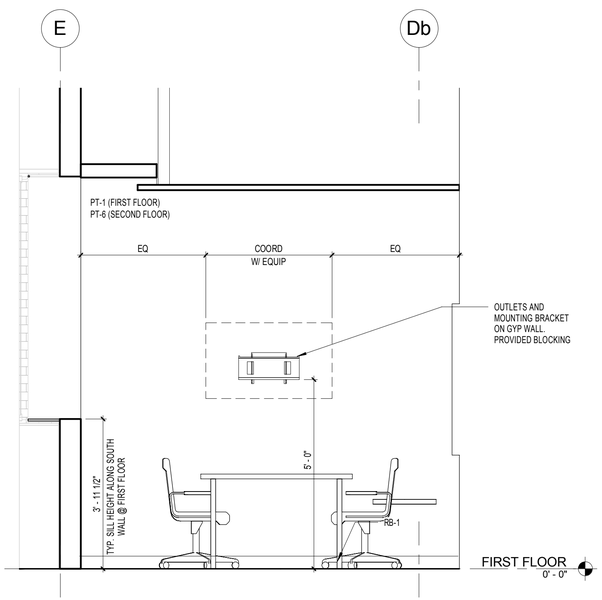
12/16/2013 8:00:14 AM



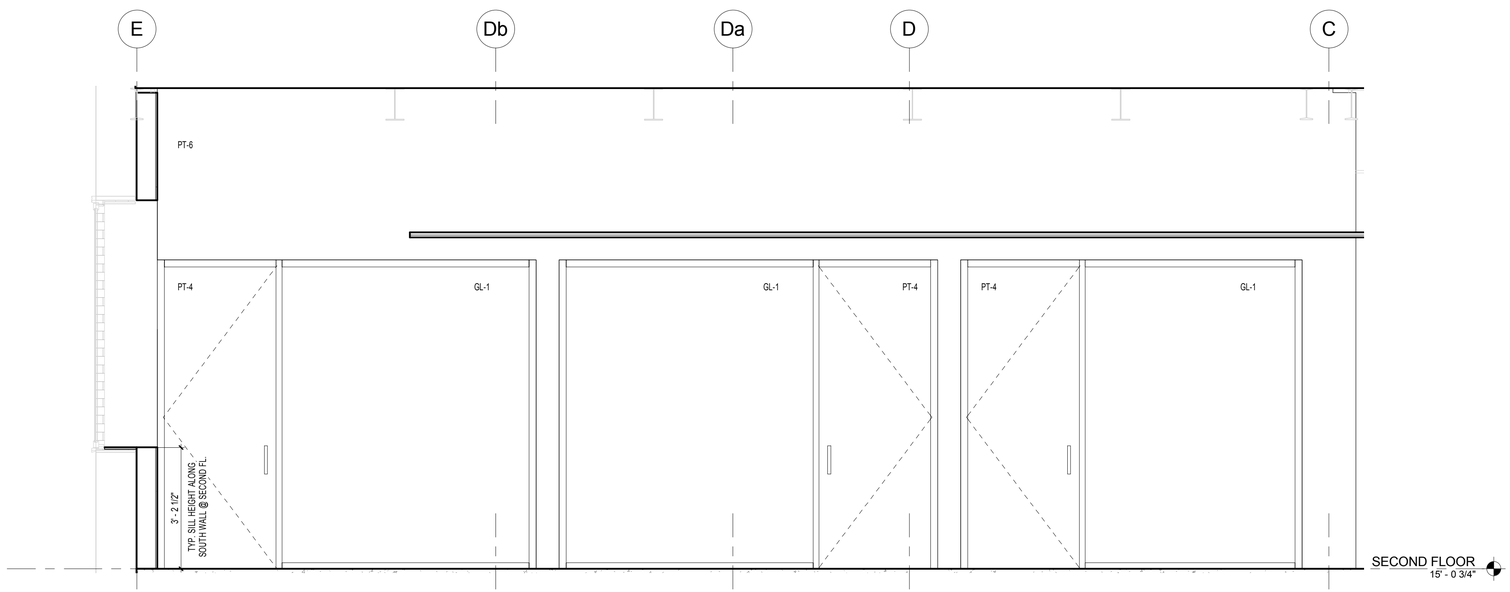
1 | 209 PANTRY - WEST ELEVATION
A-721 | REF: A-400 SCALE: 1/2" = 1'-0"



2 | OFFICE ELEVATION TYP. (244,251,254 & 258)
A-721 | REF: A-702a SCALE: 1/2" = 1'-0"



5 | TEAM ROOM ELEVATION TYP. (129 & 221)
A-721 | REF: A-701b SCALE: 1/2" = 1'-0"



4 | TEAM ROOM CIRCULATION ELEVATION TYP. (221,222 & 223)
A-721 | REF: A-702b SCALE: 1/2" = 1'-0"

GRAPHIC SCALE

REVISIONS					REVISIONS				
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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

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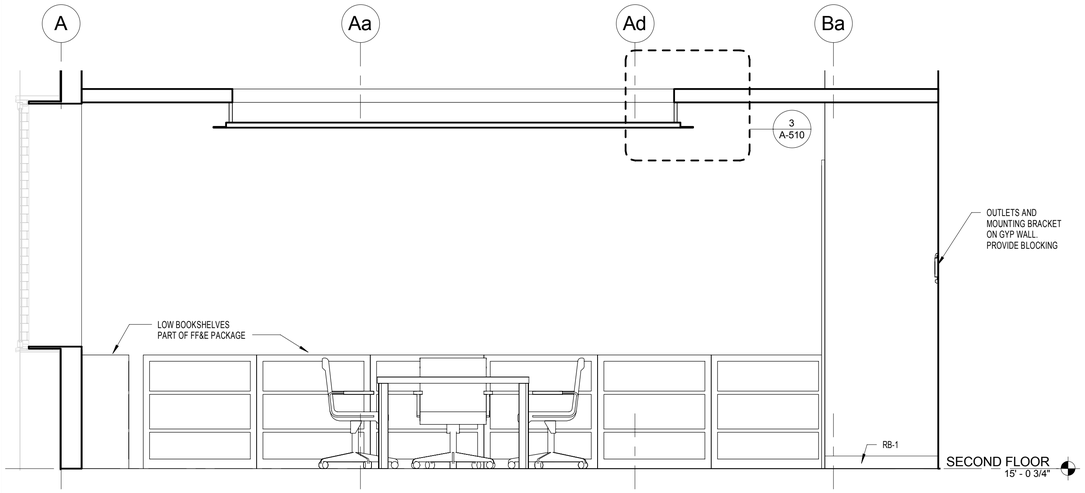
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

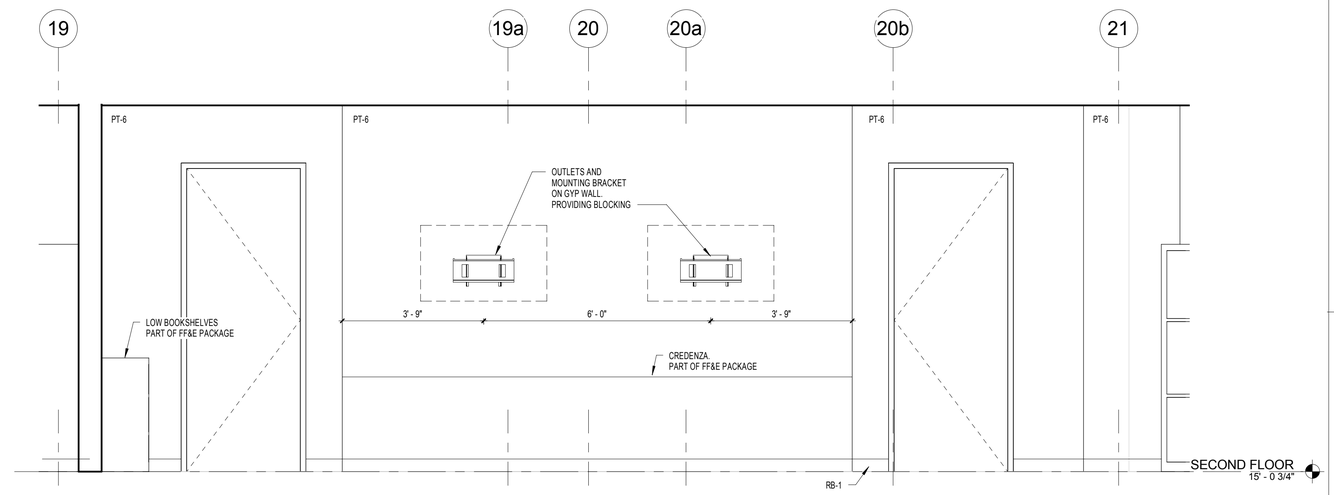
DRAWING TITLE: INTERIOR ELEVATION

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293464 | LATEST REV.
SHEET NO. A-721

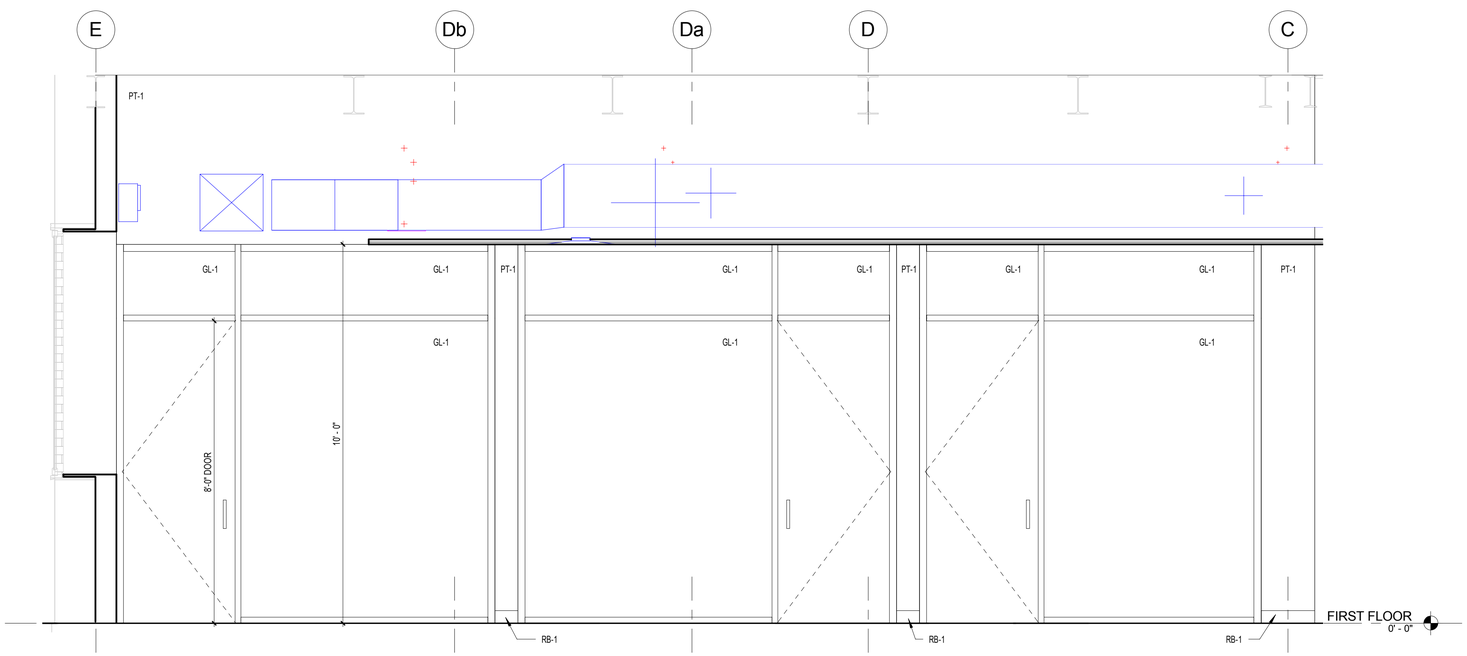
12/16/2013 8:00:18 AM



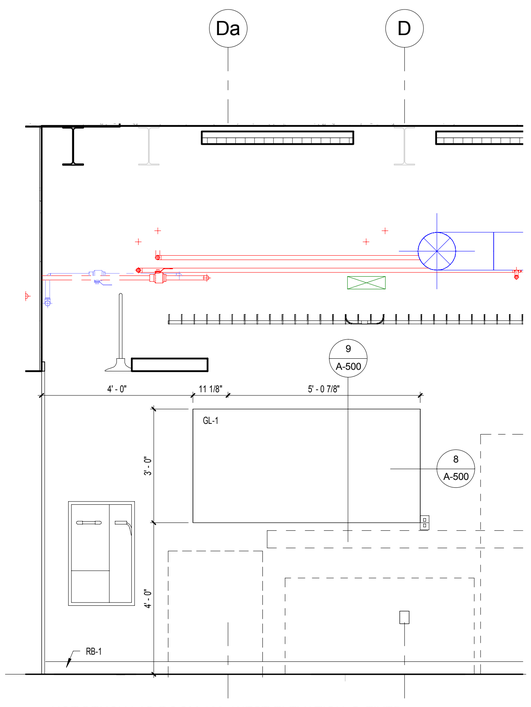
1 | CONFERENCE ROOM 264 -EAST ELEVATION
A-722 | REF: A-702b SCALE: 1/2" = 1'-0"



2 | CONFERENCE ROOM 264 - SOUTH ELEVATION
A-722 | REF: A-702b SCALE: 1/2" = 1'-0"



3 | TEAM ROOM CIRCULATION ELEVATION TYP. (127,128,129)
A-722 | REF: A-701b SCALE: 1/2" = 1'-0"



4 | HOT BENCH LAB ROOM 133- WEST ELEVATION @ FIXED WINDOW
A-722 | REF: A-701a SCALE: 1/2" = 1'-0"

12" 6" 0 1' 2' 3' 4' 5'
1/2"=1'-0"

GRAPHIC SCALE

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HAMPTON, VIRGINIA 23681-2199

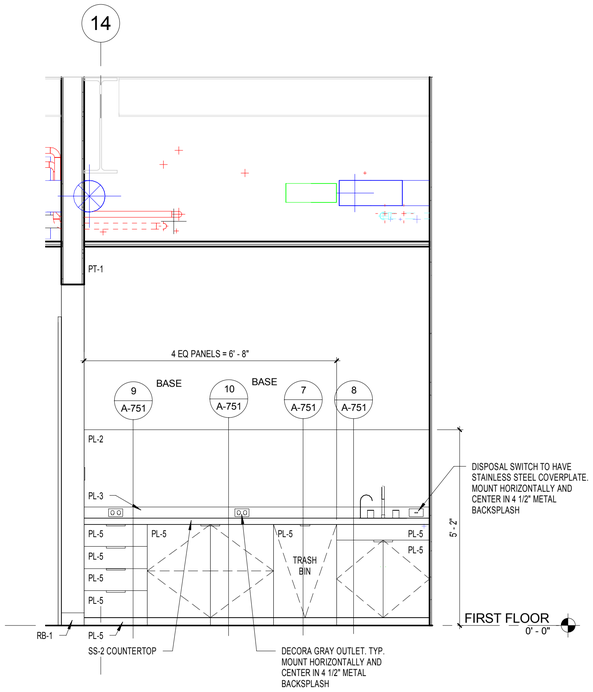
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: INTERIOR ELEVATION

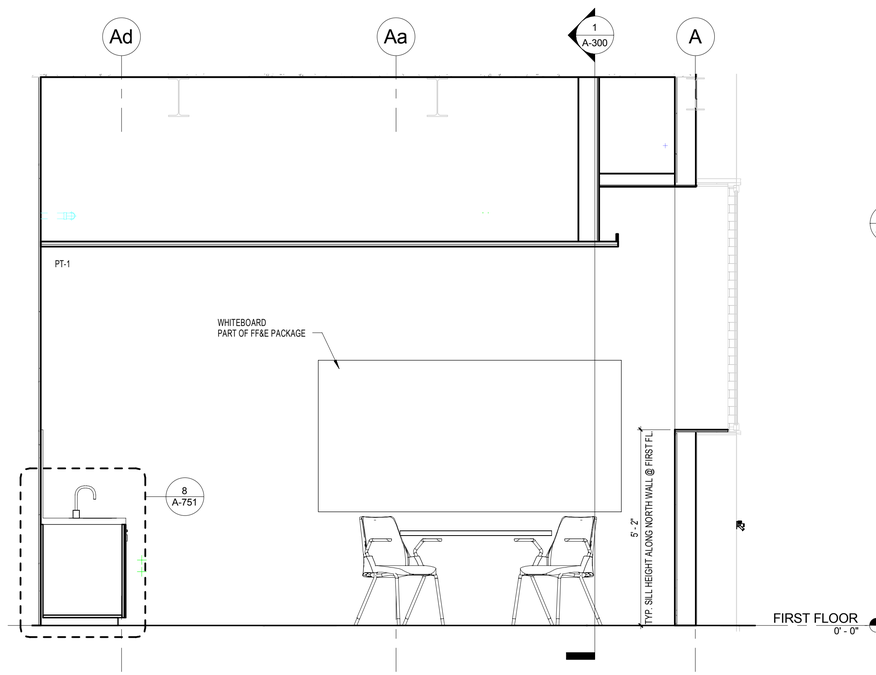
BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293465 | LATEST REV.:

SHEET NO.: A-722

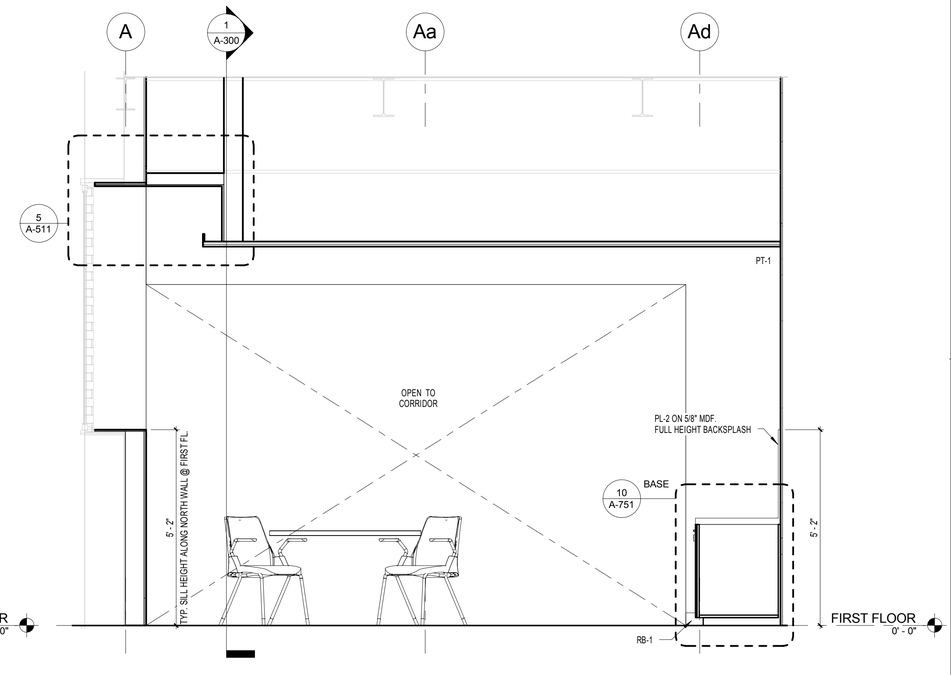
12/16/2013 8:00:22 AM



1 SEATING AREA ROOM 138C - SOUTH ELEVATION
A-723 REF: A-101b SCALE: 1/2" = 1'-0"



2 SEATING AREA ROOM 138-C - WEST ELEVATION
A-723 REF: A-101 SCALE: 1/2" = 1'-0"



3 SEATING AREA ROOM 138C - EAST ELEVATION
A-723 REF: A-400 SCALE: 1/2" = 1'-0"

1/2"=1'-0" 12" 6" 0 1' 2' 3' 4' 5'

GRAPHIC SCALE

REVISIONS					REVISIONS				
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SEAL AREA

COMMONWEALTH OF VIRGINIA
EDWARD D. WEAVER
Lic. No. 011003
ARCHITECT

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN (Author)	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED (Designer)	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ± .02 X.XXX (3 DECIMAL PLACES) ± .005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

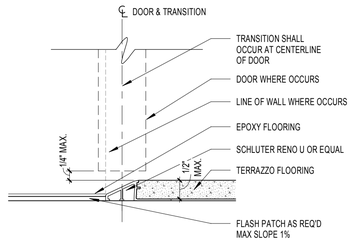
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

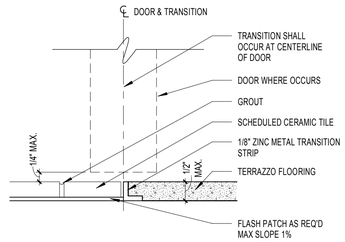
DRAWING TITLE: INTERIOR ELEVATION

BUILDING NO.: 1230
SHEET NO.: A-723
SIZE: D
DRAWING NO.: 1293466
LATEST REV.:

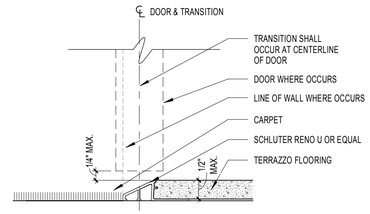
12/16/2013 8:00:26 AM



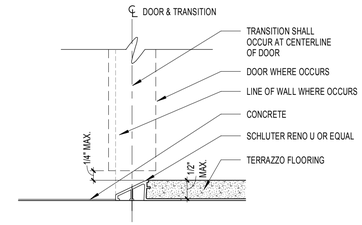
1 DETAIL @ EPOXY TO TERRAZZO
A-750 REF: A-701a SCALE: 6" = 1'-0"



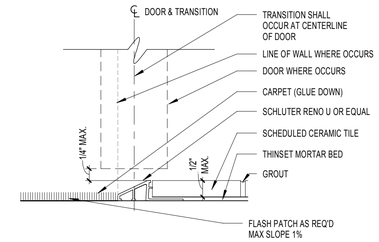
2 DETAIL @ TILE TO TERRAZZO
A-750 REF: A-701b SCALE: 6" = 1'-0"



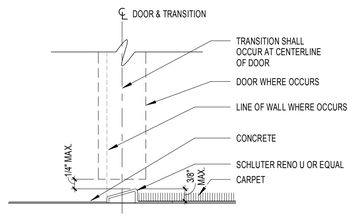
3 DETAIL @ CARPET TO TERRAZZO
A-750 REF: A-701b SCALE: 6" = 1'-0"



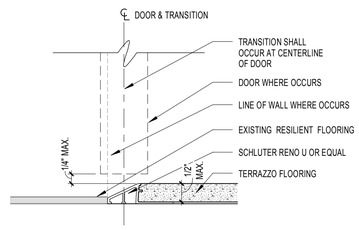
4 DETAIL @ CONCRETE TO TERRAZZO
A-750 REF: A-701a SCALE: 6" = 1'-0"



5 DETAIL @ CARPET TO TILE
A-750 REF: A-702b SCALE: 6" = 1'-0"



6 DETAIL @ CONCRETE TO CARPET
A-750 REF: A-702a SCALE: 6" = 1'-0"



7 DETAIL @ RESILIENT FLOORING TO TERRAZZO
A-750 REF: A-701b SCALE: 6" = 1'-0"

6" 5" 4" 3" 2" 1" 0
6"=1'-0"

GRAPHIC SCALE

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NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

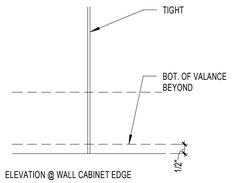
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASE AND FLOOR TRANSITION DETAILS

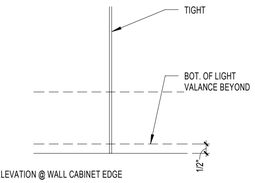
BUILDING NO.: 1230
SHEET NO.: A-750
SIZE: D
DRAWING NO.: 1293467
LATEST REV.:

12/16/2013 8:00:28 AM

ELEVATION @ CABINET JOINT



ELEVATION @ WALL CABINET EDGE



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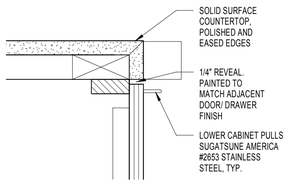
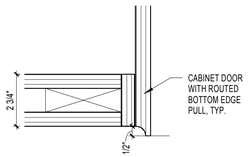
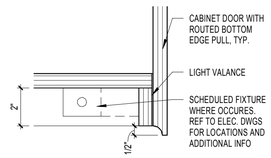


SECTION @ CABINET EDGE



SECTION @ WALL CABINET EDGE

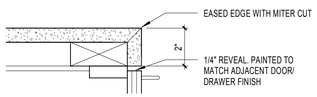


SECTION @ WALL CABINET EDGE

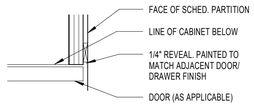
1 | A-751 MILLWORK SECTION DETAIL - CABINET EDGE
A-751 | REF: A-751 SCALE: 3" = 1'-0"

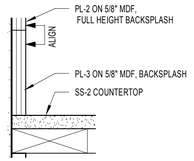
2 | A-751 MILLWORK SECTION DETAIL - WALL CABINET EDGE
A-751 | REF: A-751 SCALE: 3" = 1'-0"

3 | A-751 MILLWORK SECTION DETAIL - WALL CABINET EDGE WITH CABINET MOUNTED LIGHTING
A-751 | REF: A-751 SCALE: 3" = 1'-0"



SECTION @ COUNTERTOP EDGE

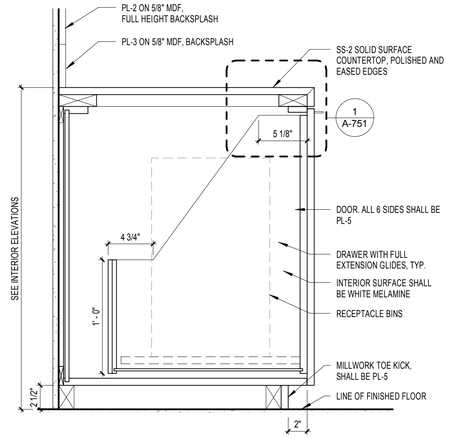




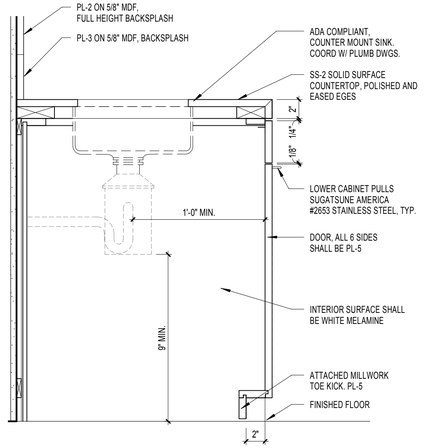
4 | A-751 MILLWORK SECTION DETAIL - COUNTERTOP EDGE
A-751 | REF: A-751 SCALE: 3" = 1'-0"

5 | A-751 MILLWORK PLAN DETAIL - END CABINETS
A-751 | REF: SCALE: 3" = 1'-0"

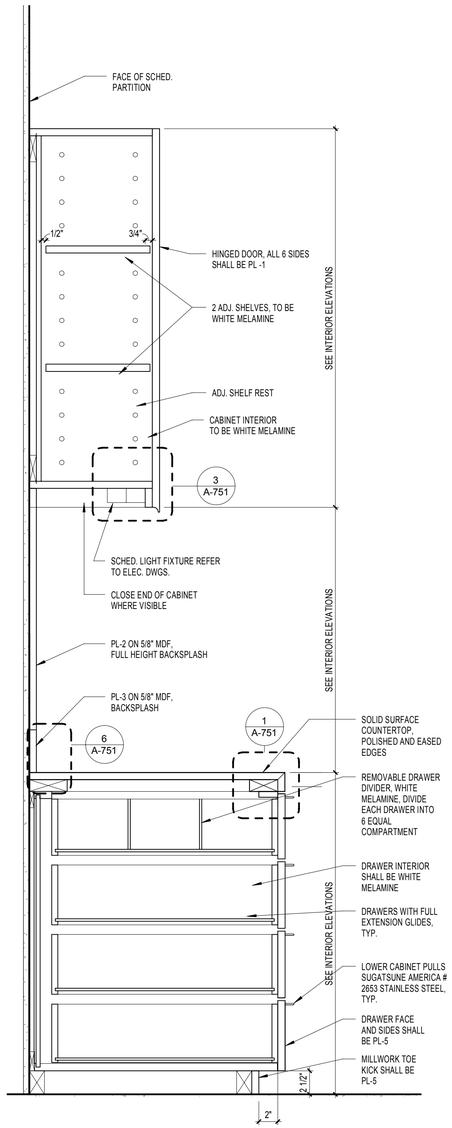
6 | A-751 MILLWORK SECTION DETAIL - FULL HEIGHT BACKSPLASH
A-751 | REF: A-751 SCALE: 3" = 1'-0"



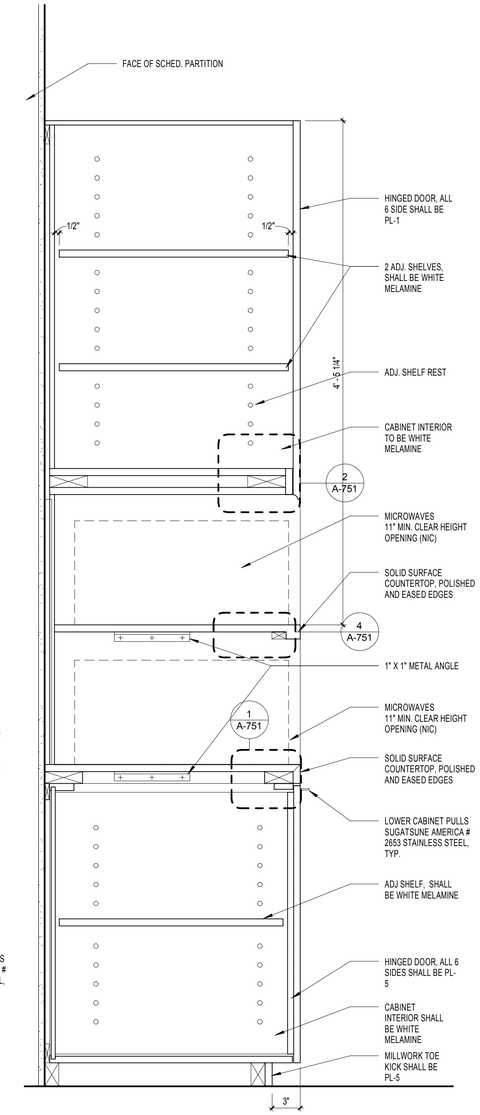
7 | A-751 MILLWORK SECTION DETAIL - RECYCLE CABINET
A-751 | REF: A-721 SCALE: 1 1/2" = 1'-0"



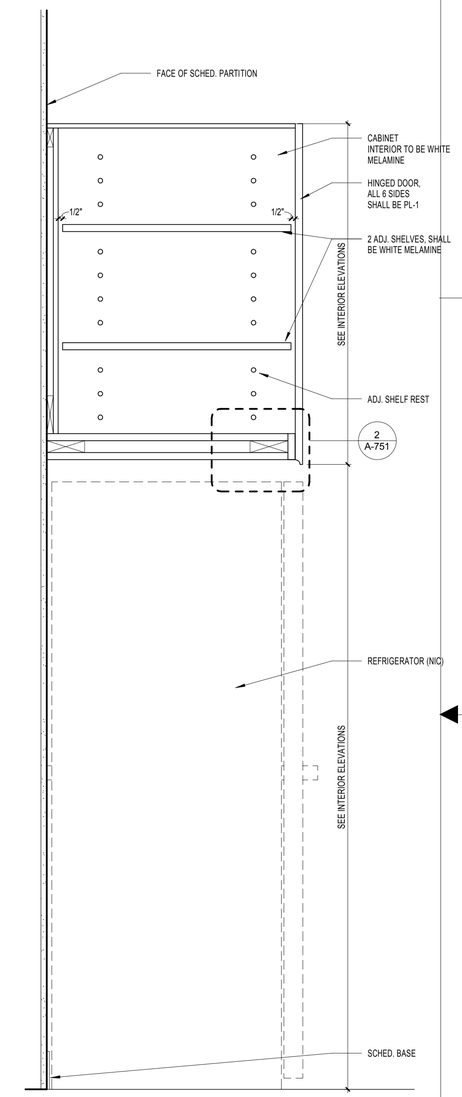
8 | A-751 MILLWORK SECTION DETAIL - SINK CABINET
A-751 | REF: A-721 SCALE: 1 1/2" = 1'-0"



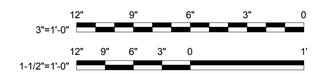
9 | A-751 MILLWORK SECTION DETAIL - BASE CABINET
A-751 | REF: A-721 SCALE: 1 1/2" = 1'-0"



10 | A-751 MILLWORK SECTION DETAIL - MICROWAVE CABINET
A-751 | REF: A-721 SCALE: 1 1/2" = 1'-0"



11 | A-751 MILLWORK SECTION DETAIL - REF. & UPPER CABINET
A-751 | REF: A-721 SCALE: 1 1/2" = 1'-0"



GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

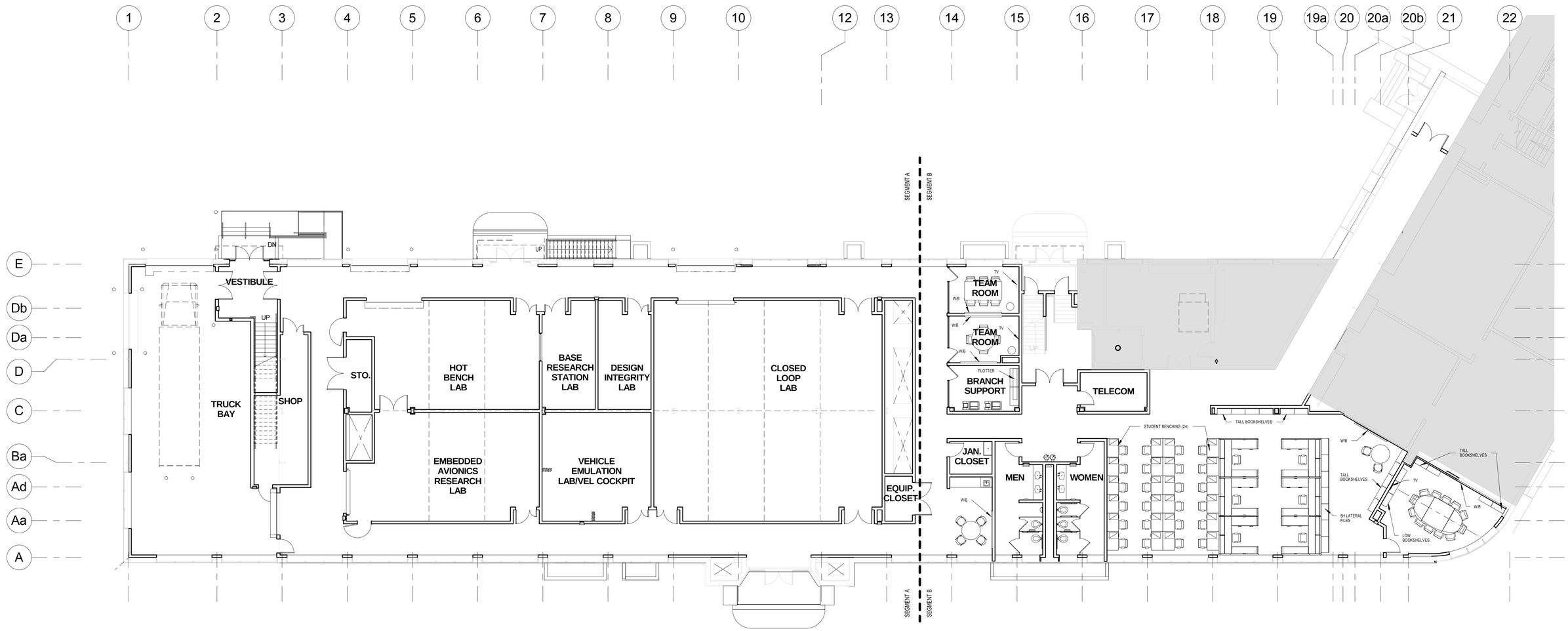
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MILLWORK DETAILS

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293468 | LATEST REV.:

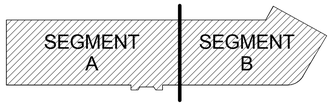
SHEET NO.: A-751

12/16/2013 8:00:33 AM



GENERAL FF&E NOTES:

1. POTENTIAL LOCATIONS HAVE BEEN IDENTIFIED FOR MOVABLE/FIXED WHITEBOARDS AND BOOKCASES. LOCATIONS WILL BE COORDINATED WITH FINAL WORKSTATION SELECTIONS, LAYOUT, THE AMOUNT OF WHITEBOARDS AND BOOK/BINDER STORAGE THAT EACH WORKSTATON CAN ACCOMODATE.
2. PER GSA'S INQUIRY THE FINISHES AND FABRICS FROM THE HEADQUARTERS BUILDING WORKSTATION ARE ALL ACTIVE AND AVAILABLE.
3. POWER AND DATA: POWER AND DATA CONNECTIONS WILL BE PROVIDED WITHIN THE BUILDING EXTERIOR FURRING WALLS FOR PERIMETER WORKSTATIONS. EXPOSED POWER AND DATA CONDUITS WILL BE PROVIDED ALONG THE COLUMNS FOR INTERIOR WORKSTATIONS. POKE-THRU WILL BE COORDINATED TO PROVIDE POWER AND DATA SERVICES IN THE CONFERENCE ROOMS. COORDINATE WITH ELECTRICAL DRAWINGS.



KEY PLAN

N

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED TS/GG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

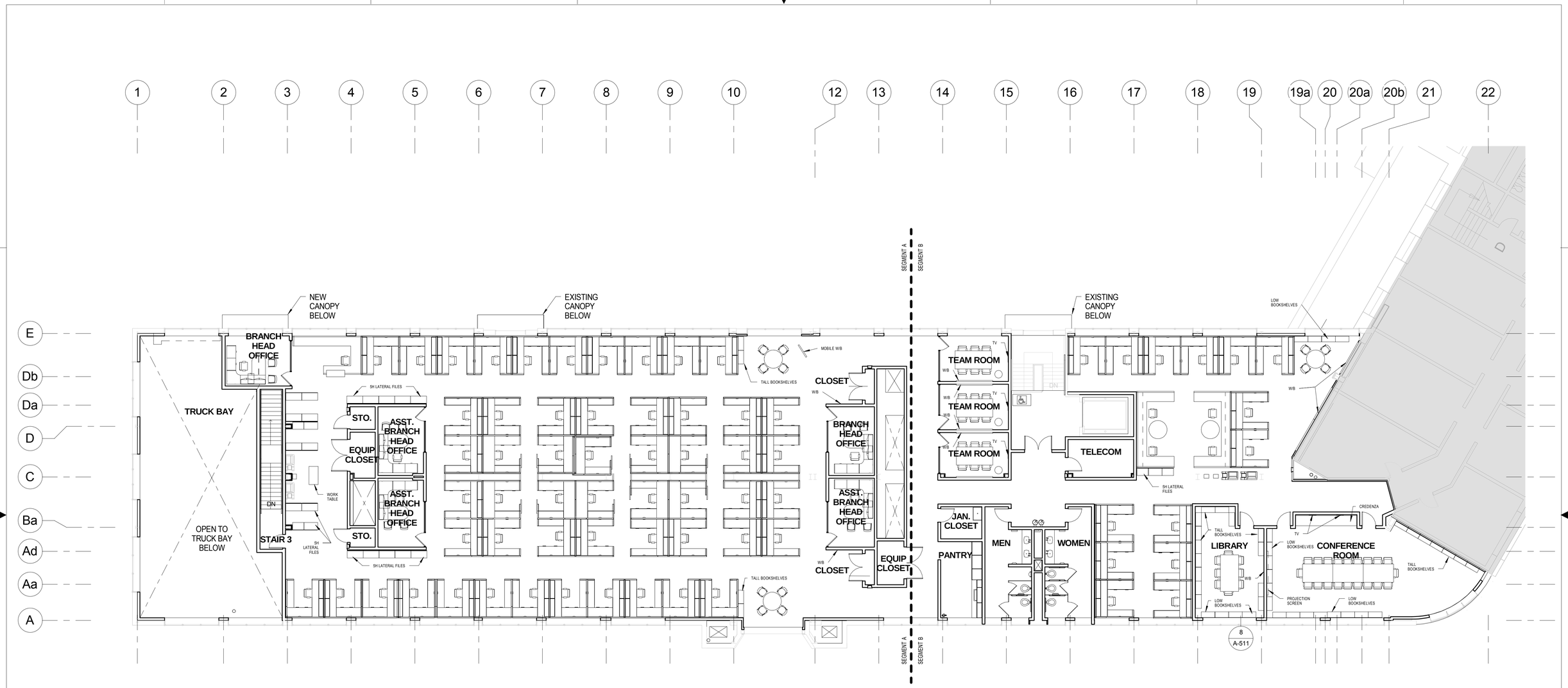
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR OVERALL FURNITURE PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293469 | LATEST REV.

SHEET NO. A-801

12/16/2013 8:00:38 AM



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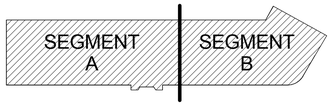

KEY PLAN

N

3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EW	
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			RES. PROJ. ENG.	

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SURFACE FINISH IN MICRONICHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR OVERALL FURNITURE PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293470 | LATEST REV.

SHEET NO. A-802

12/16/2013 8:00:46 AM

LEGEND - SERVICES / ABBREVIATIONS

ELECTRICAL OUTLETS - ABBREVIATIONS	
E1	110V DUPLEX ELECTRICAL OUTLET
E2	CONTINUOUS ELECTRICAL PLUG-IN BUSWAY (60AMP) ((3)110V QUAD OUTLET MODULES @ 4'-0" OC.)
E3	28V, 400Hz
E4	208V (SEE ELECTRICAL FOR PHASE)
E5	208V 200Amp
E6	480V
E7	110V QUAD ELECTRICAL OUTLET
E8	ELECTRICAL PLUG-IN BUSWAY (100AMP) ((3)110V QUAD OUTLET MODULES @ 4'-0" OC.)

LABORATORY SERVICES	
CA	COMPRESSED AIR
C & HW	COLD & HOT WATER FAUCET
EW/ES	EMERGENCY EYE WASH / EMERGENCY SHOWER
EW	EMERGENCY EYE WASH
HB	HOSE BIB

LABORATORY SERVICE SYMBOLS	
◁ D	WALL MOUNTED TEL/DATA OUTLET (SEE ELECTRICAL DRAWINGS)
◁ OD	OVERHEAD SERVICE MOUNTED TEL/DATA (SEE ELECTRICAL DRAWINGS)
⊣ CA	WALL OR PANEL MOUNTED COMPRESSED AIR OUTLET
Ⓐ	OVERHEAD COMPRESSED AIR DROP
○	EXHAUST DROP

MISCELLANEOUS	
ADA	AMERICAN WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
EQ	EQUIPMENT
NIC	NOT IN CONTRACT
OPP	OPPOSITE
S	SINK
SIM	SIMILAR
SS	STAINLESS STEEL
U/C	UNDER COUNTER
VIF	VERIFY IN FIELD
W/	WITH

GENERAL NOTES

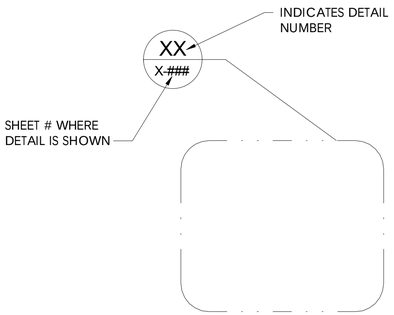
1. DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ESTABLISH BASIC DIMENSION OF UNITS, SIGHT LINES, AND UNIT PROFILES.
2. FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATION OF CASEWORK. NOTIFY ARCHITECT OF ANY DISCREPANCY.
3. COORDINATE CASEWORK AND EQUIPMENT WITH WORK OF OTHER TRADES.
4. ALL CASEWORK TO BE METAL UNLESS NOTED OTHERWISE.
5. ALL TABLES TO BE MOVEABLE (NOT FIXED TO THE FLOOR), UNLESS NOTED OTHERWISE.
6. PROVIDE LOCKS AT ALL ACID & FLAMMABLE STORAGE CABINETS.
7. PROVIDE END PANELS AND FILLERS AS REQUIRED.
8. SEE PLANS AND ELEVATIONS FOR SIZE, LOCATION, AND QUANTITY OF CASEWORK TYPES USED.
9. FINISHED FLOORING SHALL BE INSTALLED UNDER ALL CABINETS. FINISHED FLOORING INSTALLATION SHALL BE COMPLETED PRIOR TO CABINET INSTALLATION. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR BASE TO BE PROVIDED AT TOE SPACE OF ALL CASEWORK AND AT KNEE SPACES.
10. ALL COUNTERTOPS TO BE EPOXY RESIN, UNLESS NOTED OTHERWISE. ARCHITECT TO SELECT COLOR.
11. ALL SINKS TO BE MODIFIED EPOXY RESIN, UNLESS NOTED OTHERWISE. COLOR TO MATCH ADJACENT COUNTER TOP. SEE SINK SCHEDULE FOR SINK TYPES.
12. ALL SINKS SHALL BE CENTERED IN THEIR CABINETS, UNLESS OTHERWISE SHOWN ON DRAWINGS.
13. SERVICES SHOWN ON PLANS ARE FOR INFORMATION ONLY. REFER TO MECHANICAL, ELECTRICAL & PLUMBING DRAWINGS FOR EXACT QUANTITY & LOCATION OF SERVICE FIXTURES.
14. ALL SERVICES REQUIRED BY EQUIPMENT ARE NOT NECESSARILY INDICATED ON LAB PLANS. REFER TO MEP DRAWINGS & SPECIFICATIONS.
15. SEE Q-402 FOR EQUIPMENT SCHEDULE, SCOPE OF WORK, N.I.C., AND OWNER / CONTRACTOR FURNISHED / INSTALLED EQUIPMENT INFORMATION.
16. CONTINUOUS ELECTRICAL BUSWAY, DATA AND GROUND BARS ARE SHOWN ON ELEVATIONS AND PLANS ARE FOR INFORMATION ONLY. SEE ELECTRICAL DRAWINGS.
17. SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR CEILING MOUNTED PROJECTORS, PROJECTION SCREENS, CABLE TRAYS AND MARKER BOARDS.
18. OVERHEAD SERVICES (INCLUDING ELEC. BUSWAY, COMPRESSED AIR, SPECIAL ELECTRICAL, CABLE TRAY, DATA, AND EXHAUST DROPS) ARE SHOWN DIAGRAMMATICALLY ON LAB DRAWINGS. COORDINATE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND MEP DRAWINGS.

SINK SCHEDULE

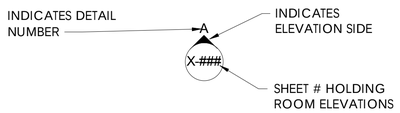
TYPE	SIZE: (L x W x D)	MATERIAL	MOUNT	REMARKS
S01	30" L x 18" W x 18" D	EPOXY	UNDERMOUNT	
S02	14" L x 10" W x 5"/11" D	EPOXY	DROP-IN	TIERED ADA SINK

SYMBOL LEGEND (PLAN/ ELEVATION/ DETAIL DRAWINGS)

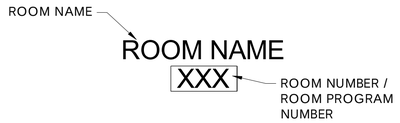
ENLARGED PLAN REFERENCE SYMBOL



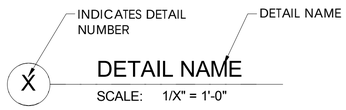
ELEVATION TAG SYMBOL



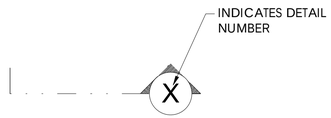
ROOM TITLE SYMBOL



DETAIL TITLE SYMBOL



SECTION SYMBOL



PLAN & ELEVATION TITLE SYMBOL

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	SST	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	SST	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	SST	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ± .02 — X.XXX (3 DECIMAL PLACES) ± .005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY"14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: GENERAL NOTES, LEGEND & ABBREVIATIONS

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293471 | LATEST REV.:

SHEET NO.: Q-001

12/16/2013 9:17:44 AM

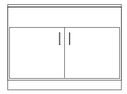
CASEWORK TYPES

SCALE: 3/8" = 1'-0"

TYPE: B

STANDING HEIGHT BASE CABINET - 36" A.F.F.

B01



SINK BASE CABINET

LOCATION:
ROOM 130 - CLOSED LOOP LAB
ROOM 134 - TRUCK BAY
ROOM 133 - HOT BENCH LAB

LABORATORY CASEWORK GENERAL INFORMATION
CABINET BODY: 18 GAUGE PAINTED STEEL
DOOR OVERLAY: INSET (FLUSH) DOORS
HINGES: 5 KNUCKLE STAINLESS STEEL
PULLS: STAINLESS STEEL 4" WIRE PULL SATIN FINISH
CATCHES: NYLON ROLLER CATCH
PAINT: EPOXY POWDER COATED. ARCHITECT TO SELECT COLOR.
COUNTER TOP: MODIFIED EPOXY RESIN . ARCHITECT TO SELECT COLOR.
LABORATORY CASEWORK TO BE SEFA COMPLIANT.
SEE SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS.

TYPE: R

SPECIAL PURPOSE CASEWORK

R04

VENTED ACID BASE CABINET

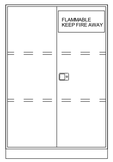
VENTED ACID BASE CABINET INFORMATION
BASIS OF DESIGN: JUSTRITE MODEL# SC29742B
OVERALL DIMENSIONS: 35"H x 35"W x 22"D
SEE MECHANICAL DRAWINGS AND
SPECIFICATIONS FOR VENTING REQUIREMENTS.

LOCATION:
ROOM 133 - HOT BENCH LAB

TYPE: F

FULL HEIGHT CABINETS - 65" AFF.

F09

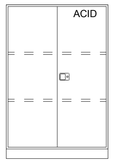


FLAMMABLE FULL HEIGHT STORAGE CABINET

FLAMMABLE FULL HEIGHT STORAGE CABINET INFORMATION
BASIS OF DESIGN: JUSTRITE MODEL# SC29452
OVERALL DIMENSIONS: 65"H x 43"W x 18"D

LOCATION:
ROOM 130 - CLOSED LOOP LAB
ROOM 133 - HOT BENCH LAB

F10



VENTED ACID FULL HEIGHT CABINET

VENTED ACID FULL HEIGHT CABINET INFORMATION
BASIS OF DESIGN: JUSTRITE MODEL# SC29707B
OVERALL DIMENSIONS: 65"H x 43"W x 18"D
SEE MECHANICAL DRAWINGS AND SPECIFICATIONS
FOR VENTING REQUIREMENTS.

LOCATION:
ROOM 130 - CLOSED LOOP LAB
ROOM 134 - TRUCK BAY

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	SST	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ± .02 ; X.XXX (3 DECIMAL PLACES) ± .005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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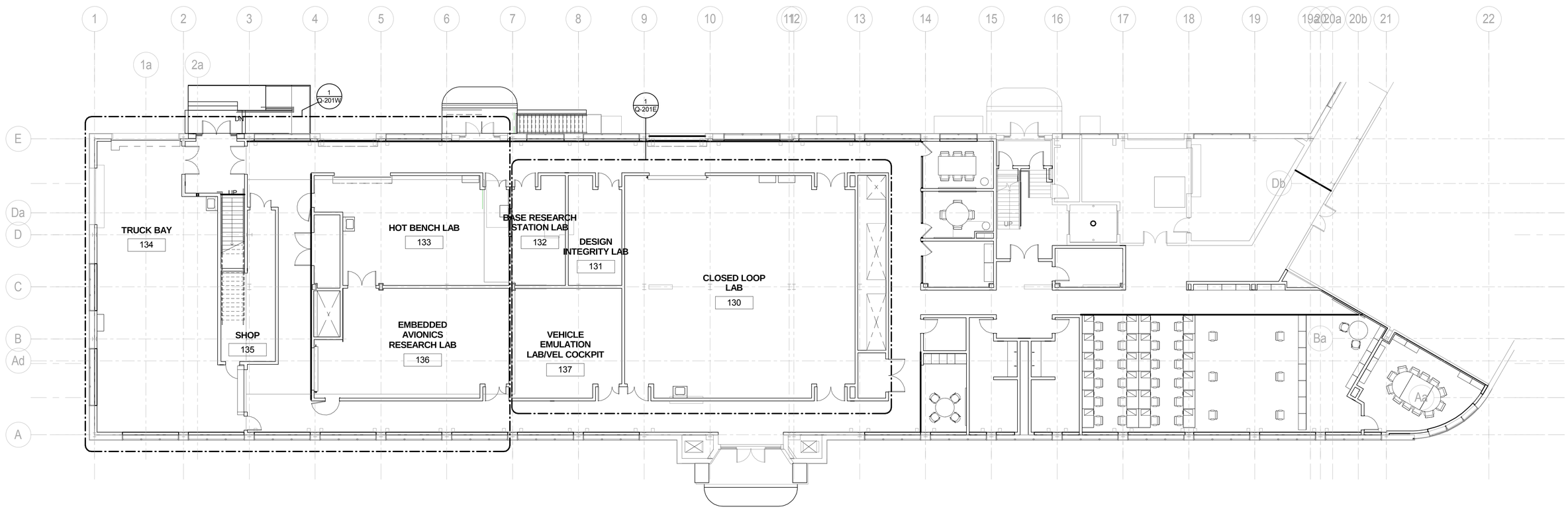
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: CASEWORK MENU

BUILDING NO.: 1230
SIZE: D
DRAWING NO.: 1293472
SHEET NO.: Q-002
LATEST REV.:

12/16/2013 9:17:44 AM



1 FIRST FLOOR LAB KEY PLAN
3/32" = 1'-0"

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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HAMPTON, VIRGINIA 23681-2199

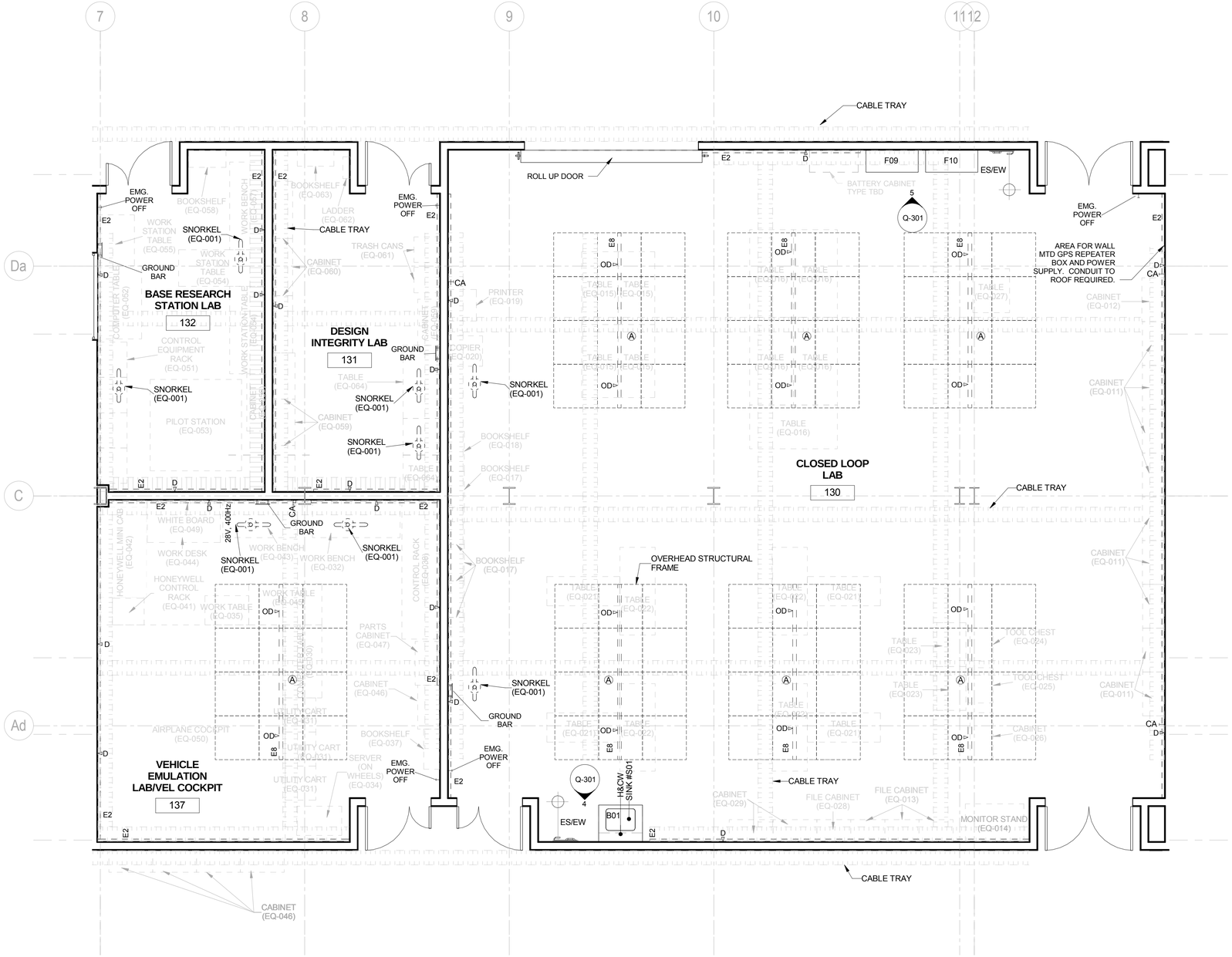
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR LAB KEY PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293473 | LATEST REV.

SHEET NO. Q-101

12/16/2013 9:17:45 AM



FIRST FLOOR ENLARGED LAB PLAN - EAST
1 1/4" = 1'-0"

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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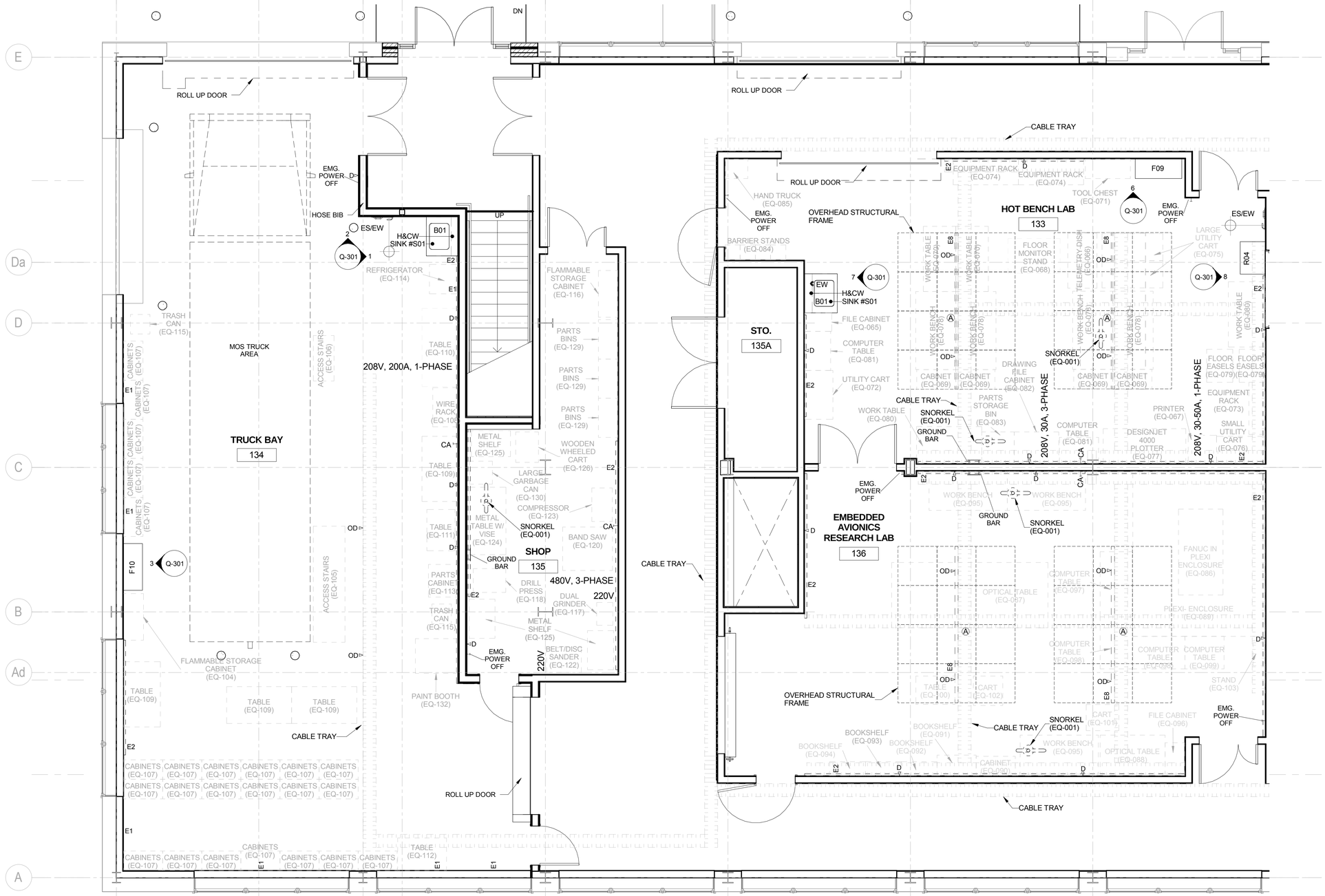
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR ENLARGED PLAN - EAST

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293474 | LATEST REV.
SHEET NO. Q-201E

12/16/2013 9:17:46 AM



1 FIRST FLOOR ENLARGED PLAN - WEST
1/4" = 1'-0"

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			RES. PROJ. ENG.		

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

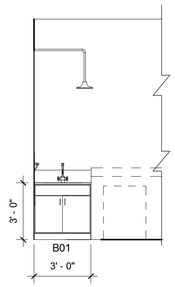
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR ENLARGED PLAN - WEST

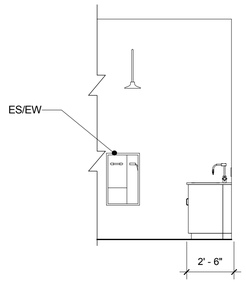
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293475 | LATEST REV.

SHEET NO. Q-201W

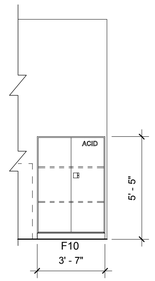
12/16/2013 9:17:47 AM



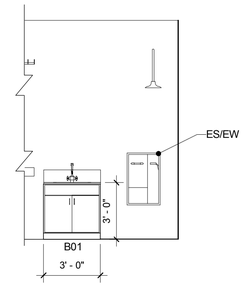
1 TRUCK BAY - 134
1/4" = 1'-0"



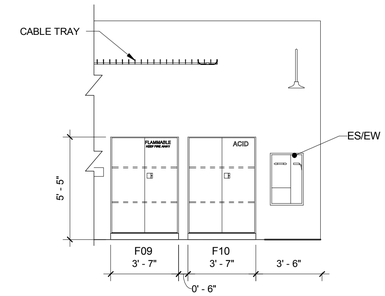
2 TRUCK BAY - 134
1/4" = 1'-0"



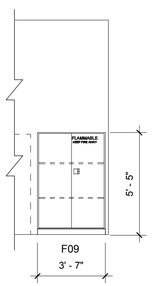
3 TRUCK BAY - 134
1/4" = 1'-0"



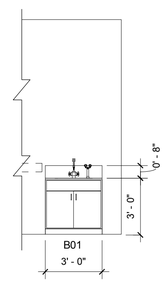
4 CLOSED LOOP LAB - 130
1/4" = 1'-0"



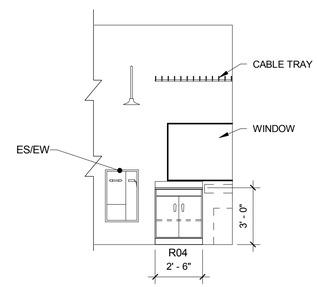
5 CLOSED LOOP LAB - 130
1/4" = 1'-0"



6 HOT BENCH LAB - 133
1/4" = 1'-0"



7 HOT BENCH LAB - 133
1/4" = 1'-0"



8 HOT BENCH LAB - 133
1/4" = 1'-0"

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY"14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: LABORATORY ELEVATIONS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293476 | LATEST REV.

SHEET NO. Q-301

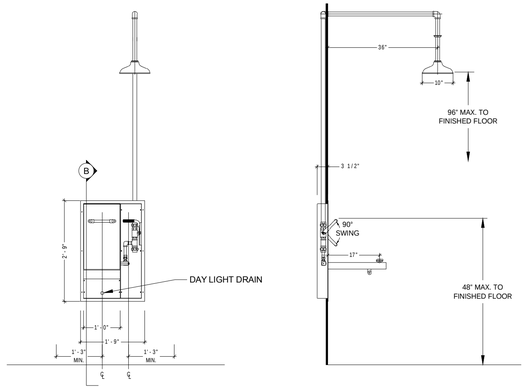
12/16/2013 9:17:48 AM

1 - EMERGENCY SHOWER — SCALE: NTS

EMG SHOWER/EYEWASH INFORMATION

BARRIER-FREE RECESSED SAFETY STATION WITH DRAIN PAN
BASIS OF DESIGN: WATER SAVER
MODEL #: SSBF2152

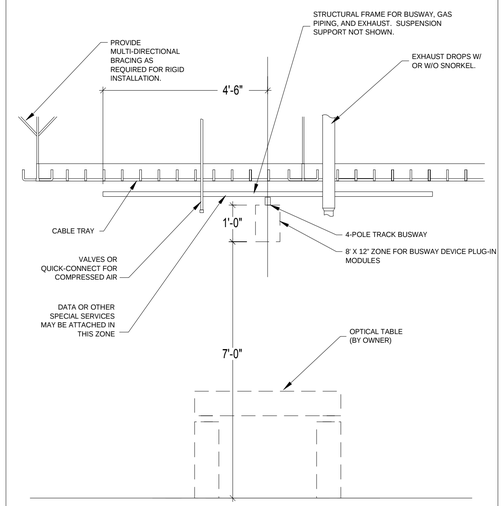
SEE SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS.



A FRONT VIEW (WITH CLOSED DRAIN PAN)

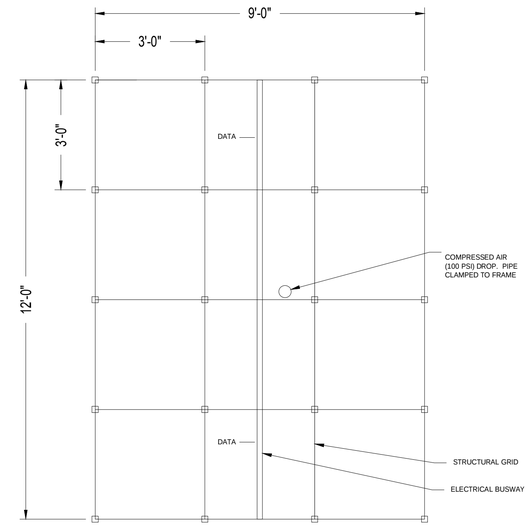
B CROSS SECTION (WITH OPENED DRAIN PAN)

2 - OVERHEAD SERVICES AND CABLE TRAY — SCALE: NTS



A SIDE VIEW (SECTION THROUGH BUSWAY)

3 - OVERHEAD SERVICES AND CABLE TRAY — SCALE: NTS



A TYPICAL PLAN OF STRUCTURAL GRID AND BUSWAY

NOTES:

STRUCTURAL CEILING GRID TO INCLUDE ELECTRICAL BUSWAY DATA, AND PIPED SERVICES AS INDICATED ON PLANS.

ELECTRICAL BUSWAY FURNISHED WITH TAP BOXES.

GRID AND SUPPORT ON 36" CENTERS WITH RIGID SUPPORTS FOR LATERAL STABILITY.

PIPED SERVICES TO BE FASTENED TO GRID WITH COMPATIBLE FASTENERS AS RECOMMENDED BY SYSTEM MANUFACTURER. NOT ALL COMPONENT CONNECTION DEVICES OR FITTINGS ARE SHOWN ON THIS DRAWING.

BASIS OF DESIGN: KUMAR NUSTRUT OR APPROVED EQUAL. STRUCTURAL STEEL CHANNELS AND FASTENERS.

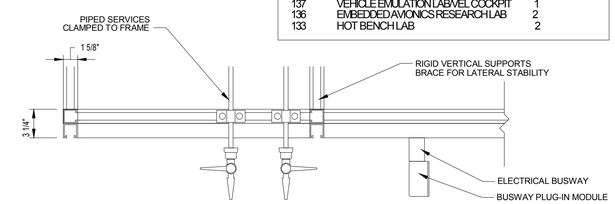
SYSTEM PAINTED TO MATCH LABORATORY CASEWORK.

MAX LOAD CAPACITY: 2000 LBS

REFER TO DIVISION 5 FOR SPECIFICATION INFORMATION.

SEE DETAIL 3A/Q-401 FOR STRUCTURAL CEILING GRID DETAIL.

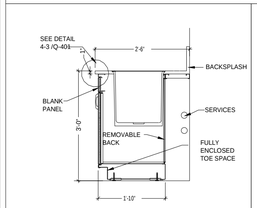
ROOM#	ROOM NAME	QTY
130	CLOSED LOOP LAB	6
137	VEHICLE EMULATION LAB/VEL COCKPIT	1
136	EMBEDDED AVIONICS RESEARCH LAB	2
133	HOT BENCH LAB	2



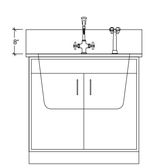
B OVERHEAD SERVICE GRID DETAIL ENLARGED SECTION

METAL CASEWORK SYSTEM — SCALE: NTS

4 - FLOOR - MOUNTED BASE CABINETS



1 SECTION THROUGH SINK CABINET TYPE B01



2 SINK CABINET FRONT ELEVATION TYPE B01

SINK FIXTURE INFORMATION

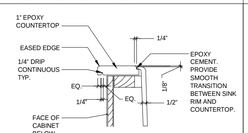
SINK
BASIS OF DESIGN: DURCON
DIMENSIONS: 30"W x 18"D x 18"H
SINK TYPE: DROP-IN
MATERIAL: MODIFIED EPOXY RESIN
COLOR TO BE SELECTED BY ARCHITECT

LABORATORY MIXING FAUCET
BASIS OF DESIGN: WATER SAVER
MODEL #: L412-8VB55

EYE WASH/DRENCH HOSE
BASIS OF DESIGN: WATER SAVER
MODEL #: EW1022SP

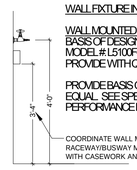
PROVIDE BASIS OF DESIGN OR APPROVED EQUAL. SEE SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS.

EPOXY SINK EDGE DETAIL



3 LIPPED (DROP-IN) SINK DETAIL NOT TO SCALE

WALL FIXTURE MOUNTING HEIGHT



WALL FIXTURE INFORMATION

WALL MOUNTED COMPRESSED AIR FAUCET
BASIS OF DESIGN: WATER SAVER
MODEL #: L5100F-225WSA
PROVIDE WITH QUICK CONNECT FITTING

PROVIDE BASIS OF DESIGN OR APPROVED EQUAL. SEE SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS.

COORDINATE WALL MOUNTED ELECTRICAL RACEWAY/BUSWAY MOUNTING HEIGHT WITH CASEWORK AND WALL FIXTURES.

4 WALL MTD. COMP. AIR FIXTURE TYPICAL MOUNTING HEIGHT NOT TO SCALE

NOTES:

METAL CASEWORK INFORMATION

CABINET BODY
18 GAUGE PAINTED STEEL

DOOR OVERLAY
INSET (FLUSH) DOORS

HINGES
5 KNUCKLE STAINLESS STEEL HINGE

DRAWER SLIDES
150# FULL EXTENSION

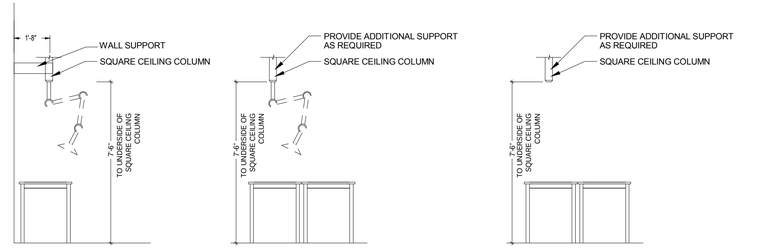
PULLS
STAINLESS STEEL 4" PULL
SATIN FINISH

CATCHES
NYLON ROLLER CATCH

PAINT
EPOXY POWDER COATED
COLOR TO BE SELECTED BY ARCHITECT

SEE SPECIFICATIONS FOR PERFORMANCE REQUIREMENTS. ALL LABORATORY CASEWORK AND EQUIPMENT TO BE SEFA (SCIENTIFIC EQUIPMENT AND FURNITURE ASSOCIATION) COMPLIANT.

5 - LOCAL EXHAUST MOUNTING DETAILS — SCALE: NTS



A TYPICAL SNORKEL MOUNTING AT WALL

B TYPICAL SNORKEL MOUNTING AT OVERHEAD GRID

C TYPICAL EXHAUST DROP MOUNTING AT OVERHEAD GRID

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN SST	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED SST	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED SST	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED SST	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: LABORATORY DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293477 | LATEST REV.

SHEET NO. Q-401

12/16/2013 9:17:48 AM

CONTRACTOR FURNISHED EQUIPMENT ONLY

Equip. Number	Room Number		Manufacturer	Model #	Spec. No.	Furnish / Install	New / Exist	Mounted	Size (LxWxH) Length	Width	Height	Remarks
EQ-01	SEE PLANS	SNORKEL	MOVEX	TERFU	115360	C/C	N	C	3" dia / 60" long			CEILING-MOUNTED
EQ-02		NOT USED										
EQ-03		NOT USED										
EQ-04		NOT USED										
EQ-05		NOT USED										
EQ-06		NOT USED										
EQ-07		NOT USED										
EQ-08		NOT USED										
EQ-09		NOT USED										
EQ-10		NOT USED										

OWNER FURNISHED/OWNER INSTALLED EQUIPMENT

Equip. Number	Room Number		Manufacturer	Model #	Spec. No.	Furnish / Install	New / Exist	Mounted	Size (LxWxH) Length	Width	Height	Remarks
EQ-011	130	CABINET			NIC	O/O	E		18	36	78	STORAGE
EQ-012	130	CABINET			NIC	O/O	E		36	19	72	ROLL-UP TYPE
EQ-013	130	FILE CABINET			NIC	O/O	E		28	18	58	
EQ-014	130	MONITOR STAND			NIC	O/O	E		48	31	78	ON WHEELS
EQ-015	130	TABLE			NIC	O/O	E		60	30	29	
EQ-016	130	TABLE			NIC	O/O	E		72	36	29	
EQ-017	130	BOOKSHELF			NIC	O/O	E		30	13	48	
EQ-018	130	BOOKSHELF			NIC	O/O	E		33	13	73	4 UNIT STACK
EQ-019	130	PRINTER			NIC	O/O	E		26	23	44	
EQ-020	130	COPIER			NIC	O/O	E		28	25	41	
EQ-021	130	TABLE			NIC	O/O	E		60	24	29	USED TO SUPPORT PLANES
EQ-022	130	TABLE			NIC	O/O	E		72	29	29	USED TO SUPPORT PLANES
EQ-023	130	TABLE			NIC	O/O	E		36	24	31	SMALL
EQ-024	130	TOOL CHEST			NIC	O/O	E		27	19	72	LARGE
EQ-025	130	TOOL CHEST			NIC	O/O	E		29	20	35	SMALL
EQ-026	130	CABINET			NIC	O/O	E		39	19	39	ROLL-UP TYPE
EQ-027	130	TABLE			NIC	O/O	E		36	30	27	SMALL
EQ-028	130	FILE CABINET			NIC	O/O	E		28	18	62	
EQ-029	130	CABINET			NIC	O/O	E		36	18	72	STORAGE
EQ-030	137	COMPUTER TABLE			NIC	O/O	E		60	30	29	
EQ-031	137	UTILITY CART			NIC	O/O	E		28	25	31	SCOPE
EQ-032	137	WORK BENCH			NIC	O/O	E		72	30	48	TAN
EQ-033	137	UTILITY CART			NIC	O/O	E		30	25	56	SCOPE
EQ-034	137	SERVER (ON WHEELS)			NIC	O/O	E		37	24	29	ON WHEELS

Equip. Number	Room Number		Manufacturer	Model #	Spec. No.	Furnish / Install	New / Exist	Mounted	Size (LxWxH) Length	Width	Height	Remarks
EQ-035	137	WORK TABLE			NIC	O/O	E		36	24	31	
EQ-036	137	BOOKSHELF			NIC	O/O	E		33	13	75	4 UNITS STACKED
EQ-037	137	BOOKSHELF			NIC	O/O	E		33	13	41	2 UNITS STACKED
EQ-038	137	CONTROL RACK			NIC	O/O	E		114	29	74	REAR ACCESS REQUIRED, 1 RACK IS 29"x24"x71"
EQ-039	137	CONTROL RACK			NIC	O/O	E		29	24	74	
EQ-040	137	FILE CABINET			NIC	O/O	E		28	18	58	
EQ-041	137	HONEYWELL CONTROL RACK			NIC	O/O	E		26	22	70	
EQ-042	137	HONEYWELL MINI CAB			NIC	O/O	E		74	38	64	ON WHEELS
EQ-043	137	WORK BENCH			NIC	O/O	E		60	30	48	BLUE
EQ-044	137	WORK DESK			NIC	O/O	E		60	34	61	WITH COMPUTER
EQ-045	137	WORK TABLE			NIC	O/O	E		60	34	31	
EQ-046	137	CABINET			NIC	O/O	E		36	18	72	STORAGE
EQ-047	137	PARTS CABINET			NIC	O/O	E		36	18	67	
EQ-048	137	VACUUM CLEANER			NIC	O/O	E		19	16	26	
EQ-049	137	WHITE BOARD			NIC	O/O	E		48	2	36	WALL MOUNT
EQ-050	137	AIRPLANE COCKPIT			NIC	O/O	E		178	154	128	
EQ-051	132	CONTROL EQUIPMENT RACK			NIC	O/O	E		29	24	75	REAR ACCESS REQUIRED
EQ-052	132	COMPUTER TABLE			NIC	O/O	E		60	36	31	REAR ACCESS REQUIRED
EQ-053	132	PILOT STATION			NIC	O/O	E		75	75	66	REAR ACCESS REQUIRED, ON WHEELS
EQ-054	132	WORK STATION TABLE			NIC	O/O	E		72	30	60	REAR ACCESS REQUIRED
EQ-055	132	WORK STATION TABLE			NIC	O/O	E		42	30	29	
EQ-056	132	CABINET			NIC	O/O	E		47	16	90	STORAGE
EQ-057	132	WORK BENCH			NIC	O/O	E		72	30	50	
EQ-058	132	BOOKSHELF			NIC	O/O	E		31	14	48	
EQ-059	131	CABINET			NIC	O/O	E		38	18	72	STORAGE
EQ-060	131	CABINET			NIC	O/O	E		47	16	90	STORAGE
EQ-061	131	TRASH CANS			NIC	O/O	E		21	21	27	
EQ-062	131	LADDER			NIC	O/O	E		18	6	120	
EQ-063	131	BOOKSHELF			NIC	O/O	E		30	13	47	
EQ-064	131	TABLE			NIC	O/O	E		60	30	30	
EQ-065	133	FILE CABINET			NIC	O/O	E		25	17	53	
EQ-066	133	TELEMETRY DISH			NIC	O/O	E		51	27	51	
EQ-067	133	PRINTER			NIC	O/O	E		26	26	28	ON WHEELS
EQ-068	133	FLOOR MONITOR STAND			NIC	O/O	E		48	32	78	
EQ-069	133	CABINET			NIC	O/O	E		36	18	78	PARTS/STORAGE
EQ-070	133	WORK TABLE			NIC	O/O	E		60	30	36	ON WHEELS
EQ-071	133	TOOL CHEST			NIC	O/O	E		42	18	64	ON WHEELS
EQ-072	133	UTILITY CART			NIC	O/O	E		45	26	37	GRAY
EQ-073	133	EQUIPMENT RACK			NIC	O/O	E		48	15	87	GRAY

Equip. Number	Room Number		Manufacturer	Model #	Spec. No.	Furnish / Install	New / Exist	Mounted	Size (LxWxH) Length	Width	Height	Remarks
EQ-074	133	EQUIPMENT RACK			NIC	O/O	E		60	24	83	CHROME
EQ-075	133	LARGE UTILITY CART			NIC	O/O	E		56	25	34	BEIGE
EQ-076	133	SMALL UTILITY CART			NIC	O/O	E		44	25	30	BEIGE
EQ-077	133	DESIGNJET 4000 PLOTTER			NIC	O/O	E		76	32	55	HP
EQ-078	133	WORK BENCH			NIC	O/O	E		72	37	55	1 TO 4
EQ-079	133	FLOOR EASELS			NIC	O/O	E		31	24	76	DRY BOARDS
EQ-080	133	WORK TABLE			NIC	O/O	E		60	34	31	
EQ-081	133	COMPUTER TABLE			NIC	O/O	E		36	24	30	
EQ-082	133	DRAWING FILE CABINET			NIC	O/O	E		41	29	49	
EQ-083	133	PARTS STORAGE BIN			NIC	O/O	E		30	29	60	
EQ-084	133	BARRIER STANDS			NIC	O/O	E		14	14	39	
EQ-085	133	HAND TRUCK			NIC	O/O	E		21	18	52	
EQ-086	136	FANUC IN PLEXI ENCLOSURE			NIC	O/O	E		79	41	49	FANUC MEASUREMENTS
EQ-087	136	OPTICAL TABLE			NIC	O/O	E		144	60	33	LARGE
EQ-088	136	OPTICAL TABLE			NIC	O/O	E		60	36	33	SMALL
EQ-089	136	PLEXI- ENCLOSURE			NIC	O/O	E		152	122	102	2 SIDES, 2 OPENINGS 37.5"
EQ-090	136	CABINET			NIC	O/O	E		36	18	78	
EQ-091	136	BOOKSHELF			NIC	O/O	E		36	19	72	
EQ-092	136	BOOKSHELF			NIC	O/O	E		33	13	78	4 UNITS STACKED
EQ-093	136	BOOKSHELF			NIC	O/O	E		33	13	72	4 UNITS STACKED
EQ-094	136	BOOKSHELF			NIC	O/O	E		33	13	42	2 UNITS STACKED
EQ-095	136	WORK BENCH			NIC	O/O	E		72	36	42	
EQ-096	136	FILE CABINET			NIC	O/O	E		29	18	60	
EQ-097	136	COMPUTER TABLE			NIC	O/O	E		60	30	29	
EQ-098	136	COMPUTER TABLE			NIC	O/O	E		48	30	27	
EQ-099	136	COMPUTER TABLE			NIC	O/O	E		36	30	27	
EQ-100	136	TABLE			NIC	O/O	E		36	26	31	
EQ-101	136	CART			NIC	O/O	E		30	24	31	WITH MAGNIFER
EQ-102	136	CART			NIC	O/O	E		27	27	28	
EQ-103	136	STAND			NIC	O/O	E		21	10	39	METAL
EQ-104	134	FLAMMABLE STORAGE CABINET			NIC	O/O	E		43	19	48	
EQ-105	134	ACCESS STAIRS			NIC	O/O	E		107	29	195	
EQ-106	134	ACCESS STAIRS			NIC	O/O	E		42	19	75	
EQ-107	134	CABINETS			NIC	O/O	E		36	18	78	STORAGE
EQ-108	134	WIRE RACK			NIC	O/O	E		36	24	75	
EQ-109	134	TABLE			NIC	O/O	E		60	34	31	
EQ-110	134	TABLE			NIC	O/O	E		72	34	31	
EQ-111	134	TABLE			NIC	O/O	E		38	26	31	
EQ-112	134	TABLE			NIC	O/O	E		45	30	26	
EQ-113	134	PARTS CABINET			NIC	O/O	E		30	28	48	PULL-OUT DRAWERS
EQ-114	134	REFRIGERATOR			NIC	O/O	E		27	27	34	

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

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ISSUE DATE
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APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	SST	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	SST	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	SST	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	SST	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: EQUIPMENT LIST

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293478 | LATEST REV.
SHEET NO. Q-402

12/16/2013 9:17:50 AM

DESIGN DATA

DESIGN CODE:
INTERNATIONAL BUILDING CODE 2009 (IBC)

WIND LOAD INFORMATION:

BASIC WIND SPEED	105 MPH		
BUILDING OCCUPANCY CATEGORY	I		
WIND LOAD IMPORTANCE FACTOR (Iw)	1.00		
WIND EXPOSURE	C		
INTERNAL PRESSURE COEFFICIENTS	± 0.18		
COMPONENTS AND CLADDING (GROSS WIND PRESSURES):			
(FOR ZONE DEFINITIONS & DIAGRAMS SEE DESIGN GUIDE ASCE/SEI 7 SECTION 6)			
WIDTH OF PRESSURE COEFFICIENT ZONE (a)	10.5 ft MAX		
TRIBUTARY WIND LOAD AREAS:	10 ft²	50 ft²	100 ft²
ROOF (GABLE/HIP/MONOSLOPE):			
NEGATIVE ZONE 1	27.4 psf	25.8 psf	25.1 psf
NEGATIVE ZONE 2	46.0 psf	34.6 psf	29.7 psf
NEGATIVE ZONE 3	46.0 psf	34.6 psf	29.7 psf
POSITIVE PRESSURE ALL ZONES	11.1 psf	10.0 psf	10.0 psf
WALLS:			
ZONE 4 (+/-)	27.2 psf	24.6psf	23.5 psf
ZONE 5 (+/-)	33.4 psf	28.3 psf	26.1 psf

SEISMIC LOAD INFORMATION:

SEISMIC USE GROUP / OCCUPANCY CATEGORY	I
SEISMIC LOAD IMPORTANCE FACTOR (Ie)	1.0
SEISMIC SITE CLASS	D
MAPPED SPECTRAL RESPONSE ACCELERATION (Ss)	0.124
MAPPED SPECTRAL RESPONSE ACCELERATION (S1)	0.049
SPECTRAL RESPONSE COEFFICIENT (Sds)	0.132
SPECTRAL RESPONSE COEFFICIENT (Sd1)	0.078
SEISMIC DESIGN CATEGORY	A
BASIC SEISMIC FORCE RESISTING SYSTEM	ORDINARY UNREINFORCED MASONRY SHEAR WALLS
RESPONSE MODIFICATION FACTOR	1.5
DESIGN BASE SHEAR	0.01Wx at each floor level
ANALYSIS PROCEDURE	INDEX FORCE ANALYSIS

SNOW LOAD INFORMATION:

GROUND SNOW LOAD (Pg)	20 psf
SNOW LOAD IMPORTANCE FACTOR (Is)	1.0
SNOW EXPOSURE FACTOR (Ce)	1.00
THERMAL FACTOR (Ct)	1.00 (1.2 AT CANOPY)
FLAT ROOF SNOW LOAD (Pf)	20 psf
DESIGN/BALANCED SNOW LOAD (Ps)	20 psf + DRIFT

PRESUMED SOIL LOAD INFORMATION FROM ADJACENT SITE REPORT:

PRESUMED COEFFICIENT OF SLIDING FRICTION (μ)	0.30
PRESUMED LATERAL EARTH PRESSURE:	
ACTIVE	40 pcf
AT-REST	55 pcf
PASSIVE	250 pcf
PRESUMED NET ALLOWABLE SOIL BEARING PRESSURE	Qa = 2000 psf

NOTE: ALL PRESUMED SOIL INFO TO BE FIELD VERIFIED BY GEOTECHNICAL ENG

LIVE LOADS PER EXISTING 1950 DWGS:

EXIST BASEMENT FROM GRID LINE 7 TO 18 (33in 2-WAY SLAB)	500 psf (presumed)
EXIST FIRST FLOOR FROM GRID LINE 1 TO 3	550 psf
EXIST FIRST FLOOR FROM GRID LINE 3 TO 21	250 psf
EXIST SECOND FLOOR AREA	250 psf
EXIST ROOF AREA	100 psf

MATERIAL DESIGN PROPERTIES

CONCRETE STRENGTHS:	
FOOTINGS	f'c = 3000 psi
CONCRETE WALLS / PIERS	f'c = 4000 psi
SLAB ON GRADE & ON METAL DECK	f'c = 4000 psi
REINFORCING STEEL STRENGTHS:	
BARS (ASTM A 615, grade 60)	fy = 60,000 psi
WWF (ASTM A 185)	fy = 65,000 psi
STRUCTURAL MASONRY STRENGTHS:	
ASTM C 90, grade N (CMU)	f'm = 2500 psi
MORTAR (ASTM C 270):	
TYPE M (BELOW GRADE)	fu = 2500 psi
TYPE S (ABOVE GRADE)	fu = 1800 psi
GROUT (ASTM C 476):	
BOND BEAMS (pea gravel)	f'c = 3000 psi
MASONRY WALLS AND PIERS (pea gravel)	f'c = 3000 psi
STRUCTURAL STEEL STRENGTHS:	
WF SHAPES (ASTM A992)	fy = 50,000 psi
ANGLES, CHANNELS, PLATES, & BARS (ASTM A36)	fy = 36,000 psi
SQUARE & RECTANGULAR TS OR HSS SECTIONS (ASTM A500, GRADE B)	fy = 46,000 psi
ROUND HSS SECTIONS (ASTM A500, GRADE B)	fy = 42,000 psi

STRUCTURAL STEEL NOTES

1. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM WITH THE AISC (AMERICAN INSTITUTE OF STEEL CONSTRUCTION), "MANUAL OF STEEL CONSTRUCTION", LATEST EDITION.
2. ALL STEEL DETAILS AND CONNECTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AISC "SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS, ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN", LATEST EDITION.
3. FABRICATORS SHALL DESIGN CONNECTIONS NOT SPECIFICALLY DETAILED ON PLANS AS FOLLOWS:
   A. GENERAL: MEMBERS REQUIRING END MOMENT CONNECTIONS SHALL MEET THE REQUIREMENTS OF TYPE 1 "RIDGE FRAME" CONSTRUCTION INCLUDING FRICTION BOLTS IF UTILIZED. ALL OTHER MEMBERS SHALL FOLLOW THE REQUIREMENTS OF TYPE 2 "SIMPLE" CONSTRUCTION.
   B. MEMBER SHEAR CONNECTIONS: UNLESS A LARGER END VERTICAL REACTION IS SHOWN OTHERWISE ON THE DRAWINGS (IE R = 85k), MINIMUM DESIGN SHEAR FORCES SHALL BE AS FOLLOWS:
      I. NON-COMPOSITE BEAMS: SUPPORT A REACTION "R" EQUAL TO ONE HALF THE TOTAL UNIFORM LOAD CAPACITY FROM THE TABLE OF UNIFORM LOAD CONSTANTS IN THE AISC MANUAL PART 2 FOR GIVEN SHAPE, SPAN, AND GRADE OF STEEL.
4. USE A325N BOLTS UNLESS NOTED OTHERWISE.
5. SPLICES SHALL BE ALLOWED ONLY AT LOCATIONS SPECIFICALLY INDICATED ON THE STRUCTURAL DRAWINGS UNLESS APPROVED OTHERWISE BY THE ENGINEER.
6. OVERSIZED OR SLOTTED HOLES SHALL NOT BE USED FOR ANY CONNECTIONS UNLESS SPECIFICALLY INDICATED ON THE DRAWINGS OR APPROVED BY THE ENGINEER.
7. BEAM AND GIRDER CONNECTIONS SHALL BE AS NOTED ON PLANS AND IN DETAILS.
8. PROVIDE HOLES IN ALL STEEL AS REQUIRED TO PREVENT ANY ACCUMULATION OF WATER DURING ERECTION. ALL PENETRATIONS THROUGH MAIN MEMBERS SHALL NOT " IN DIAMETER AND SHALL BE GROUND SMOOTH.
9. CUTS, HOLES, COPING, ETC. REQUIRED FOR WORK OF OTHER TRADES SHALL BE SHOWN ON THE SHOP DRAWINGS AND MADE IN THE SHOP. CUTS OR BURNING OF HOLES IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.
10. PROVIDE ANY NECESSARY TEMPORARY BRACING OR GUYS TO PROVIDE LATERAL SUPPORT OF THE BUILDING UNTIL PERMANENT CONNECTIONS ARE COMPLETELY INSTALLED TO THE CMU SHEAR WALLS.
11. STRUCTURAL STEEL FRAMING SHALL BE TRUE AND PLUMB BEFORE CONNECTIONS ARE FINALLY BOLTED OR WELDED.
12. TOP OF STEEL ELEVATION = DECK BEARING AS NOTED ON PLAN, UNO REFERENCED FROM FIRST FLOOR SLAB ELEVATION OF 0'-0". SEE CIVIL FOR SITE SPECIFIC DATUM (i.e. 16.36' = 0'-0").
13. EQUALLY SPACE BEAMS BETWEEN GRID LINES WHERE DIMENSIONS ARE NOT PROVIDED, TYP. UNO.
14. **NO** PROVISIONS HAVE BEEN MADE FOR FUTURE EXPANSION.

CAST-IN-PLACE CONCRETE NOTES

1. DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST PROVISIONS OF ACI 318/318R.
2. CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER AT LEAST 48 HOURS PRIOR TO PLACING CONCRETE TO FACILITATE ON SITE OBSERVATION OF REBAR.
3. ARRANGEMENT AND BENDING OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ACI DETAILING MANUAL (ACI SP-66), LATEST EDITION.
4. WHEN THE AVERAGE TEMPERATURE FROM MIDNIGHT TO MIDNIGHT IS EXPECTED TO DROP BELOW 40 DEGREES FAHRENHEIT FOR THREE SUCCESSIVE DAYS, COLD WEATHER CONCRETING REQUIREMENTS MUST BE FOLLOWED.
5. WHEN AMBIENT AIR OR CONCRETE TEMPERATURES EXCEED 90 DEGREES FAHRENHEIT, STEEL REINFORCING AND/OR FORMING SURFACES ARE ABOVE 120 DEGREES, OR WHEN WIND VELOCITY, HUMIDITY, OR SOLAR RADIATION CREATE CONDITIONS OF ACCELERATED MOISTURE LOSS AND INCREASED RATE OF HYDRATION, HOT WEATHER CONCRETING REQUIREMENTS SHALL BE FOLLOWED.
6. ALL HOOKS IN STEEL REINFORCING SHALL BE ACI STANDARD HOOKS, UNLESS NOTED OTHERWISE IN CONSTRUCTION DOCUMENTS.
7. ALL CONCRETE SURFACES SHALL BE FORMED, UNLESS OTHERWISE NOTED.
8. CONTROL JOINTS SHALL BE PLACED IN SLAB ON GRADE AND SLAB ON METAL DECK CONSTRUCTION WITHIN 24 HOURS OF INITIAL POUR.
9. WIRE SPACERS, CHAIRS, TIES, ETC., FOR SUPPORT OF STEEL REINFORCING SHALL BE PROVIDED BY THE CONTRACTOR TO ENSURE REINFORCING IS PLACED IN THE PROPER POSITION DURING CONCRETE PLACEMENT.
10. STEEL REINFORCING SPLICES OF ADJACENT BARS SHALL BE STAGGERED SUCH THAT SPLICES ARE 4 FEET APART, MINIMUM.
11. PROVIDE (2) #5 BARS AROUND ALL OPENINGS AND (2) #5 DIAGONALLY AT ALL OPENING CORNERS UNLESS OTHERWISE SPECIFIED. EXTEND 2'-6" PAST OPENING TYPICALLY.
12. WELDED WIRE REINFORCING SHALL BE IN FLAT SHEETS ONLY, AND LAPPED A MINIMUM OF 6 INCHES.
13. WELDING OF STEEL REINFORCING IS NOT PERMITTED.
14. SLEEVES, CONDUITS, OR PIPES THROUGH SLABS AND WALLS SHALL BE PLACED AT THREE DIAMETERS ON CENTER, OR 4 INCHES MINIMUM.
15. ALUMINUM CONDUIT OR PIPING SHALL NOT BE CAST IN CONCRETE.
16. PROVIDE ¾" CHAMFER ON EXPOSED CORNERS OF CONCRETE UNO. TOP EDGES OF WALLS SHALL BE TOOLED UNO.
17. FINISH & COVER CONCRETE SLABS w/ FILM FORMING CURING COMPOUND OR VAPOR RETARDER UNO OR SPECIFIED OTHERWISE.

CAST-IN-PLACE CONCRETE TOLERANCES

1. CONCRETE COVER MEASURED PERPENDICULAR FROM THE SURFACE IN DIRECTION OF TOLERANCES:

MEMBERS 12" OR LESS	±3/8"
MEMBERS OVER 12"	±1/2"

2. STEEL REINFORCEMENT SPACING SHALL BE WITHIN THE FOLLOWING TOLERANCES:
   ¼" SPACING DISTANCE, NOT TO EXCEED 1"

3. PLACEMENT OF EMBEDDED ITEMS SHALL BE WITHIN THE FOLLOWING TOLERANCES:

VERTICAL ALIGNMENT	±1"
LATERAL ALIGNMENT	±1"
LEVEL ALIGNMENT	±1"

4. PLACEMENT OF FOOTINGS SHALL BE WITHIN THE FOLLOWING TOLERANCES:

LATERAL ALIGNMENT	±2"
LEVEL ALIGNMENT	+1/2" TO -2"
(LEVEL ALIGNMENT SUPPORTING MASONRY)	±1/2"

5. CROSS-SECTIONAL DIMENSION OF FOOTINGS SHALL BE WITHIN THE FOLLOWING TOLERANCES:

FORMED FOOTINGS	+2" TO -1/2"
EARTHCAST FOOTINGS:	
2' OR LESS	+3" TO -1/2"
GREATER THAN 2' BUT LESS THAN 6'	+6" TO -1/2"
GREATER THAN 6'	+12" TO -1/2"
FOOTING THICKNESS	±5%

6. TOP OF FOOTING SLOPE — 1" IN 10'

STEEL DECK NOTES

1. DECK, ACCESSORIES AND ATTACHMENTS SHALL CONFORM TO "STEEL DECK INSTITUTE SPECIFICATIONS", LATEST EDITION.
2. FLOOR DECK TO STRUCTURE FASTENING SHALL BE ACCOMPLISHED USING 5- 5/8"Ø PUDDLE WELDS FOR EACH 36" WIDTH AND 2- #10 TEK SCREW SIDE LAP FASTENERS.
3. PAINTED SURFACES OF DECK DAMAGED AS A RESULT OF HANDLING, SHIPPING, OR INSTALLATION SHALL BE CLEANED AND REPAIRED WITH AN APPROVED REPAIR PAINT IN ACCORDANCE WITH THE STEEL DECK SPECIFICATIONS.

CMU WALL CONSTRUCTION NOTES

1. IN ACCORDANCE WITH "ACI 530-05/ASCE 6-05/TMS 402-05 BUILDING CODE FOR MASONRY STRUCTURES" PROVIDE LEVEL B QUALITY ASSURANCE PER TABLE 1.15.2 AND AS REQUIRED IN CHAPTER 1. VERIFY f'm REQUIRED USING THE UNIT STRENGTH METHOD.
2. CMU SHALL BE LAID IN RUNNING BOND WITH TYPE S MORTAR (TYPE M BELOW GRADE).
3. PROVIDE MINIMUM 1- #5 VERTICAL BAR AT ALL WALL CORNERS, ENDS OF WALLS, & EACH SIDE OF CONTROL JOINTS AND/OR OPENINGS.
4. ALL REINFORCED CELLS SHALL BE GROUTED WITH PEA GRAVEL CONCRETE HAVING A MIN COMPRESSIVE STRENGTH OF 3,000psi.
5. HORIZONTAL REINFORCING AND BOND BEAM REINFORCING AT CORNERS SHALL BE LAPPED A MINIMUM OF 48 BAR DIAMETERS, OR 24" INCHES, WHICHEVER IS LARGER.
6. CLEANOUTS SHALL BE PROVIDED IN THE BOTTOM COURSE OF MASONRY FOR EACH GROUT POUR, WHEN THE POUR HEIGHT EXCEEDS 5 FEET.
7. GROUT LIFTS SHALL NOT EXCEED 5 FEET. CONSOLIDATE GROUT AT TIME OF PLACEMENT.
8. FACE SHELLS AND WEB FORMING CELLS SHALL BE FULL-BEDDED IN THE STARTING COURSE ON FOUNDATIONS, AND IN ALL COURSES OF PIERS AND PILASTERS.
9. PROVIDE HORIZONTAL JOINT REINFORCING AT 16" OC VERTICALLY (8" OC IN PARAPET WALLS) UNO.
10. HORIZONTAL JOINT REINFORCING SHALL BE TERMINATED AT CONTROL JOINTS. BOND BEAM REINFORCING SHALL BE CONTINUOUS.
11. REFER TO ARCHITECTURAL DRAWINGS FOR CONTROL JOINT SPACINGS.
12. SOLID OR SOLID GROUTED CMU SHALL BE PROVIDED IN COURSES IMMEDIATELY ABOVE AND BELOW ANY CHANGES IN WYTHE THICKNESS.
13. IN BLOCK WIDTH CHANGES, MAINTAIN CONTINOUS RUNNING BOND. NO CONTINOUS JOINTS @ TRANSITIONS

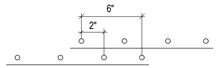
MILD REINFORCING STEEL MINIMUM CLEAR COVER

CONCRETE CAST AGAINST EARTH AND PERMANENTLY EXPOSED TO EARTH:	
FOOTINGS:	3"
CONCRETE EXPOSED TO EARTH OR WEATHER:	
WALLS, COLUMNS, BEAMS:	
UP THROUGH #5 BARS	1 1/2"
#6 THRU #18 BARS	2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:	
WALLS:	
UP THROUGH #11	3/4"
#14 AND #18 BARS	1 1/2"
ELEVATED SLABS:	
TOP	3/4"
BOTTOM	1"
BEAMS:	
TOP / BOTTOM / SIDE	1 1/2"
COLUMNS:	
SIDES	1 1/2"

(DIMENSIONS ABOVE ARE MINIMUMS, UNLESS NOTED OTHERWISE IN DETAILS)

REINFORCING NOTES

1. REINFORCING SHALL BE DETAILED IN ACCORDANCE WITH ACI 315 (CURRENT EDITION).
2. ALL LAPS SHALL BE CLASS "B" PER ACI 318 UNLESS OTHERWISE NOTED ON THE DESIGN DRAWINGS, OR UNLESS THE DETAILER TAKES SPECIAL CARE TO PROVIDE STAGGERED LAPS. USE TOP BAR LAP LENGTHS FOR ALL HORIZONTAL WALL BARS AND FOR TOP BARS IN SLABS AND BEAMS OVER 12" DEEP.
3. LAP LENGTH SHALL BE SPECIFICALLY NOTED ON PLACING DRAWINGS WHERE MORE THAN ONE BAR MAKES UP A CONTINUOUS STRING.
4. CORNER BARS WITH CLASS "B" PER ACI 318 LAPS SHALL BE PROVIDED AT ALL WALL CORNERS AND INTERSECTIONS PER DETAIL S-301
5. HORIZONTAL BARS, EXCEPT FOR CONTINUOUS STRINGS FROM ONE CORNER OF OPENING TO ANOTHER, SHALL BE DETAILED TO SHOW THE DISTANCE FROM AT LEAST ONE END OF THE BAR TO THE NEAREST BUILDING GRID LINE OR WALL.
6. WELDED WIRE FABRIC SHALL BE LAPPED AND/OR ANCHORED TO DEVELOP Fy PER ACI 315.



7. PROVIDE MINIMUM COVER PER ACI 318, 7.7.1 (AS SHOWN ON THIS SHEET)
8. PROVIDE ISOLATION BOARD WHERE SLABS ABUT VERTICAL SURFACES AS SHOWN IN FOUNDATION AND FRAMING DETAILS.

DRAWING LIST

SHEET NUMBER	SHEET NAME	100% 2013-11-06
S-001	STRUCTURAL NOTES & SCHEDULES	X
S-100	BASEMENT FOUNDATION PLAN	X
S-101	FIRST FLOOR OVERALL FRAMING PLAN	X
S-102	SECOND FLOOR OVERALL FRAMING & DEMO PLANS	X
S-103	ROOF OVERALL FRAMING PLAN	X
S-301	STRUCTURAL SECTIONS & DETAILS	X

STRUCTURAL ABBREVIATIONS

ABBRV.	WORD OR PHRASE	ABBRV.	
@	AT	LL	LIVE LOAD
&	AND	LLH	LONG LEG HORIZONTAL
AB	ANCHOR BOLT	LLV	LONG LEG VERTICAL
ALT	ALTERNATE	LSL	LAMINATED STRAND LUMBER
APA	AMERICAN PLYWOOD ASSOC.	LVL	LAMINATED VENEER LUMBER
ARCH	ARCHITECT(URAL)	LW	LONG WAY
BC	BOTTOM CHORD	MFR	MANUFACTURER
BLDG	BUILDING	MAX	MAXIMUM
BLKG	BLOCKING	MECH	MECHANICAL
BM	BEAM	MIN	MINIMUM
BOT	BOTTOM	MISC	MISCELLANEOUS
BRG	BEARING	NIC	NOT IN CONTRACT
℄	CENTERLINE	NTS	NOT TO SCALE
CB	COLUMN BASE	OC	ON CENTER
CIP	CAST-IN-PLACE	O.F.	OUTSIDE FACE
CL	CENTERLINE	OPP	OPPOSITE
CLR	CLEAR	PARA	PARALLEL
CJ	CONTROL OR CONSTRUCTION JOINT	P/C	PRECAST CONCRETE
CMU	CONCRETE MASONRY UNIT	PCF	POUNDS PER CUBIC FOOT
COL	COLUMN	PERP	PERPENDICULAR
CONC	CONCRETE	PL (℄)	STEEL PLATE
CONT	CONTINUOUS	PLY	PLYWOOD
DBA	DEFORMED BAR ANCHOR	PSI	POUNDS PER SQUARE INCH
DEFL	DEFLECTION	PSF	POUNDS PER SQUARE FOOT
DEMO	DEMOLITION	PSL	PARALLEL STRAND LUMBER
DFL	DOUGLAS FIR LARCH	P/T	POST TENSIONED CONCRETE
DIA (Ø)	DIAMETER	PT	PRESSURE TREATED
DIM	DIMENSION	REINF	REINFORCEMENT
DL	DEAD LOAD	REQD	REQUIRED
DTL	DETAIL	RTU	ROOF TOP UNIT
DWL	DOWEL	SCHD	SCHEDULE
DWG	DRAWING	SHT	SHEET
EA	EACH	SIM	SIMILAR
EF	EACH FACE	SMS	SHEET METAL SCREWS
EJ	EXPANSION JOINT	SOG	SLAB ON GRADE
EL	ELEVATION	SPEC	SPECIFICATION
EMBED	EMBEDMENT	SPF	SPRUCE-PINE-FIR
EOSL	EDGE OF SLAB	SQ	SQUARE
EOS	EDGE OF STEEL	SS	STAINLESS STEEL
EQ	EQUAL	STL	STEEL
EW	EACH WAY	STR	STRUCTURAL
EXIST	EXISTING	SW	SHORT WAY
EXP	EXPANSION	SYM	SYMMETRICAL
EXT	EXTERIOR	SYP	SOUTHERN YELLOW PINE
FD	FLOOR DRAIN	T&B	TOP AND BOTTOM
FND	FOUNDATION	TC	TOP CHORD
FF	FINISH FLOOR	T&G	TONGUE AND GROOVE
FIN	FINISH	TF	TOP OF FOOTING ELEVATION
FLR	FLOOR	TL	TOP OF LEDGE ELEVATION
FRMG	FRAMING	TOC	TOP OF CONCRETE ELEVATION
FTG	FOOTING	TOSL	TOP OF SLAB ELEVATION
GA	GAGE	TOS	TOP OF STEEL ELEVATION
GALV.	GALVANIZED	TP	TOP OF PIER ELEVATION
GB	GRADE BEAM	T/PC	TOP OF PILE CAP
GC	GENERAL CONTRACTOR	TRANS	TRANSVERSE
GT	GIRDER TRUSS	TS	TUBE STEEL
GYP	GYPSUM	TW	TOP OF WALL ELEVATION
HORIZ	HORIZONTAL	TYP	TYPICAL
HIF	HORIZONTAL INSIDE FACE	UNO	UNLESS NOTED OTHERWISE
HOF	HORIZONTAL OUTSIDE FACE	VERT	VERTICAL
HSS	HOLLOW STRUCTURAL SECTION	VIF	VERTICAL INSIDE FACE
HT	HEIGHT	VOF	VERTICAL OUTSIDE FACE
HVAC	HEATING, VENTILATING & AIR COND.	w/	WITH
HWS	HEADED WELD STUD	WF	WIDE FLANGE
I.F.	INSIDE FACE	w/o	WITHOUT
INFO	INFORMATION	WP	WORKPOINT
JST	JOIST	WT	WEIGHT
KSI	KIPS PER SQUARE INCH	WWF	WELDED WIRE FABRIC
L	ANGLE	SLRS	SEISMIC LOAD RESISTING SYSTEM
		SMF	SPECIAL MOMENT FRAME
		SCBF	SPECIAL CONCENTRIC BRACED FRAME

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
11-6-13
MATTHEW MICHAEL DRABIC
Lic. No. 046454
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NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	JJH	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	JJH	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	GMC	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	GMC	
LARRY SNYDER	NASA COD	12/02/2013	TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ± 02; X.XXX (3 DECIMAL PLACES) ± 005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

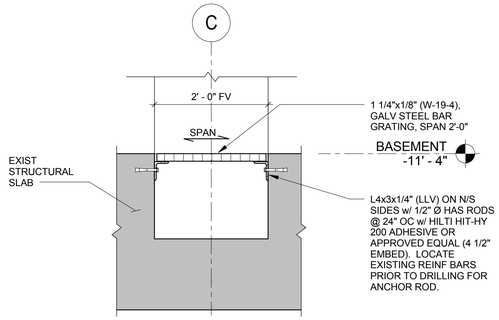
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: STRUCTURAL NOTES & SCHEDULES

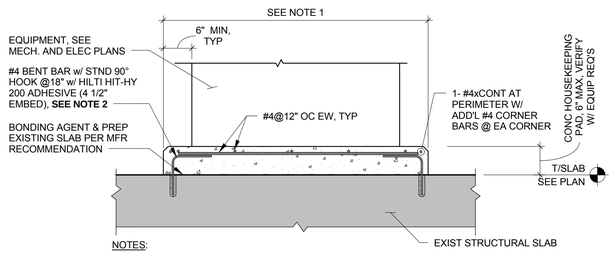
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293479 | LATEST REV.

SHEET NO. S-001

12/16/2013 8:47:17 AM



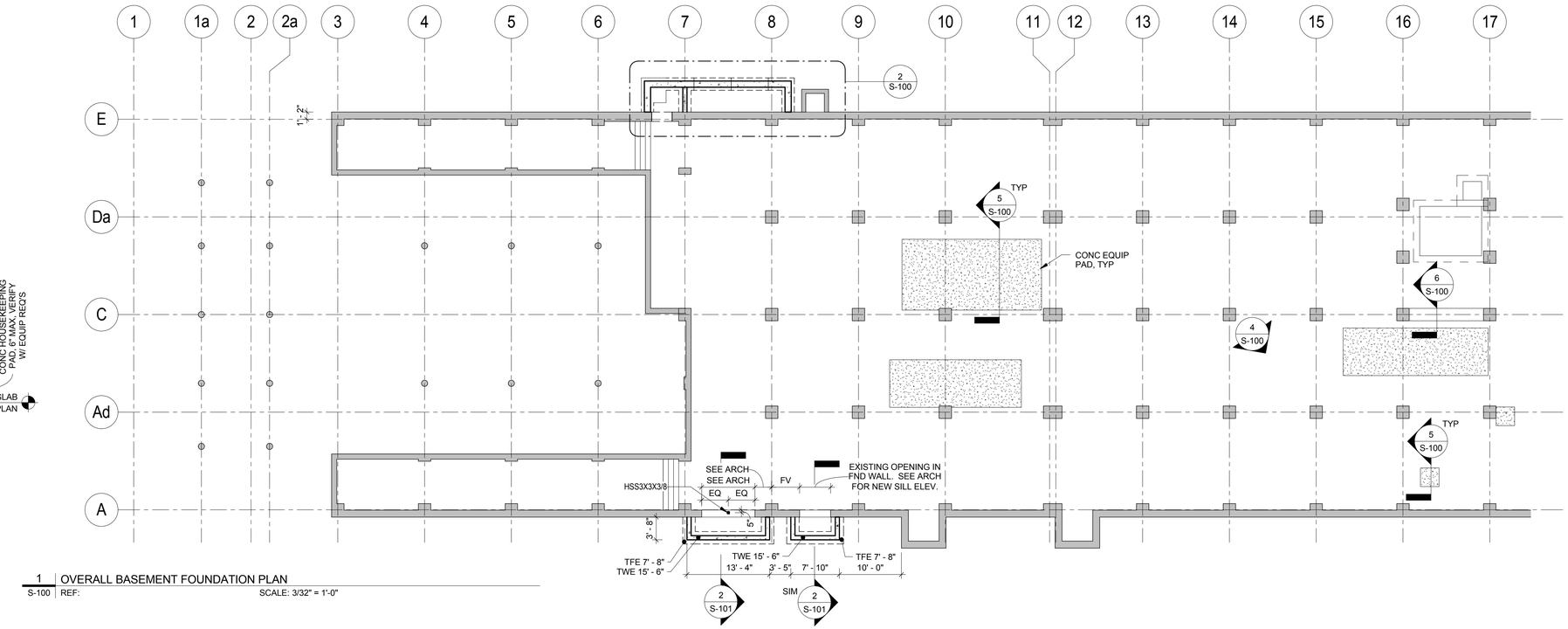
6 | EXISTING TRENCH GRATING INFILL DETAIL
S-100 | REF: S-100 SCALE:NTS



NOTES:

1. CONTRACTOR TO COORDINATE SIZE AND LOCATION OF PADS WITH ELECTRICAL AND MECHANICAL REQUIREMENTS AND WITH FINAL SELECTION OF EQUIPMENT.
2. DO NOT DRILL THROUGH EXIST REBAR IN EXIST SLAB. LOCATE BARS THROUGH NON-DESTRUCTIVE MEANS PRIOR TO DRILLING INTO SLAB.

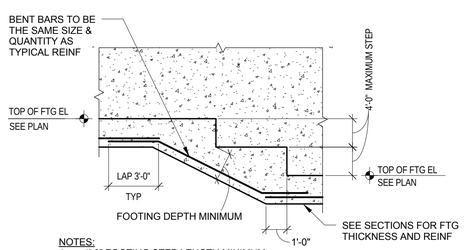
5 | TYP EQUIPMENT PAD ON EXIST SLAB DETAIL
S-100 | REF: S-100 SCALE:NTS



1 | OVERALL BASEMENT FOUNDATION PLAN
S-100 | REF: SCALE: 3/32" = 1'-0"

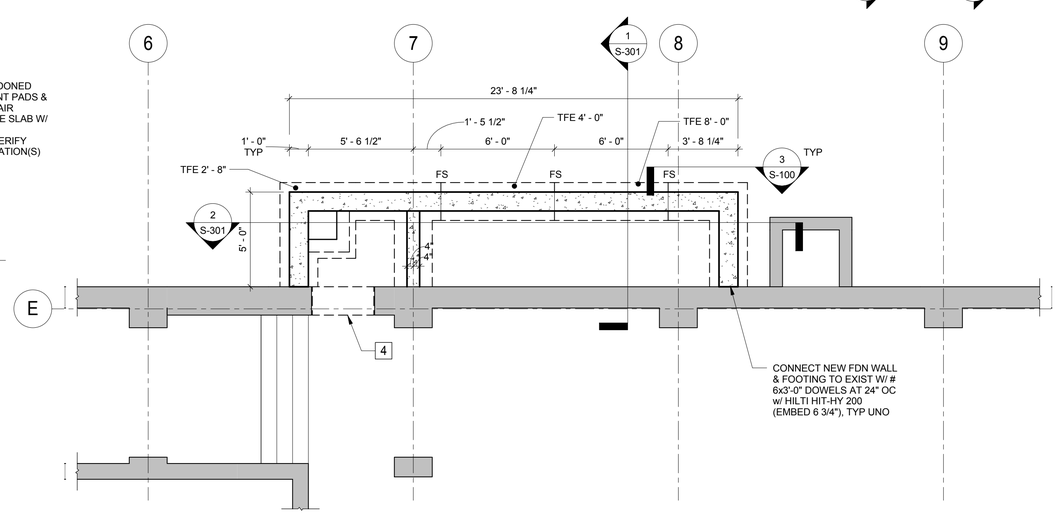
REMOVE THE ABANDONED EXISTING EQUIPMENT PADS & BASE PLATES. REPAIR EXISTING CONCRETE SLAB W/ CONCRETE REPAIR PATCHING. FIELD VERIFY QUANTITY AND LOCATION(S) W/ OWNER.

4 | EXISITNG BASEMENT PHOTO
S-100 | REF: S-100 SCALE:NTS



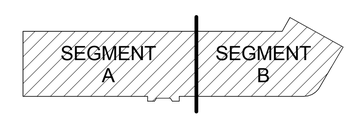
NOTES:
1. 4'-0" FOOTING STEP LENGTH MINIMUM.

3 | TYP. STEPPED FOOTING @ CONC. WALL
S-100 | REF: SCALE:NTS



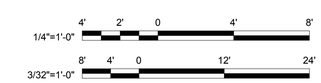
2 | PARTIAL LOWER LEVEL PLAN
S-100 | REF: S-100 SCALE: 1/4" = 1'-0"

DEMO PLAN NOTES (□)	
NUMBER	DESCRIPTION
1	SAW CUT OPENING IN EXISITNG CONCRETE SLAB, ONLY. EXISTING BEAMS SHALL REMAIN. DO NOT OVERCUT OPENINGS W/ CIRCULAR SAW. INSTALL SUPPORT FRAMING PRIOR TO DEMO WHERE REQUIRED.
2	REMOVE EXISTING STEEL FRAMING, SHOWN IN HIDDEN LINE TYPE
3	REMOVE MEZZANINE FRAMING CIRCA 1969 FRAMING AND MASONRY PARTITION WALL SUPPORTING STEEL JOIST FRAMING W/ WOOD DECKING, SOUTH OF GRID LINE D
4	SAW CUT NEW OPENING IN EXISTING FOUNDATION WALL. DO NOT OVERCUT OPENING. SEE ARCH DOOR SCHEDULE FOR REQUIRED ROUGH OPENING DIMENSIONS
5	INFILL SLAB DEPRESSIONS W/ SELF LEVELING CONCRETE TOPPING
6	INFILL EXISTING FLOOR OPENINGS LESS THAN 2'-0" IN WIDTH OR LENGTH BY FASTENING 3/8" STL PLATE TO THE UNDERSIDE OF THE FLAT SLAB W/ 3/4" Ø x 4" LONG HILTI HUS SCREW ANCHORS. FILL VOID W/ SELF LEVELING CONCRETE TOPPING.



KEY PLAN

N



GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

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			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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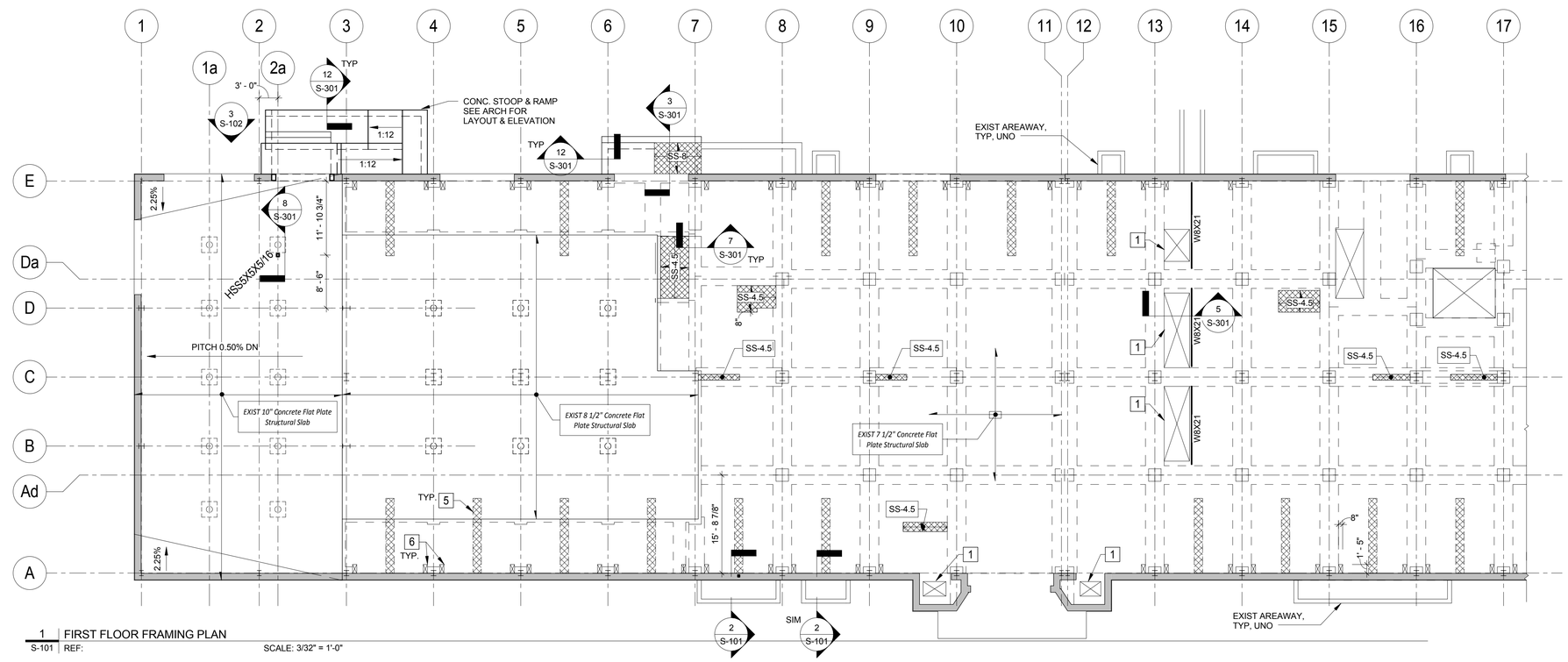
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

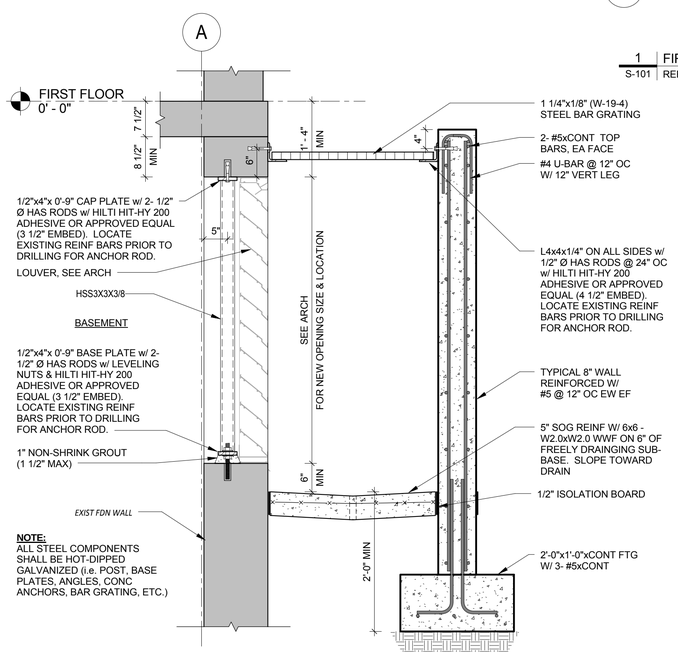
DRAWING TITLE: BASEMENT FOUNDATION PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293480 | LATEST REV.
SHEET NO. S-100

12/16/2013 8:48:14 AM



1 FIRST FLOOR FRAMING PLAN
S-101 REF: SCALE: 3/32" = 1'-0"



NOTE:
ALL STEEL COMPONENTS SHALL BE HOT-DIPPED GALVANIZED (i.e. POST, BASE PLATES, ANGLES, CONC ANCHORS, BAR GRATING, ETC.)

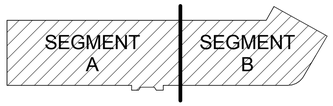
2 AREAWAY SECTION
S-101 REF: S-100 SCALE: 3/4" = 1'-0"

DEMO PLAN NOTES (□)

NUMBER	DESCRIPTION
1	SAW CUT OPENING IN EXISITNG CONCRETE SLAB, ONLY. EXISTING BEAMS SHALL REMAIN. DO NOT OVERCUT OPENINGS W/ CIRCULAR SAW. INSTALL SUPPORT FRAMING PRIOR TO DEMO WHERE REQUIRED.
2	REMOVE EXISTING STEEL FRAMING, SHOWN IN HIDDEN LINE TYPE
3	REMOVE MEZZANINE FRAMING CIRCA 1969 FRAMING AND MASONRY PARTITION WALL SUPPORTING STEEL JOIST FRAMING W/ WOOD DECKING, SOUTH OF GRID LINE D
4	SAW CUT NEW OPENING IN EXISTING FOUNDATION WALL. DO NOT OVERCUT OPENING. SEE ARCH DOOR SCHEDULE FOR REQUIRED ROUGH OPENING DIMENSIONS
5	INFILL SLAB DEPRESSIONS W/ SELF LEVELING CONCRETE TOPPING
6	INFILL EXISTING FLOOR OPENINGS LESS THAN 2'-0" IN WIDTH OR LENGTH BY FASTENING 3/8" STL PLATE TO THE UNDERSIDE OF THE FLAT SLAB W/ 3/4" Ø x 4" LONG HILTI HUS SCREW ANCHORS. FILL VOID W/ SELF LEVELING CONCRETE TOPPING.

STRUCTURAL SLAB SCHEDULE

MARK	TYPE	STEEL DECK TYPE	CONC SLAB & REINFORCING	REMARKS
FIRST FLOOR				
SS-4.5	4 1/2" THICK SLAB w/ NW CONC & 1.5" STL DECK	1-1/2 INCH 18 GAUGE GALVANIZED COMPOSITE FLOOR DECK	3 INCH NW CONC TOPPING OVER STL DECK, REINFORCED W/ 6x6 - W1.4xW1.4 WELDED WIRE FABRIC	
SS-8	8" THICK CONC SLAB	N/A	#4 @ 12" OC EW TOP & BOTTOM w/ ACI 180° HOOK	EXTERIOR
FIRST FLOOR: 5				
SECOND FLOOR				
SS-4.5	4 1/2" THICK SLAB w/ NW CONC & 1.5" STL DECK	1-1/2 INCH 18 GAUGE GALVANIZED COMPOSITE FLOOR DECK	3 INCH NW CONC TOPPING OVER STL DECK, REINFORCED W/ 6x6 - W1.4xW1.4 WELDED WIRE FABRIC	
SS-7	7" THICK SLAB w/ NW CONC & 2" STL DECK	2 INCH 18 GAUGE GALVANIZED COMPOSITE FLOOR DECK	5 INCH NW CONC TOPPING OVER STL DECK, REINFORCED W/ 6x6 - W2.9xW2.9 WELDED WIRE FABRIC	
SECOND FLOOR: 5				
Grand total: 10				



KEY PLAN

N

3/4"=1'-0" 12" 6" 0 1' 2' 3'
3/32"=1'-0" 8' 4' 0 12' 24'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
11-6-13
MATTHEW MICHAEL DRABIC
Lic. No. 046454
PROFESSIONAL ENGINEER

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3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	GMC	
LARRY SNYDER	NASA COD	12/02/2013	TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

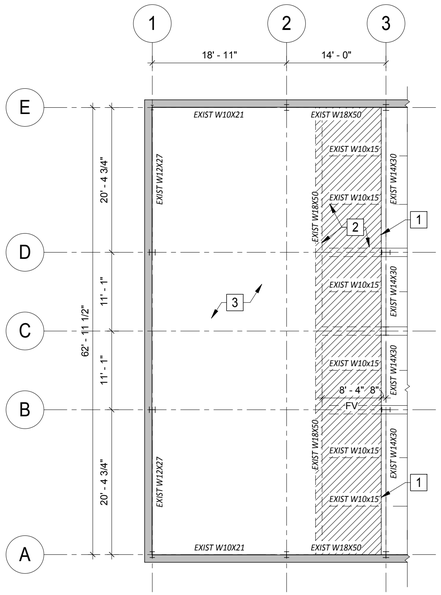
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

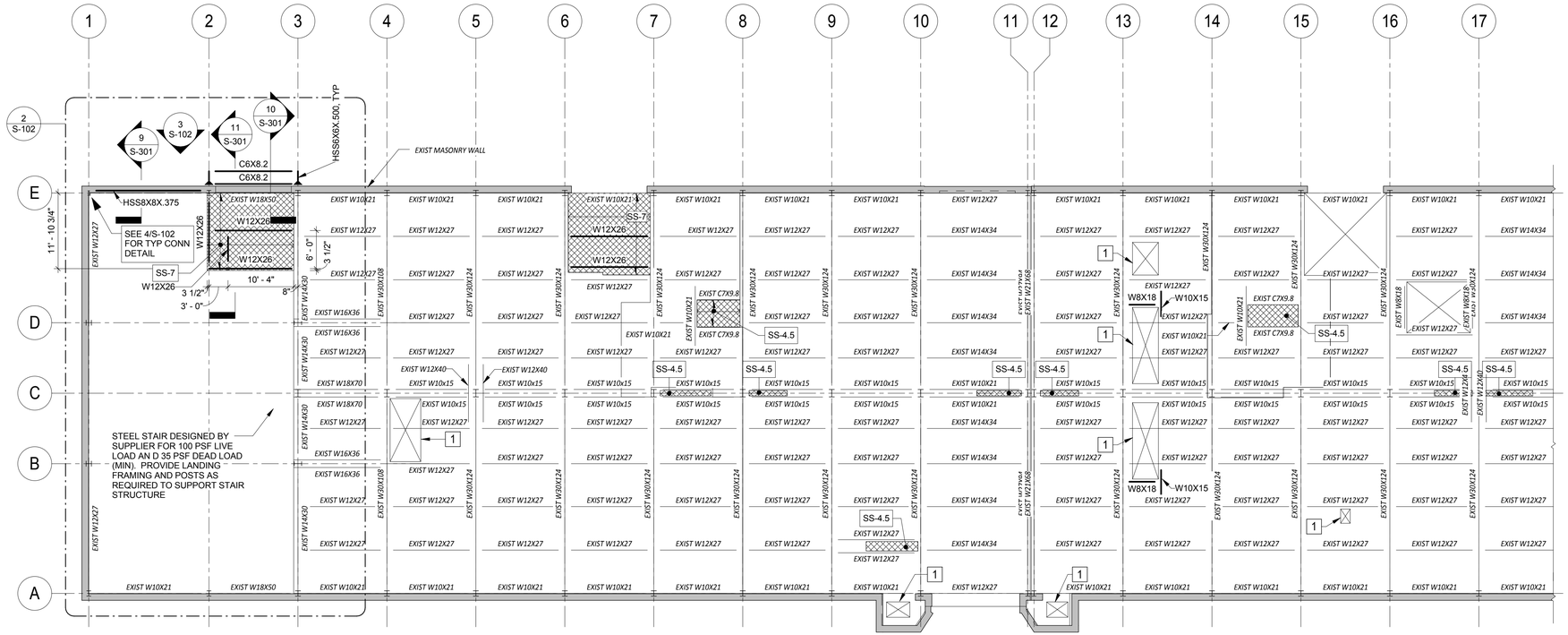
DRAWING TITLE: FIRST FLOOR OVERALL FRAMING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293481 | LATEST REV.
SHEET NO. S-101

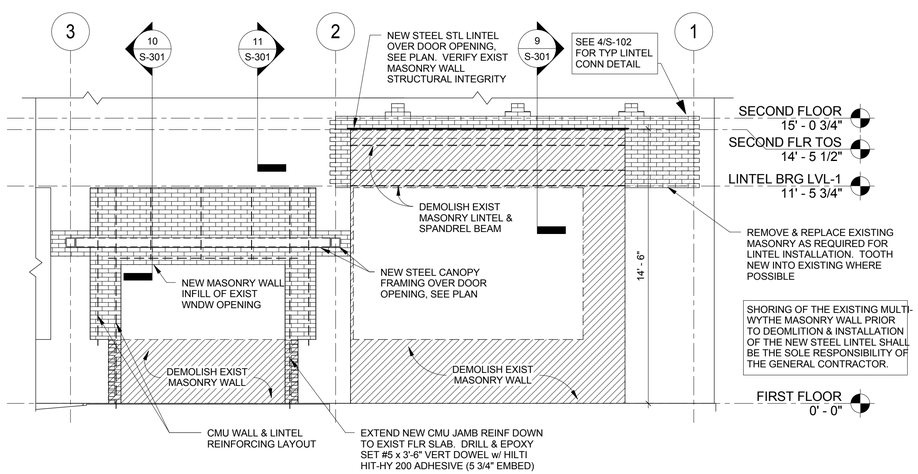
12/16/2013 8:48:28 AM



2 SECOND FLOOR PARTIAL DEMOLITION PLAN
S-102 | REF: S-102 SCALE: 3/32" = 1'-0"

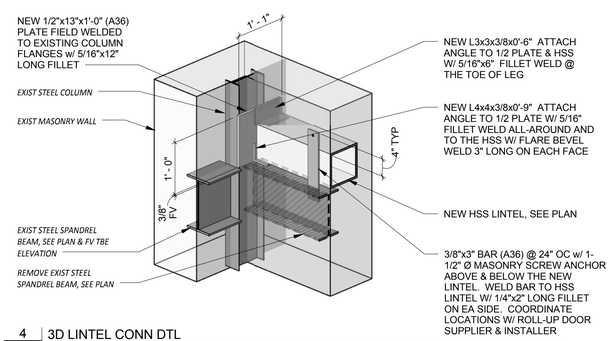


1 SECOND FLOOR FRAMING PLAN
S-102 | REF: S-102 SCALE: 3/32" = 1'-0"



3 SOUTH PARTIAL ELEVATION
S-102 | REF: S-101 SCALE: 1/4" = 1'-0"

DEMO PLAN NOTES (□)	
NUMBER	DESCRIPTION
1	SAW CUT OPENING IN EXISITNG CONCRETE SLAB, ONLY. EXISTING BEAMS SHALL REMAIN. DO NOT OVERCUT OPENINGS W/ CIRCULAR SAW. INSTALL SUPPORT FRAMING PRIOR TO DEMO WHERE REQUIRED.
2	REMOVE EXISTING STEEL FRAMING, SHOWN IN HIDDEN LINE TYPE
3	REMOVE MEZZANINE FRAMING CIRCA 1969 FRAMING AND MASONRY PARTITION WALL SUPPORTING STEEL JOIST FRAMING W/ WOOD DECKING, SOUTH OF GRID LINE D
4	SAW CUT NEW OPENING IN EXISTING FOUNDATION WALL. DO NOT OVERCUT OPENING. SEE ARCH DOOR SCHEDULE FOR REQUIRED ROUGH OPENING DIMENSIONS
5	INFILL SLAB DEPRESSIONS W/ SELF LEVELING CONCRETE TOPPING
6	INFILL EXISTING FLOOR OPENINGS LESS THAN 2'-0" IN WIDTH OR LENGTH BY FASTENING 3/8" STL PLATE TO THE UNDERSIDE OF THE FLAT SLAB W/ 3/4" Ø x 4" LONG HILTI HUS SCREW ANCHORS. FILL VOID W/ SELF LEVELING CONCRETE TOPPING.



4 3D LINTEL CONN DTL
S-102 | REF: SCALE:

STRUCTURAL SLAB SCHEDULE				
MARK	TYPE	STEEL DECK TYPE	CONC SLAB & REINFORCING	REMARKS
FIRST FLOOR				
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SS-8	8" THICK CONC SLAB	N/A	#4 @ 12" OC EW TOP & BOTTOM w/ ACI 180" HOOK	EXTERIOR
FIRST FLOOR: 5				
SECOND FLOOR				
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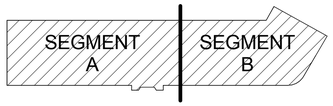
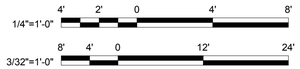
SS-7	7" THICK SLAB w/ NW CONC & 2" STL DECK	2 INCH 18 GAUGE GALVANIZED COMPOSITE FLOOR DECK	5 INCH NW CONC TOPPING OVER STL DECK, REINFORCED W/ 6x6 - W2.9xW2.9 WELDED WIRE FABRIC	
SECOND FLOOR: 5				
Grand total: 10				



KEY PLAN

N



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LARRY SNYDER	NASA COD	12/02/2013	TECH. PROJ. ENG.		
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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

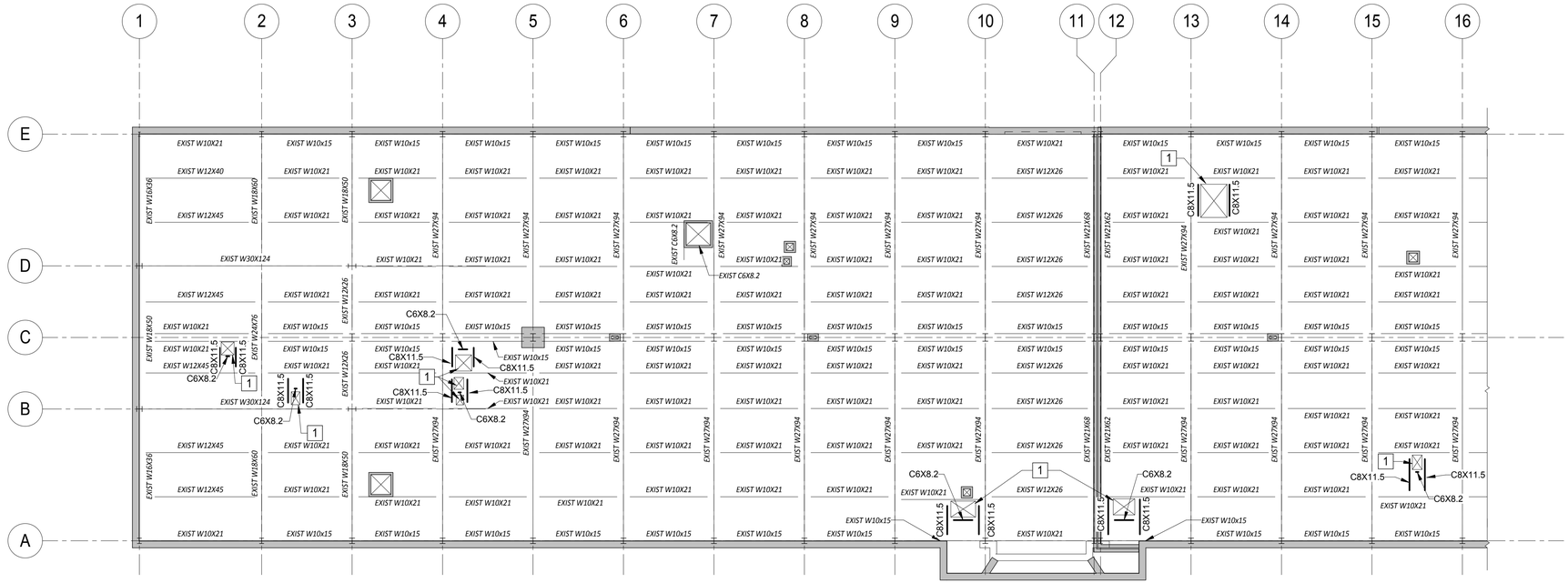
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR OVERALL FRAMING & DEMO PLANS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293482 | LATEST REV.

SHEET NO. S-102

12/16/2013 8:48:46 AM



1 ROOF FRAMING PLAN
S-103 REF:
SCALE: 3/32" = 1'-0"

DEMO PLAN NOTES (□)	
NUMBER	DESCRIPTION
1	SAW CUT OPENING IN EXISITNG CONCRETE SLAB, ONLY. EXISTING BEAMS SHALL REMAIN. DO NOT OVERCUT OPENINGS W/ CIRCULAR SAW. INSTALL SUPPORT FRAMING PRIOR TO DEMO WHERE REQUIRED.
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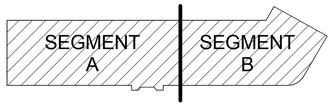

KEY PLAN

N

3/32"=1'-0"
8' 4' 0 12' 24'

GRAPHIC SCALES

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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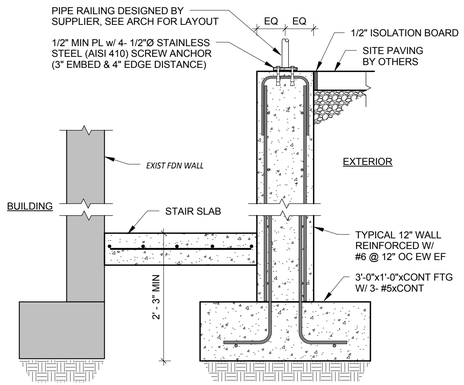
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

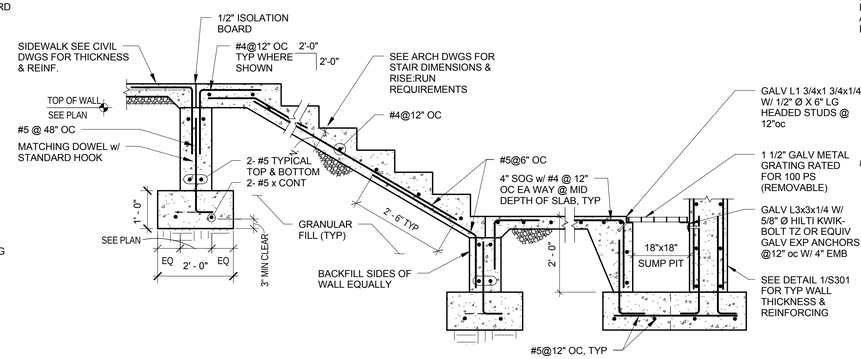
DRAWING TITLE: ROOF OVERALL FRAMING PLAN

BUILDING NO.: 1230
SIZE: D
DRAWING NO.: 1293483
SHEET NO.: S-103
LATEST REV.:

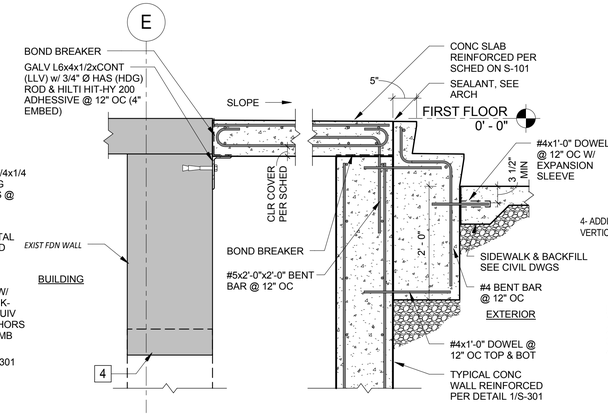
12/16/2013 8:48:54 AM



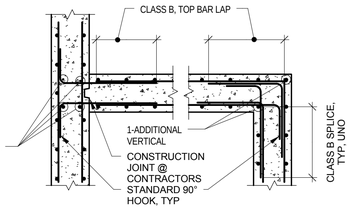
1 EXTERIOR STAIR WALL SECTION
S-301 REF: S-100 SCALE: 3/4" = 1'-0"



2 EXTERIOR STAIR SECTION
S-301 REF: S-100 SCALE: 1/2" = 1'-0"

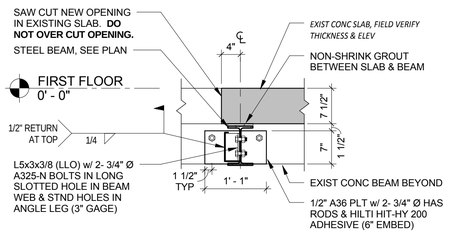


3 SECTION
S-301 REF: S-101 SCALE: 3/4" = 1'-0"



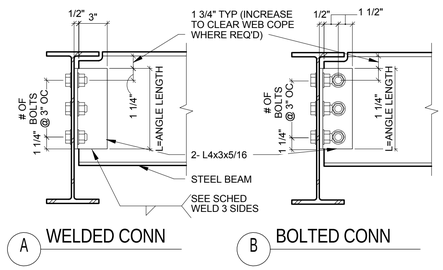
NOTES:
1. CORNER BARS SAME SIZE & SPACING AS HORIZONTAL REINFORCING.
2. SEE PLAN & ASSOCIATED WALL SECTIONS FOR WALL THICKNESS & REINFORCING.
3. CENTER SINGLE LAYER OF STEEL IN WALL SECTION UNO.
4. CATEGORY 6 REFERS TO CATEGORIES FOR USE IN DETERMINING DEVELOPMENT AND SPLICE LENGTHS IN THE CURRENT CRSI HANDBOOK.

4 REINFORCING @ WALL CORNERS
S-301 REF: SCALE: 3/4" = 1'-0"



NOTE:
LOCATE VERTICAL & HORIZONTAL REINFORCING STEEL IN EXISTING CONC BEAM PRIOR TO INSTALLATION OF ADHESIVE ANCHORS. DO NOT DRILL THROUGH EXISITING REINF STEEL, ADJUST PLATE LOCATION AND FIELD WELD SINGLE ANGLE CONNECTION AS REQUIRED

5 SECTION
S-301 REF: S-101 SCALE: 3/4" = 1'-0"



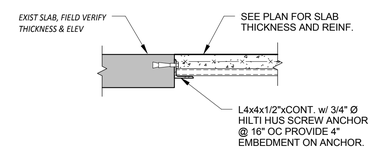
A WELDED CONN
B BOLTED CONN

CONNECTION SCHEDULE

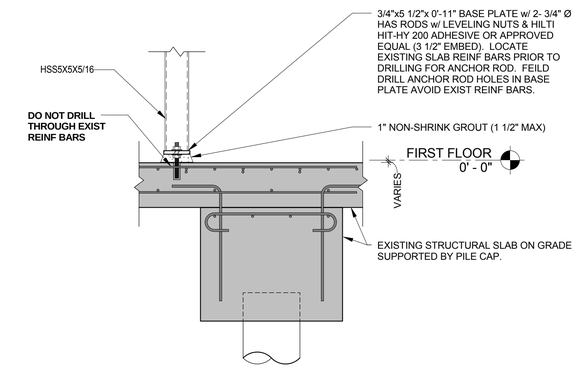
BEAM SIZE	NO OF BOLTS	L=ANGLE LENGTH	WELD SIZE (in)
W8, W10	2	5 1/2"	3/16
W12, W14	3	8 1/2"	3/16
W16	4	11 1/2"	3/16

NOTES:
1. BOLTS ARE 3/4" DIA. A325 N BOLTS. HOLES ARE 13/16" DIA HOLES. USE SIMILAR CONNECTION @ WIDE FLANGE BEAM TO COLUMN FLANGE OR WEB.
2. CONNECTIONS SHOWN ARE MINIMUM UNLESS OTHERWISE INDICATED.

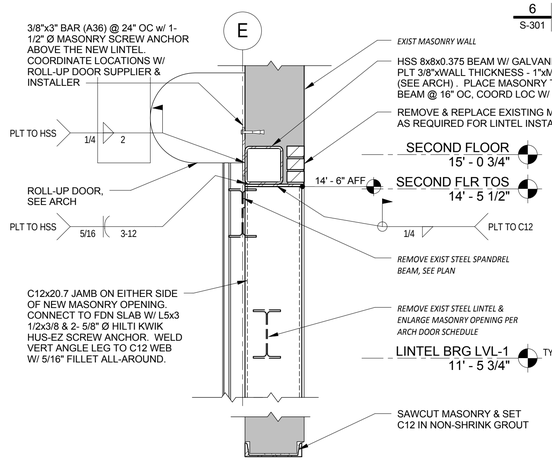
6 TYP. BEAM TO BEAM OR BEAM TO COL.
S-301 REF: SCALE: 3/4" = 1'-0"



7 CONC SLAB BEARING EXIST SLAB
S-301 REF: SCALE: 3/4" = 1'-0"

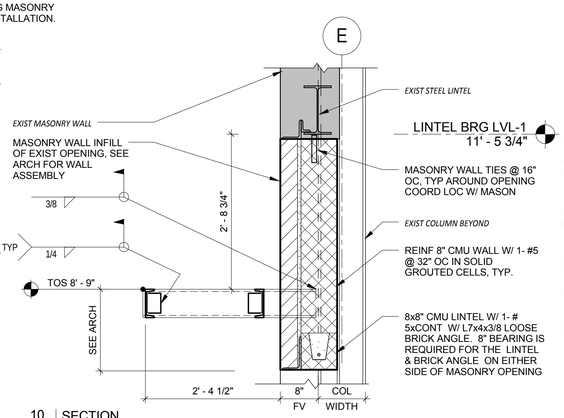


8 SECTION
S-301 REF: S-101 SCALE: 3/4" = 1'-0"



JAMB PLAN DETAIL

9 SECTION
S-301 REF: S-102 SCALE: 3/4" = 1'-0"



10 SECTION
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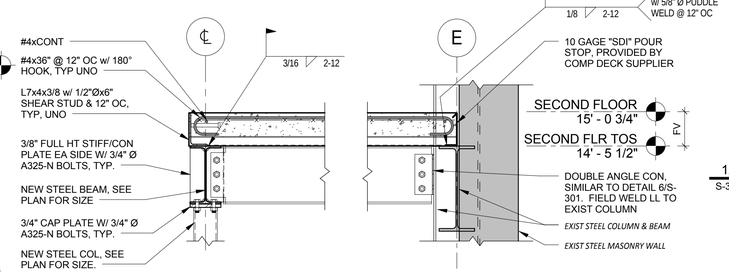
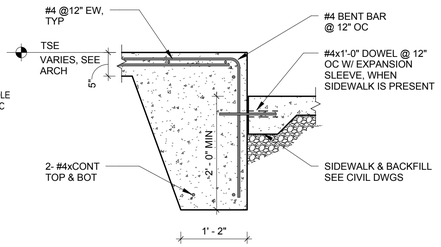
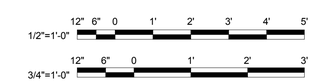


11 SECTION
S-301 REF: S-102 SCALE: 3/4" = 1'-0"



12 STOOP & RAMP TYP DETAIL
S-301 REF: S-101 SCALE: 3/4" = 1'-0"



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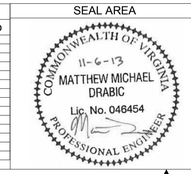

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: STRUCTURAL SECTIONS & DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293484 | LATEST REV.
SHEET NO. S-301

12/16/2013 8:49:01 AM

ABBREVIATIONS

A	ABV	ABOVE
	AC	AIR CONDITIONING UNIT
	ACCU	AIR COOLED CONDENSING UNIT
	AD	ACCESS DOOR
	AFF	ABOVE FINISHED FLOOR
	AFM	AIRFLOW MONITORING STATION
	AGA	AMERICAN GAS ASSOCIATION
	ALUM	ALUMINUM
	AMB	AMBIENT
	AMCS	AUTOMATED MONITORING AND CONTROL SYSTEM
	AMP	AMPERE(S)
	AP	ACCESS PANEL
	APD	AIR PRESSURE DROP
	APPROX	APPROXIMATELY
	ARCH	ARCHITECT / ARCHITECTURAL
	ARI	AIR-CONDITIONING AND REFRIGERATION INSTITUTE
	AS	AIR SEPARATOR
	ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATING & AIR CONDITIONING ENGINEERS, INC.
	ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS
	ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
	ATC	AUTOMATIC TEMPERATURE CONTROLS
	AUX	AUXILIARY
	AVG	AVERAGE
	AWG	AMERICAN WIRE GAUGE
	AWS	AMERICAN WELDING SOCIETY
B	BDD	BACKDRAFT DAMPER
	BHP	BRAKE HORSEPOWER
	BLDG	BUILDING
	BOHP	BOILER HORSEPOWER
	BOB	BOTTOM OF BEAM
	BOD	BOTTOM OF DUCT
	BSMT	BASEMENT
	BTUH	BRITISH THERMAL UNIT/HOUR
C	CC	COOLING COIL
	CD	CEILING DIFFUSER
	CENT	CENTRIFUGAL
	CFH	CUBIC FEET PER HOUR
	CFM	CUBIC FEET PER MINUTE
	CLG	CEILING
	℄	CENTERLINE
	C.O.	CLEAN OUT
	CO	CARBON MONOXIDE
	COL	COLUMN
	COMP	COMPRESSOR
	CA	COMPRESSED AIR
	COND	CONDENSATE
	CONN	CONNECTION
	CONT	CONTINUATION
	COP	COEFFICIENT OF PERFORMANCE
	CO2	CARBON DIOXIDE
	CPS	CYCLES PER SECOND
	CU FT	CUBIC FEET
	CU IN.	CUBIC INCH
	CV	CONSTANT VOLUME
D	D	DRAIN
	dB	DECIBEL(S)
	DB	DRY BULB TEMPERATURE
	DC	DIRECT CURRENT
	DDC	DIRECT DIGITAL CONTROL
	DEMO	DEMOLITION
	DFU	DRAIN FIXTURE UNIT
	DIA	DIAMETER
	DN	DOWN
	DOM	DOMESTIC
	DPT	DIFFERENTIAL PRESSURE TRANSMITTER
	DWDI	DOUBLE WIDTH DOUBLE INLET
	DWG	DRAWING
	DWV	DRAIN, WASTE, VENT
	DX	DIRECT EXPANSION
E	(E)	EXISTING
	EXST	EXISTING
	EA	EXHAUST AIR
	EA	EACH
	EAT	ENTERING AIR TEMPERATURE
	EDB	ENTERING DRY BULB TEMPERATURE
	EER	ENERGY EFFICIENCY RATIO
	EF	EXHAUST FAN
	EFF	EFFICIENCY
	ELEV	ELEVATION
	ELEC	ELECTRIC
	EMER	EMERGENCY
	ENGR	ENGINEER
	EPDM	ETHYLENE PROPYLENE DIENE TERPOLYMER
	EQ	EQUAL
	EQUIP	EQUIPMENT
	ER	EXHAUST REGISTER
	ESP	EXTERNAL STATIC PRESSURE
	ET	EXPANSION TANK
	ETR	EXISTING TO REMAIN
	EWB	ENTERING WET BULB TEMPERATURE
	EWT	ENTERING WATER TEMPERATURE
	EXH	EXHAUST
F	FACP	FIRE ALARM CONTROL PANEL
	FCU	FAN COIL UNIT
	FD	FIRE DAMPER
	FDC	FIRE DEPARTMENT CONNECTION
	FDV	FIRE DEPARTMENT VALVE
	FFCP	FIREFIGHTER'S CONTROL PANEL
	FHC	FIRE HOSE CABINET
	FIN	FINISH
	FLR	FLOOR
	FM	FLOW METER
	FLA	FULL LOAD AMPERE(S)
	FLEX	FLEXIBLE
	FOB	FLAT ON BOTTOM
	FOT	FLAT ON TOP
	FP	FIRE PROTECTION
	FPM	FEET PER MINUTE
	FPS	FEET PER SECOND
	FT	FEET
	FTR	FINNED TUBE RADIATION
	FU	FIXTURE UNITS
G	GA	GAUGE
	GAL	GALLON(S)
	GALV	GALVANIZED
	GPH	GALLONS PER HOUR
	GPM	GALLONS PER MINUTE
H	HC	HEATING COIL
	HGT	HEIGHT
	HOA	HAND-OFF-AUTOMATIC
	HP	HORSEPOWER
	HTR	HEATER
	HVAC	HEATING, VENTILATING, & AIR-CONDITIONING
I	I=B=R	INSTITUTE OF BOILER & RADIATOR MANUFACTURERS
	IN.	INCH(ES)
	IN. WG	INCHES OF WATER GAUGE
	INV	INVERT
K	KVA	KILOVOLT AMPERE(S)
	KW	KILOWATT(S)
L	LAT	LEAVING AIR TEMPERATURE
	LBS	POUND(S)
	LB/HR	POUNDS
	LDB	LEAVING DRY BULB TEMPERATURE
	LF	LINEAR FEET
	LPR	LOW PRESSURE STEAM RETURN
	LPS	LOW PRESSURE STEAM SUPPLY
	LRA	LOCKED ROTOR AMPERES
	LWB	LEAVING WET BULB TEMPERATURE
	LWT	LEAVING WATER TEMPERATURE
M	MAX	MAXIMUM
	MBH	ONE THOUSAND BTUH
	MCU	MODULAR COOLING UNIT
	MCC	MOTOR CONTROL CENTER
	MECH	MECHANICAL
	MER	MECHANICAL EQUIPMENT ROOM
	MFR	MANUFACTURER
	MIN	MINIMUM
	MISC	MISCELLANEOUS
	MPR	MEDIUM PRESSURE STEAM RETURN
	MPS	MEDIUM PRESSURE STEAM SUPPLY
	MTD	MOUNTED
N	N/A	NOT APPLICABLE
	N.C.	NORMALLY CLOSED
	NC	NOISE CRITERIA
	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
	NIC	NOT IN CONTRACT
	N.O.	NORMALLY OPEN
	NO.	NUMBER
	NPSH	NET POSITION SUCTION HEAD
	NTS	NOT TO SCALE
O	OA	OUTDOOR AIR
	OCC	OCCUPIED
	OED	OPENED END DUCT
	OPNG	OPENING
	OV	OUTLET VELOCITY
P	PC	PUMPED CONDENSATE
	PCP	PRESSURE POWERED CONDENSATE PUMP
	PD	PRESSURE DROP
	PH	PHASE
	PHC	PREHEAT COIL
	PM	ROOM PRESSURE MONITOR
	PNL	PANEL
	PPM	PARTS PER MILLION
	PRESS	PRESSURE
	PRV	PRESSURE RELIEF VENT
	PRVS	PRESSURE REDUCING VALVE STATION
	PSF	POUNDS PER SQUARE FOOT
	PSI	POUNDS PER SQUARE INCH
	PSIA	POUNDS PER SQUARE INCH ABSOLUTE
	PSIG	POUNDS PER SQUARE INCH GAUGE
Q	QTY	QUANTITY
R	RA	RETURN AIR
	REQ'D	REQUIRED
	REV	REVISION
	RF	RETURN FAN
	RH	RELATIVE HUMIDITY
	RLA	RUNNING LOAD AMPERES
	RM	ROOM
	RPM	REVOLUTIONS PER MINUTE
	RR	RETURN REGISTER
	RS	REFRIGERANT SUCTION
S	SA	SUPPLY AIR
	SENS	SENSIBLE
	SF	SUPPLY FAN
	SHT	SHEET
	SMACNA	SHEET METAL AND AIR-CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION
	SO	SCREENED OPENING
	SP	STATIC PRESSURE
	SPA	SCHOOL OF PUBLIC AFFAIRS
	SPEC	SPECIFICATION
	SQ	SQUARE
	SQ FT	SQUARE FOOT
	SRV	SAFETY RELIEF VENT
	SS	STAINLESS STEEL
	STD	STANDARD
	STRUCT	STRUCTURE
	SWP	STANDARD WORKING PRESSURE
	SWSI	SINGLE WIDTH SINGLE INLET
	SYMB	SYMBOL
T	TAD	TRANSFER AIR DUCT
	TOT	TOTAL
	TD	TRANSFER DUCT
	TEMP	TEMPERATURE
	TYP	TYPICAL
U	UH	UNIT HEATER
	UNO	UNLESS NOTED OTHERWISE
	UNOCC.	UNOCCUPIED
V	V	VOLT(S)
	VAV	VARIABLE AIR VOLUME
	VB	VACUUM BREAKER
	VEL	VELOCITY
	VERT	VERTICAL
	VFD	VARIABLE FREQUENCY DRIVE
	VTR	VENT THROUGH ROOF
W	W/	WITH
	W/O	WITHOUT
	WB	WET BULB TEMPERATURE
	WG	WATER GAUGE
	WMS	WIRE MESH SCREEN
	WPD	WATER PRESSURE DROP
	WR	WALL REGISTER
	WTR	WATER TEMPERATURE RISE
Z	ZVB	ZONE VALVE BOX

DUCTWORK SYMBOLS

ITEM INDICATED	DOUBLE LINE DRAWING REPRESENTATION	SINGLE LINE DRAWING REPRESENTATION
TAKEOFFS IN SUPPLY DUCTS	8 6; 20 6; WIDTH 12 6 DEPTH	8 6; 20 6; 12 6
BUTTED TAKEOFF TO REGISTER OR GRILLE WITH VECTROL OR EQUAL	24x6 R 260; VECTROL OR EQUAL; 18 6; 12 6	24x6 R 260; 18 6; 12 6
DUCT SPLIT USING MITERED ELBOWS WITH DUCT TURNS	A+B; 15° MAX; A; B	
RISE (UP) OR DROP (DN) IN DIRECTION OF AIR FLOW (ARROW INDICATES DIRECTION OF AIR FLOW)	R (OR D-DROP)	R (OR D-DROP)
ONE SIDED EXPANSION OR CONTRACTION	MAX. EXPANSION 1 IN 7 LENGTHS; MAX. CONTRACTION 2 IN 7 LENGTHS; 16 6; 12 6	12 6; 16 6
TWO SIDED EXPANSION OR CONTRACTION	MAX. EXPANSION 2 IN 7 LENGTHS; MAX. CONTRACTION 2 IN 7 LENGTHS; 16 8; 12 6	12 6; 16 8
TYPICAL BUTTED TAKEOFF WITH BALANCING DAMPER & HEATING COIL	HEATING COIL; DUCT SIZE SAME AS COIL SIZE; 12 12; 10 12	HEATING COIL; 12 10; 12 12
RETURN OR EXHAUST DUCT SPLIT TAKEOFF	18 6; 20 6; 10 6; 10 6	18 6; 20 6; 10 6; 10 6
VERTICAL SPLIT TAKEOFF (PLAIN VIEW)	18x6 ABV. 20x14 BLW.; 20 14; 18 18; 18 6	20 14; 18 18; 18 6; 18 6
	FSD FIRE DAMPER; SD SMOKE DAMPER; BDD GRAVITY DAMPER; M MOTORIZED CONTROL DAMPER; FSD COMBINATION FIRE/SMOKE DAMPER	
	VOLUME DAMPER	VOLUME DAMPER
DUCT WITH DUCT LINING	DUCT SOUND LINING; 18 6	DUCT SOUND LINING; 18 6
SUPPLY DUCT TURNING UP AND DOWN	TURNING DN; 12 10; 12 10; TURNING UP	TURNING DN; 12 10; 12 10; TURNING UP
RETURN OR EXHAUST DUCT TURNING UP AND DOWN	TURNING DN; 12 10; 12 10; TURNING UP	TURNING DN; 12 10; 12 10; TURNING UP
SQUARE ELBOW WITH TURNING VANES IN SUPPLY DUCTS	12 6; 8 6; 6 6; WIDTH; DEPTH	12 6; 8 6; 6 6
SUPPLY DUCT TAKEOFF WHERE TRUNK VELOCITY IS LESS THAN 1200 FPM	D; 24 12; 45°; 6"; 8 6; 8" DIA ROUND	24 12; 8 6; 8" DIA ROUND
RETURN/EXHAUST DUCT TAKEOFF WHERE MAIN DUCT VELOCITY IS LESS THAN 1200 FPM	D; 24 12; 45°; 45°; 6"; 3 X W MIN.; W	24 12
SYMMETRICAL WYE DUCTWORK SPLIT	24 12; 14 12	24 12; 14 12; 14 12

DUCTWORK SYMBOLS

DIFFUSER WITH FLEXIBLE DUCT	FLEXIBLE DUCT; CFM; 120; CONICAL BELLMOUTH	FLEXIBLE DUCT; CFM; 120; CONICAL BELLMOUTH
LINEAR DIFFUSER CEILING MOUNTED	FLEXIBLE DUCT ROUND DUCT; INACTIVE PORTION W/O PLENUM; 100; CFM; 4-LD*; LENGTH (FEET); TYPE. SEE SCHEDULE. ACTIVE PORTION W/PLENUM	FLEXIBLE DUCT ROUND DUCT; INACTIVE PORTION W/O PLENUM; 100; CFM; 4-LD*; LENGTH (FEET); TYPE. SEE SCHEDULE. ACTIVE PORTION W/PLENUM
LINEAR DIFFUSER WALL MOUNTED	FLEXIBLE DUCT ROUND DUCT; INACTIVE PORTION W/O PLENUM; 100; CFM; 4-LD*; LENGTH (FEET); TYPE. SEE SCHEDULE. ACTIVE PORTION W/PLENUM	FLEXIBLE DUCT. ROUND DUCT; INACTIVE PORTION W/O PLENUM; 100; CFM; 4-LD*; LENGTH (FEET); TYPE. SEE SCHEDULE. ACTIVE PORTION W/PLENUM
DIFFUSER WITH RIGID DUCTWORK	DIFFUSER; 120; CFM; VOLUME DAMPER	DIFFUSER; 120; CFM; VOLUME DAMPER

PIPING SYMBOLS

CF	CHEMICAL FEED SUPPLY
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D	DRAIN PIPE
HPR	HIGH PRESSURE STEAM CONDENSATE RETURN
HPS	HIGH PRESSURE STEAM SUPPLY
MPR	MEDIUM PRESSURE STEAM CONDENSATE SUPPLY
MPS	MEDIUM PRESSURE STEAM CONDENSATE RETURN
PC	PUMPED CONDENSATE
LPR	LOW PRESSURE STEAM CONDENSATE RETURN
LPS	LOW PRESSURE STEAM SUPPLY
PCR	PUMPED STEAM CONDENSATE RETURN
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
SV	SAFETY VALVE DISCHARGE
VV	VAPOR VENT (STEAM)
V	VENT
L	REFRIGERANT (LIQUID)
S	REFRIGERANT (SUCTION)
	RELIEF VALVE
	STOP AND CHECK VALVE
	PRESSURE REDUCING VALVE
	VALVE IN RISER
	DIFFERENTIAL PRESSURE GAUGE
P	DIFFERENTIAL PRESSURE SENSOR
PS	DIFFERENTIAL PRESSURE SWITCH
P	PRESSURE SENSOR
PS	PRESSURE SWITCH
F	FLOW SENSOR
	FLOW METER
	BTU METER
	PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVE (PICCV)
	CHECK VALVE
	ANCHOR - PIPING
	ALIGNMENT PIPE GUIDES
	EXPANSION LOOP

PIPING SYMBOLS

FS	FLOW SWITCH
	EXPANSION JOINT
FD	FLOOR DRAIN

(1) (2) (2) (3) (4) (5) (6) (7) (8)
(9)(10)(10) (10)(10) (11) (12)(13)
(14) (15) (16)(17) (18)
(19) (20) (21) (22) (23)
(24)
T T H H (25) (26) (27) (28)
(29) (30) (31) (32) (33) (34)
(35) (36) (37) (38) (39)
(40) (41) (42) (43)

1. ___ PIPE UP
2. ___ PIPE CONNECTION
3. ___ PIPE TOP CONNECTION
4. ___ PIPE BOTTOM CONNECTION
5. ___ DROP IN DIRECTION OF FLOW
6. ___ DIRECTION OF FLOW
7. ___ RISE IN DIRECTION OF FLOW
8. ___ PIPE DOWN
9. ___ PIPE CAP
10. ___ SHUT-OFF VALVE
11. ___ COMBINATION BALANCING AND SHUT-OFF VALVE
12. ___ BALANCING VALVE
13. ___ PIPE CONTINUES
14. ___ STRAINER
15. ___ STRAINER WITH BLOW DOWN VALVE
16. ___ PIPE UNION
17. ___ 2-WAY CONTROL VALVE
18. ___ 3-WAY CONTROL VALVE
19. ___ SOLENOID VALVE
20. ___ CHECK VALVE
21. ___ DRAIN VALVE
22. ___ STEAM TRAP & DRIP ASS'Y.
23. ___ DIRECTION OF PIPE PITCH. ARROW INDICATED DIRECTION OF LIQUID FLOW
24. ___ RADIATION ELEMENT AS NOTED AND SPECIFIED
25. ___ THERMOSTAT
26. ___ TEMPERATURE SENSOR
27. ___ HUMIDISTAT
28. ___ HUMIDITY SENSOR
29. ___ SPRING HANGER PIPE SUPPORT
30. ___ PIPE GUIDE
31. ___ PIPE ANCHOR
32. ___ PRESSURE GAUGE
33. ___ PRESSURE GAUGE W/ GAUGECOCK
34. ___ THERMOMETER
35. ___ AIR VENT (AUTOMATIC)
36. ___ AIR VENT (MANUAL)
37. ___ WATER FLOW MEASURING STATION
38. ___ POINT OF CONNECTION BETWEEN NEW AND EXISTING SERVICES
39. ___ PRESSURE & TEMPERATURE STATION
40. ___ PIPE FLEX CONNECTION
41. ___ PUMP
42. ___ REDUCER
43. ___ POINT OF DISCONNECTION

MISCELLANEOUS SYMBOLS

CO	CARBON MONOXIDE SENSOR
SD	DUCT MOUNTED SMOKE DETECTOR
SD	SMOKE DAMPER
OS	OCCUPANCY SENSOR
H	DUCT MOUNTED HUMIDIFIER
⌀	DIAMETER OF ROUND DUCT
	PUSHBUTTON SWITCH (100% EXHAUST BACKUP)
AMS	AIR FLOW MEASURING STATION
V-#	VARIABLE VOLUME TERMINAL UNIT WITH REHEAT COIL (VVR); TAG
C C-#	CONSTANT VOLUME TERMINAL UNIT WITH REHEAT COIL (CVR); TAG
R-#	VARIABLE VOLUME TERMINAL UNIT (VV); TAG
	RECTANGULAR SUPPLY DUCT
	ROUND SUPPLY DUCT
	RETURN OR EXHAUST DUCT
	UNIT HEATER
	DUCT FLEXIBLE CONNECTION
	SOUND ATTENUATOR
	BOARD INSULATION
UC	UNDERCUT DOOR, 1/2", UNO

GENERAL IDENTIFICATION

CD-1 100: TYPE; AIR QUANTITY } DIFFUSER, REGISTER, GRILLE MARK
AHU-1: EQUIPMENT TYPE; SCHEDULE REFERENCE } EQUIPMENT MARK

POINT OF CONNECTION BETWEEN NEW AND EXISTING CONSTRUCTION
POINT OF CONNECTION BETWEEN DEMOLITION AND EXISTING CONSTRUCTION
OS OCCUPANCY SENSOR

VVR 2 - 02 - 08: TYPE; ZONE - #; AHU - #; FLOOR #

CONVENTIONS, SYMBOLS, ABBREVIATIONS AND INTERPRETATION OF DRAWINGS

THE MECHANICAL DRAWINGS CANNOT BE FULLY AND CORRECTLY INTERPRETED WITHOUT REFERENCE TO SYMBOLS, SCHEDULES, ABBREVIATIONS AND SPECIFICATIONS.

ANY OF THE SYMBOLS MAY APPEAR ON THE DRAWINGS, USE ONLY THOSE PERTAINING TO THESE DOCUMENTS.

IT IS THE INTENT OF THE DRAWINGS TO SHOW THE INSTALLATION, AS DETAILED BY THE TYPICAL ARRANGEMENTS. ITEMS SHOWN ONCE ON FLOOR PLANS, ELEVATIONS, DETAILS OR DIAGRAMS MAY NOT BE REPEATED IN FULL FOR OTHER TYPICAL INSTANCES.

THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO INDICATE CAPACITY, SIZE, APPROXIMATE LOCATION AND GENERAL ARRANGEMENT, NOT THE SPECIFIC DETAILS OF CONSTRUCTION.

INFORMATION SHOWN IN THESE DOCUMENTS IS REPRESENTED AS FOLLOWS:

DEMOLITION DRAWINGS	NEW WORK DRAWINGS
EXISTING TO BE REMOVED OR RELOCATED (HEAVY LINE WEIGHT)	NEW WORK PROVIDED BY THIS CONTRACT (HEAVY LINE WEIGHT)
EXISTING TO REMAIN (LIGHT LINE WEIGHT)	EXISTING TO REMAIN (LIGHT LINE WEIGHT)

GENERAL DEMOLITION NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.
2. DEMOLITION SHALL GENERALLY BE ARRANGED TO AGREE WITH THE ACCOMPLISHMENT OF WORK UNDER THE VARIOUS PHASES AND IN COORDINATION WITH THE REQUIRED MODIFICATIONS.
3. EXISTING DUCTWORK, PIPING, AND FIXTURES SHOWN ARE BASED ON EXISTING DRAWINGS AND FIELD OBSERVATION, AND MAY NOT REFLECT THE ACTUAL CONDITION, ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF ARCHITECTS/ENGINEERS PRIOR TO ANY INSTALLATION.
4. DEMOLITION DRAWINGS DO NOT SHOW EVERY EXISTING DUCT, PIPE, ETC. CONTRACTOR SHALL REMOVE ONLY ITEMS WHERE SHOWN TO BE REMOVED. ITEMS TO BE RELOCATED SHALL BE ADJUSTED AND CLEANED BEFORE RE-INSTALLATION. ITEMS TO REMAIN AND TO BE REUSED FOR THE NEW DESIGN, I.E. THERMOSTATS & HUMIDISTATS, SHALL BE PROTECTED DURING CONSTRUCTION.
5. PRIOR TO DEMOLITION, REVIEW WITH OWNER ALL MATERIALS TO BE REMOVED. SHOULD THE OWNER OPT TO KEEP ANY MATERIALS, REMOVE AND DELIVER THE PARTS TO THE OWNER ON THE SITE WHERE SO DIRECTED. OTHERWISE, ALL DEMOLISHED OR REMOVED MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER.
6. DEMOLITION SHALL INCLUDE REMOVAL OF ALL PARTS AND PIECES IN THEIR ENTIRETY BACK TO POINTS INDICATED OR IF NOT INDICATED BACK TO THEIR POINT OF SOURCE. WHERE CONDITIONS PROHIBIT TOTAL REMOVAL OF THE WORK, THE REMAINING PORTION SHALL BE CUT FLUSH WITH THE SURROUNDING SURFACE AND BE CAPPED, PLUGGED OR SEALED AND THE SURROUNDING SURFACE SHALL BE REFINISHED IN AN APPROVED MANNER.
7. DO NOT REMOVE EXISTING STRUCTURAL WORK. DO NOT REMOVE OPERATIONAL ELEMENTS AND SAFETY-RELATED COMPONENTS IN A MANNER RESULTING IN A REDUCITION OF CAPACITIES TO PERFORM IN THE MANNER INTENDED OR RESULTING IN DECREASED OPERATIONAL LIFE, INCREASED MAINTENANCE, OR DECREASED SAFETY.
8. REMOVALS, DISCONNECTIONS, AND RELOCATIONS SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE INVOLVED AND SHALL BE EMPLOYED BY A CONTRACTOR LICENSED IN THE TRADE INVOLVED. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ACCEPTED TRADE PRACTICES.
9. PROVIDE ADEQUATE TEMPORARY SUPPORT FOR WORK TO REMAIN TO PREVENT FAILURE. DO NOT ENDANGER OTHER WORK.
11. USE TEMPORARY ENCLOSURES, OR OTHER SUITABLE METHODS TO LIMIT DUST AND DIRT RISING AND SCATTERING TO LOWEST PRACTICAL LEVEL. COMPLY WITH GOVERNING REGULATIONS AND AUTHORITIES HAVING JURISDICTION PERTAINING TO INDOOR AIR QUALITY AND THE ENVIRONMENTAL PROTECTION.
12. COPPER AND STEEL PIPING SHALL BE CAPPED USING COMMERCIALLY MANUFACTURED "CAPS". CAP/PLUG INSTALLATION SHALL BE IN ACCORDANCE WITH NEW WORK INSTALLATION PROCEDURES. CRIMPING OF TUBING IS NOT ACCEPTABLE.

DRAWING LIST

M-001	MECHANICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES
M-100A	BASEMENT SEGMENT A - DUCTWORK
M-100B	BASEMENT SEGMENT B - DUCTWORK
M-101A	FIRST FLOOR SEGMENT A - DUCTWORK
M-101B	FIRST FLOOR SEGMENT B - DUCTWORK
M-101AL	FIRST FLOOR SEGMENT A - LAB AIR BALANCE
M-102A	SECOND FLOOR SEGMENT A - DUCTWORK
M-102B	SECOND FLOOR SEGMENT B - DUCTWORK
M-103A	ROOF LEVEL SEGMENT A - DUCTWORK
M-103B	ROOF LEVEL SEGMENT B - DUCTWORK / PIPING
MD-200B	BASEMENT SEGMENT B - PIPING DEMOLITION
M-200A	BASEMENT SEGMENT A - PIPING
M-200B	BASEMENT SEGMENT B - PIPING
MD-201B	BASEMENT SEGMENT B - PIPING DEMOLITION
M-201A	FIRST FLOOR SEGMENT A - PIPING
M-201B	FIRST FLOOR SEGMENT B - PIPING
M-202A	SECOND FLOOR SEGMENT A - PIPING
M-202B	SECOND FLOOR SEGMENT B - PIPING
M-300A	BASEMENT PARTIAL SEGMENT A MER - ENLARGED PLANS
M-300B	BASEMENT PARTIAL SEGMENT B MER - ENLARGED PLANS
M-401	HVAC SECTIONS
M-402	HVAC SECTIONS
M-501	RISER DIAGRAMS
M-601	MECHANICAL CONTROLS
M-602	MECHANICAL CONTROLS
M-603	MECHANICAL CONTROLS
M-604	MECHANICAL CONTROLS
M-605	MECHANICAL CONTROLS
M-606	MECHANICAL CONTROLS
M-701	MECHANICAL DETAILS
M-702	MECHANICAL DETAILS
M-703	MECHANICAL DETAILS
M-704	MECHANICAL DETAILS
M-705	MECHANICAL DETAILS
M-706	MECHANICAL DETAILS
M-707	MECHANICAL DETAILS
M-801	MECHANICAL SCHEDULES
M-802	MECHANICAL SCHEDULES
M-803	MECHANICAL SCHEDULES
M-804	MECHANICAL SCHEDULES

GENERAL NOTES

1. SEE EQUIPMENT SCHEDULES FOR EQUIPMENT DESIGNATIONS.
2. DUCTWORK DIMENSIONS ARE CLEAR INSIDE DIMENSIONS.
3. FOR EXACT LOCATION OF DIFFUSERS, REGISTERS, AND GRILLES SEE ARCHITECTURAL REFLECTED CEILING PLANS AND ARCHITECTURAL DETAILS.
4. COORDINATE ROUTING OF DUCTWORK WITH LIGHTING AND SPRINKLER LAYOUTS AND ARCHITECTURAL DETAILS AND MAKE ADJUSTMENTS TO ROUTING AS NECESSARY.
5. SUBMIT SHOP DRAWINGS FOR LOCATION OF ALL ACCESS PANELS, INDICATING: LOCATION, SIZE, TYPE, AND STYLE. THE CONTRACTOR SHALL RELOCATE AND/OR ADJUST MECHANICAL EQUIPMENT AND/OR DEVICES TO ALLOW FOR A SYMMETRICAL DESIGN OF ACCESS PANEL LOCATIONS AS REQUIRED AND APPROVED BY THE ARCHITECT.
6. PROVIDE FLEXIBLE DUCTWORK AND ROUND DUCTWORK TO DIFFUSERS OF SAME SIZE OF DIFFUSER'S NECK. MAXIMUM LENGTH OF FLEXIBLE DUCT IS 5'-0".
7. PROVIDE RIGID DUCTWORK TO THE INLET OF TERMINAL UNITS, DUCT SIZE SHALL MATCH SIZE OF INLET OF TERMINAL UNIT.
8. PROVIDE UP AND DOWN DUCT TRANSITION AS NECESSARY TO INSTALL DUCTWORK UNDER EQUIPMENT AND BUILDING STRUCTURAL MEMBERS. MAKE ADJUSTMENT TO DUCTWORK BY THIS CONTRACT AS NECESSARY TO COORDINATE WITH FIELD CONDITIONS: PIPES, DUCTS, CONDUITS, BEAMS AND BUILDING STRUCTURAL MEMBERS.
9. PROVIDE DUCT TRANSITIONS TO ALL TERMINAL UNITS. DUCT TRANSITIONS SHALL CONNECT TERMINAL UNITS TO DUCTWORK PROVIDED BY THIS CONTRACT. REFER TO DRAWINGS FOR DUCT SIZES.
10. CUT LENGTH OF RODS ASSOCIATED WITH DUCTS AND PIPING SUPPORTS AS MUCH AS POSSIBLE TO PERMIT THE INSTALLATION OF CEILINGS. REFER TO SPECIFICATIONS 230529 FOR MORE INFORMATION.
11. CONTRACTOR TO COORDINATE LOCATION OF ALL THERMOSTATS WITH THE LATEST FURNITURE LAYOUT DRAWINGS.
12. ALL DUCTWORK SHALL BE INSTALLED AS HIGH AS POSSIBLE AND TIGHT TO THE SLAB ABOVE. REFER TO THE ARCHITECTURAL CEILING PLANS FOR CEILING HEIGHT REQUIREMENTS.
13. CONTRACTOR SHALL SURVEY THE SITE PRIOR TO PREPARATION OF BID AND PRIOR TO PREPARATION OF SHOP DRAWINGS. INFORMATION SHOWN IN THESE DRAWINGS IS BASED ON THE DESIGN DRAWINGS OF THE BASE BUILDING, SHOP DRAWINGS, FOR WORK UNDER THIS CONTRACT, SHALL REFLECT ACTUAL EXISTING CONDITIONS. CONTRACTOR SHALL MAKE REVISIONS AS NECESSARY TO REFLECT ACTUAL CONDITIONS AT NO COST TO THE OWNER. THIS SHALL INCLUDE SHOP DRAWING PREPARATION AS WELL AS CONSTRUCTION COST.
14. ALL SUPPLY DIFFUSERS MOUNTED ON ACOUSTICAL CEILINGS ARE TYPE CD, UNO. ALL RETURN REGISTERS MOUNTED ON ACOUSTICAL CEILINGS ARE TYPE RR, UNO. ALL RETURN/EXHAUST REGISTERS MOUNTED ON GYPSUM BOARD AND SIDEWALLS ARE TYPE ER, UNO. SEE SCHEDULE FOR NECK SIZES.
15. ALL WALL MOUNTED LOW RETURN AIR REGISTERS TO BE INSTALLED 12"AFF, UNO. FRONT BLADE TO BE HORIZONTAL AND FACE DOWNWARD.
16. CONTRACTOR SHALL COORDINATE DUCT SIZES WITH EXISTING CONDITIONS AND MAKE ADJUSTMENTS IN DUCT SIZES AS NECESSARY WHILE MAINTAINING EQUIVALENT DUCT CROSS AREA.
17. CONTRACTOR SHALL UTILIZE ADJUSTABLE SHEAVES DURING TESTING AND BALANCING. UPON COMPLETION, CONTRACTOR SHALL REMOVE ADJUSTABLE SHEAVES AND PROVIDE FIXED SHEAVES.

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

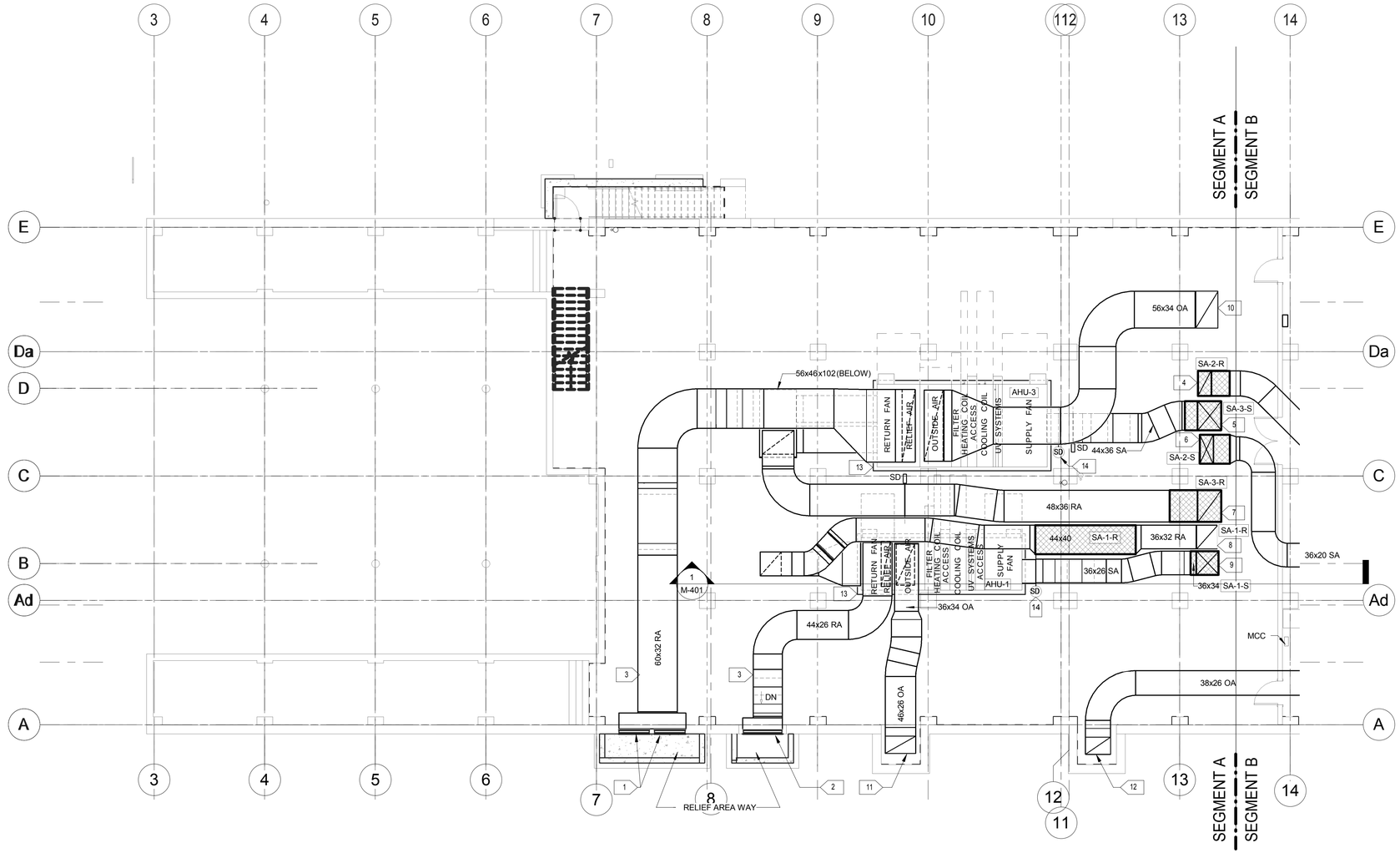
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293485 | LATEST REV.
SHEET NO. M-001

12/16/2013 9:01:41 AM



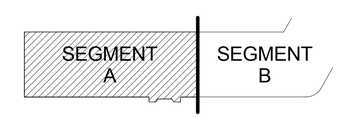
1 BASEMENT SEGMENT A - DUCTWORK
M-100A
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INGRESS/EGRESS OF AHU EQUIPMENT WILL BE THROUGH FREIGHT ELEVATOR AND/OR VIA FLOOR HATCH.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
4. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 20.77 SF MINIMUM FREE AREA RELIEF LOUVER WITH 108"(W) x 60"(H) x 24"(D) INSULATED RELIEF PLENUM. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR EXACT LOUVER LOCATION AND FACE DIMENSIONS.
2. 10.88 SF MINIMUM FREE AREA RELIEF LOUVER WITH 60"(W) x 48"(H) x 18"(D) INSULATED RELIEF PLENUM. COORDINATE WITH ARCHITECT FOR EXACT LOUVER LOCATION AND FACE DIMENSIONS.
3. PROVIDE INSULATED RELIEF DUCTWORK.
4. 38x20 RA UP (AHU-2).
5. 44x36 SA UP (AHU-3).
6. 44X20/36x20 SA UP (AHU-2).
7. 48x36 RA UP (AHU-3).
8. 36x32 RA UP (AHU-1).
9. 36X34/36x26 SA UP (AHU-1).
10. 56x34 OA UP (AHU-3).
11. 46x26 OA UP (AHU-1).
12. 38X26 OA UP (AHU-2).
13. PROVIDE 6" HIGH CONCRETE PAD WITH 6" WIDTH ON ALL SIDES OF EQUIPMENT.
14. COORDINATE WITH FA SERIES DRAWINGS FOR SMOKE DETECTORS.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED J	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX. (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

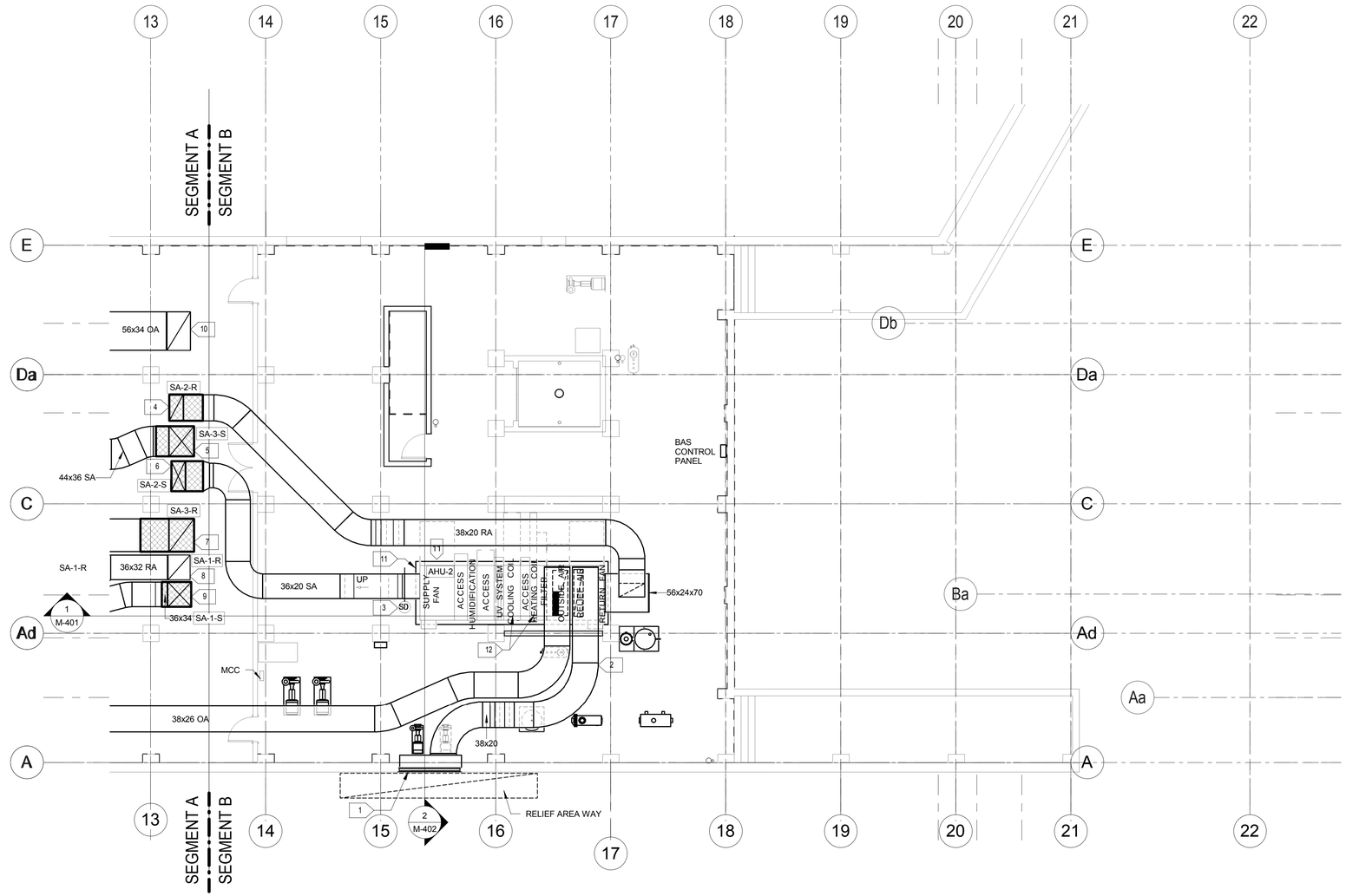
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT A - DUCTWORK

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293486 | LATEST REV.

SHEET NO. M-100A

12/16/2013 9:01:48 AM



1 M-100B BASEMENT SEGMENT B - DUCTWORK

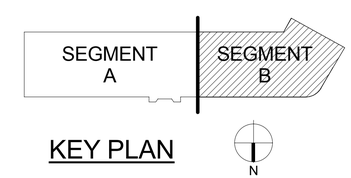
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INGRESS/EGRESS OF AHU EQUIPMENT WILL BE THROUGH FREIGHT ELEVATOR AND/OR VIA FLOOR HATCH.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
4. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 6.82 SF MINIMUM FREE AREA RELIEF LOUVER WITH 90"(W) x 24"(H) x 18"(D) INSULATED RELIEF PLENUM. COORDINATE WITH ARCHITECT FOR EXACT LOUVER LOCATION AND FACE DIMENSIONS.
2. PROVIDE INSULATED RELIEF DUCTWORK.
3. COORDINATE WITH FA SERIES DRAWINGS FOR SMOKE DETECTORS.
4. 38x20 RA UP (AHU-2).
5. 44x36 SA UP (AHU-3).
6. 44x20/36x20 SA UP (AHU-2).
7. 48x36 RA UP (AHU-3).
8. 36x32 RA UP (AHU-1).
9. 36x34/36x26 SA UP (AHU-1).
10. 56x34 OA UP (AHU-3).
11. PROVIDE 6" HIGH CONCRETE PAD WITH 6" WIDTH ON ALL SIDES OF EQUIPMENT.
12. CONTRACTOR TO FIELD VERIFY SUFFICIENT DISTANCE FOR COIL PULL.



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	JI	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

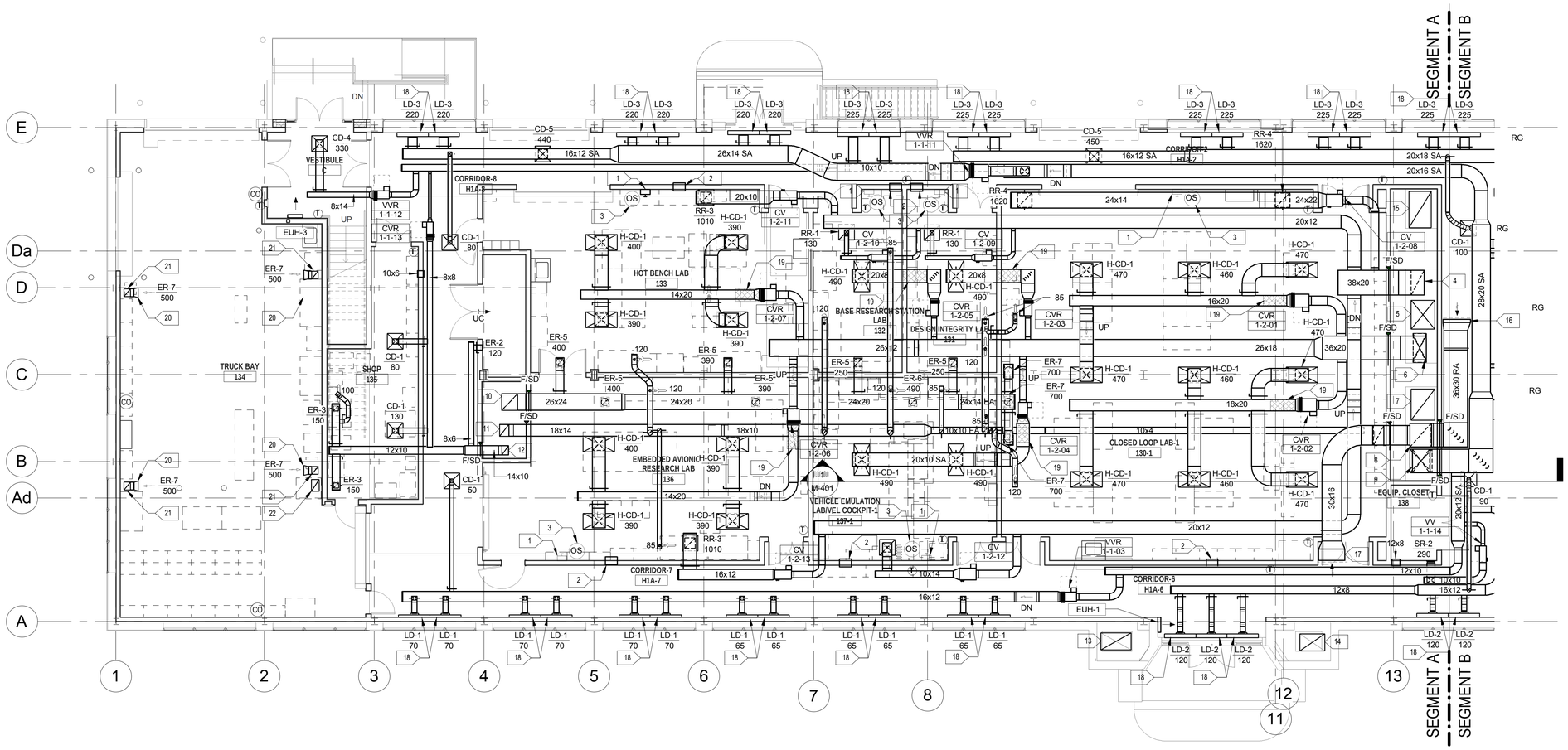
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT B - DUCTWORK

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293487 | LATEST REV.

SHEET NO. M-100B

12/16/2013 9:01:52 AM



1 | M-101A FIRST FLOOR SEGMENT A - DUCTWORK

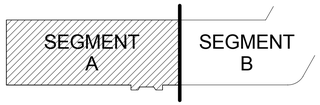
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. PROVIDE 24" MINIMUM ACCESS CLEARANCE FOR AIR TERMINAL UNIT CONTROL BOX.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
4. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. PROVIDE PUSHBUTTON SWITCH FOR 100% EXHAUST BACKUP.
2. PROVIDE PRESSURE MONITOR.
3. PROVIDE OCCUPANCY SENSOR.
4. 38x20 RA DN (AHU-2).
5. 44x36 SA UP AND DN (AHU-3).
6. 36x20 SA DN (AHU-2).
7. 48x36 RA UP AND DN (AHU-3).
8. 36x32 RA DN (AHU-1).
9. 36x26 SA DN (AHU-1).
10. 26x24 EA LAB EMERGENCY UP (EF-3).
11. 18x14 EA LAB GENERAL UP (EF-2).
12. 14x10 EA SHOPS UP (EF-4).
13. 46x26 OA UP AND DN (AHU-1).
14. 38x26 OA UP AND DN (AHU-2).
15. 56x34 OA UP AND DN (AHU-3).
16. 42x40 OED W/ WMS BALANCE TO 6,500 CFM.
17. 40x26 OED W/ WMS BALANCE TO 4,000 CFM.
18. ADJUST PATTERN CONTROLLER FOR VERTICAL AND HORIZONTAL THROW.
19. PROVIDE INTEGRAL SOUND ATTENUATOR.
20. PROVIDE LOW EXHAUST 12" AFF.
21. 10X12 EA UP (EF-5).
22. 18x12 EA UP PAINT SPRAY BOOTH.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037533
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

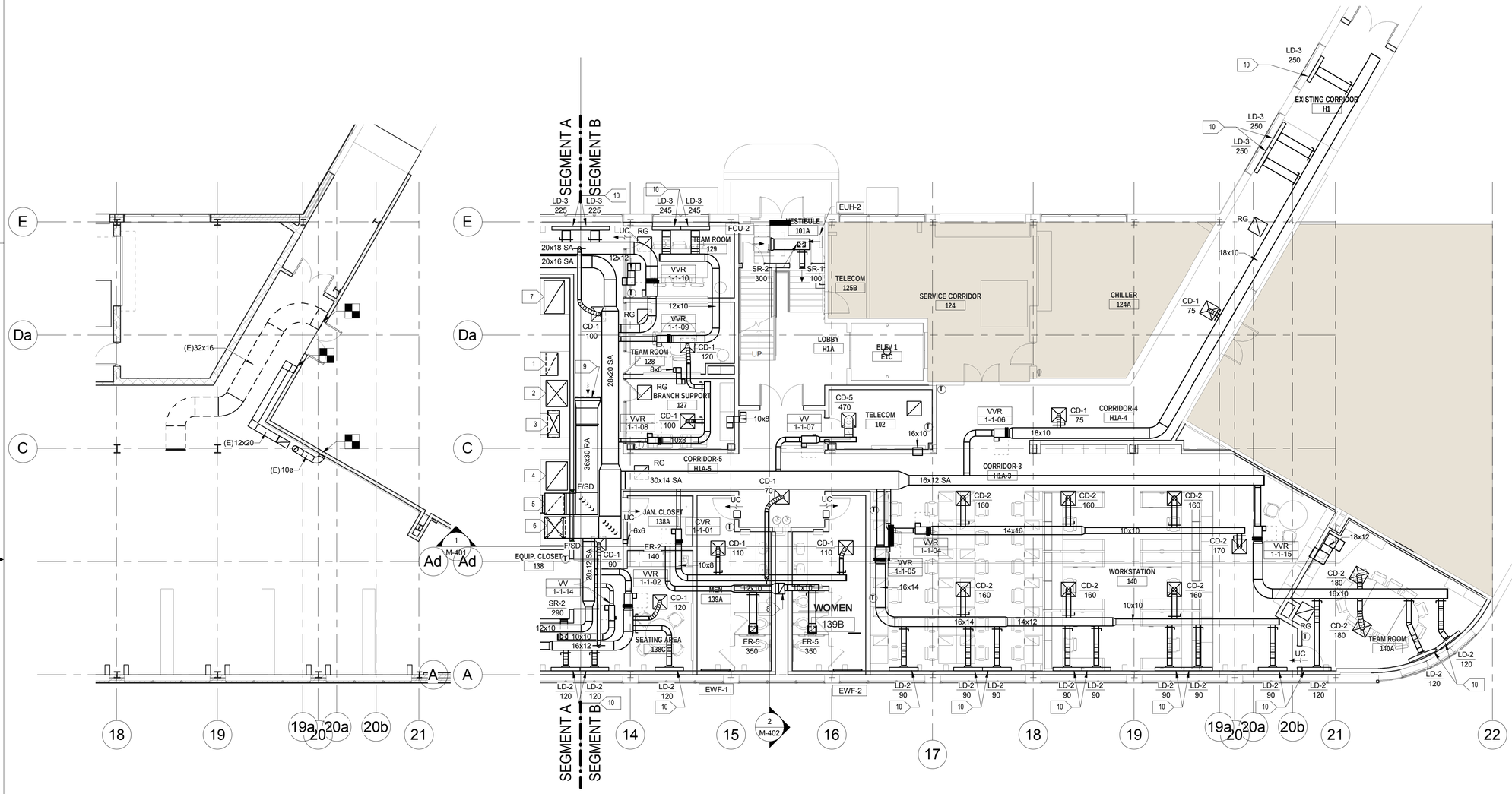
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT A - DUCTWORK

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293488 | LATEST REV.:

SHEET NO.: M-101A

12/16/2013 9:01:59 AM



2 | PARTIAL FIRST FLOOR SEGMENT B - DUCTWORK DEMOLITION
M-101B | SCALE: 1/8" = 1'-0"

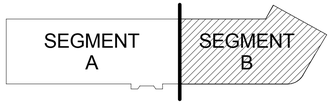
1 | FIRST FLOOR SEGMENT B - DUCTWORK
M-101B | SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. PROVIDE 24" MINIMUM ACCESS CLEARANCE FOR AIR TERMINAL UNIT CONTROL BOX.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
4. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 38x20 RA DN (AHU-2).
2. 44x36 SA UP AND DN (AHU-3).
3. 36x20 SA DN (AHU-2).
4. 48x36 RA UP AND DN (AHU-3).
5. 36x32 RA DN (AHU-1).
6. 36x26 SA DN (AHU-1).
7. 56x34 OA DN AND UP (AHU-3).
8. 18x10 EA UP (EF-1).
9. 42x40 OED W/ WMS BALANCE TO 6,500 CFM.
10. ADJUST PATTERN CONTROLLER FOR VERTICAL AND HORIZONTAL THROW.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT B - DUCTWORK

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293489 | LATEST REV.:

SHEET NO.: M-101B

12/16/2013 9:02:10 AM

MODE	: OCC.
SA	: 1,570
RA	: 1,010
EA	: 210
ACH	: 8.0
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: UNOCC.
SA	: 790
RA	: 230
EA	: 210
ACH	: 4.0
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: EMERG.
SA	: 790
RA	: 0
EA (GEN)	: 210
EA (EMERG)	: 790
ACH	: 5.1
TEMP	: -
RH	: -
PRESS	: NEG.

MODE	: OCC.
SA	: 490
RA	: 130
EA	: 210
ACH	: 8.1
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: UNOCC.
SA	: 400
RA	: 40
EA	: 210
ACH	: 6.6
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: EMERG.
SA	: 250
RA	: 0
EA (GEN)	: 210
EA (EMERG)	: 250
ACH	: 7.6
TEMP	: -
RH	: -
PRESS	: NEG.

MODE	: OCC.
SA	: 490
RA	: 130
EA	: 210
ACH	: 8.1
TEMP	: 72
RH	: 35-45
PRESS	: POS.

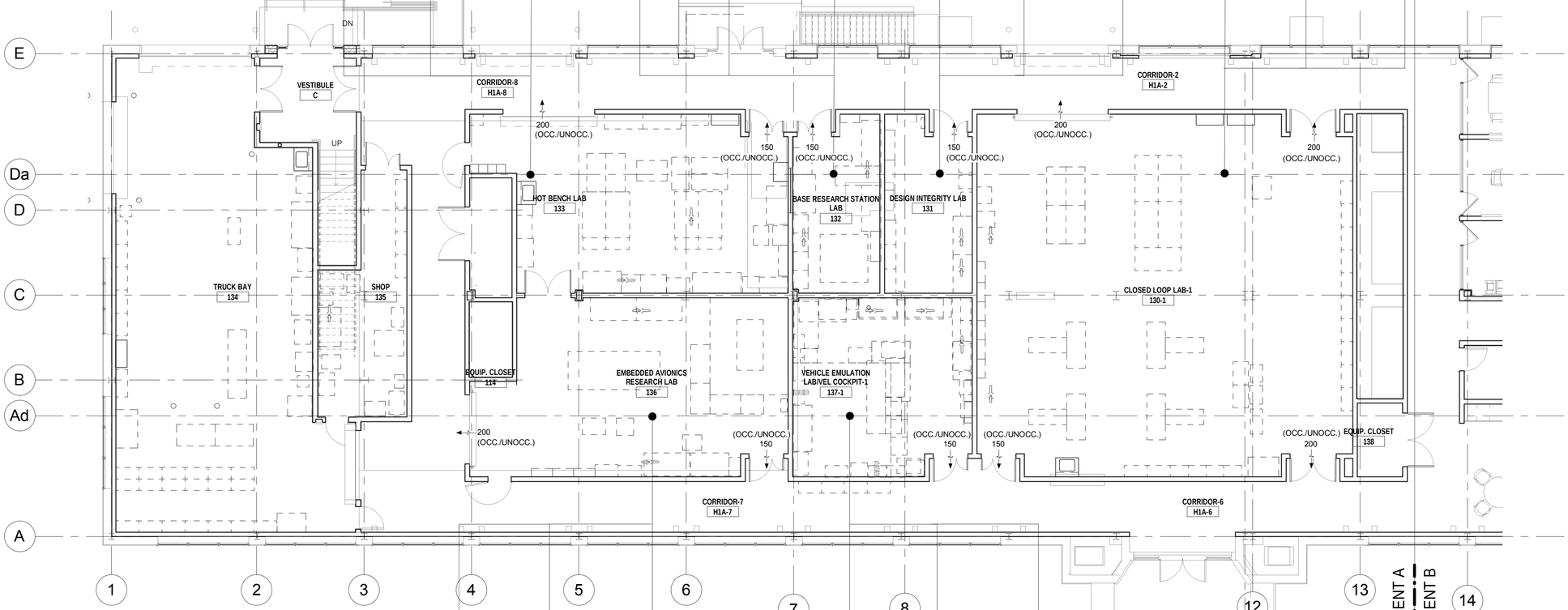
MODE	: UNOCC.
SA	: 400
RA	: 40
EA	: 210
ACH	: 6.6
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: EMERG.
SA	: 250
RA	: 0
EA (GEN)	: 210
EA (EMERG)	: 250
ACH	: 7.6
TEMP	: -
RH	: -
PRESS	: NEG.

MODE	: OCC.
SA	: 4,200
RA	: 3,240
EA	: 210
ACH	: 8.0
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: UNOCC.
SA	: 2,100
RA	: 1,140
EA	: 210
ACH	: 4.0
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: EMERG.
SA	: 2,100
RA	: 0
EA (GEN)	: 210
EA (EMERG)	: 2,100
ACH	: 4.4
TEMP	: -
RH	: -
PRESS	: NEG.



MODE	: OCC.
SA	: 1,570
RA	: 1,010
EA	: 210
ACH	: 8.0
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: UNOCC.
SA	: 790
RA	: 230
EA	: 210
ACH	: 4.0
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: EMERG.
SA	: 790
RA	: 0
EA (GEN)	: 210
EA (EMERG)	: 790
ACH	: 5.1
TEMP	: -
RH	: -
PRESS	: NEG.

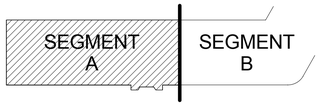
MODE	: OCC.
SA	: 980
RA	: 620
EA	: 210
ACH	: 8.1
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: UNOCC.
SA	: 490
RA	: 130
EA	: 210
ACH	: 4.0
TEMP	: 72
RH	: 35-45
PRESS	: POS.

MODE	: EMERG.
SA	: 490
RA	: 0
EA (GEN)	: 210
EA (EMERG)	: 490
ACH	: 5.8
TEMP	: -
RH	: -
PRESS	: NEG.

1 LEVEL 1 LAB AIR BALANCE
M-101AL

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



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	JI	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

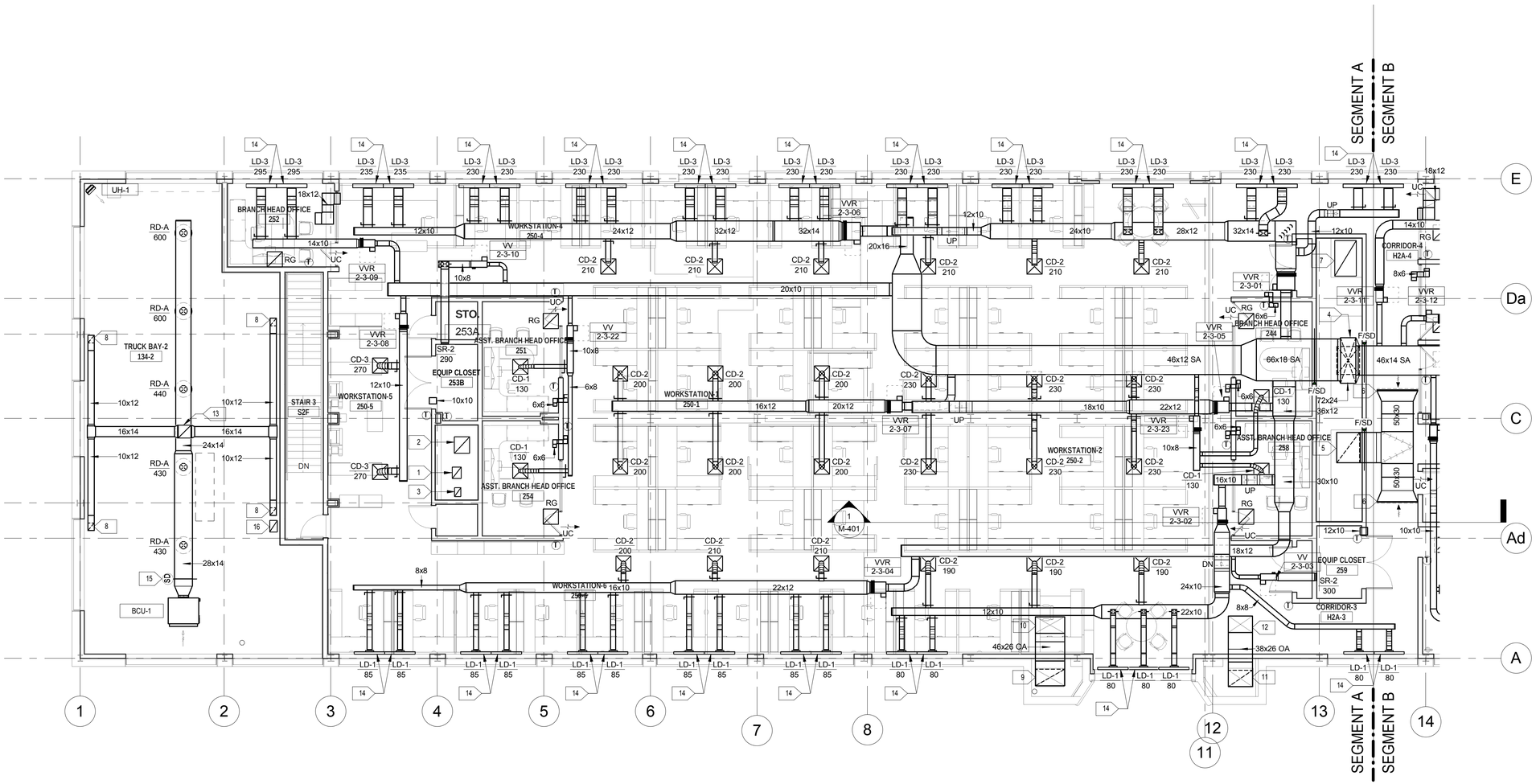
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT A - LAB AIR BALANCE

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293490_ | LATEST REV.

SHEET NO. M-101AL

12/16/2013 9:02:04 AM



1 / M-102A SECOND FLOOR SEGMENT A - DUCTWORK

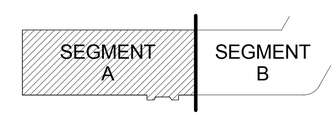
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. PROVIDE 24" MINIMUM ACCESS CLEARANCE FOR AIR TERMINAL UNIT CONTROL BOX.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
4. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 18x14 EA LAB GENERAL UP AND DN (EF-2).
2. 26x24 EA LAB EMERGENCY UP AND DN (EF-3).
3. 14X10 EA SHOPS UP AND DN (EF-4).
4. 72x24 & 44x36 SA DN (AHU-3).
5. 48x36 RA DN (AHU-3).
6. 64x32 OED W/ WMS BALANCE TO 9,200 CFM.
7. 56x34 OA DN (AHU-3) AND UP (GV-3).
8. 12x12 EA DN 12" AFF.
9. 46x26 OA DN (AHU-1).
10. 44x26 OA UP (GV-1).
11. 38x26 OA DN (AHU-2).
12. 38x26 OA UP (GV-2).
13. 20x20 EA UP (EF-5).
14. ADJUST PATTERN CONTROLLER FOR VERTICAL AND HORIZONTAL THROW.
15. COORDINATE WITH FA SERIES DRAWINGS FOR SMOKE DETECTORS.
16. 18x12 UP AND DN PAINT SPRAY BOOTH.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037023
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

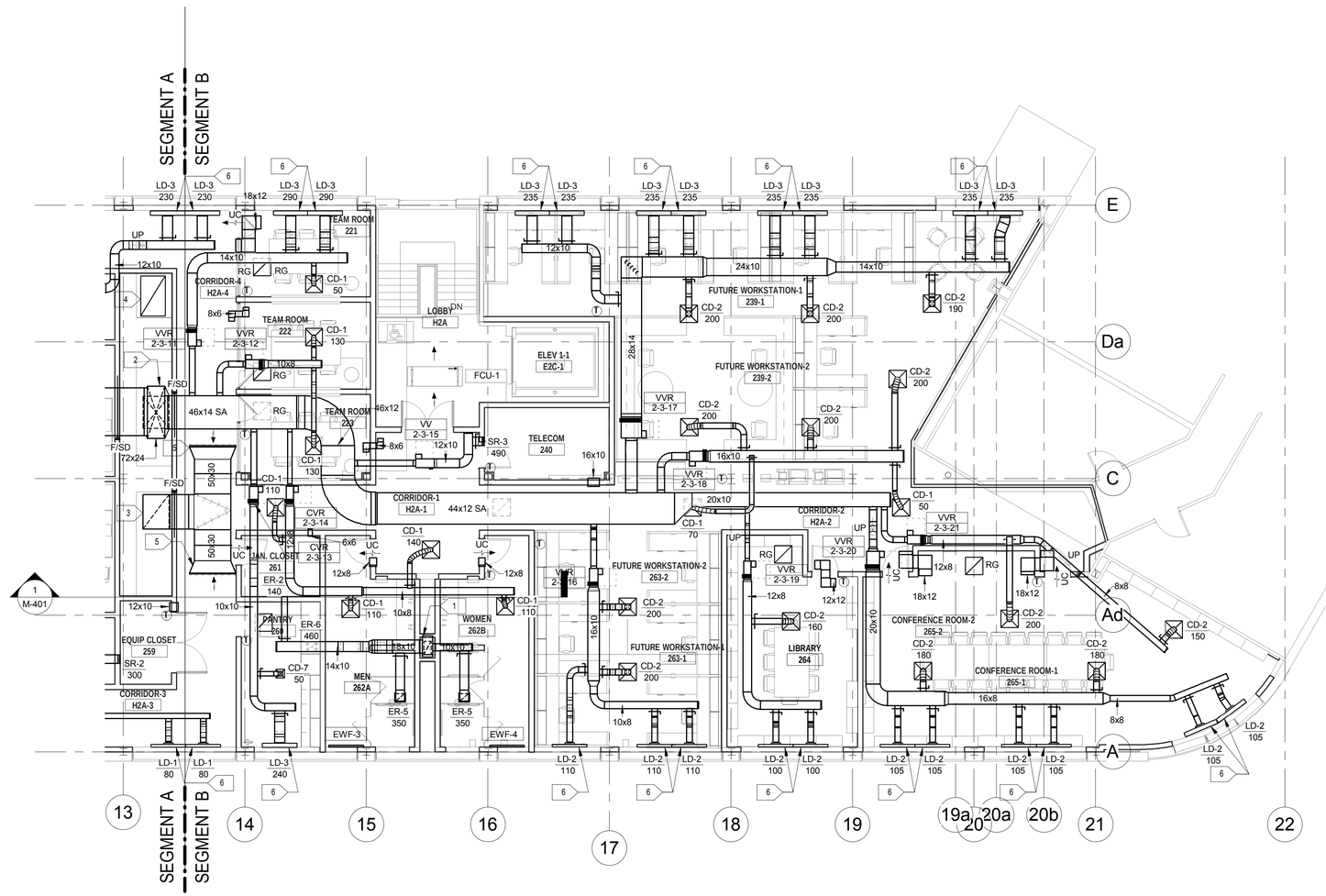
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT A - DUCTWORK

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293491 | LATEST REV.

SHEET NO. M-102A

12/16/2013 9:02:21 AM



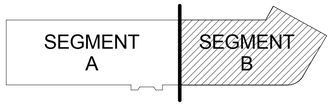
1 SECOND FLOOR SEGMENT B - DUCTWORK
M-102B
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. PROVIDE 24" MINIMUM ACCESS CLEARANCE FOR AIR TERMINAL UNIT CONTROL BOX.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
4. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 18x10 EA DN 26x14 EA UP (EF-1).
2. 72x24 / 44x36 SA DN (AHU-3).
3. 48x36 RA DN (AHU-3).
4. 56x34 OA DN (AHU-3)
5. 64x32 OED W/ WMS BALANCE TO 9,200 CFM.
6. ADJUST PATTERN CONTROLLER FOR VERTICAL AND HORIZONTAL THROW.



KEY PLAN

N

1/8"=1'-0"
8' 4' 0 8' 16'

GRAPHIC SCALES

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED J	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

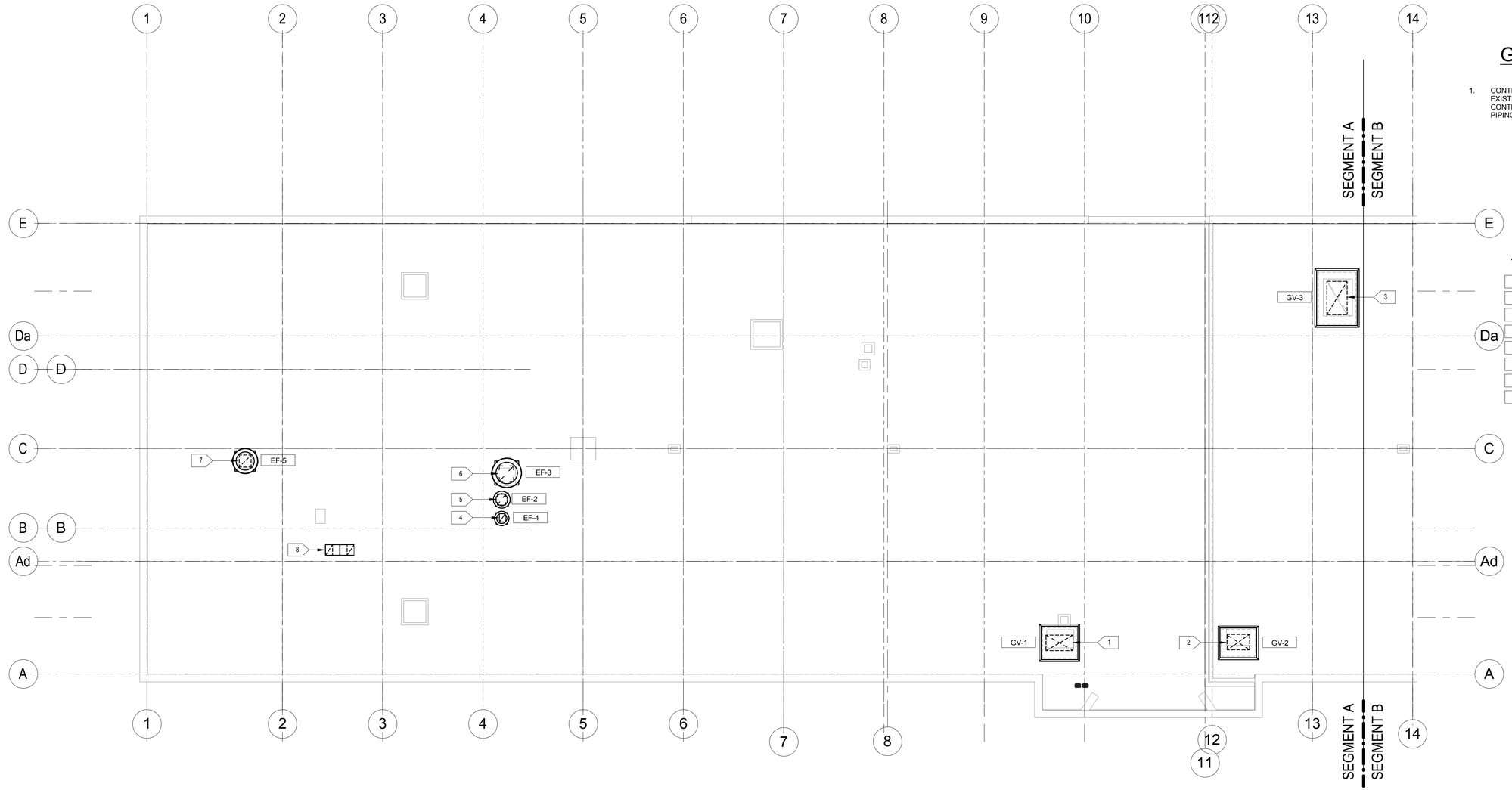
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT B - DUCTWORK

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293492 | LATEST REV.

SHEET NO. M-102B

12/16/2013 9:02:28 AM



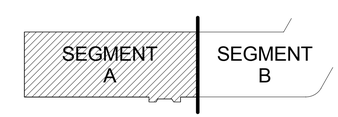
1 ROOF LEVEL SEGMENT A - DUCTWORK
M-103A
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 46x26 OA DN (GV-1).
2. 38x26 OA DN (GV-2).
3. 56x34 OA DN (GV-3).
4. 14x10 EA DN SHOPS (EF-4).
5. 18x14 EA DN LAB GENERAL (EF-2).
6. 26x24 EA DN LAB EMERGENCY (EF-3).
7. 20x20 EA DN TRUCK BAY (EF-5).
8. TERMINATE PAINT SPRAY BOOTH EXHAUST DUCT 18" ABOVE THE ROOF WITH GOOSNECK.



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037023
PROFESSIONAL ENGINEER
11/6/2013

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

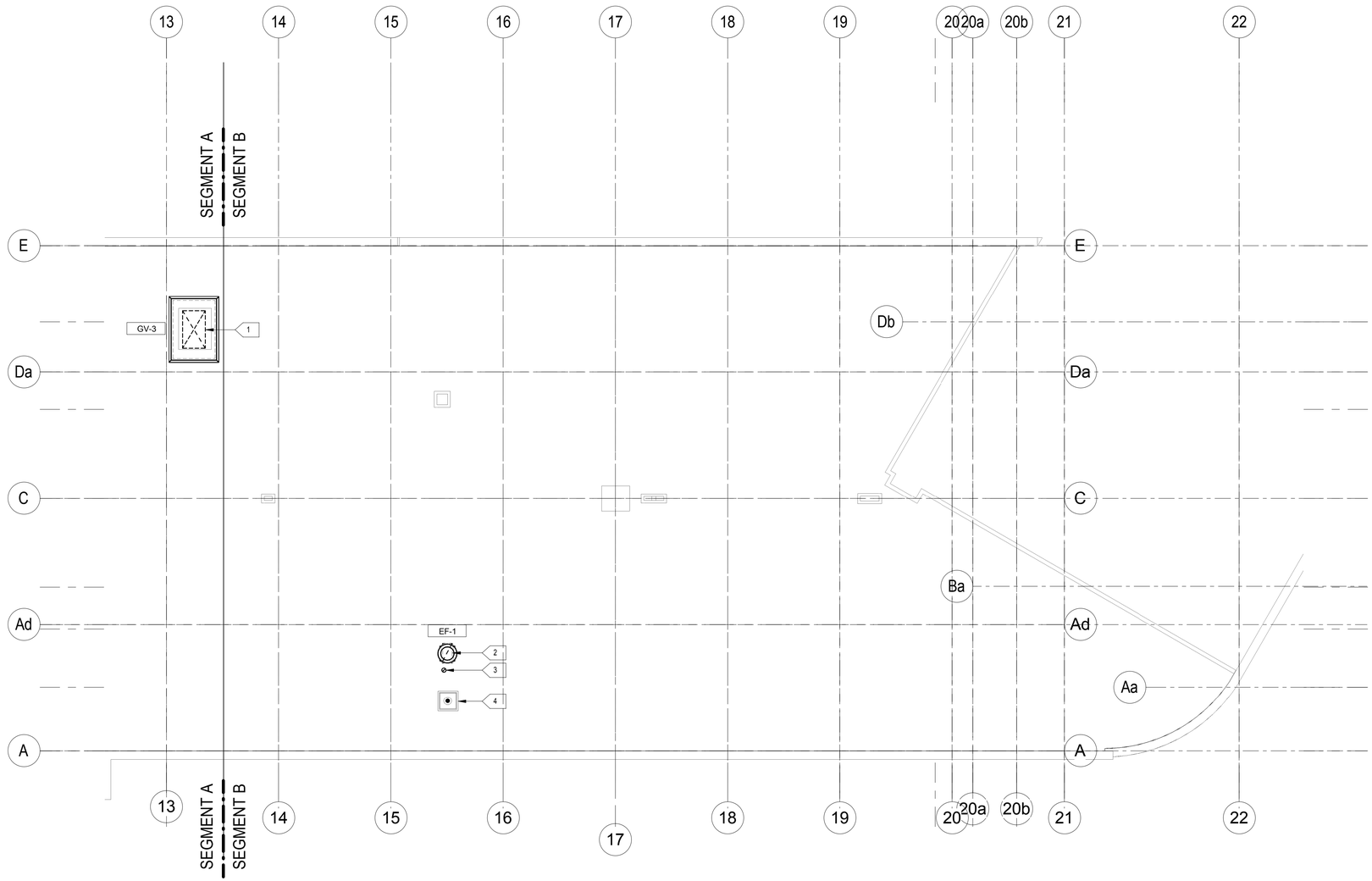
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF LEVEL SEGMENT A - DUCTWORK

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293493 | LATEST REV.

SHEET NO. M-103A

12/16/2013 9:02:33 AM



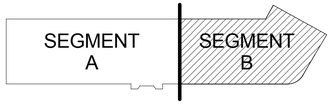
1 ROOF LEVEL SEGMENT B - DUCTWORK / PIPING
M-103B
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 56x34 OA DN (GV-3).
2. 26x14 EA (EF-1).
3. TERMINATE 3" SAFETY RELIEF VENT ABOVE ROOF WITH STEAM EXHAUST HEAD.
4. TERMINATE 6" COMBINED VENT OPEN TAP 7' ABOVE ROOF.



KEY PLAN

N

1/8"=1'-0"
8' 4' 0 8' 16'

GRAPHIC SCALES

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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Arlington, Va. 22201

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED J	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

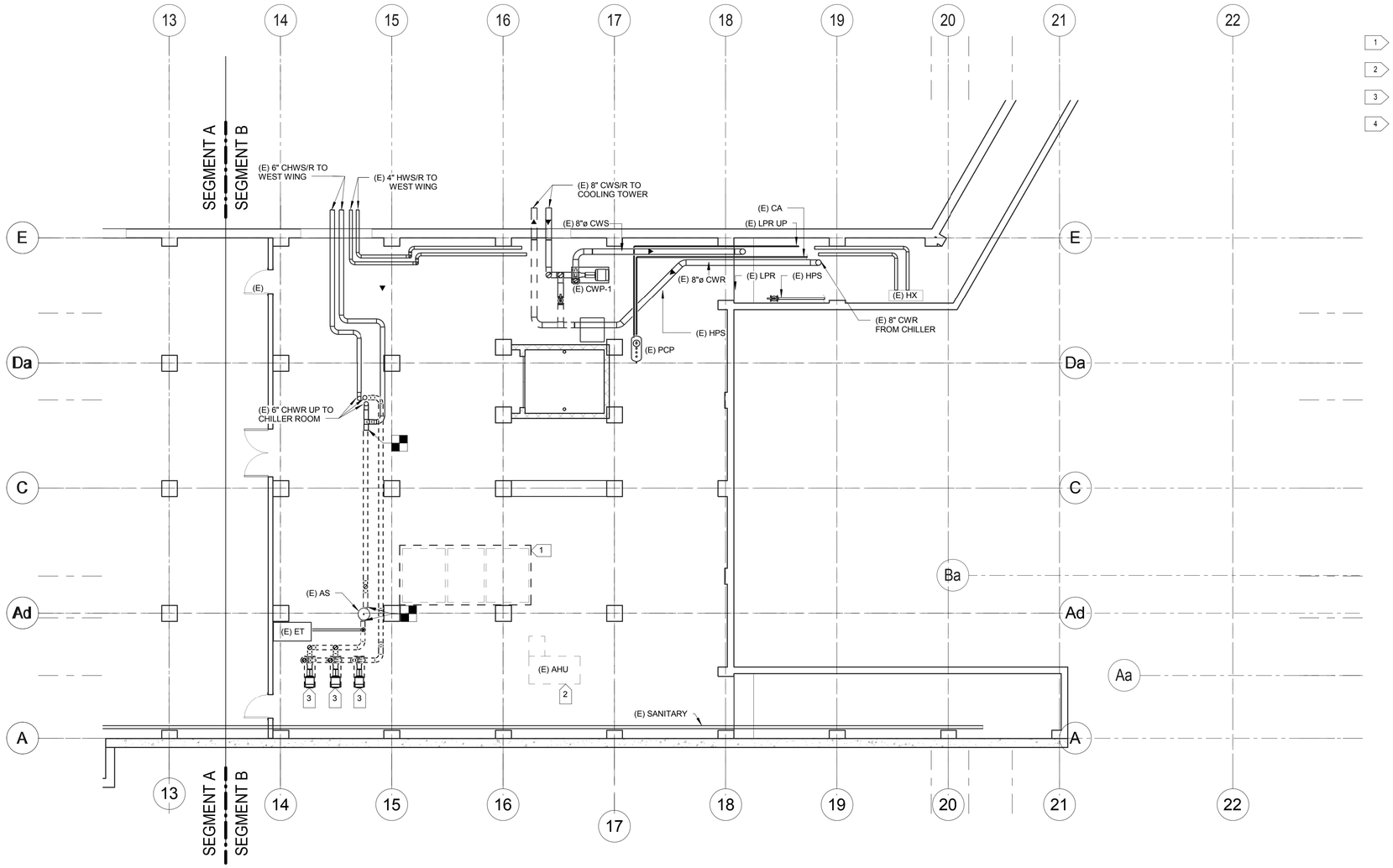
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF LEVEL SEGMENT B - DUCTWORK / PIPING

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293494 | LATEST REV.
SHEET NO. M-103B

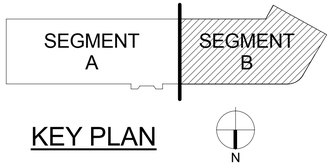
12/16/2013 9:02:37 AM



1 BASEMENT SEGMENT B - PIPING DEMOLITION
MD-200B
SCALE: 1/8" = 1'-0"

SPECIFIC NOTES

1. DEMOLISH EXISTING AHU CONCRETE PAD AND COORDINATE WITH STRUCTURAL.
2. DEMOLISH EXISTING AHU, ASSOCIATED DUCTWORK AND PIPING, SUPPORTS AND APPURTENANCES.
3. DEMOLISH EXISTING CHILLED WATER PUMPS, ASSOCIATED PIPING, SUPPORTS AND APPURTENANCES.
4. DEMOLISH EXISTING DUCTWORK AND CAP THE OPENING ADJACENT TO WALL.



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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Arlington, Va. 22201

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ISSUE DATE
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APPROVALS				
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WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

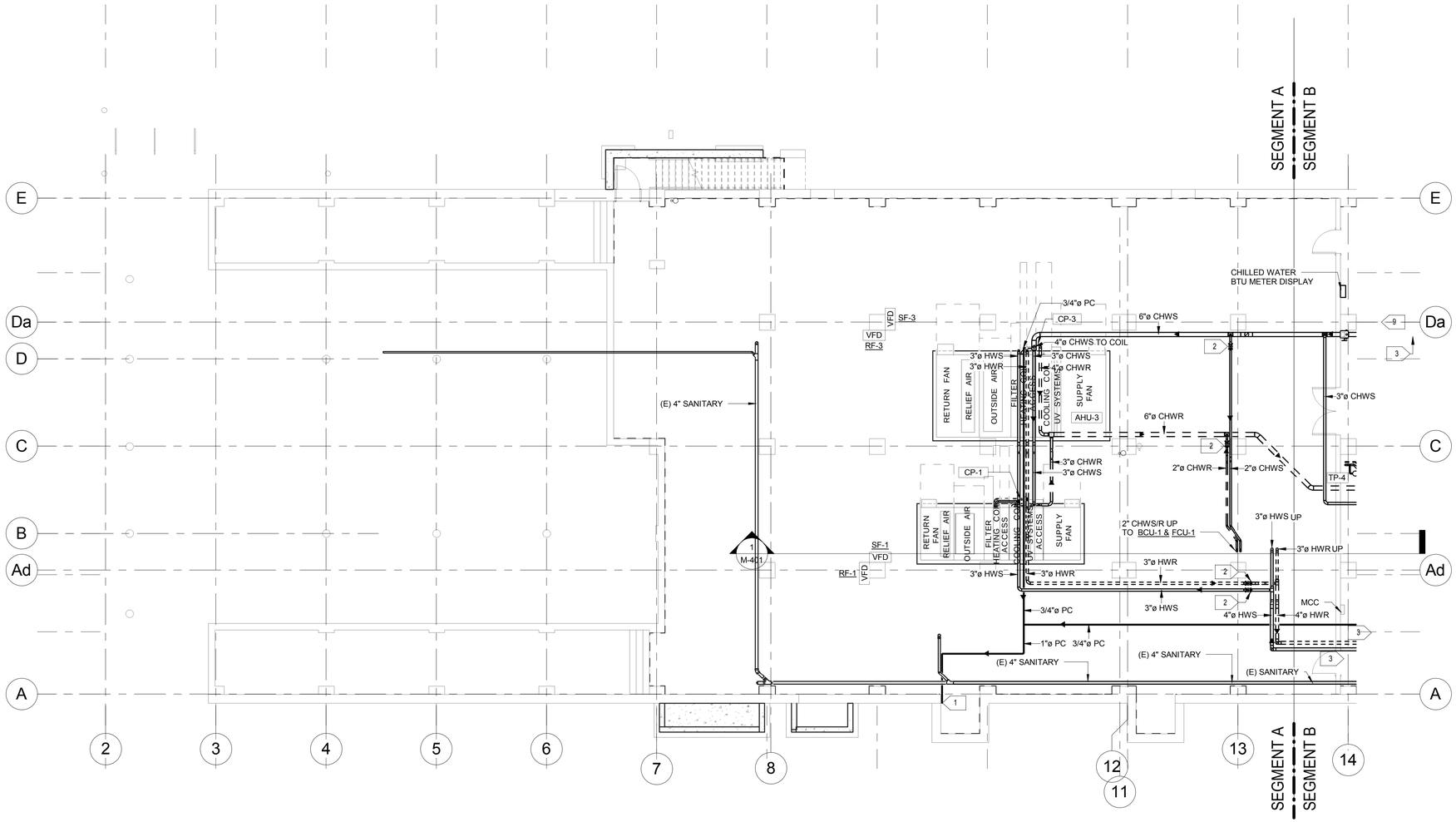
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT B - PIPING DEMOLITION

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293495 | LATEST REV.

SHEET NO. MD-200B

12/16/2013 9:04:52 AM



1 M-200A BASEMENT SEGMENT A - PIPING

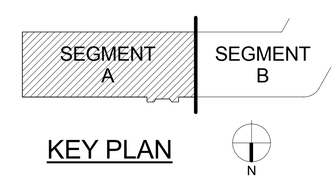
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INSTALL PIPNG AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
2. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
3. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. CONNECT 1" PC TO (E) STORM DRAIN. COORDINATE WITH PLUMBING DRAWING P-100A.
2. PROVIDE ISOLATION VALVE.



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

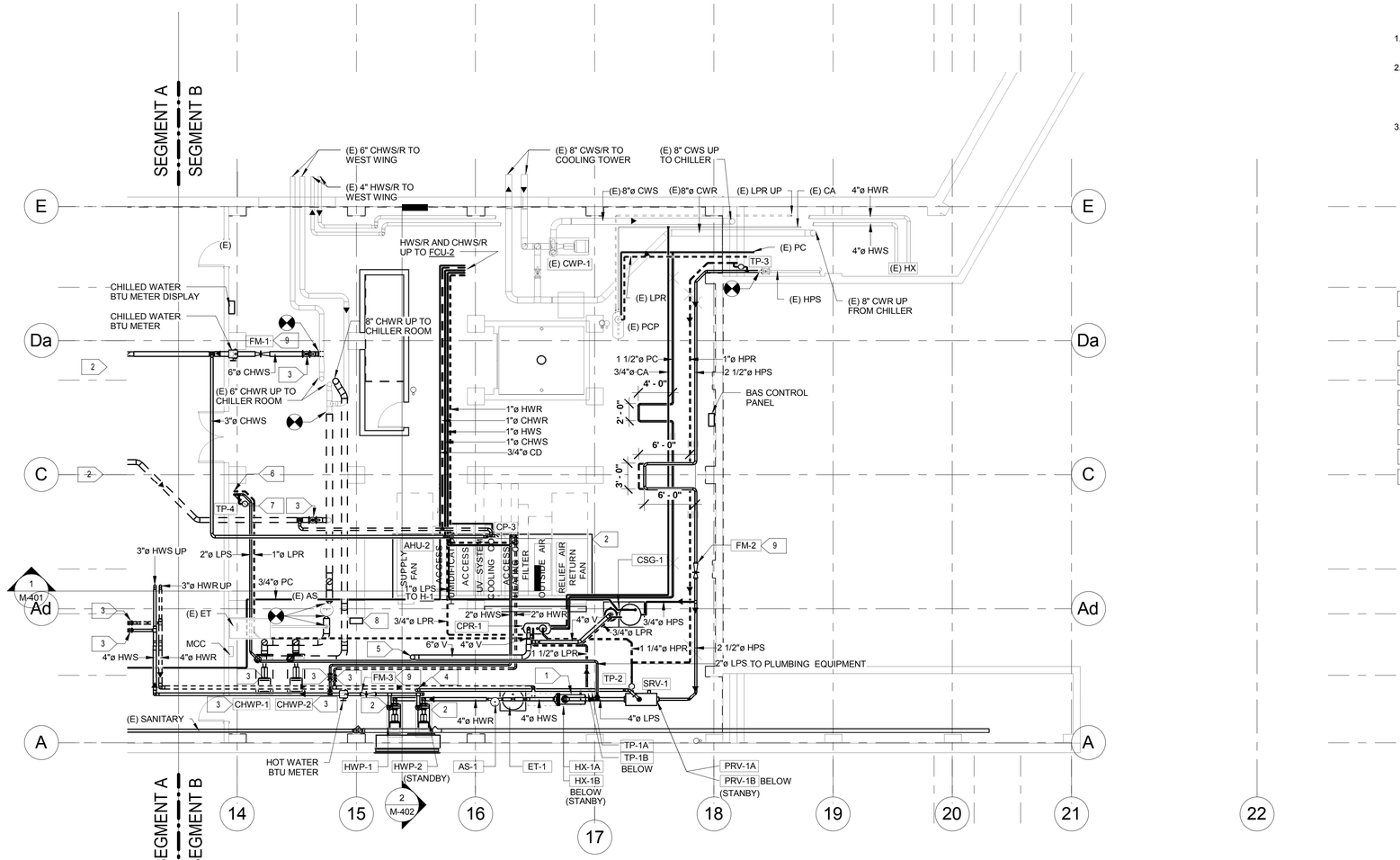
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT A - PIPING

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293496 | LATEST REV.

SHEET NO. M-200A

12/16/2013 9:02:42 AM



1 M-200B BASEMENT SEGMENT B - PIPING

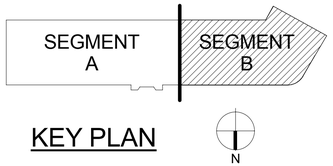
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INSTALL PIPNG AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
2. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
3. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. ELEVATE HEAT EXCHANGERS FOR GRAVITY CONDENSATE RETURN.
2. PROVIDE 6" HIGH CONCRETE PAD WITH 6" WIDTH ON ALL SIDES OF EQUIPMENT.
3. PROVIDE ISOLATION VALVE.
4. 3" Ø SAFETY RELIEF VENT UP THRU ROOF.
5. 6" Ø COMBINED VENT UP THRU ROOF.
6. 1" Ø LPR DN TO PLUMBING EQUIPMENT.
7. 2" Ø LPS DN TO PLUMBING EQUIPMENT.
8. HOT WATER BTU METER DISPLAY.
9. PROVIDE MANUFACTURER RECOMMENDED STRAIGHT PIPE LENGTH FOR UPSTREAM AND DOWNSTREAM METER RUN.



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

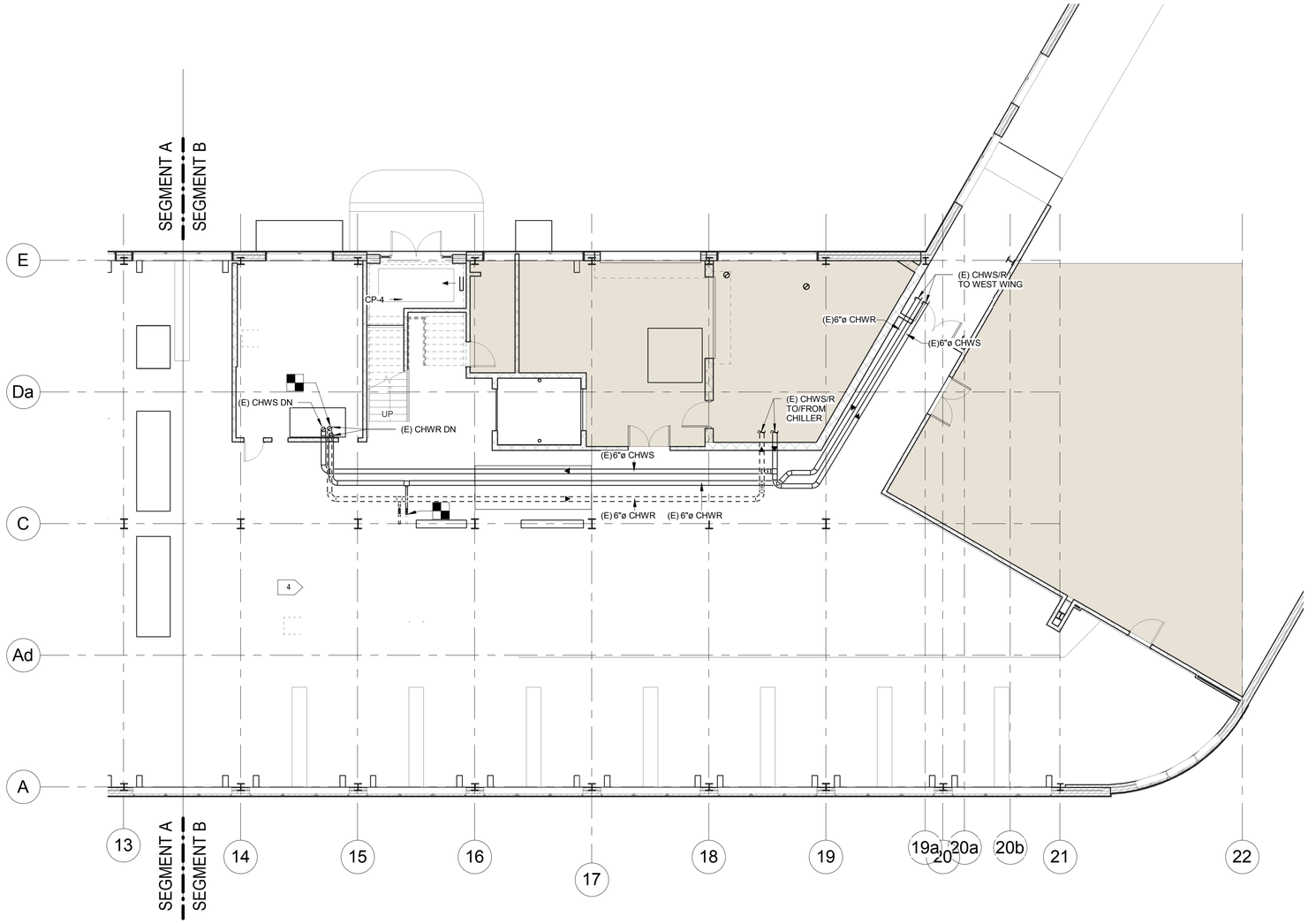
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT B - PIPING

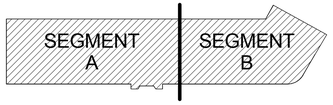
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293497 | LATEST REV.

SHEET NO. M-200B

12/16/2013 9:02:48 AM



1 FIRST FLOOR SEGMENT B - PIPING DEMOLITION
MD-201B
SCALE: 1/8" = 1'-0"



KEY PLAN

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

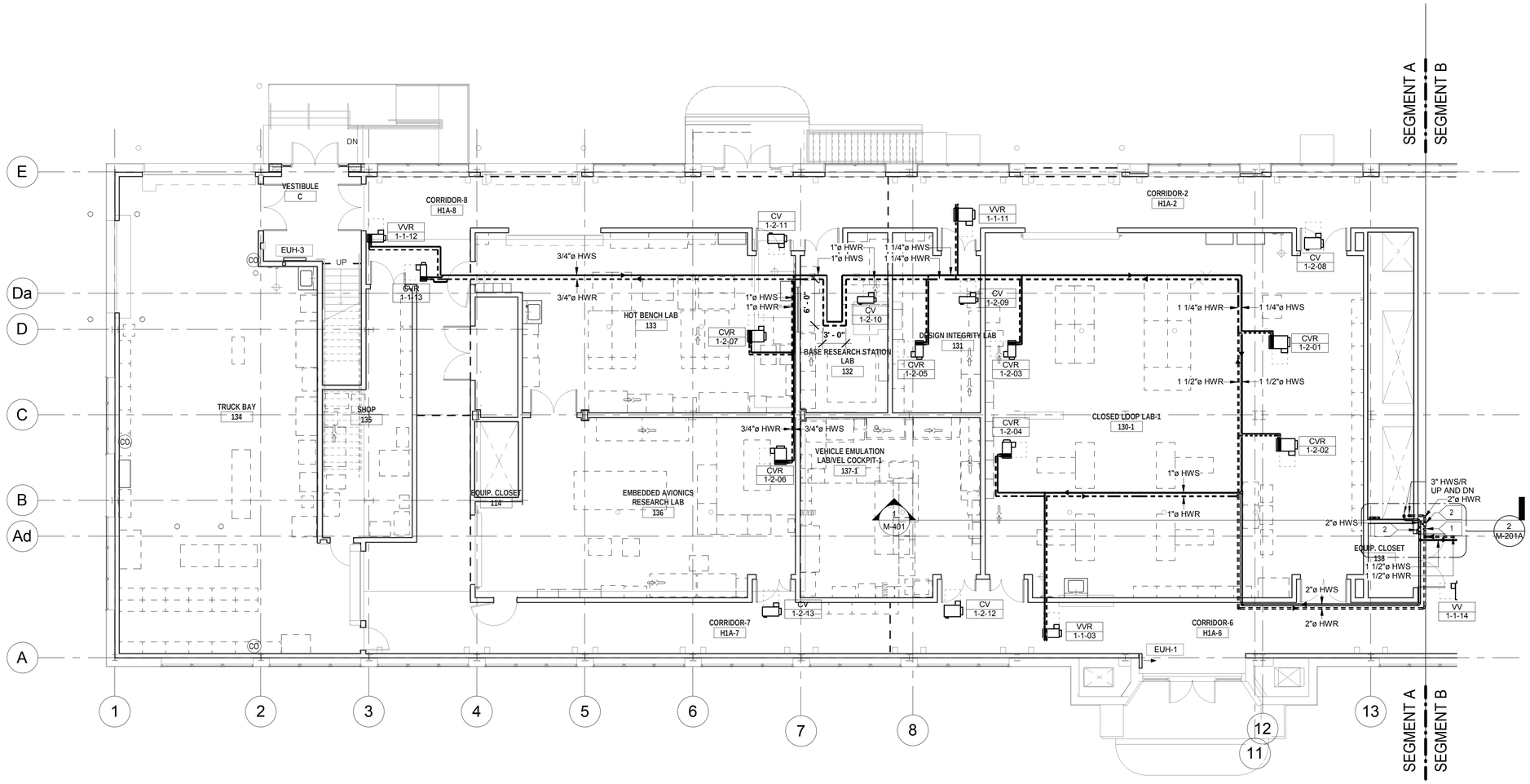
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT B - PIPING DEMOLITION

BUILDING NO. 1230
SIZE D
DRAWING NO. 1293498
LATEST REV.
SHEET NO. MD-201B

12/16/2013 9:04:57 AM



1 | M-201A FIRST FLOOR SEGMENT A - PIPING

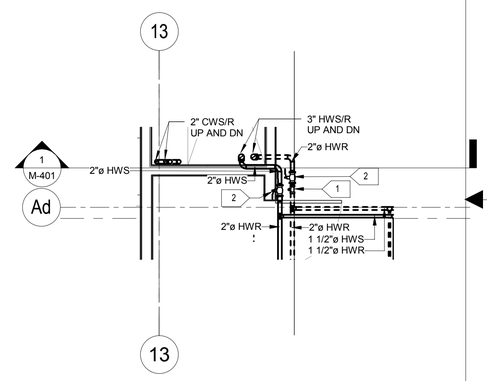
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INSTALL PIPNG AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
2. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
3. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

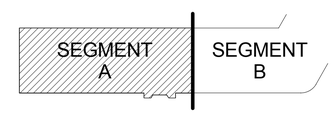
SPECIFIC NOTES

1. PRESSURE INDEPENDENT (NON-SPRING RETURN) SELF-BALANCING CONTROL VALVE. BALANCE TO 34.7 GPM
2. PROVIDE ISOLATION VALVE.



2 | M-201A FIRST FLOOR - ENLARGED SHAFT PIPING PLAN

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



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

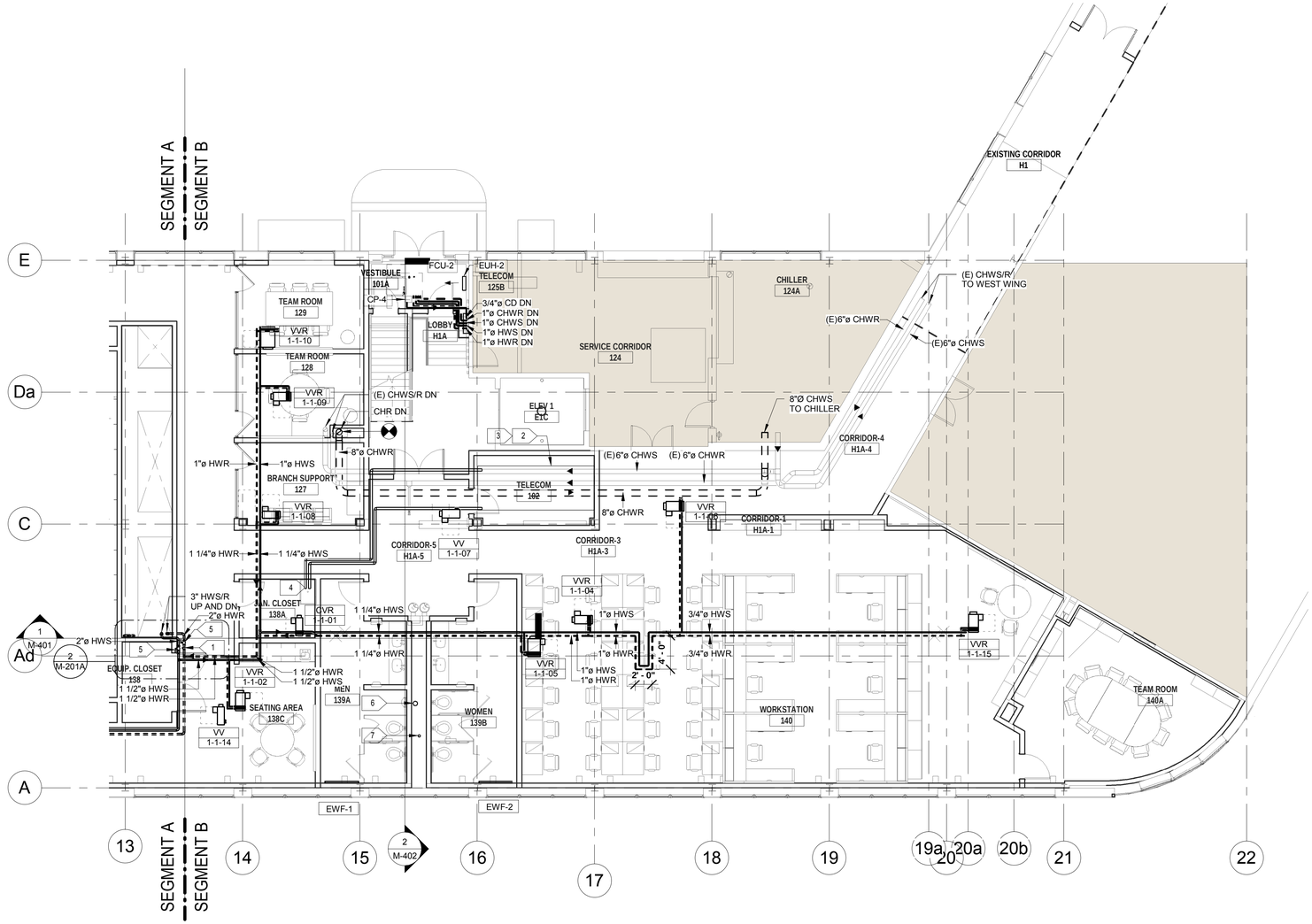
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT A - PIPING

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293499 | LATEST REV.:

SHEET NO.: M-201A

12/16/2013 9:02:56 AM



1 M-201B FIRST FLOOR SEGMENT B - PIPING

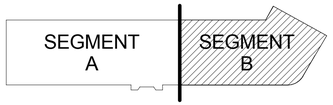
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INSTALL PIPNG AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
2. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
3. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. PRESSURE INDEPENDENT (NON-SPRING RETURN) SELF-BALANCING CONTROL VALVE. BALANCE TO 34.7 GPM.
2. PROVIDE FIELD FABRICATED STAINLESS STEEL DRIP PAN, 14'-0"(L) x 5'-0"(D) x 1'-6"(H). PROVIDE WATER SENSOR. ROUTE 3" DRAIN PIPE AT END OF DRIP PAN TO JANITOR CLOSET FUNNEL FLOOR DRAIN. FIELD COORDINATE EXACT LOCATION.
3. PROVIDE A BINARY WATER DETECTOR IN THE DRIP PAN TO SEND AN ALARM TO BAS UPON SENSING WATER.
4. COORDINATE WITH PLUMBING DRAWING P-101B FOR EXACT LOCATION OF FUNNEL FLOOR DRAIN AND TERMINATION OF 3" DRAIN PIPE.
5. PROVIDE ISOLATION VALVE.
6. 6"Ø COMBINED VENT UP TO ROOF.
7. 3"Ø SAFETY RELIEF VENT UP TO ROOF.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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Arlington, Va. 22201

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

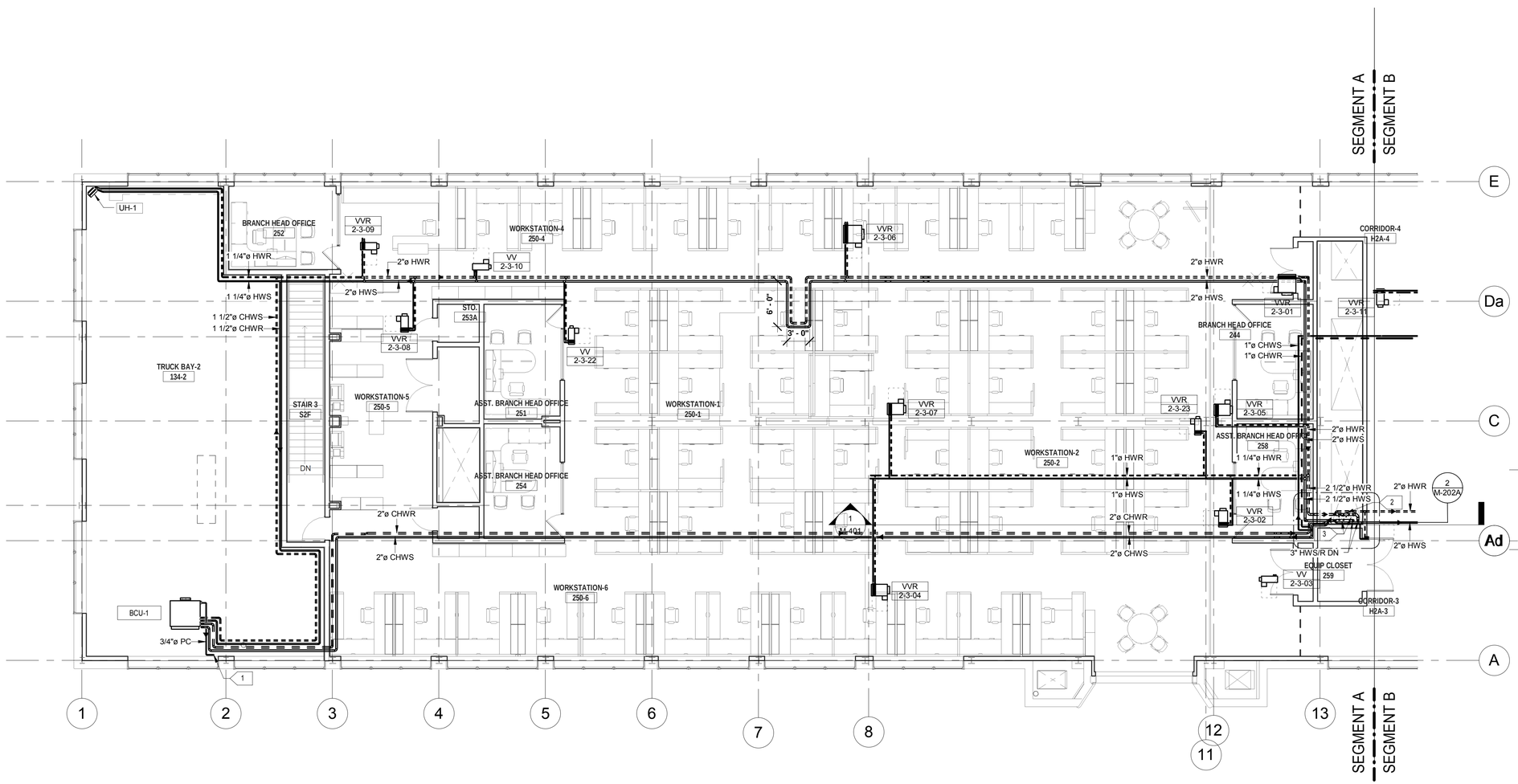
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT B - PIPING

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293500 | LATEST REV.

SHEET NO. M-201B

12/16/2013 9:03:03 AM



1 M-202A SECOND FLOOR SEGMENT A - PIPING

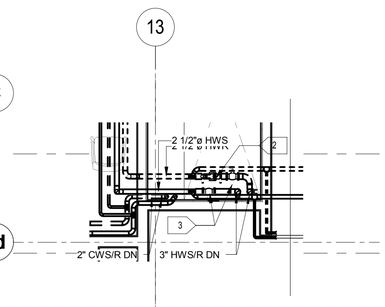
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INSTALL PIPNG AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
2. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
3. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

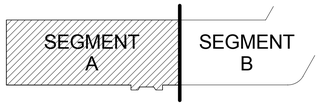
SPECIFIC NOTES

1. CONNECT 3/4" PC TO (E) STORM DRAIN. COORDINATE WITH PLUMBING DRAWING P-101A.
2. PRESSURE INDEPENDENT (NON-SPRING RETURN) SELF-BALANCING CONTROL VALVE. BALANCE TO 64.5 GPM.
3. PROVIDE ISOLATION VALVE.



2 M-202A SECOND FLOOR - ENLARGED SHAFT PIPING PLAN

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



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

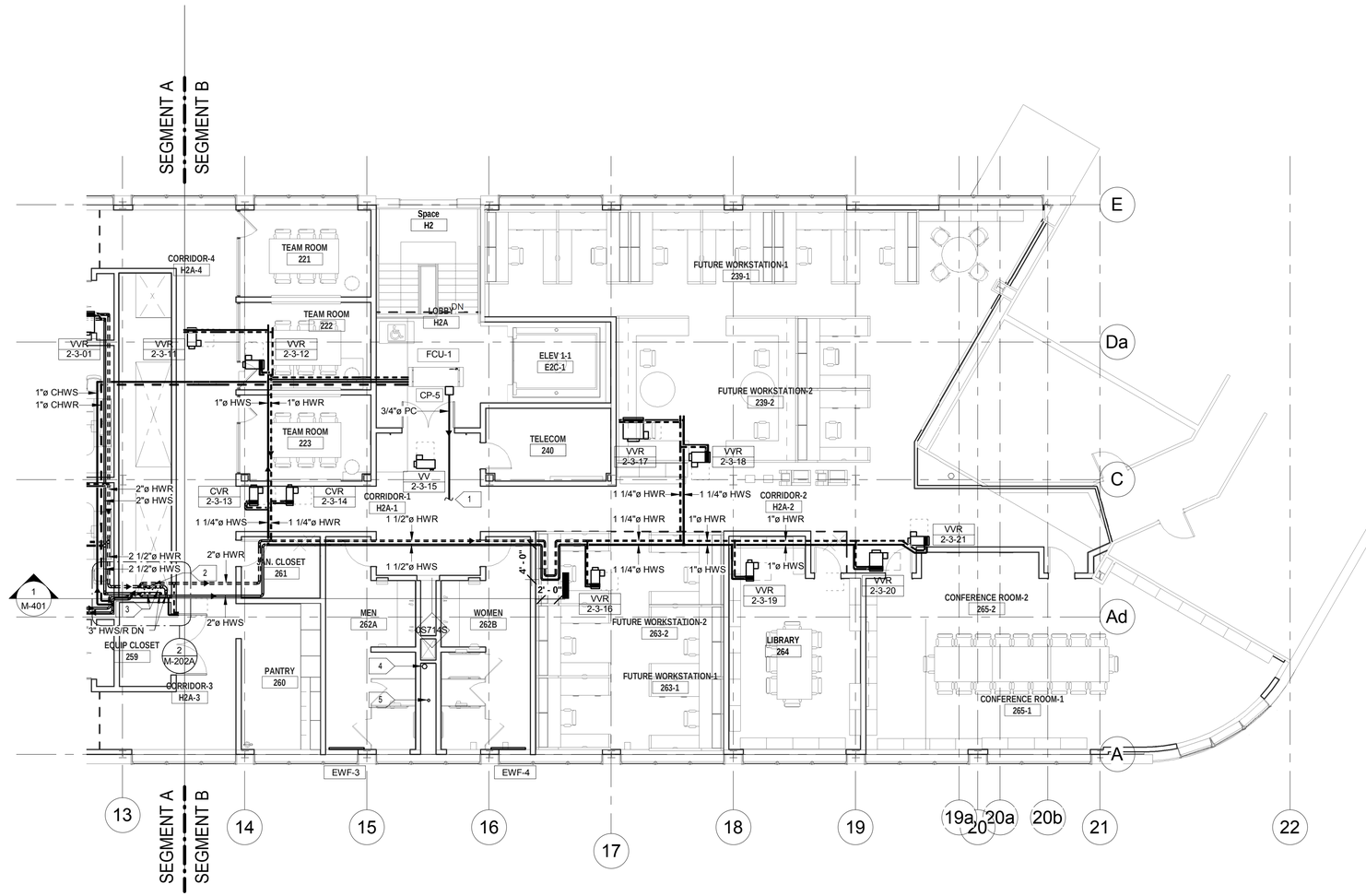
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT A - PIPING

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293501 | LATEST REV.

SHEET NO. M-202A

12/16/2013 9:03:11 AM



1 M-202B SECOND FLOOR SEGMENT B - PIPING

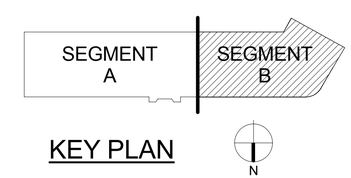
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. INSTALL PIPNG AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
2. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
3. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. CONNECT 3/4" PC TO (E) STORM DRAIN. COORDINATE WITH PLUMBING DRAWING P-102B.
2. PRESSURE INDEPENDENT (NON-SPRING RETURN) SELF-BALANCING CONTROL VALVE. BALANCE TO 64.5 GPM.
3. PROVIDE ISOLATION VALVE.
4. 6"Ø COMBINED VENT UP TO ROOF.
5. 3"Ø SAFETY RELIEF VENT UP TO ROOF.



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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ISSUE DATE
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT B - PIPING

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293502 | LATEST REV.

SHEET NO. M-202B

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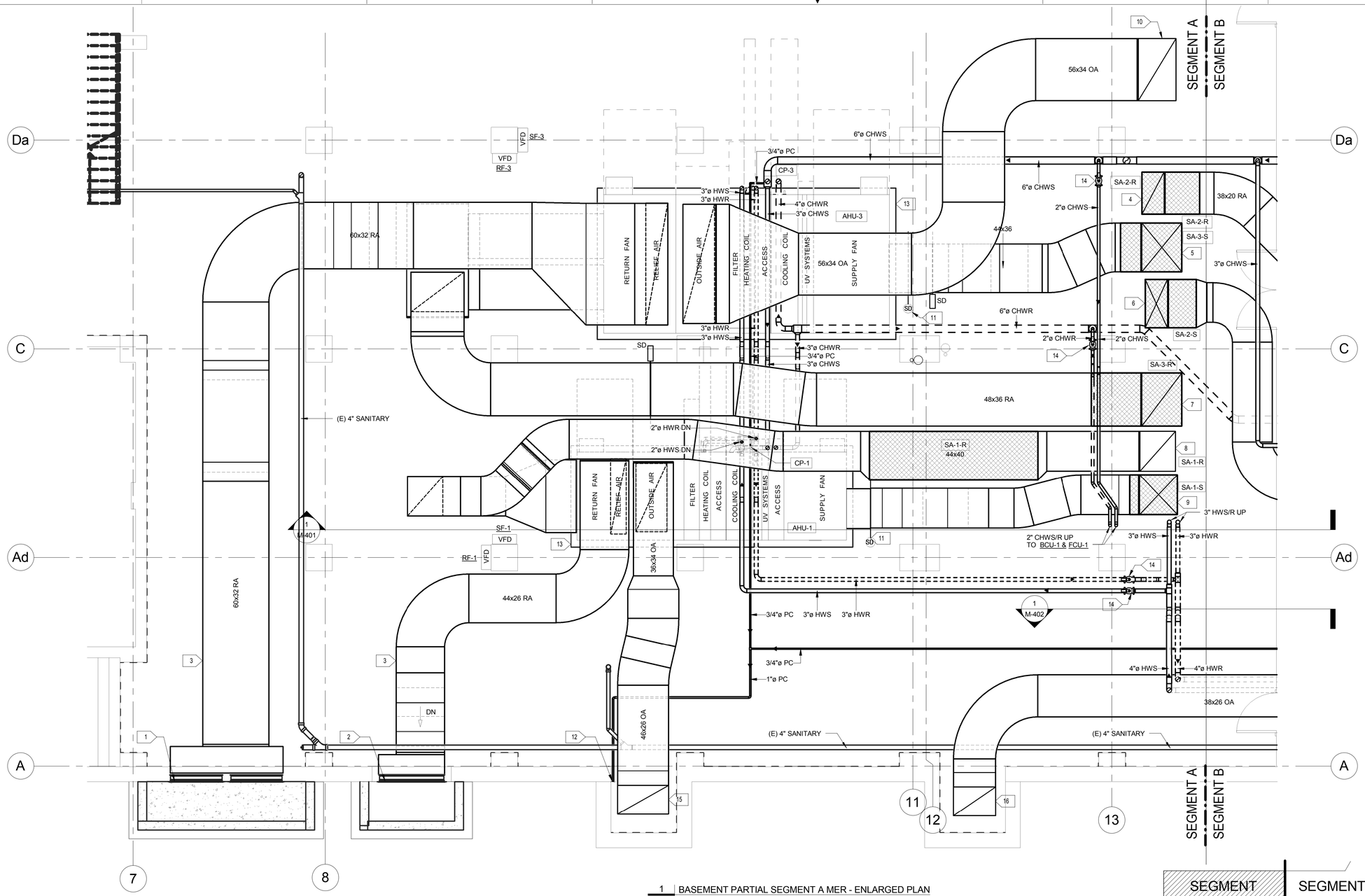


1 M-300A BASEMENT PARTIAL SEGMENT A MER - ENLARGED PLAN

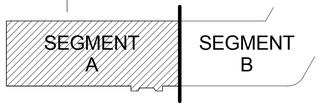
SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. INGRESS/EGRESS OF AHU EQUIPMENT WILL BE THROUGH FREIGHT ELEVATOR AND/OR VIA FLOOR HATCH.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. INSTALL PIPNG AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
4. PROVIDE 1/4" SLOPE FOR ALL COOLING COIL CONDENSATE DRAINS (CD).
5. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
6. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. 20.77 SF MINIMUM FREE AREA RELIEF LOUVER WITH 108"(W) x 60"(H) x 24"(D) INSULATED RELIEF PLENUM. COORDINATE WITH ARCHITECT FOR EXACT LOUVER LOCATION AND FACE DIMENSIONS.
2. 10.88 SF MINIMUM FREE AREA RELIEF LOUVER WITH 60"(W) x 48"(H) x 18"(D) INSULATED RELIEF PLENUM. COORDINATE WITH ARCHITECT FOR EXACT LOUVER LOCATION AND FACE DIMENSIONS.
3. PROVIDE INSULATED RELIEF DUCTWORK.
4. 38x20 RA UP (AHU-2).
5. 44x36 SA UP (AHU-3).
6. 44X20/36x20 SA UP (AHU-2).
7. 48x36 RA UP (AHU-3).
8. 36x32 RA UP (AHU-1).
9. 36X34/36x26 SA UP (AHU-1).
10. 56x34 OA UP (AHU-3).
11. COORDINATE WITH FA SERIES DRAWINGS FOR SMOKE DETECTORS.
12. CONNECT 1" PC TO (E) STORM DRAIN. COORDINATE WITH PLUMBING DRAWING P-100A.
13. PROVIDE 6" CONCRETE PAD WIDTH ON ALL SIDES OF EQUIPMENT.
14. PROVIDE ISOLATION VALVE.
15. 46x26 OA UP (GV-1).
16. 38x26 OA (GV-2).



KEY PLAN

N

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
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NASA
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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED Approver	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

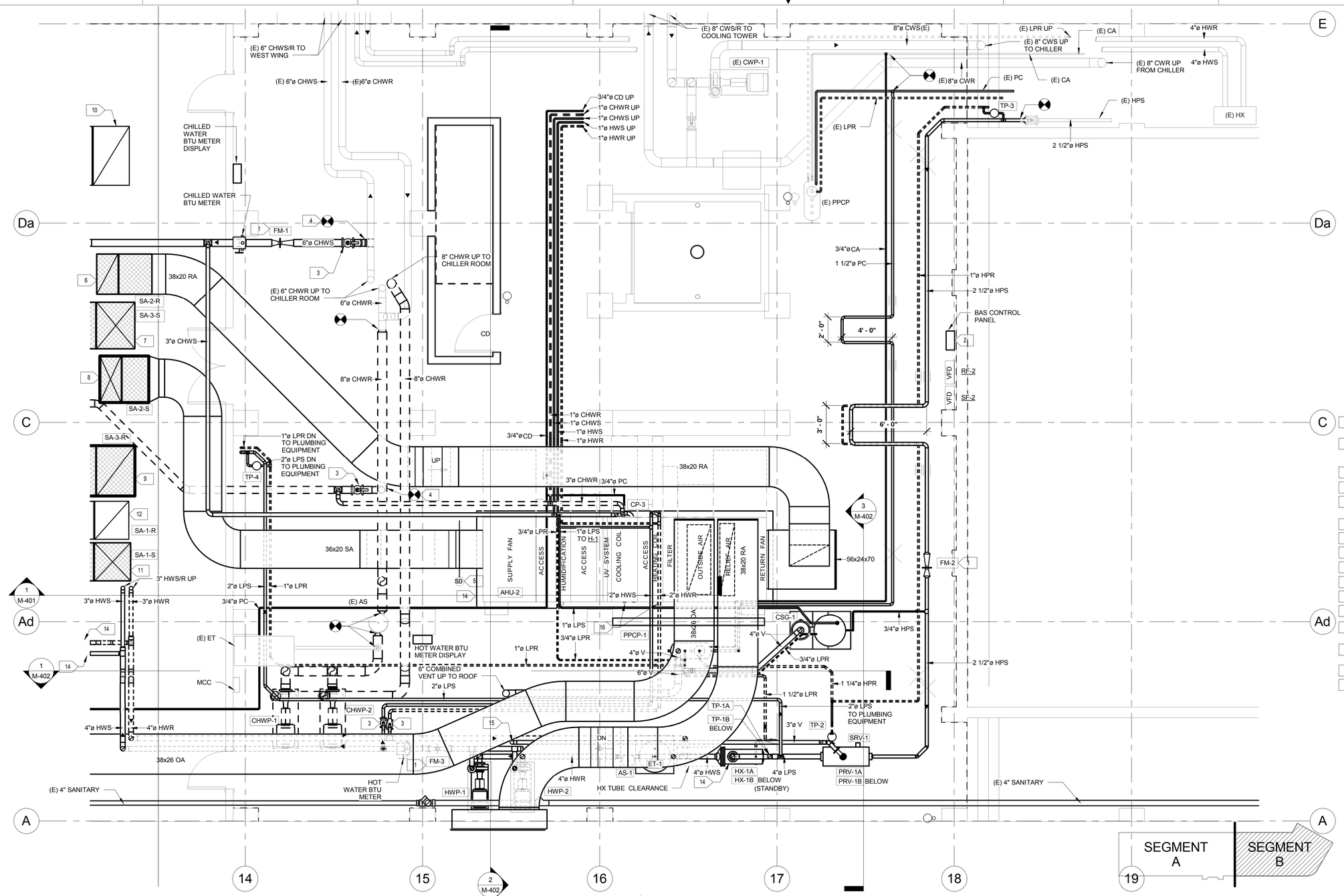
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT PARTIAL SEGMENT A MER - ENLARGED PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293503 | LATEST REV.

SHEET NO. M-300A

12/16/2013 9:03:25 AM



1 BASEMENT PARTIAL SEGMENT B MER - ENLARGED PLANS
M-300B
SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. INGRESS/EGRESS OF AHU EQUIPMENT WILL BE THROUGH FREIGHT ELEVATOR AND/OR VIA FLOOR HATCH.
2. CONTRACTOR SHALL SUBMIT SHEET METAL SHOP DRAWINGS. NO FABRICATION ALLOWED PRIOR TO APPROVAL OF SHEET METAL SHOP DRAWINGS. LONG RADIUS ELBOWS SHALL NOT BE SUBSTITUTED WITH 90 DEGREE RECTANGULAR ELBOWS WITH VANES.
3. INTALL PIPING AS HIGH AS POSSIBLE UNLESS NOTED OR SHOWN OTHERWISE.
4. PROVIDE 1/4" SLOPE FOR ALL COOLING COIL CONDENSATE DRAINS (CD).
5. PROVIDE 1"/40' DOWNWARD SLOPE (IN DIRECTION OF FLOW) FOR ALL HORIZONTAL HIGH PRESSURE SUPPLY/ RETURN STEAM PIPING.
6. CONTRACTOR SHALL COMPLY WITH SPECIFICATION SECTION 018612.0740 - "RELIABILITY CENTERED ACCEPTANCE FOR MECHANICAL SYSTEMS" IN ACCORDANCE WITH BUILDING AND EQUIPMENT ACCEPTANCE GUIDE.
7. CONTRACTOR SHALL BE RESPONSIBLE TO DEMOLISH EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE. CONTRACTOR TO FIELD VERIFY EXISTING ABANDONED PIPING/DUCTWORK NOT IN SERVICE.

SPECIFIC NOTES

1. PROVIDE MANUFACTURER RECOMMENDED STRAIGHT PIPE LENGTH FOR UPSTREAM AND DOWNSTREAM METER RUN.
2. PROVIDE FOUR (4) RELAY MODULES FROM FIRE ALARM SYSTEM FOR AHU SHUTDOWN WIRED TO BAS CONTROL PANEL.
3. PROVIDE ISOLATION VALVE.
4. PROVIDE WET TAP CONNECTION.
5. COORDINATE WITH FA SERIES DRAWINGS FOR SMOKE DETECTORS.
6. 38x20 RA UP (AHU-2).
7. 44x36 SA UP (AHU-3).
8. 44X20/36x20 SA UP (AHU-2).
9. 48x36 RA UP (AHU-3).
10. 56x34 OA UP (AHU-3).
11. 36X34/36x26 SA UP (AHU-1).
12. 36x32 RA UP (AHU-1).
13. ELEVATE HEAT EXCHANGERS FOR GRAVITY CONDENSATE RETURN.
14. PROVIDE 6" HIGH CONCRETE PAD WITH 6" WIDTH ON ALL SIDES OF EQUIPMENT.
15. 3" Ø SAFETY RELIEF VENT UP THRU ROOF.
16. CONTRACTOR TO FIELD VERIFY SUFFICIENT DISTANCE FOR COIL PULL.

KEY PLAN

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
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			RES. PROJ. ENG.	

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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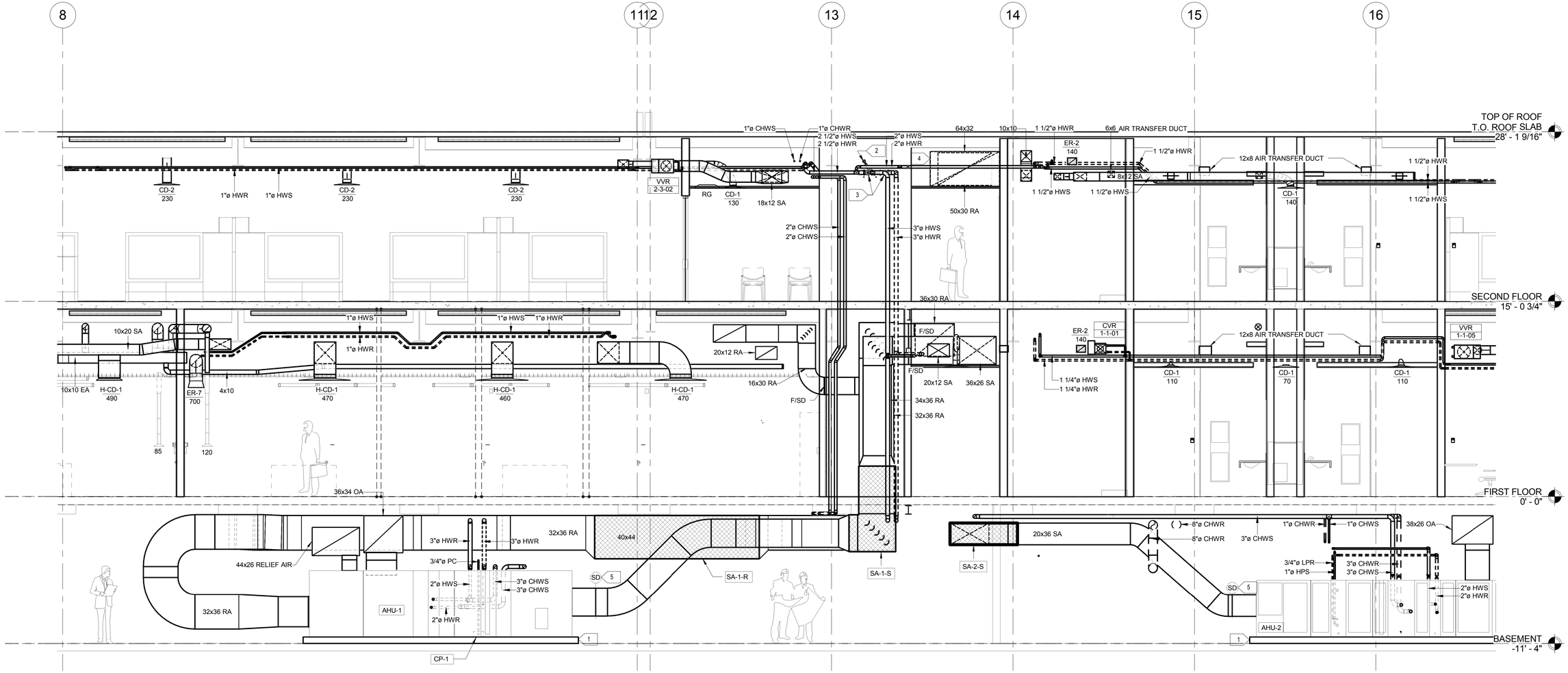
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT PARTIAL SEGMENT B MER - ENLARGED PLANS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293504 | LATEST REV.
SHEET NO. M-300B

12/16/2013 9:03:33 AM



1 | HVAC SECTIONS
M-401 | SCALE: 1/4" = 1'-0"

SPECIFIC NOTES

1. PROVIDE 6" HIGH CONCRETE PAD WITH 6" WIDTH ON ALL SIDES OF EQUIPMENT.
2. PRESSURE INDEPENDENT (NON-SPRING RETURN) SELF-BALANCING CONTROL VALVE. BALANCE TO 64.5 GPM.
3. PROVIDE ISOLATION VALVE.
4. 64x32 OED W/ WMS BALANCE TO 9,200 CFM.
5. COORDINATE WITH FA SERIES DRAWINGS FOR SMOKE DETECTORS.

4' 2' 0 4' 8'
1/4"=1'-0"

GRAPHIC SCALES

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JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED J	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

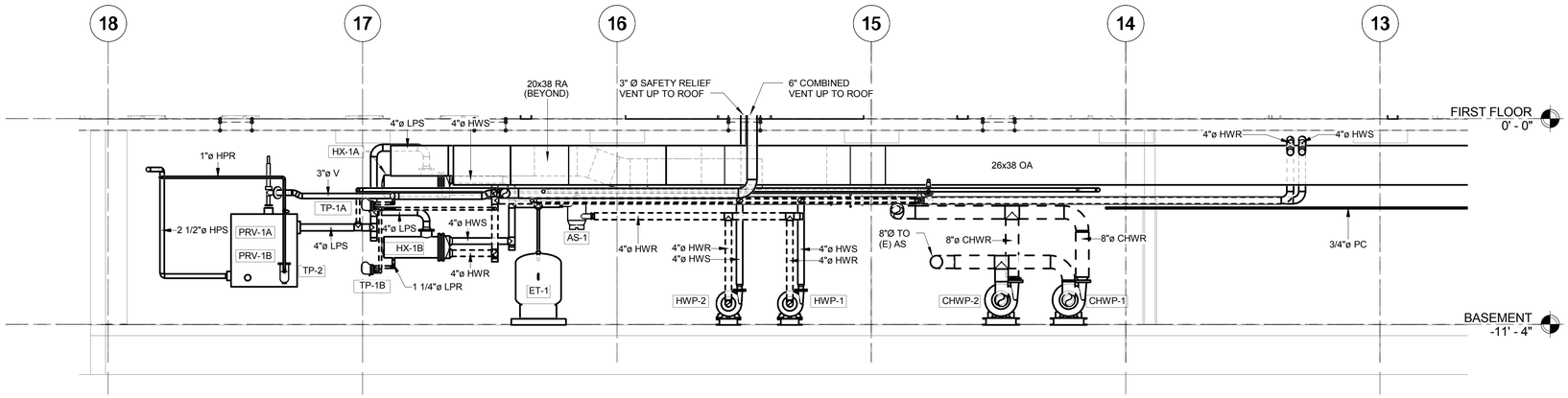
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

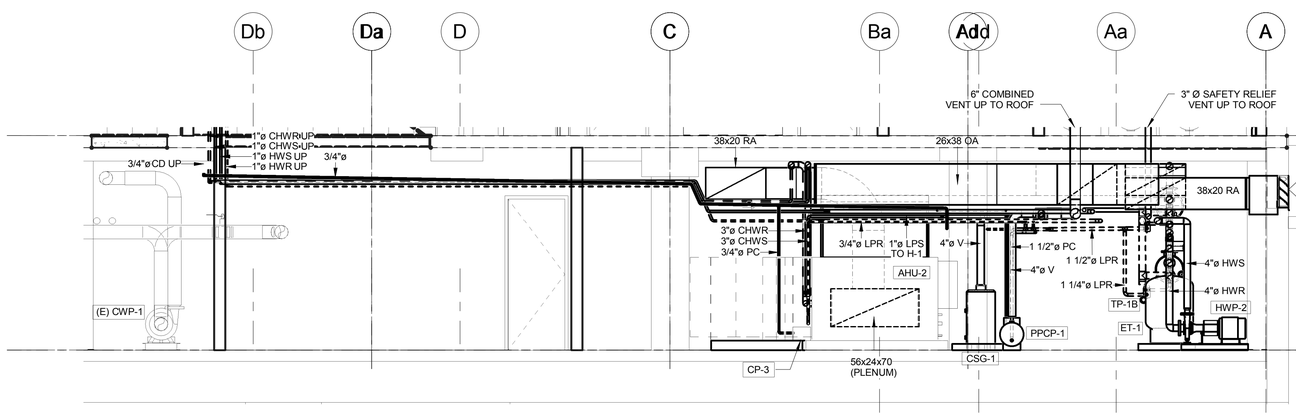
DRAWING TITLE: HVAC SECTIONS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293505 | LATEST REV.
SHEET NO. M-401

12/16/2013 9:03:43 AM



1 HVAC SECTION
M-402
SCALE: 1/4" = 1'-0"



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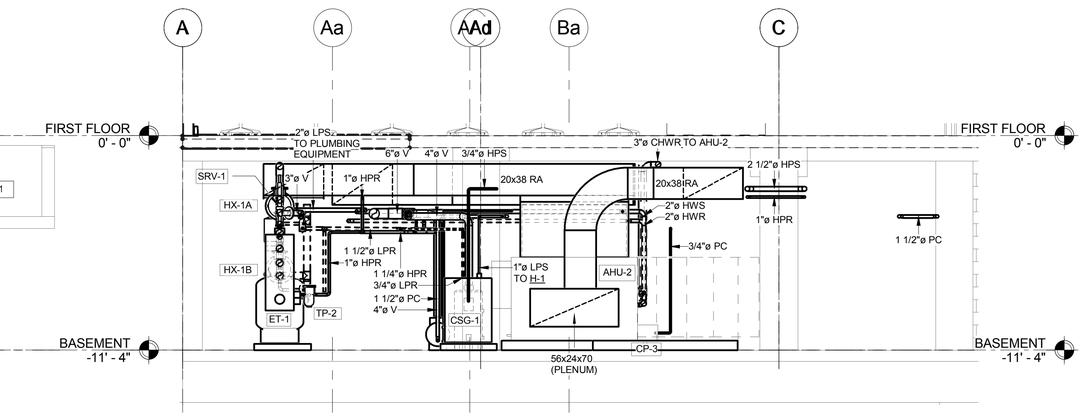

3 HVAC SECTION
M-402
SCALE: 1/4" = 1'-0"

SPECIFIC NOTES

1. 6.82 SF MINIMUM FREE AREA RELIEF LOUVER WITH 90"(W) x 24"(H) x 18"(D) INSULATED RELIEF PLENUM. COORDINATE WITH ARCHITECT FOR EXACT LOUVER LOCATION AND FACE DIMENSIONS.

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: HVAC SECTIONS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293506 | LATEST REV.

SHEET NO. M-402

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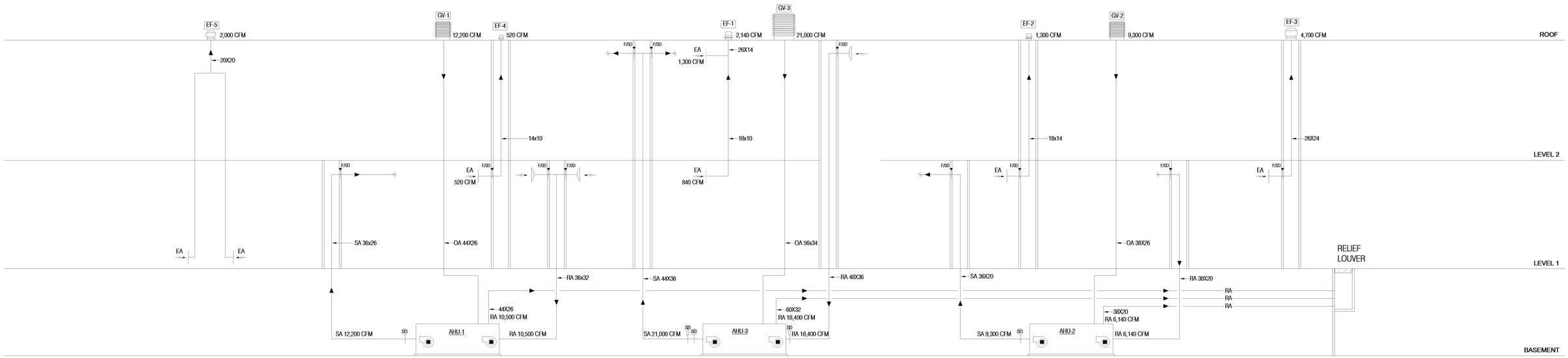
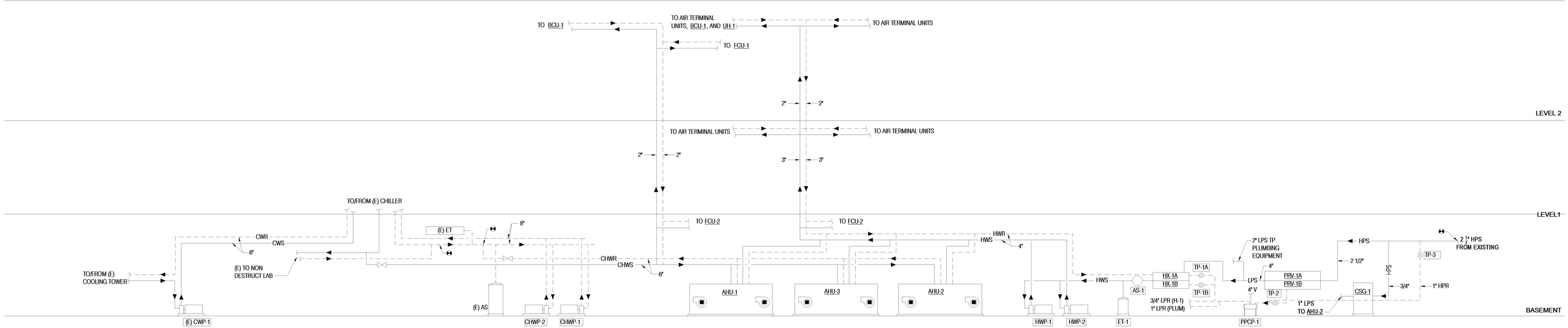


1 AIRSIDE RISER DIAGRAM

NOT TO SCALE



2 STEAM AND WATERSIDE RISER DIAGRAM

NOT TO SCALE

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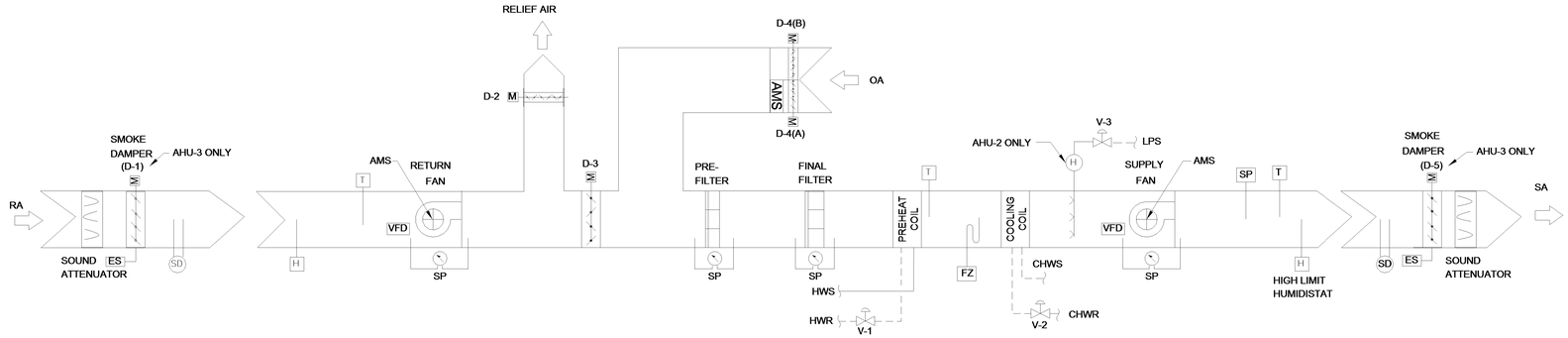
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: RISER DIAGRAMS

BUILDING NO. 1230
SHEET NO. M-501
SIZE D
DRAWING NO. 1293507
LATEST REV.

12/16/2013 9:03:55 AM



VAV AIR HANDLING UNIT SCHEMATIC DIAGRAM

NTS

SEQUENCE OF OPERATION:

A. GENERAL

1. AIR HANDLING UNIT SHALL OPERATE THROUGH THE DIRECT DIGITAL CONTROL BUILDING AUTOMATION SYSTEM (BAS) AND SHALL BE CAPABLE OF MANUAL OPERATION. SETPOINTS SHALL BE USER ADJUSTABLE THROUGH THE BAS SYSTEM. THE BAS SHALL COMMUNICATE WITH BUILDING 1215.

2. AIR TERMINAL UNITS SHALL BE INTERLOCKED WITH THEIR ASSOCIATED AHU TO BE INDEXED TO OCCUPIED MODE AHEAD OF THE AHU CENTRAL FAN.

B. SUPPLY AND RETURN FAN OPERATION

1. ON A SIGNAL FOR UNIT START, AUTOMATIC SMOKE DAMPERS (D-1 AND D-5) SHALL OPEN FULLY. SUPPLY AND RETURN FANS SHALL BE HARD WIRED INTERLOCKED TO START WHEN DAMPERS ARE FULLY OPEN. FANS SHALL BE LOCKED OUT THROUGH DAMPER END SWITCHES UNTIL DAMPERS (D-1) AND (D-5) ARE PROVED OPEN.

2. MINIMUM OUSIDE AIR DAMPER (D-4A) SHALL OPEN TO ITS MINIMUM POSITION. RELIEF DAMPER (D-2) AND RETURN AIR DAMPER (D-3) SHALL CLOSE PROPORTIONALLY.

3. SUPPLY AND RETURN FANS SHALL NOT BE INTERELOCKED WITH GENERAL EXHAUST FANS. SEE M603 FOR SEQUENCE OF OPERATION FOR GENERAL EXHAUST FANS.

C. UNIT TEMPERATURE CONTROL

1. AVERAGING TEMPERATURE SENSOR, LOCATED IN SUPPLY AIR DISCHARGE SHALL MAINTAIN SUPPLY AIR TEMPERATURE AS FOLLOWS:

   a. ON A TEMPERATURE RISE ABOVE SETPOINT 55°F (ADJUSTABLE) CHILLED WATER CONTROL VALVE (V-2) SHALL MODULATE TOWARD FULL OPEN POSITION.

   b. ON A TEMPERATURE DROP BELOW SETPOINT, THE CHILLED WATER CONTROL VALVE SHALL MODULATE TOWARD THE CLOSED POSITION. ON A CONTINUED DROP IN SUPPLY AIR TEMPERATURE, THE HOT WATER VALVE (V-1) SHALL MODULATE TOWARD FULL OPEN POSITION.

   c. TEMPERATURE CONTROLLER SHALL HAVE POSITION INDICATING DEVICE (PID) CAPABLITY.

D. ECONOMIZER OPERATION

1. WHENEVER OUTSIDE AIR ENTHALPY EXCEEDS RETURN AIR ENTHALPY, MAXIMUM OUTSIDE AIR DAMPER (D-4B) SHALL REMAIN FULLY CLOSED, RELIEF AIR DAMPER SHALL REMAIN AT ITS MINIMUM POSITION, AND RETURN AIR DAMPER SHALL REMAIN FULLY OPEN.

2. WHENEVER OUTSIDE AIR TEMPERATURE DROPS TO 65°F OR BELOW (BUT NOT LOWER THAN 40°F AND OUTSIDE AIR ENTHALPY IS BELOW OR EQUAL TO THE RETURN AIR ENTHALPY.) AT SENSOR, THE BAS AUTOMATICALLY SWITCH TO ECONOMIZER OPERATION. THE ECONOMIZER SHALL MODULATE OUTSIDE AIR DAMPERS (D-4B), RELIEF AIR DAMPER (D-2) AND RETURN AIR DAMPER (D-3). THE CHILLED WATER CONTROL VALVE (V-2) SHALL BE DEENERGIZED IN THE CLOSED POSITION AND ECONOMIZER SHALL MAINTAIN THE SUPPLY AIR TEMPERATURE AT 55°F.

E. LABORATORY 100% EXHAUST BACKUP MODE (AHU-2 ONLY)

1. LABORATORY 100% EXHAUST BACKUP OR PURGE MODE WILL BE INDEXED VIA A PUSHBUTTON SWITCH LOCATED WITHIN THE LABORATORY SPACE.

2. THE DDC SYSTEM SHALL MODULATE THE SUPPLY LAB GRADE AIR TERMINAL UNIT TO MAINTAIN MAKEUP AIR TO THE LABORATORY DURING 100% EXHAUST BACKUP. DURING 100% EXHAUST BACKUP THE VACUUM PUMP, SNORKEL, AND VENTED CABINET EXHAUST WILL MAINTAIN THEIR SCHEDULED AIRFLOWS AS CONSTANT VOLUME. DURING 100% EXHAUST BACKUP THE LABORATORY WILL REMAIN NEGATIVE.

3. THE 100% EXHAUST BACKUP MODE SHALL MODULATE OUTSIDE AIR DAMPERS (D-4B), RELIEF AIR DAMPER (D-2), AND RETURN AIR DAMPER (D-3). THE CHILLED WATER CONTROL VALVE (V-2) AND/OR HOT WATER CONTROL VALVE (V-1) SHALL MODULATE TO MAINTAIN TEMPERATURE SETPOINT.

F. MINIMUM OUTSIDE AIR CONTROL

1. AIR FLOW MEASURING STATION SHALL SENSE AIR VELOCITY AT MINIMUM OUTSIDE AIR INTAKE. FLOW SIGNAL SHALL BE LINEARIZED AND MULTIPLIED BY APPROPRIATE FACTORS TO PRODUCE A LINEAR SIGNAL WHICH IS PROPORTIONAL TO AIR FLOW IN CUBIC FEET PER MINUTE.

2. IF AIR FLOW THROUGH MINIMUM AIR FLOW MEASUREING STATION FALLS BELOW SETTING, CONTROLLER MODULATES RETURN AIR DAMPER TOWARD CLOSED POSITION, AND OPENS RELIEF AIR DAMPER PROPORTIONSATELY.

G. AIR VOLUME CONTROL

1. STATIC PRESSURE SENSOR, SENSING PRESSURE IN THE SUPPLY AIR DUCT DOWNSTREAM OF THE FAN PER "FAN PRESSURE OPTIMIZATION" CONTROLS, SHALL MODULATE VARIABLE FREQUENCY DRIVE (VFD) ON THE SUPPLY FAN TO MAINTAIN SET STATIC PRESSURE.

2. RETURN FAN VFD SHALL MODULATE SPEED TO TRACK SUPPLY FAN VIA AMS TO MAINTAIN CONSTANT CFM DIFFERENTIAL BETWEEN SUPPLY AND RETURN AIR FANS.

H. FAN PRESSURE OPTIMATION CONTROL

1. THE BUILDING AUTOMATION SYSTEM (BAS) SHALL CONTINUOUSLY MONITOR THE DAMPER POSITION OF ALL VENTILATION FLOW CONTROL VAV TERMINAL UNITS. THE DISCHARGE DUCT STATIC PRESSURE SHALL BE SENSED DIRECTLY AT THE DISCHARGE OF THE AHU. THE SENSOR MUST BE MOUNTED IN A NON-TURBULENT LOCATION.

2. WHEN ANY VAV DAMPER IS MORE THAN 75% (ADJUSTABLE) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET UPWARD BY 0.1 IN W.C. (ADJUSTABLE), AT A FREQUENCY OF 5 MINUTES (ADJUSTABLE), UNTIL NO DAMPER IS MORE THAN 75% (ADJUSTABLE) OPEN OR THE DISCHARGE DUCT STATIC PRESSURE SETPOINT HAS RESET UPWARD TO THE SYSTEM MAXIMUM DUCT STATIC PRESSURE SETPOINT OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MAXIMUM SPEED SETTING. THE BAS SHALL MONITOR ALL CV

3. WHEN ALL VAV DAMPERS ARE LESS THAN 65% (ADJUSTABLE) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD BY 0.1 IN W.C.(ADJUSTABLE), AT A FREQUENCY OF 5 MINUTES (ADJUSTABLE), UNTIL AT LEAST ONE DAMPER IS MORE THAN 65% (ADJUSTABLE) OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM DUCT STATIC PRESSURE SETPOINT OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MINIMUM SPEED SETTING.
DAMPERS TO ENSURE AIRFLOW THROUGH CV BOXES ARE SATISFIED PRIOR TO RESETTING DUCT STATIC PRESSURE SETPOINT DOWNWARD.

4. THE CONTROL BANDS, SETPOINT INCREMENT VALUES, SETPOINT DECREMENT VALUES AND ADJUSTMENT FREQUENCIES SHALL BE ADJUSTED TO MAINTAIN MAXIMUM STATIC PRESSURE OPTIMIZATION WITH STABLE SYSTEM CONTROL AND MAXIMUM OCCUPANT COMFORT.

5. THE BAS SHALL HAVE THE CAPABILITY TO ALLOW THE OPERATOR TO EXCLUDE "PROBLEM" VENTILATION FLOW CONTROL VAV BOXES THAT SHOULD NOT BE CONSIDERED WHEN DETERMINING THE OPTIMIZED SETPOINT.

6. THE BAS SHALL ALSO READ THE STATUS OF THE DISCHARGE DUCT AIR STATIC PRESSURE SENSOR AND DISPLAY THE ACTIVE DISCHARGE DUCT STATIC PRESSURE READING ON THE STATUS SCREEN.

7. THE BAS SHALL HAVE THE ABILITY TO IDENTIFY, AND DISPLAY TO THE USER, THE VAV BOX THAT SERVES THE CRITICAL VAV AIR SYSTEM (THAT IS, THE VENTILATION FLOW CONTROL VAV BOX WITH THE MOST WIDE-OPEN DAMPER). THIS INFORMATION SHALL UPDATE DYNAMICALLY AS THE LOAD IN THE BUILDING CHANGES. DURING THE COMMISSIONING PROCESS, THE CONTROLS CONTRACTOR SHALL DEMONSTRATE THE PERFORMANCE OF FAN PRESSURE OPTIMIZATION

I. HUMIDITY CONTROL (AHU-2 ONLY)

1. WHENEVER RETURN AIR HUMIDITY FALLS BELOW 35% RH, HUMIDIFIER ISOLATION VALVE (V-3) SHALL OPEN. WHEN CONDENSATE TEMPERATURE SENSOR INDICATES SYSTEM HAS WARMED UP, CONTROLLER SHALL MODULATE HUMIDIFIER CONTROL VALVE (V-3) TO MAINTAIN 40% RH (ADJUSTABLE).

2. WHENEVER SUPPLY AIR HUMIDITY EXCEEDS 85% RH, DUCT MOUNTED HIGH LIMIT HUMIDISTAT SHALL OVER-RIDE CONTROLLER TO PREVENT A FURTHER RISE.

3. WHEN CHILLED WATER VALVE IS OPEN, OR WHEN SYSTEM FAN IS STOPPED, HUMIDIFIER ISOLATION VALVE (V-3) SHALL BE FULLY CLOSED, AND HUMIDIFIER SHALL BE INACTIVE.

4. THE HUMIDIFIER SHALL BE INTERLOCKED WITH ASSOCIATED SUPPLY FAN.

J. SMOKE CONTROL

1. DUCT SMOKE DETECTORS ARE FURNISHED UNDER DIVISION 26 BUT ARE INSTALLED BY DIVISION 23. FAN AND SMOKE DAMPER INTERLOCK WIRING ARE UNDER THIS SECTION, POWER AND ALARM WIRING ARE UNDER DIVISION 26.

2. DUCT SMOKE DETECTORS LOCATED IN THE RETURN AND SUPPLY AIRSTREAM SHALL PERFORM THE FOLLOWING IF SMOKE IS SENSED.

   a. NOTIFY FIRE ALARM SYSTEM.

   b. STOP RETURN FAN AND SUPPLY FAN. DAMPER OPERATORS SHALL BE ADJUSTED SUCH THAT CLOSING OF DAMPERS WILL BE DELAYED UNTIL RESPECTIVE FANS ROLL TO NEAR STOP.

   c. CLOSE AHU SMOKE ISOLATION DAMPERS AT FLOORS SERVED BY AHU. (AHU-3 ONLY).

K. SAFETY CONTROLS

1. UPON SIGNAL FROM THE AIR HANDLING UNIT SUPPLY AIR OR RETURN AIR SMOKE DETECTOR, THE SUPPLY FAN AND ALL INTERLOCKED FANS SHALL STOP. ALL SMOKE DAMPERS SHALL CLOSE. OTHER DAMPERS SHALL RETURN TO THEIR NORMAL FAIL SAFE POSITION.

2. DIFFERENTIAL PRESSURE SWITCH ACROSS FILTER BANK SHALL SEND AN ALARM TO THE BAS SYSTEM WHENEVER 1.5 INCH WATER COLUMN IS EXCEEDED.

3. HIGH STATIC LIMIT SHUTS DOWN FAN UPON SENSING OF STATIC PRESSURE IN DISCHARGE PLENUM OF 1" WATER COLUMN ABOVE SUPPLY SYSTEM PRESSURE. FAN STARTED BY MANUAL RESET.

4. FREEZE PROTECTION SENSOR SHALL STOP SUPPLY AND RETURN FANS WHEN IT SENSES THE AIR TEMPERATURE FALLS TO 35°F (ADJUSTABLE) AND BELOW, AND SEND ALARM SIGNAL TO BAS.

5. LOW LIMIT TEMPERATURE SENSOR LOCATED ON THE UPSTREAM SIDE OF THE COOLING COIL SHALL SEND AN ALARM SIGNAL TO THE BAS SYSTEM WHEN TEMPERATURE FALLS BELOW 45°F (ADJUSTABLE).

6. LOW STATIC PRESSURE SAFETY LOCATED IN THE MIXED AIR PLENUM SHALL STOP FAN IF THE PRESSURE FALLS 1" W.C. (ADJUSTABLE) BELOW NORMAL OPERATING PRESSURE. FAN STARTED BY MANUAL RESET.

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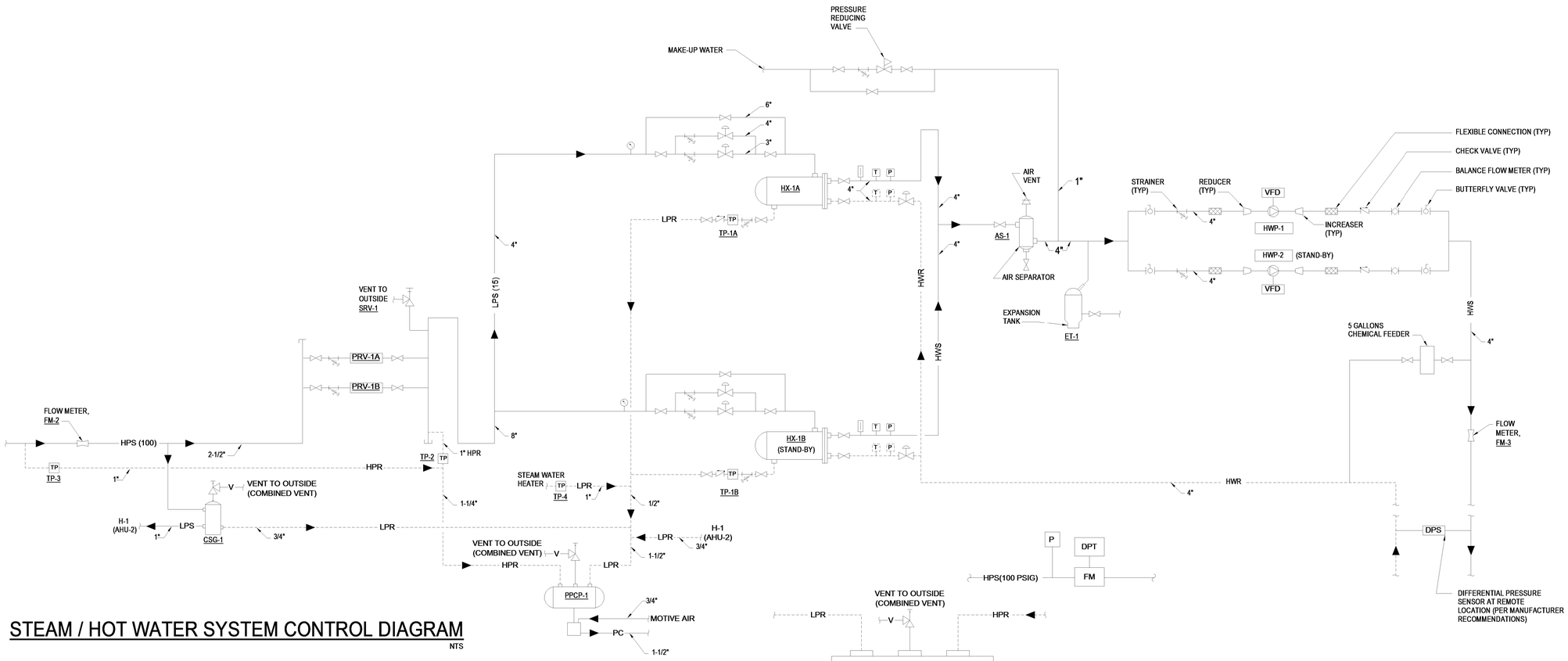
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL CONTROLS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293508 | LATEST REV.

SHEET NO. M-601

12/16/2013 9:03:58 AM



STEAM / HOT WATER SYSTEM CONTROL DIAGRAM

NTS

STEAM / HOT WATER SYSTEM CONTROL SEQUENCE:

1. GENERAL, THE HEATING SYSTEM SHALL CONSIST OF, TWO HEAT EXCHANGERS (ONE AS STAND-BY) AND TWO HOT WATER PUMPS (ONE AS STAND-BY) CIRCULATING HOT WATER TO THE AHUS, TERMINAL BOXES AND UNIT HEATERS.

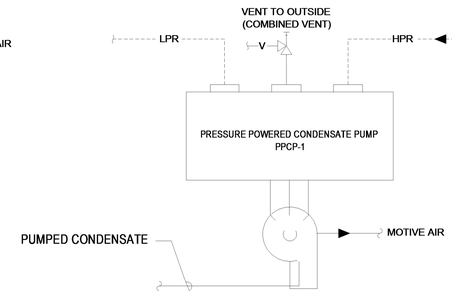
2. HEAT EXCHANGER START/STOP CYCLE: SYSTEM SHALL START AND STOP THROUGH THE BAS. PROVIDE PROGRAM TO SELECT LEAD/LAG HX TO EQUALIZE RUNTIME. OPEN ISOLATION CONTROL VALVE FOR LEAD HX AND START LEAD PUMP, MODULATE 1/3 & 2/3 STEAM VALVES TO MAINTAIN THE SUPPLY WATER TEMPERATURE OF 180°F (ADJ.)

3. START SEQUENCE: INDEXED BY THE BAS SYSTEM. THE HOT WATER PUMP AND HEAT EXCHANGER SHALL OPERATE CONTINUOUSLY.

4. DIFFERENTIAL PRESSURE CONTROL: THE BAS SYSTEM SHALL MODULATE THE VARIABLE SPEED DRIVE TO MAINTAIN 5 PSIG (ADJ.) DIFFERENTIAL PRESSURE. IF DIFFERENTIAL PRESSURE DROPS BELOW SETPOINT FOR 5 MINUTES (ADJ.) AND VFD IS AT 100% SPEED OR ON LACK OF PROOF-OF-FLOW, START STAND-BY PUMP (HWP-2) (SEE BELOW) AND ALARM BAS.

5. STAND-BY HEAT EXCHANGER AND PUMP OPERATION: THROUGH THE BAS IF THE LEAD HEAT EXCHANGER (HX-1A) FAILS TO MAINTAIN THE SYSTEM WITHIN 10°F OF SETPOINT FOR MORE THAN 5 MIN. (ADJ.), THE STAND-BY EXCHANGER (HX-1B) SHALL START AND LEAD HEAT EXCHANGER (HX-1A) SHALL BE DE-ENERGIZED. LEAD AND STAND-BY PUMPS AND HEAT EXCHANGERS SHALL BE ALTERNATED WEEKLY THROUGH THE BAS SYSTEM. PUMPS SHALL BE INTERLOCKED TO PREVENT SIMULTANEOUS OPERATION OF LEAD AND STAND-BY PUMPS. HEAT EXCHANGERS SHALL ALSO BE INTERLOCKED TO PREVENT SIMULTANEOUS OPERATION OF LEAD AND STAND-BY HEAT EXCHANGERS.

6. STAND-BY PUMP (HWP-2) START/STOP SEQUENCE: START PUMP AT 30% SPEED AND RAMP PUMP UP OVER 30 SECONDS UNTIL IT MATCHES THE SPEED OF THE LEAD PUMP (HWP-1). ONCE SPEEDS HAVE MATCHED, OPERATE PUMPS AT THE SAME SPEED WHEN BOTH ARE RUNNING. WHEN PUMP SPEEDS DROP BELOW 60% (ADJ.) FOR MORE THAN 5 MINUTES (ADJ.) WITH BOTH PUMP RUNNING, STOP STAND-BY PUMP.



STEAM CONDENSATE PUMP

NTS

STEAM AND CONDENSATE PUMP SEQUENCE OF CONTROL:

A. STEAM AND CONDENSATE PUMP SYSTEM:

1. DESCRIPTION: SYSTEM CONSISTS OF STEAM AND PRESSURE REDUCING STATIONS (PRV'S) 100# TO 15#, DIFFERENTIAL PRESSURE TRANSMITTERS, PRESSURE POWERED CONDENSATE PUMP.

   a. STEAM PRESSURE REDUCING STATIONS SHALL MODULATE TO MAINTAIN LINE PRESSURE SCHEDULED. PRV'S ARE SIZED FOR 1/3 TO 2/3 CAPACITY RESPECTIVELY. UPON STARTUP, THE 1/3 PRV SHALL OPEN AND MODULATE TO MAINTAIN SETPOINT. AFTER 1/3 PRV IS FULLY OPEN, AND SETPOINT CANNOT BE MAINTAINED, THE 2/3 PRV SHALL OPEN, AND THE 1/3 PRV SHALL CLOSE. THE 2/3 PRV SHALL MODULATE TO MAINTAIN SETPOINT. AFTER THE 2/3 PRV IS FULLY OPEN AND THE SETPOINT CANNOT BE MAINTAINED, THE 1/3 PRV SHALL OPEN AND MODULATE TO MAINTAIN SETPOINT.

2. ALARMS: PRINT DIAGNOSTIC ALARM TO DDC IF SEQUENCE OF OPERATION CANNOT BE ACCOMPLISHED DURING NORMAL SCHEDULED HOURS OF OPERATION. OPERATORS SHALL BE ABLE TO VIEW ALL POINTS OF CONTROL PRIOR TO FAILURE. PROVIDE OTHER DIAGNOSTIC AND MAINTENANCE ALARMS AS NOTED IN SEQUENCES.

ALARM	REPORT	ACTION
CONDENSATE HIGH WATER LEVEL	YES	-
CONDENSATE FAILURE(EACH)	YES	MARK PUMP AS "FAILED"

   a. ON A START SIGNAL TO ANY WATER-MOVING DEVICE, ALL ALARMS MUST BE CLEAR PRIOR TO UNIT START-UP. ALL ALARMS MUST BE AVAILABLE FOR DISPLAY IN THE DDC SYSTEM.

   b. RUN-TIME MAINTENANCE: MAINTAIN FOR EACH WATER HEATER AND PUMP A RECORD OF THE RUN TIME AND NUMBER OF STARTS.

   c. IF THE DDC SYSTEM IS COMMANDING THE WATER HEATERS OR PUMPS OFF DUE TO AN OUT OF TOLERANCE OPERATION POINT, THE DDC SHALL INDICATE THE ALARM THROUGH THE EQUIPMENT STATUS POINT.

   d. PROVIDE HIGH WATER LEVEL ALARM FOR CONDENSATE RECIEVER.

   e. CALCULATE STEAM AND CONDENSATE FLOW IN LBS/HR AND GPM.

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COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	JI	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL CONTROLS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293509 | LATEST REV.

SHEET NO. M-602

12/16/2013 9:04:01 AM

ELECTRIC EWF/EUH DIAGRAM

NTS

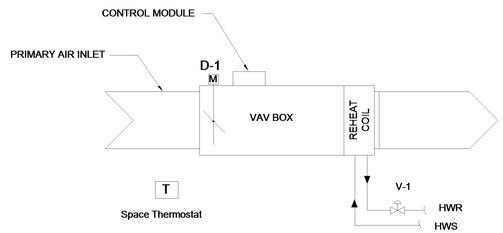
SEQUENCE OF OPERATION:

A. TEMPERATURE CONTROL EWF (NO FAN, INTEGRAL T-STAT):

1. THERMOSTAT SHALL ENERGIZE ELECTRIC HEATING COIL AND CYCLE FAN TO MAINTAIN SETPOINT OF 68°F (ADJUSTABLE).
2. DEENERGIZE ELECTRIC HEATING COIL WHEN THERMOSTAT IS SATISFIED.

B. TEMPERATURE CONTROL EUH (INTEGRAL T-STAT, EUH):

1. UNIT MOUNTED HEAT-OFF SWITCH AND THERMOSTAT CONTROL.
2. HEAT POSITION, THERMOSTAT SHALL ENERGIZE ELECTRIC HEATING COIL TO MAINTAIN SETPOINT OF 65°F (ADJUSTABLE).
3. OFF POSITION, DEENERGIZE ELECTRIC HEATING COIL, FAN OFF.



VARIABLE AIR VOLUME TERMINAL UNITS WITH REHEAT

NTS

SEQUENCE OF OPERATION :

A. GENERAL:

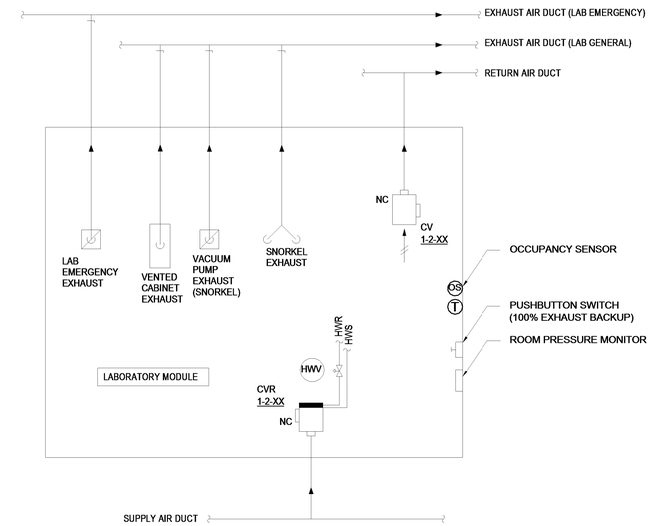
1. VAV TERMINAL UNITS SHALL OPERATE THROUGH DDC CONTROL SYSTEM. SPACE TEMPERATURE SETPOINT SHALL BE 72°F (ADJUSTABLE) FOR LABS, 75°F (ADJUSTABLE) FOR OFFICE/CONFERENCE ROOMS, AND 78°F (ADJUSTABLE) FOR ELECTRICAL ROOMS.

B. OCCUPIED MODE:

1. SPACE THERMOSTAT SHALL MODULATES PRIMARY AIR DAMPER AND (D-1) TO MAINTAIN SPACE TEMPERATURE. UPON CALL FOR HEAT, THE PRIMARY AIR DAMPER SHALL CLOSE TO MINIMUM POSITION. UPON CALL FOR HEAT WITH PRIMARY AIR DAMPER IN MINIMUM POSITION, REHEAT CONTROL VALVE (V-1) SHALL OPEN AND MODULATE IN SEQUENCE TO MAINTAIN SPACE TEMPERATURE SETPOINT. REVERSE SHALL OCCUR UPON CALL FOR COOLING. DO NOT MODULATE DAMPER FOR CVR AIR TERMINAL UNITS, MODULATE REHEAT COIL CONTROL VALVE (V-1) ONLY TO MAINTAIN SPACE TEMPERATURE.

C. UNOCCUPIED MODE:

1. SPACE THERMOSTAT SHALL MODULATE REHEAT CONTROL VALVE (V-1) TO MAINTAIN 70°F SPACE TEMPERATURE (ADJUSTABLE).



LAB GRADE AIR TERMINAL UNIT DIAGRAM

NTS

SEQUENCE OF OPREATION:

A. GENERAL:

1. ALL EQUIPMENT STATED WITHIN THIS SEQUENCE OF CONTROLS SHALL BE CONTROLLED VIA THE DDC SYSTEM.
2. LABORATORY AREAS MUST REMAIN POSITIVELY PRESSURIZED WITH RESPECT TO THE ADJACENT SPACES AT ALL TIMES UNLESS OTHERWISE NOTED ON PLANS OR IN THIS SEQUENCE.
3. ATC CONTRACTOR SHALL PROVIDE DDC ROOM CONTROLLER AND LAB GRADE AIR TERMINAL UNITS (SUPPLY & RETURN). AT THE ATC CONTRACTOR'S DISCRETION, ROOM CONTROLLERS MAY BE FIELD MOUNTED OR FACTORY INSTALLED.
4. THE DDC SYSTEM SHALL TRACK AND REPORT THE RETURN AND SUPPLY AIR VOLUME VIA A SINGLE ROOM CONTROLLER PER LABORATORY ROOM.
5. REFER TO PLANS FOR SUPPLY AND RETURN AIR VOLUME FLOW RATES. THE VACUUM PUMP, SNORKEL, AND VENTED CABINET EXHAUST WILL MAINTAIN THEIR SCHEDULED AIRFLOWS AS CONSTANT VOLUME AT ALL TIMES. THE CONSTANT VOLUME TWO-POSITION SUPPLY AND RETURN LAB GRADE AIR TERMINAL UNITS SHALL MODULATE TO MAINTAIN OCCUPIED AIRFLOW SETPOINTS.
6. THE ACCURACY OF THE AIR FLOWS MUST BE WITHIN 5% AT A GIVEN SETPOINT AT ALL TIMES.
7. THE CONTROLS SHALL BE SETUP SO THAT THE LABORATORY REMAINS POSITIVE (BASED ON SUPPLY/RETURN DIFFERENTIAL CFM) AT ALL TIMES UNLESS OTHERWISE NOTED HEREIN.

B. LABORATORY OPERATION SCHEDULE:

1. THE DDC SYSTEM SHALL INDEX 'OCCUPIED MODE' AND 'UNOCCUPIED MODE' VIA OCCUPANCY SENSORS (OS).
2. THE DDC SYSTEM SHALL INDEX 'OCCUPIED MODE' VIA OCCUPANCY SENSORS (OS). DURING OCCUPIED MODE THE DDC SYSTEM SHALL MODULATE THE SUPPLY AND RETURN LAB GRADE AIR TERMINAL UNITS (1-2-XX CVR & 1-2-XX CV) TO THE MAXIMUM AIRFLOW VALUES AS STATED ON THE PLANS.
3. WHEN INDEXED TO 'UNOCCUPIED MODE', WITH 30 MINUTE DELAY BETWEEN 'OCCUPIED MODE' TO 'UNOCCUPIED MODE', THE DDC SYSTEM SHALL CONTROL THE SUPPLY AND RETURN LAB GRADE AIR TERMINAL UNITS (1-2-XX CVR & 1-2-XX CV) TO THE MINIMUM AIRFLOW VALUES AS STATES ON THE PLANS.

C. LABORATORY MODULE AIR BALANCE:

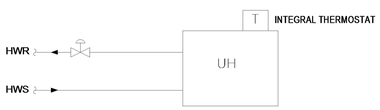
1. THE DDC SYSTEM SHALL MONITOR EXHAUST AIRFLOW FROM ALL CONSTANT VOLUME EXHAUST AIR DEVICES (VACUUM PUMP, SNORKEL, AND VENTED CABINET EXHAUST) WITHIN THE LABORATORY MODULE AND MODULATE THE SUPPLY LAB GRADE AIR TERMINAL UNITS TO MAINTAIN THE SET DIFFERENTIAL AIRFLOW AT ALL TIMES.

D. TEMPERATURE CONTROL:

1. DDC SYSTEM SHALL MODULATE HOT WATER CONTROL VALVE (HWV) TO MAINTAIN ROOM TEMPERATURE SETPOINT 70 DEGREES F (ADJUSTABLE) AS SENSED BY ROOM TEMPERATURE SENSOR (T).

E. LABORATORY 100% EXHAUST BACKUP:

1. LABORATORY 100% EXHAUST BACKUP OR PURGE MODE WILL BE INDEXED VIA A PUSHBUTTON SWITCH LOCATED WITHIN THE LABORATORY SPACE.
2. THE DDC SYSTEM SHALL MODULATE THE SUPPLY LAB GRADE AIR TERMINAL UNIT TO MAINTAIN MAKEUP AIR TO THE LABORATORY DURING 100% EXHAUST BACKUP. DURING 100% EXHAUST BACKUP THE VACUUM PUMP, SNORKEL, AND VENTED CABINET EXHAUST WILL MAINTAIN THEIR SCHEDULED AIRFLOWS AS CONSTANT VOLUME. DURING 100% EXHAUST BACKUP THE LABORATORY WILL REMAIN NEGATIVE.



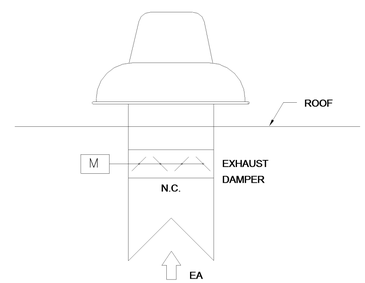
UH DIAGRAM

NTS

HOT WATER UNIT HEATER SEQUENCE:

A. TEMPERATURE CONTROL UNIT HEATER:

1. THERMOSTAT SHALL SHALL OPEN CONTROL VALVE AND CYCLE FAN TO MAINTAIN SETPOINT OF 60 DEGREES FAHRENHEIT (ADJUSTABLE).
2. VALVE CLOSES AND FAN STOPS WHEN THERMOSTAT IS SATISFIED.



EXHAUST FAN DIAGRAM

NTS

SEQUENCE OF OPERATION:

A. GENERAL: CONSTANT VOLUME ROOF MOUNTED EXHAUST FAN WITH MOTORIZED BACKDRAFT DAMPER.

B. OPERATION: EXHAUST FANS START AND STOP VIA BUILDING AUTOMATION SYSTEM (BAS). UPON INITIATION, MOTORIZED DAMPER SHALL OPEN AND FAN SHALL BE ACTIVATED. PROVE DAMPER IS OPEN WITH END SWITCH PRIOR TO FAN STARTING. SEQUENCE REVERSES UPON SHUTDOWN.

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B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL CONTROLS

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293510 | LATEST REV.

SHEET NO.: M-603

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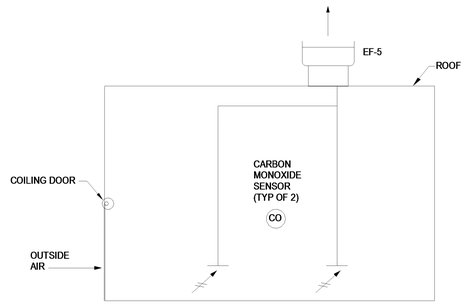
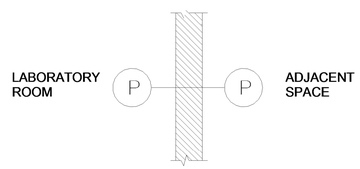


TRUCK BAY EXHAUST FAN DIAGRAM (EF-5)

NTS

SEQUENCE OF OPREATION:

1. THE DDC SYSTEM SHALL ENERGIZE AND DE-ENERGIZE THE EXHAUST FAN (EF-5).
2. THE EXHAUST FAN SHALL BE ENERGIZED WHEN ANY OF THE CARBON MONOXIDE SENSORS IN THE TRUCK BAY SENSE 25 PARTS PER MILLION OR GREATER OF CARBON MONOXIDE (CO).
3. UPON CO SENSOR ACTIVATION, AN AUDIBLE ALARM READILY DISTINGUISHABLE FROM THE BUILDING FIRE ALARM SOUNDS ACCOMPANIED BY THE OPERATION OF BLUE STROBE LIGHTS TO EVACUATE THE TRUCK BAY. CO SENSOR ACTIVATION SHALL ENERGIZE EXHAUST FAN AND EXHAUST FAN SHALL REMAIN ON UNTIL MANUALLY RESET BY EMERGENCY PERSONNEL. CO GAS SYSTEM SHALL BE CONNECTED TO THE BUILDING FIRE ALARM SYSTEM SUCH THAT THE STATUS CAN BE CONSTANTLY MONITORED BY THE EMERGENCY DISPATCH OFFICE (EDO). COORDINATE WITH FA SERIES DWG FA-100B.
4. DDC SYSTEM SHALL ALARM UPON FAN FAILURE AS SENSED BY THE CURRENT TRANSFORMER RELAY (CTR).
5. CARBON MONOXIDE SENSORS SHALL HAVE WIRE GUARD AND SHALL BE MOUNTED PER MANUFACTURER'S RECOMMENDED HEIGHT. CO SENSORS SHALL BE PROVIDED AND INSTALLED BY THE ATC CONTRACTOR TO MEET SPACE COVERAGE REQUIREMENTS. A MINIMUM OF 2 CO SENSORS SHALL BE PROVIDED.



ROOM DIFFERENTIAL PRESSURE MONITOR

NTS

SEQUENCE OF OPERATION:

A. GENERAL

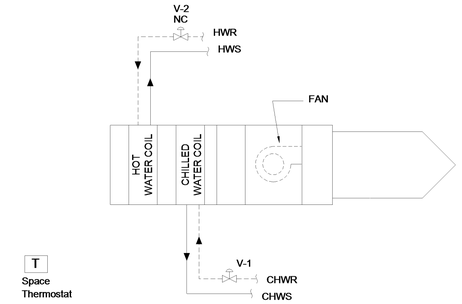
1. A ROOM PRESSURE CONTROL SYSTEM SHALL BE FURNISHED AND INSTALLED TO MONITOR ROOM PRESSURE.
2. ALL COMPONENTS OF THE ROOM PRESSURE CONTROLLER ARE BASED ON TSI INCORPORATED MODEL 8630 PRESSURA ROOM PRESSURE MONITOR.

B. PRESSURE SENSOR

1. THE PRESSURE SENSOR SHALL ACCURATELY MEASURE ROOM PRESSURE FROM -0.20000 TO +0.20000 INCHES H2O. THE SENSOR SHALL BE CAPABLE OF MEASURING DOWN TO 0.00015 INCHES H2O. THE SENSOR SHALL BE BI-DIRECTIONAL TO DETERMINE THE PROPER DIRECTION OF PRESSURE. UNI-DIRECTIONAL SENSORS ARE NOT ACCEPTABLE.

C. SEQUENCE OF OPERATION

1. THE ROOM PRESSURE SENSOR SHALL MEASURE THE AIR VELOCITY BETWEEN THE CONTROLED SPACE AND THE REFERENCED SPACE. THE MEASURMENT SHALL BE MADE USING A THERMAL ANEMOMETER WITH TWO VELOCITY SENSING ELEMENTS MOUNTED IN-LINE. THE MEASURED VELOCITY BETWEEN THE CONTROLLED SPACE AND REFERENCE SPACE IS THEN CONVERTED TO THE PRESSURE DIFFERENTIAL AND DISPLAYED ON FACE OF MONITOR.
2. A GREEN LIGHT ON THE ROOM PRESSURE CONTROLLER SHALL INDICATE NORMAL OR SAFE OPERATING PRESSURE.
3. AN AUDIBLE AND VISUAL (RED LIGHT) ALARM SHALL BE ACTVATED WHENEVER THE MEASURED ROOM PRESSURE FALLS BELOW THE PROGRAMMABLE LOW ALARM SET POINT OR RISES ABOVE THE PROGRAMMABLE HIGH ALARM SET POINT. THE ALARM SHALL BE TURN OFF WHEN THE MEASURED ROOM PRESSURE RISES 0.0001 INCHES H2O ABOVE THE LOW ALARM SET POINT OR FALLS 0.0001 INCHES H2O BELOW THE HIGH ALARM SET POINT.



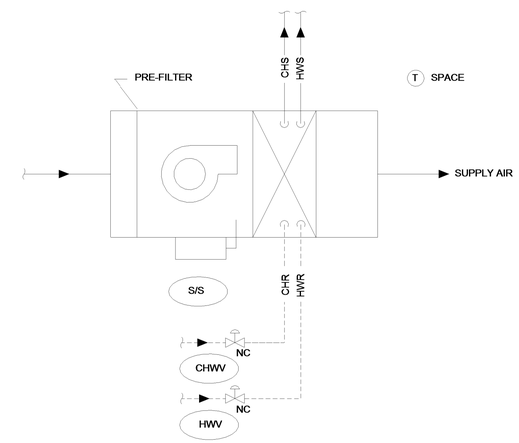
FAN COIL UNIT CONTROL DIAGRAM

NTS

SEQUENCE OF OPERATION:

A. GENERAL:

1. ON SPACE TEMPERATURE ABOVE 76F, THE FAN COIL UNIT SHALL BE ENABLED.
2. FAN COIL UNIT SHALL START AND THE CHILLED WATER VALVE (V-1) SHALL MODULATE TO MAINTAIN SETPOINT.
3. ON A CALL FOR HEATING, HOT WATER VALVE (V-2) SHALL MODULATE TO MAINTAIN SETPOINT.



BLOWER COIL UNIT CONTROL SEQUENCE

NTS

SEQUENCE OF OPERATION:

A. GENERAL:

1. BLOWER COIL UNIT SHALL OPERATE THROUGH FACTORY CONTROL SYSTEM. SPACE TEMPERATURE SETPOINT SHALL BE AS FOLLOWS.

B. SEQUENCE:

1. COOLING (TRUCK BAY)
   a. ON A CALL FOR COOLING, CHWV SHALL MODULATE OPEN TO MAINTAIN (T) SETTING OF 78° F (ADJUSTABLE).
   b. WHEN (T) HAS BEEN SATISFIED, CHWV SHALL CLOSE.
2. HEATING (TRUCK BAY)
   a. ON A CALL FOR HEATING, HWV SHALL MODULATE OPEN TO MAINTAIN (T) SETTING OF 65° F (ADJUSTABLE).
   b. WHEN (T) HAS BEEN SATISFIED, HWV SHALL CLOSE.

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DRAWING TITLE: MECHANICAL CONTROLS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293511 | LATEST REV.

SHEET NO. M-604

12/16/2013 9:04:07 AM

AIR HANDLING UNITS

| INPUT/OUTPUT SUMMARY | INPUTS | | |

POINT LIST

SYSTEM	DESCRIPTION	TYPE			ALARM				TREND	NOTES
		(B)INARY (A)NALOG	(I)NPUT (O)UTPUT (D)ATA		RUNTIME TOTAL/ MAINTENANCE	VALUE CHANGE TYPE				
AIR TERM. UNIT	POINT DESCRIPTION			ENG UNIT	COS	HI	LO		TREND LOG DATA	
VAV	CFM FLOW	A	I	CFM						
VAV	DAMPER CONTROL	A	O	%OPN						
VAV	HEATING VALVE	B	O	ON						
VAV	SUPPLY AIR TEMPERATURE	A	I	DEG F					X	
VAV	ZONE SPACE TEMPERATURE	A	I	DEG F		X	X		X	
VAV	CFM FLOW SETPOINT (MONITOR ONLY)	A	D	CFM						
VAV	SPACE TEMP HEATING SETPOINT OCC	A	D	DEG F						
VAV	SPACE TEMP HEATING SETPOINT UN-O	A	D	DEG F						
VAV	SPACE TEMP COOLING SETPOINT OCC	A	D	DEG F						
VAV	SPACE TEMP COOLING SETPOINT UN-O	A	D	DEG F						

POINT LIST

SYSTEM	DESCRIPTION	TYPE			ALARM				TREND	NOTES
		(B)INARY (A)NALOG	(I)NPUT (O)UTPUT (D)ATA		RUNTIME TOTAL/ MAINTENANCE	VALUE CHANGE TYPE				
EXH. FANS	POINT DESCRIPTION			ENG UNIT	COS	HI	LO		TREND LOG DATA	
EXFANS	EF START/STOP include damper interlock	B	O	ON/OFF					X	
EXFANS	EF STATUS	B	I	ON/OFF					X	
EXFANS	EF DAMPER POSITION	B	I	ON/OFF					X	
EXFANS	EF DAMPER CONTROL	B	O	ON/OFF					X	
EXFANS	EF ALARM	B	I	ALARM	X				X	

POINT LIST

SYSTEM	DESCRIPTION	TYPE			ALARM				TREND	NOTES
		(B)INARY (A)NALOG	(I)NPUT (O)UTPUT (D)ATA		RUNTIME TOTAL/ MAINTENANCE	VALUE CHANGE TYPE				
SYSTEM	POINT DESCRIPTION			ENG UNIT	COS	HI	LO		TREND LOG DATA	NOTES
MISC	ROOM PRESSURE MONITOR PER/ROOM	A	I	IN/WTR						
MISC	ROOM PRESSURE MONITOR +/- PER/ROOM	B	I	POS/NEG						
MISC	ROOM PRESSURE MONITOR ALARM PER/ROOM	B	I	ALARM						

POINT LIST

INPUT/OUTPUT SUMMARY

System, Apparatus, or Area Point Description - HOT WATER SYSTEM	INPUTS: ANALOG MEASURED: Temperature	Pressure	KW	GPM/GPH	Diff. Pressure	Flow	VFD Speed	Steam Pressure	Steam Flow (Instantaneous)	Steam Flow (Cumulus)	Humidity	Lb/Hr	INPUTS: BINARY: water Status	Meter	Hi/State Switch	Low Alarm	End Switch	VFD Alarm	OUTPUTS: DIGITAL: Off-On	Off-Hi-Lo	Open-Close	Strobe/horn	Stages	OUTPUTS: ANALOG: Valve Control	Set Point Adj	Vari Drive Control	SYSTEM FEATURES: ALARMS: High Temperature	Low Temperature	Hi Binary	Low Binary	Proof Status		GENERAL: Alarm Instruct	Night Set-back	DDC Control	Color Graphic	Supplementary Notes
Outside Air	X		X																															X		X		X	
Heat Exchanger 1&2 Steam Side 1/3 2/3 Valve																									X									X		X		X	
Heat Exchangers 1A & 1B	X							X																				X	X					X		X		X	
Heat Exchangers 1A & 1B Isolation valve																		X				X												X		X		X	
Bypass valve																		X				X												X		X		X	
Condensate Recovery Pumps						X		X							X						X					X			X	X		X		X		X		X	
Drip Pan														X																			X						
Hot Water Pumps 1 & 2							X		X							X				X	X						X			X	X		X						VFD

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SHEET NO. M-606

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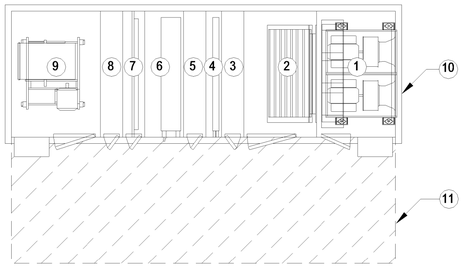
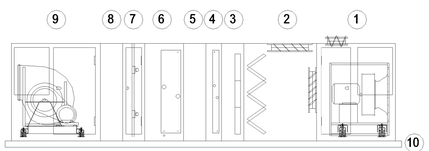


PLAN VIEW



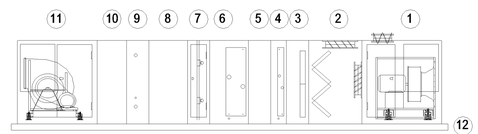
ELEVATION VIEW

1. FAN SECTION
2. AIR MIXING SECTION
3. FILTER SECTION
4. COIL SECTION
5. ACCESS SECTION
6. COIL SECTION
7. UV SECTION
8. ACCESS SECTION
9. FAN SECTION
10. 6" CONCRETE PAD
11. CLEARANCE / MAINTENANCE

M701 / 1 **DETAILS OF AHU-1**

NOT TO SCALE

PLAN VIEW



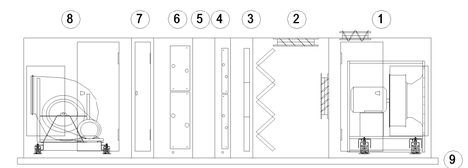
ELEVATION VIEW

1. FAN SECTION
2. AIR MIXING SECTION
3. FILTER SECTION
4. COIL SECTION
5. ACCESS SECTION
6. COIL SECTION
7. UV SECTION
8. ACCESS SECTION
9. HUMIDIFICATION SECTION
10. ACCESS SECTION
11. FAN SECTION
12. 6" CONCRETE PAD
13. CLEARANCE / MAINTENANCE

M701 / 2 **DETAILS OF AHU-2**

NOT TO SCALE

PLAN VIEW



ELEVATION VIEW

1. FAN SECTION
2. AIR MIXING SECTION
3. FILTER SECTION
4. COIL SECTION
5. ACCESS SECTION
6. COIL SECTION
7. UV SECTION
8. FAN SECTION
9. 6" CONCRETE PAD
10. CLEARANCE / MAINTENANCE

M701 / 3 **DETAILS OF AHU-3**

NOT TO SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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LANGLEY RESEARCH CENTER

ISSUE DATE
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APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

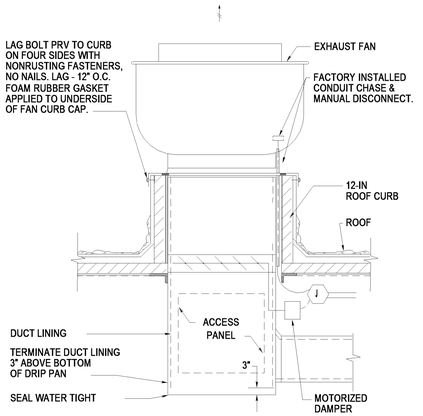
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293514 | LATEST REV.

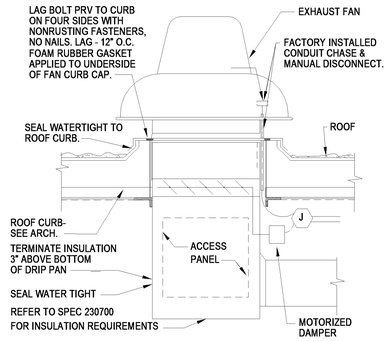
SHEET NO. M-701

12/16/2013 9:04:13 AM



M702 1 ROOF MOUNTED UP-BLAST FAN INSTALLATION DETAIL

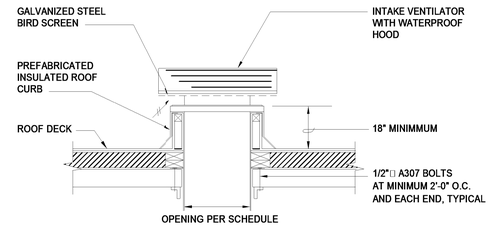
NOT TO SCALE



NOTE: PROVIDE FACTORY MOUNTED DISCONNECT SWITCH UNDER HOOD FOR LOCAL DISCONNECT. INSTALLATION & WIRING FROM SWITCH TO MOTOR BY DIVISION 16.

M702 2 POWER ROOF VENTILATOR DETAIL

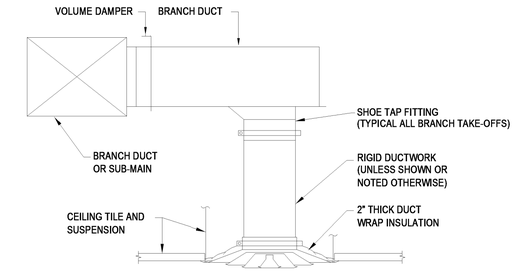
NOT TO SCALE



NOTE: CURB AND ANCHORAGE SHALL MEET SPECIFIED WIND LOAD CRITERIA INDICATED ON STRUCTURAL DRAWINGS.

M702 3 GRAVITY INTAKE VENTILATOR

NOT TO SCALE



SECTION

M702 4 CEILING DIFFUSER AND REGISTER CONNECTION

NOT TO SCALE

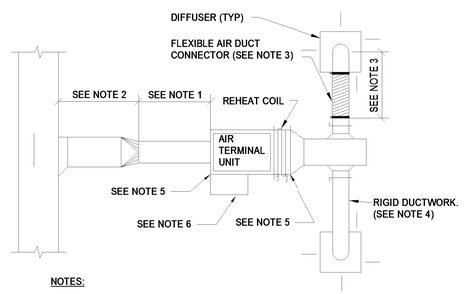
DUCT PRESSURE CLASS TABLE							
DUCT INVOLVED	POSITIVE (P) OR NEGATIVE (N) PRESSURE	MINIMUM PRESSURE CLASS W.G. IN.	DUCTWORK				REMARKS
			ROUND / OVAL		RECTANGLE		
			DUCT SEAL CLASS	DUCT LEAK CLASS	DUCT SEAL CLASS	DUCT LEAK CLASS	
FROM OUTSIDE AIR LOUVER TO AHU	N	2	A	6	A	8	1,4
FROM AHU TO TERMINAL BOXES	P	6	A	3	A	6	1,2
FROM TERMINAL BOXES TO ROOM OUTLETS	P	2	A	6	A	8	1,3
FROM CEILING REGISTER TO RETURN FAN	N	2	A	3	A	6	1,5
FROM RETURN FAN TO AHU	P	1	A	6	A	6	1,11
FROM CEILING REGISTER TO EXHAUST FAN	N	2	A	6	A	8	1,6
FROM EXHAUST FAN TO LOUVER	P	2	A	6	A	8	1,10
FROM BLOWER COIL UNIT TO SUPPLY GRILLE	P	1	A	6	A	12	1,8
FROM BLOWER COIL UNIT TO RETURN GRILLE	N	1	A	6	A	12	1,9

NOTES:

1. TEST IN ACCORDANCE WITH SPEC SECTION 23 05 93, "HVAC TESTING, ADJUSTING, AND BALANCING FOR HVAC"
2. INCLUDES DUCTWORK FROM FAN DISCHARGE TO UPSTREAM SIDE OF AIR TERMINAL UNITS.
3. INCLUDES DUCTWORK DOWNSTREAM OF AIR TERMINAL UNITS ONLY.
4. INCLUDES LOUVER PLENUM AND DUCTWORK TO AHU OUTDOOR AIR INTAKE CONNECTION.
5. INCLUDES DUCTWORK FROM FURTHEST REGISTER/GRILLE CONNECTION TO AHU RETURN AIR CONNECTION.
6. INCLUDES DUCTWORK FROM FURTHEST REGISTER/GRILLE CONNECTION TO EXHAUST FAN THROAT.
7. INCLUDES DUCTWORK DOWNSTREAM OF BLOWER COIL UNITS.
8. INCLUDES DUCTWORK UPSTREAM OF BLOWER COIL UNITS.
9. INCLUDES DUCTWORK FROM EXHAUST FAN DISCHARGE TO OUTDOOR EXHAUST PLENUM/LOUVER CONNECTION.
10. INCLUDES DUCTWORK FROM RETURN FAN DISCHARGE TO AHU.

M702 5 DUCT CONSTRUCTION AND LEAKAGE CLASS TABLE

NOT TO SCALE

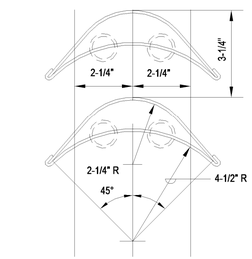


NOTES:

1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET.
2. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET. FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100'.
3. FLEXIBLE AIR DUCT CONNECTORS, ONLY WHEN SHOWN OR NOTED ON PLANS, USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'-0". USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.
4. RIGID DUCTWORK, UNLESS SHOWN OR NOTED OTHERWISE.
5. COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE INSULATION WITH VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.
6. PROVIDE MINIMUM OF 24" FOR PANEL ACCESS CLEARANCE AT AIR TERMINAL UNIT CONTROL PANEL.

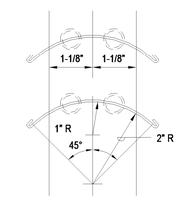
702 6 AIR TERMINAL UNIT DETAIL

NOT TO SCALE



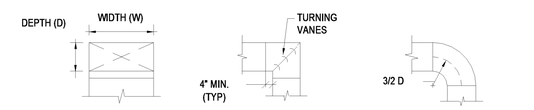
LARGE DOUBLE VANE ELBOW

USE FOR ELBOWS 36" OR WIDER AND ANY DEPTH



SMALL SINGLE VANE ELBOW

USE FOR ELBOWS UP TO 36" IN WIDTH AND/OR DEPTH



FRONT VIEW | MITERED ELBOW | SMOOTH RADIUS ELBOW

NOTES:

1 ALL SQUARE OR RECTANGULAR ELBOWS SHALL HAVE ONE OF THE TWO TYPES OF TURNING VANES SHOWN ABOVE.

2 VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

3 ALL SQUARE OR RECTANGULAR ELBOWS SHOWN ON PLANS FOR EXHAUST OR RETURN DUCT MAY BE MADE RADIUS ELBOWS PROVIDED SPACE PERMITS RADIUS INSTALLATION.

4 ALL SQUARE OR RECTANGULAR ELBOWS SHOWN ON PLANS FOR SUPPLY DUCT MAY BE MADE RADIUS ELBOWS PROVIDED SPACE PERMITS RADIUS INSTALLATION AND THERE IS NO OUTLET OR TAKE-OFF WITHIN 5D ON THE DOWNSTREAM SIDE OF THE ELBOW.

M702 7 RECTANGULAR ELBOWS

NOT TO SCALE

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	JI	
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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE √

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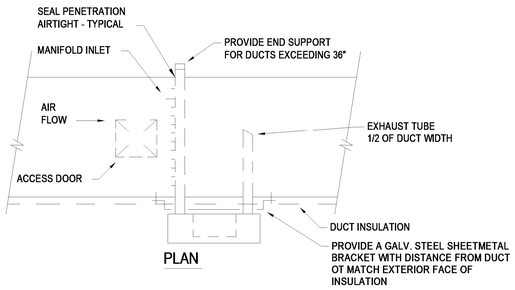
DRAWING TITLE: MECHANICAL DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293515 | LATEST REV.

SHEET NO. M-702

12/16/2013 9:04:17 AM



PLAN

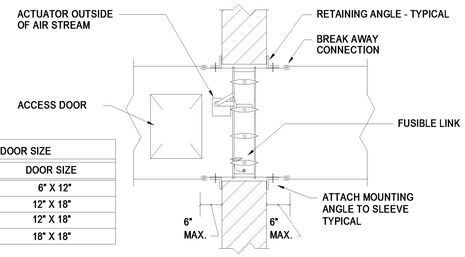
NOTES:

1. INSTALL DUCT SMOKE DETECTORS IN ACCORDANCE WITH DETECTOR MANUFACTURER'S INSTALLATION INSTRUCTIONS, AND REQUIREMENTS INDICATED ABOVE. WHERE REQUIREMENTS ARE IN CONFLICT, THE MORE STRINGENT WILL GOVERN.

2. PROVIDE DIFFERENTIAL PRESSURE TESTING OF EACH SMOKE DETECTOR - INDICATE COMPLIANCE WITH MANUFACTURERS RECOMMENDED DIFFERENTIAL PRESSURE.

M703 1 DUCT SMOKE DETECTOR

NOT TO SCALE



F.D. ACCESS DOOR SIZE	
DUCT WIDTH	DOOR SIZE
6" THRU 18"	6" X 12"
19" THRU 24"	12" X 18"
25" THRU 36"	12" X 18"
37" AND UP	18" X 18"

NOTES:

1. INSTALL FIRE/SMOKE DAMPERS IN ACCORDANCE WITH DAMPER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND REQUIREMENTS INDICATED ABOVE. WHERE REQUIREMENTS ARE IN CONFLICT, THE MORE STRINGENT WILL GOVERN.

2. APPLY DUCT INSULATION OVER RETAINING ANGLES ONLY AFTER FINAL INSPECTION.

3. PROVIDE NUMBER OF ACCESS DOORS TO FACILITATE REMOVAL OF ALL FUSIBLE LINK ELEMENTS.

4. FIRE/SMOKE DAMPERS AND RESPECTIVE ACTUATORS SHALL BE U.L. TESTED AND LABELED AS AN ASSEMBLY.

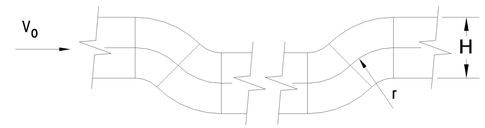
5. RUN CAULKING BEAD ALONG ANGLE AT WALL AND SLEEVE AT WALL TO PREVENT SMOKE MIGRATION.

6. WALL THICKNESS VARIES, SEE ARCHITECTURE PLANS.

7. PROVIDE CLEARANCE BETWEEN DAMPER SLEEVE AND OPENING AT A MINIMUM OF 1/8" PER FOOT OF HEIGTH (OR WIDTH).

M703 2 COMBINATION SMOKE/FIRE DAMPER

NOT TO SCALE

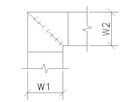


NOTES:

1. r/H EQUALS A MINIMUM OF 1.5
2. 45° SMOOTH RADIUS ELBOWS

M703 3 DUCTWORK OFFSET

NOT TO SCALE



NOTE:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.

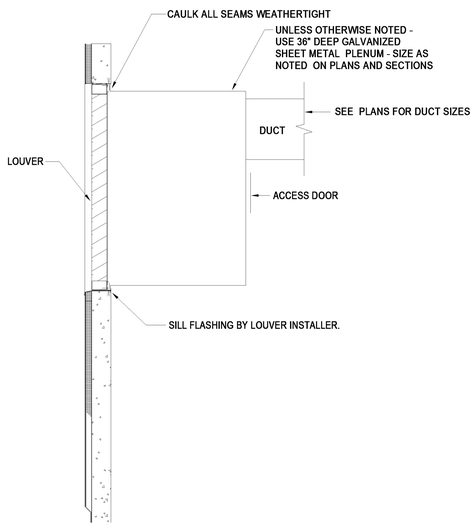
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.

3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" [50mm] RADIUS, 1 1/2" [40mm] MAXIMUM SPACE BETWEEN VANES AND A 3/4" [20mm] TRAILING EDGE.

4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" [500mm] VANES SHALL BE DOUBLE VANE TYPE.

M703 4 DUCTWORK SQUARE VANE ELBOWS

NOT TO SCALE

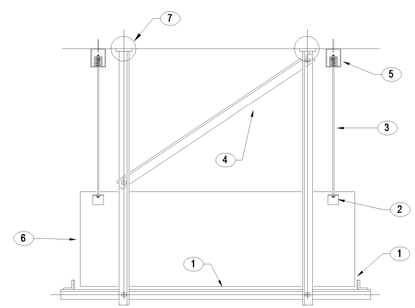


SECTION

NOTES:
1. FOR LOUVER WITH BLANKOFF PANELS ONLY PROVIDE INSTALLATION SIMILAR TO ABOVE - SEAL ALL SEAMS WEATHERTIGHT.

M703 5 LOUVER CONNECTION

NOT TO SCALE



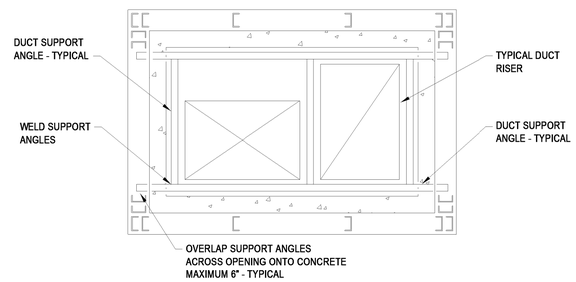
NOTE:
VIBRATION ISOLATION IS REQUIRED FOR ALL ROTATING EQUIPMENT.

KEY NOTES:

1. PROVIDE GAP FOR NORMAL VIBRATION. THE GAP SHALL BE LARGE ENOUGH SO THAT SUSPENDED EQUIPMENT DOES NOT TOUCH THE SUPPORTS UNDER NORMAL OPERATION.
2. LOCK NUT.
3. HANGER ROD.
4. DIAGONAL BRACING. TYPICAL FOUR SIDES.
5. VIBRATION ISOLATOR.
6. EQUIPMENT TO BE SUSPENDED.
7. REFER TO DETAIL TITLED "CONNECTION TO CONCRETE STRUCTURE".

M703 6 SUSPENDED EQUIPMENT WITH VIBRATION MOUNT

NOT TO SCALE



PLAN

NOTES:
VERIFY WITH PLAN SHEETS FOR EXACT DUCT CONFIGURATION IN EACH SHEET.

M703 7 DUCT RISER SUPPORT IN SHAFT

NOT TO SCALE

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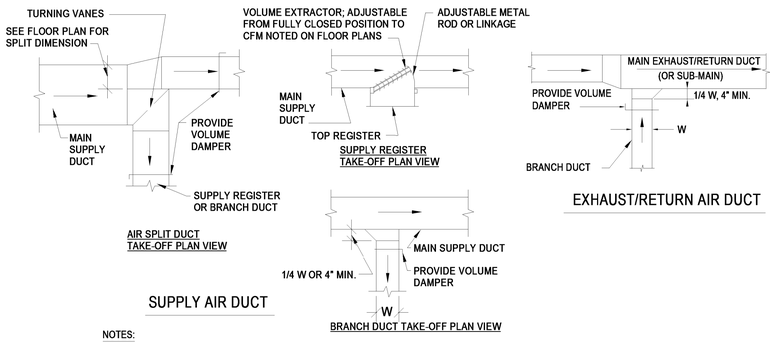
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293516 | LATEST REV.

SHEET NO. M-703

12/16/2013 9:04:20 AM

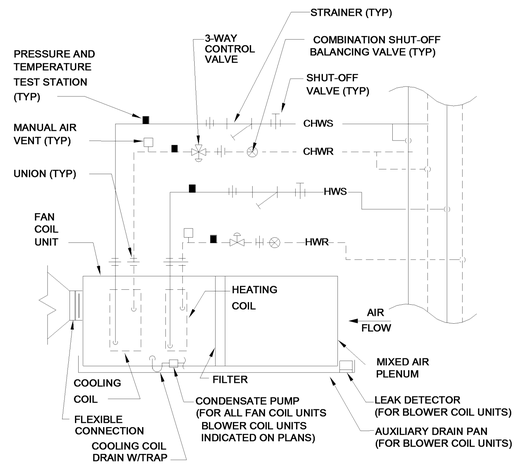


NOTES:

1. THE SUPPLY REGISTER TAKE-OFF MAY BE USED FOR UP UP TO 25% OF THE MAIN DUCT CFM. THE BRANCH DUCT TAKE-OFF MAY BE USED FOR UP TO 15% OF THE MAIN DUCT CFM ANYTIME AND UP TO 40% WHEN THE MAIN DUCT VELOCITY IS 1000 FPM OR LESS. THE AIR SPLIT DUCT TAKE-OFF SHALL BE USED IN ALL OTHER CASES AND MAY BE USED AT ANYTIME.
2. PROVIDE MANUAL DAMPER IN EACH BRANCH DUCT AS INDICATED ABOVE AND AT OTHER LOCATIONS ON FLOOR PLANS.

M704 1 BRANCH DUCT CONNECTIONS

NOT TO SCALE

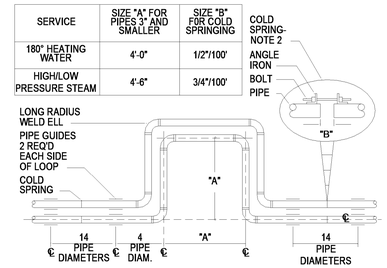


NOTE: MAKE CHW & HW CONNECTION TO SIDE OR BOTTOM OF MAINS. TOP CONNECTION NOT ALLOWED.

M704 2 FAN COIL / BLOWER COIL UNIT PIPING DETAIL

NOT TO SCALE

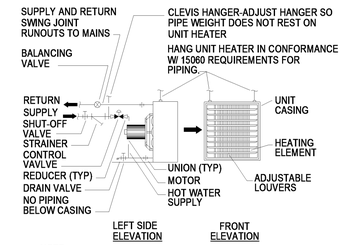
SERVICE	SIZE "A" FOR PIPES 3" AND SMALLER	SIZE "B" FOR COLD SPRINGING
180° HEATING WATER	4'-0"	1/2"/100'
HIGH/LOW PRESSURE STEAM	4'-6"	3/4"/100'



NOTE:
1. ALL EXPANSION LOOPS SHALL BE AS STATED IN SCHEDULE ABOVE UNLESS OTHERWISE SHOWN ON PLAN.
2. INSTALL ALL PIPE, LEAVING SPACE AT COLD SPRING LOCATION.

M704 3 HEATING PIPING EXPANSION LOOP DETAIL

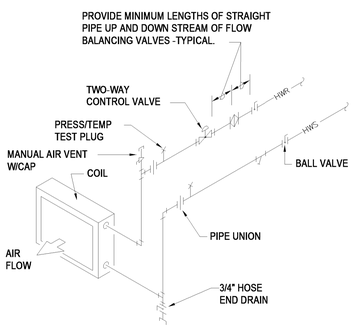
NOT TO SCALE



NOTE:
1. AIR VENTS REQUIRED ON UP-FED UNITS ONLY.
2. PROVIDE CLEARANCE FROM OBSTRUCTIONS (WALL, ECT.) TO ALLOW FOR REMOVAL OF MOTOR WITH UNIT HEATER IN PLACE.

M704 4 HORIZONTAL HOT WATER UNIT HEATER DETAIL

NOT TO SCALE

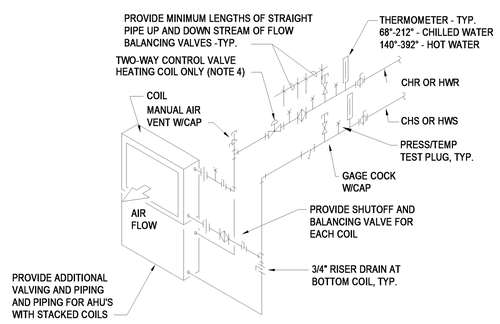


NOTES:

1. PROVIDE FOR ALL AIR TERMINAL VALVES RE-HEAT COILS.
2. INSTALL PIPING TO ALLOW EQUIPMENT REMOVAL WITH A MINIMUM DISRUPTION OF PIPING.

M704 5 REHEAT COIL PIPING DIAGRAM

NOT TO SCALE

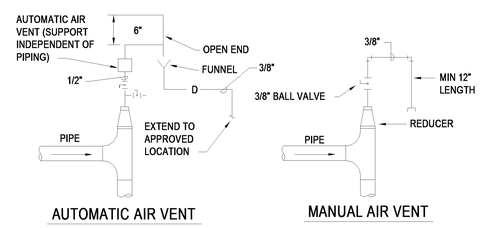


NOTES:

1. INSTALL PIPING TO ALLOW REMOVAL OF COIL FROM UNIT WITH MINIMUM DISRUPTION OF PIPING.
2. PIPE SUPPLY/RETURN IN COUNTERFLOW CONFIGURATION TO AIRFLOW.
3. PROVIDE FOR EACH AHU CHILLED WATER COIL AND HOT WATER COIL. INDICATED AS NON - VERTICAL SPLIT CONFIGURATION.
3. PROVIDE 3-WAY VALVE FOR COOLING COIL. PROVIDE 2-WAY CONTROL VALVE FOR HEATING COIL.

M704 6 HYDRONIC COIL W/ 2-WAY VALVE

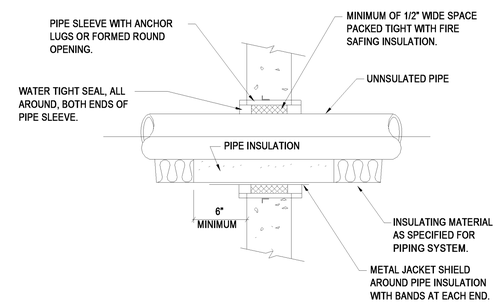
NOT TO SCALE



NOTE:
FOR AIR VALVE REHEAT COIL CONNECTIONS TERMINATE DRAIN A MINIMUM OF 12" ABOVE CEILING FOR MAINTENANCE ACCESS.

M704 7 AIR VENT DETAIL

NOT TO SCALE



M704 8 RATED WALL PENETRATION

NOT TO SCALE

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COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037533
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

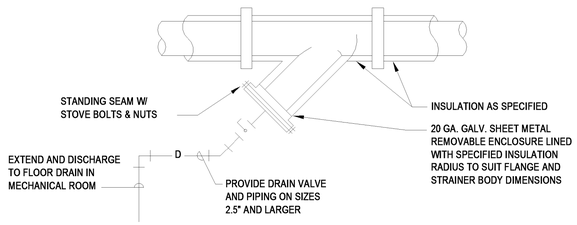
DRAWING TITLE: MECHANICAL DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293517 | LATEST REV.

SHEET NO. M-704

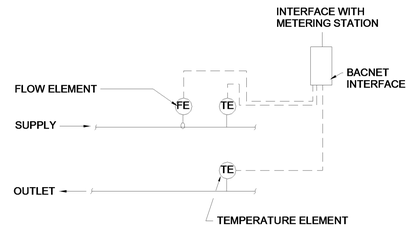
12/16/2013 9:04:24 AM

STRAINER BODY SIZE (IN)	DRAIN SIZE (IN)
2-1/2	3/4
3	3/4
4	3/4
6	1
8	1-1/4
10	1-1/2
12	2
14	2



M705 1 STRAINER INSTALLATION DIAGRAM

NOT TO SCALE

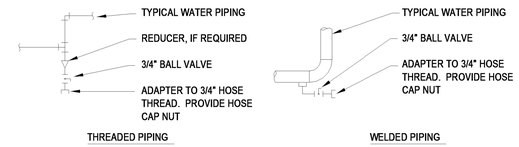


NOTE:

1. MAINTAIN UPSTREAM AND DOWN STREAM DISTANCES RECOMMENDED BY METER MANUFACTURES

M705 2 WATER FLOW MEASURING STATION (WITH BTU METER)

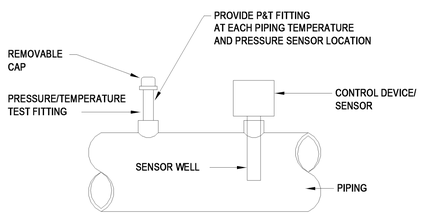
NOT TO SCALE



NOTE:
FOR AIR VALVE REHEAT COIL CONNECTIONS TERMINATE DRAIN A MINIMUM OF 12" ABOVE CEILING FOR MAINTENANCE ACCESS.

M705 3 DRAIN VALVE CONNECTION

NOT TO SCALE

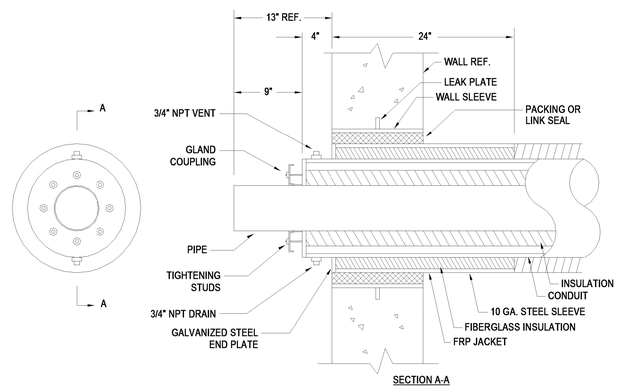


SIDE ELEVATION

NOTES: 1. PROVIDE P&T FITTINGS AT ADDITIONAL LOCATIONS INDICATED ON COIL AND EQUIPMENT CONNECTION DETAILS.

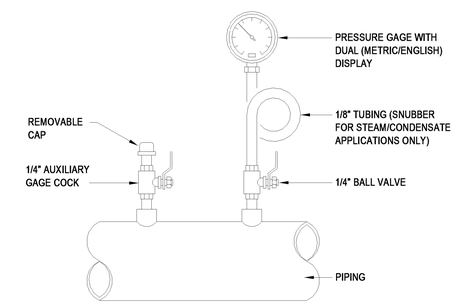
M705 4 PIPING PRESSURE/TEMPERATURE TEST FITTING

NOT TO SCALE



M705 5 PIPING PENETRATION DETAIL

NOT TO SCALE



NOTES:

1. PROVIDE AUXILIARY GAGE COCK AT EACH PRESSURE GAGE LOCATION.
2. INSTALL PRESSURE GAGES (AND SNUBBERS) IN VERTICAL POSITION - ADD ELBOW FOR VERTICAL PIPING.

M705 6 PIPING PRESSURE GAGE

NOT TO SCALE

REVISIONS					REVISIONS				
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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

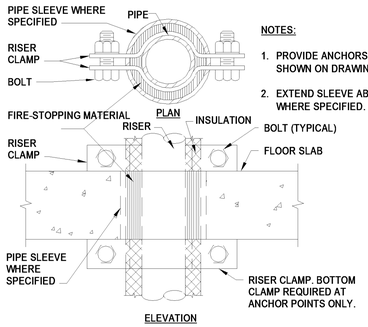
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293518 | LATEST REV.

SHEET NO. M-705

12/16/2013 9:04:27 AM

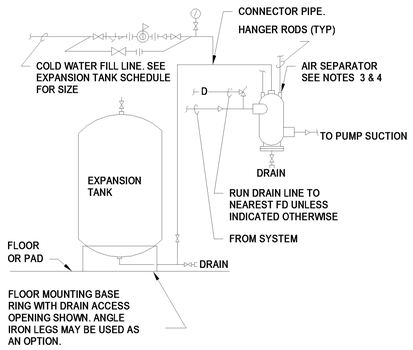


NOTES:

1. PROVIDE ANCHORS ONLY WHERE SHOWN ON DRAWINGS.
2. EXTEND SLEEVE ABOVE FLOOR WHERE SPECIFIED.

M706 1 SUPPORT/ANCHOR FOR PIPE RISERS

NOT TO SCALE

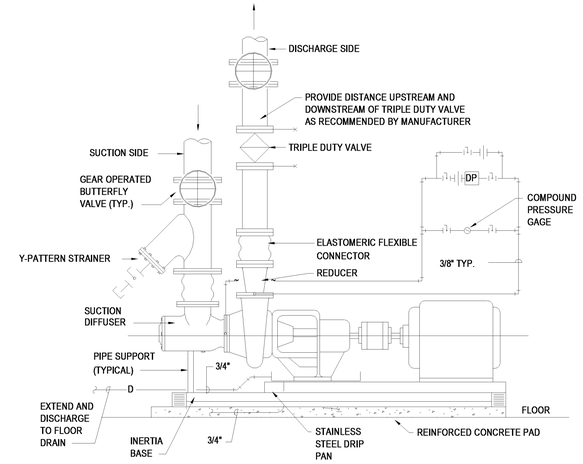


NOTES:

1. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.
2. RELIEF VALVE FOR CHILLED WATER SYSTEM IS SHOWN. OMIT WHEN RELIEF VALVE IS SHOWN ON HEAT EXCHANGER DETAIL & SYSTEM IS USED ONLY FOR HOT WATER HEATING. COMBINATION HEATING & COOLING SYSTEMS WILL REQUIRE THE RELIEF VALVE.
3. PROVIDE STRAINER IN AIR SEPARATOR WHEN INDICATED IN EXPANSION TANK SCHEDULE.
4. FOR HOT WATER SYSTEMS 2" [50mm] AND SMALLER AND CHILLED WATER SYSTEMS USE IN-LINE AIR PURGER IN LIEU OF AIR SEPARATOR.
5. SET PRESSURE REDUCING VALVE SO PRESSURE AT HIGHEST POINT IN SYSTEM HAS A MINIMUM OF 4 PSIG [28kPa].

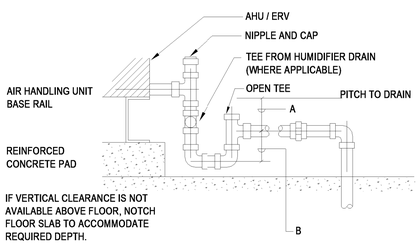
M706 2 VERTICAL EXPANSION TANK - PIPING CONNECTIONS

NOT TO SCALE



M706 3 END SUCTION PUMP

NOT TO SCALE

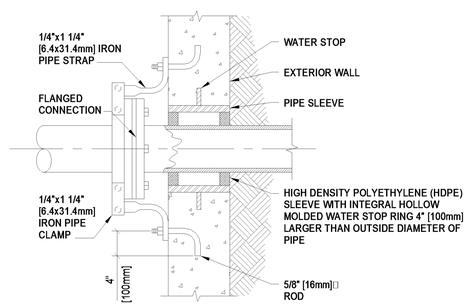


TAG	A (IN.)	B (IN.)
AHU	7	5
BCU	3	1

NOTE:
PROVIDE CONDENSATE DRAIN FROM EACH AHU/ERV COOLING COIL DRAIN PAN FULL SIZE OF DRAIN PAN OUTLET. EXTEND PIPE BELOW INTERSTITAL SLAB AND ROUTE CONDENSATE AS SHOWN ON PLANS.

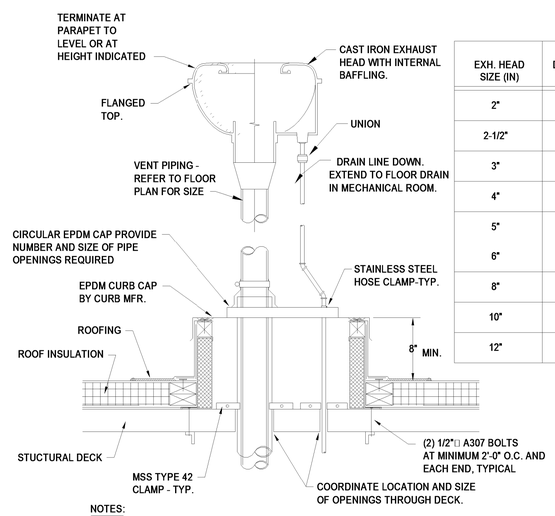
M706 4 CONDENSATE TRAP DETAIL

NOT TO SCALE



M706 5 SUPPORT ANCHOR (CHILLED WATER

NOT TO SCALE



EXH. HEAD SIZE (IN)	DRAIN UNIT SIZE (IN)	RATED CAPACITY (#/HR)
2"	3/4"	645
2-1/2"	3/4"	920
3"	3/4"	1,420
4"	1"	2,450
5"	1-1/2"	3,845
6"	1-1/2"	5,540
8"	2"	9,610
10"	2"	15,150
12"	3"	21,325

NOTES:

1. COORDINATE LOCATIONS OF ROOF CURBS AND EQUIPMENT SUPPORTS WITH ROOFING CONTRACTOR.
2. COMPENSATE FOR PITCH IN ROOF STRUCTURE WITH CURB SO THAT TOP OF CURB AND EQUIPMENT ARE DEAD LEVEL.
3. REFER TO ARCHITECTURAL AND STRUCTURAL DETAILS FOR FLASHING AND REINFORCEMENT DETAILS AT ROOF DECK. COORDINATE FOR FINAL LOCATIONS.
4. CURB AND ANCHORAGE SHALL MEET SPECIFIED WIND CRITERIA AND GROSS UPLIFT PRESSURE INDICATED ON STRUCTURAL DRAWINGS.
5. PROVIDE CURBS WITH NUMBER OF PIPE PENETRATIONS INDICATED ON FLOOR PLAN.

M706 6 STEAM EXHAUST HEAD DETAIL

NOT TO SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	JI	
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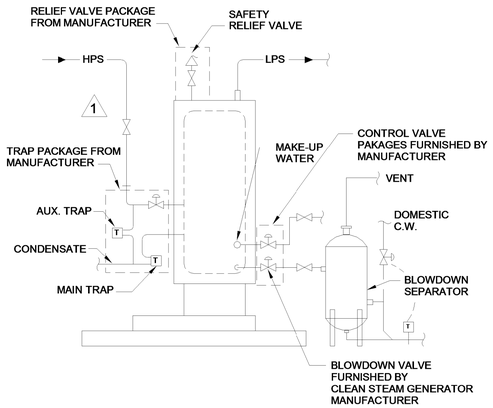
DRAWING TITLE: MECHANICAL DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293519 | LATEST REV.

SHEET NO. M-706

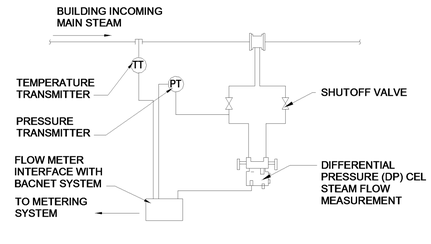
12/16/2013 9:04:30 AM



1. ENABLE UPON SIGNAL FROM BAS BOILER CONTROL PANEL, MAINTAIN LPS STEAM DISCHARGE PRESSURE.
2. LOW LEVEL SENSOR MODULATES MAKE UP WATER VALVE TO MAINTAIN OPERATING WATER LEVEL.

M707 1 CLEAN STEAM GENERATOR

NOT TO SCALE

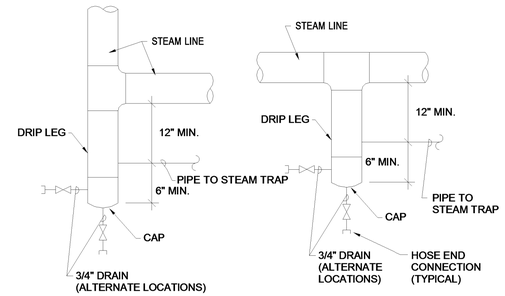


NOTE:

1. MAINTAIN UPSTREAM AND DOWN STREAM DISTANCES RECOMMENDED BY METER MANUFACTURES.
2. IMPULSE LINES SHOULD INCLUDE VALVED DIRT TRAPS AND BE EQUAL IN LENGTH.

M707 2 STEAM METER DETAIL

NOT TO SCALE



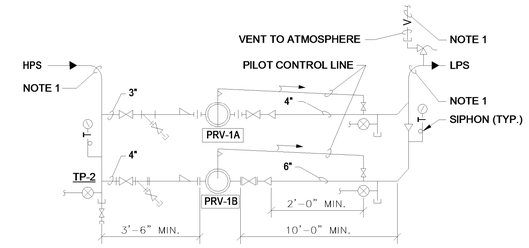
ELEVATIONS

NOTE:

1. DRIP POCKET PIPE SIZE SAME AS STEAM MAIN UNLESS OTHERWISE NOTED.

M707 3 STEAM LINE DRIP POCKET

NOT TO SCALE

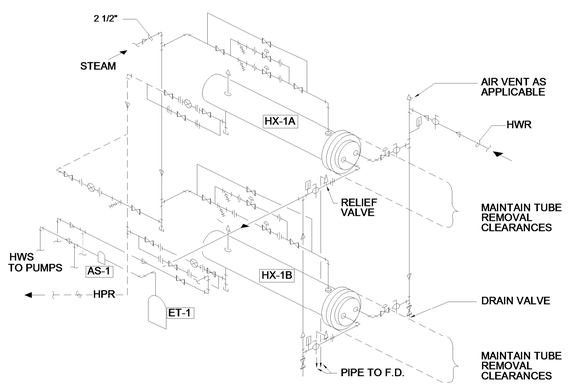


NOTE:

1. SEE FLOOR PLANS FOR PIPE SIZE.
2. SEE EQUIPMENT SCHEDULES FOR VALVE DATA. INSTALL VALVES AS RECOMMENDED BY MANUFACTURER.
3. PROVIDE NECESSARY UNIONS FOR THE REMOVAL OF VALVE WITH SCREWED CONNECTIONS.

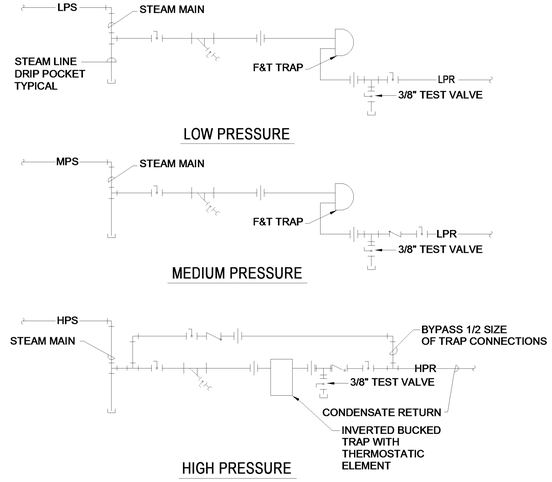
M707 4 STEAM PRESSURE REDUCING STATION DOUBLE VALVE

NOT TO SCALE



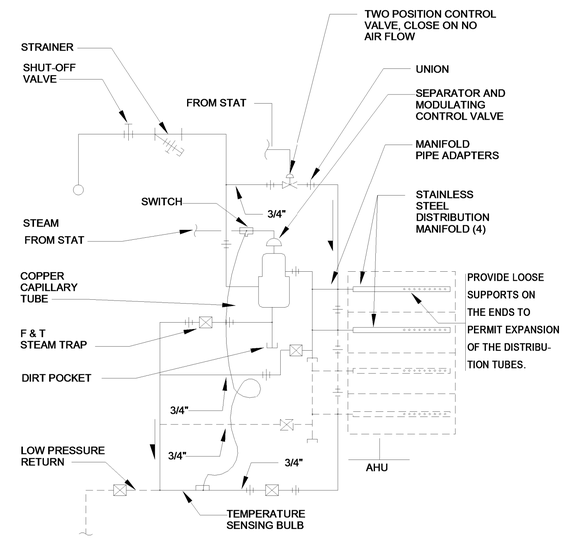
M707 5 HEAT EXCHANGER PIPING

NOT TO SCALE



M707 6 TYPICAL STEAM TRAP DIAGRAMS

NOT TO SCALE



M707 7 MULTIPLE MANIFOLD HUMIDIFIER DETAIL

NOT TO SCALE

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BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293520 | LATEST REV.

SHEET NO. M-707

12/16/2013 9:04:33 AM

AIR HANDLING UNIT SCHEDULE

TAG	LOCATION	AIR QUANTITIES			SUPPLY/ RETURN FANS	COOLING COIL										PREHEAT COIL										MANUFACTURER AND MODEL NUMBER	REMARKS
		FAN SUPPLY (CFM)	OUTDOOR AIR (CFM)	RETURN FAN (CFM)		TOTAL MBH	SENSIBLE MBH	EAT DB/WB (°F)	LAT DB/WB (°F)	MAX AIR PD (IN. WG)	EWT (°F)	LWT (°F)	WATER FLOW (GPM)	MAX WATER PD (FT)	MIN. ROWS	TOTAL (MBH)	MIN. FACE AREA (SQFT)	ROWS	MAX APD (IN.WG)	EAT (F)	LAT (F)	EWT (F)	LWT (F)	WATER FLOW (GPM)	WATER PD (FT)		
AHU-1	BASEMENT	12,200	1,830	10,500	SF-1/RF-1	530.74	383.8	79.73 / 65.81	51.15 / 51.05	0.81	44.0	54.0	105.7	15.0	6	369.6	24.1	1	0.07	-	-	180	160	36.9	2.7	TRANE PERFORMANCE CLIMATE CHANGER UNIT SIZE 25	2,3,4,5,6
AHU-2	BASEMENT	9,300	3,160	6,140	SF-2/RF-2	456.2	303.5	80.81 / 67.39	51.21 / 51.08	0.88	44.0	54.0	90.9	6.6	6	317.0	19.8	1	0.06	-	-	180	160	31.7	2.4	TRANE PERFORMANCE CLIMATE CHANGER UNIT SIZE 21	1,2,3,4,5,6
AHU-3	BASEMENT	21,000	3,150	18,400	SF-3/RF-3	904.5	645.2	79.56 / 65.75	51.65.7 / 51.15	0.59	44.0	54.0	180.3	17.5	6	732.2	47.1	1	0.06	-	-	180	160	73.1	5.5	TRANE PERFORMANCE CLIMATE CHANGER UNIT SIZE 50	2,3,4,5,6

NOTES:
1. PROVIDE AHU DISPERSION TYPE STEAM HUMIDIFIER.
2. PROVIDE COPPER FINS AND COPPER TUBES FOR BOTH HEATING AND COOLING COILS.
3. PROVIDE UV-C EMITTER/LAMP SECTION .
4. PROVIDE DIRECT DRIVE PLENUM (DDP) RETURN FAN.
5. PROVIDE SINGLE POINT POWER CONNECTION.
6. PROVIDE 3-WAY VALVE FOR COOLING COIL.

FILTER SCHEDULE

SERVICE	PRE FILTER					FINAL FILTER				
	MAX. FACE VEL. (FPM)	% EFF	THICK (IN.)	PRESS DROP INITIAL (IN. WG.)	PRESS DROP FINAL (IN. WG.)	MAX. FACE VEL. (FPM)	% EFF	THICK (IN.)	PRESS DROP INITIAL (IN. WG.)	PRESS DROP FINAL (IN. WG.)
AHU-1	244	MERV 8	4	0.53	-	450	MERV 14	4	0.79	-
AHU-2	279	MERV 8	4	0.54	-	432	MERV 14	4	0.78	-
AHU-3	210	MERV 8	4	0.52	-	382	MERV 14	4	0.76	-

SUPPLY/RETURN FAN SCHEDULE

TAG	SERVICE	CFM	T.S.P. IN	E.S.P. IN	FAN TYPE	ARRANGEMENT, DISCHARGE	WHEEL		MAX. RPM	DRIVE	TOTAL BHP	MOTOR			CONTROL TYPE	REMARKS
							TYPE	MIN. DIA. IN				QUANTITY	NOM. HP	PHASE VOLT.		
SF-1	AHU-1	12,200	5.5	3.2	CENT	FRONT TOP	AF	22	1,801	BELT	15.8	1	20.0	3/460	VFD	1
SF-2	AHU-2	9,300	6.2	3.8	CENT	FRONT TOP	AF	18	2,561	BELT	15.2	1	20.0	3/460	VFD	1
SF-3	AHU-3	21,000	5.3	3.4	CENT	FRONT TOP	AF	25	1,731	BELT	27.3	1	30.0	3/460	VFD	1
RF-1	AHU-1	10,500	2.6	1.5	PLENUM	FRONT TOP	AF	20	1,818	DD	6.6	2	5.0	3/460	VFD	1
RF-2	AHU-2	6,140	2.6	1.9	PLENUM	FRONT TOP	AF	18.25	1,741	DD	3.9	2	3.0	3/460	VFD	1
RF-3	AHU-3	18,400	2.4	1.5	PLENUM	FRONT TOP	AF	27	1,217	DD	10.9	2	7.5	3/460	VFD	1

REMARKS:
1. BALALANCE AHU FANS TO THE TOTAL DIFFUSER/REGISTER CFM'S SHOWN ON PLANS.

LOUVERED GRAVITY VENTILATOR SCHEDULE

TAG	LOCATION	SERVICE	TYPE	VOLUME (CFM)	SP (IN. WG)	THROAT VELOCITY (FT/MIN)	THROAT SIZE		CURB CAP SIZE		MANUFACTURER AND MODEL NUMBER	REMARKS
							W (IN.)	L (IN.)	W (IN.)	L (IN.)		
GV-1	ROOF	AHU-1	OA INTAKE	12,200	0.072	631	48	58	56	66	GREENHECK WIH	1, 2
GV-2	ROOF	AHU-2	OA INTAKE	9,300	0.069	600	42	54	50	62	GREENHECK WIH	1, 2
GV-3	ROOF	AHU-3	OA INTAKE	21,000	0.0621	586	60	86	68	94	GREENHECK WIH	1, 2

REMARKS:
1. PROVIDE 18" BASE ROOF CURB.
2. PROVIDE GALVANIZED BIRDSCREEN, 0.5" MESH TYPE.

EXHAUST FAN SCHEDULE

TAG	SERVICE	LOCATION	CFM	T.S.P. IN	E.S.P. IN	FAN TYPE	WHEEL		MAX. RPM	DRIVE	BHP	MOTOR		CONTROL TYPE	MANUFACTURER AND MODEL NUMBER	REMARKS
							TYPE	MIN. DIA. IN				NOM. HP	PHASE VOLT.			
EF-1	GENERAL EXHAUST	ROOF	2,200	0.75	0.75	CENT	BI	21.4	876	BELT	0.54	0.75	460/60/3	CV	GREENHECK GB-200HP-7	1,2
EF-2	LAB GENERAL EXHAUST	ROOF	1,300	0.75	0.75	CENT	BI	14.6	1,156	BELT	0.34	0.5	115/60/1	CV	GREENHECK GB-141-5	1,2
EF-3	LAB EMERGENCY EXHAUST	ROOF	4,700	1.0	1.0	CENT	BI	30.50	664	BELT	1.40	1.5	460/60/3	CV	GREENHECK CUBE-300HP-15	1,2
EF-4	SHOPS	ROOF	550	0.75	0.75	CENT	BI	11.2	1,385	BELT	0.16	0.25	115/60/1	CV	GREENHECK GB-101-4	1,2
EF-5	TRUCK BAY	ROOF	2,000	0.75	0.75	CENT	BI	18.5	893	BELT	0.45	0.60	115/60/1	CV	GREENHECK CUBE-180-5	1,2,3

REMARKS:
1. PROVIDE 12" ROOF CURB.
2. PROVIDE MOTORIZED DAMPER.
3. INTERLOCK FAN WITH CO SENSORS.

STEAM HUMIDIFIER SCHEDULE

TAG	SERVICE	CFM	STEAM		DUCT SIZE		NO. OF MANIFOLDS	MANIFOLDS LENGTH (IN.)	MANUFACTURER AND MODEL NUMBER	REMARKS
			CAPACITY (LB/HR)	PRESSURE (PSIG)	W (IN)	H (IN)				
H-1	AHU-2	9,300	96	15	NOTE 1		NOTE 1	NOTE 1	DRI-STEEM ULTRA-SORB LH	2, 3, 4, 5

REMARKS:
1. COORDINATE INTERNAL AHU DIMENSIONS WITH AHU MANUFACTURER.
2. PROVIDE MAXIMUM 12" ABSORPTION DISTANCE.
3. STAINLESS STEEL.
4. HUMIDITY SENSOR AND HIGH LIMIT SHALL BE TIED INTO THE BAS.
5. PROVIDE INSULATED TUBES.

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037523
PROFESSIONAL ENGINEER
11/6/2013

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LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	ID	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	JI	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL SCHEDULES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293521 | LATEST REV.

SHEET NO. M-801

12/16/2013 9:04:37 AM

DIFFUSER, REGISTER, AND GRILLE SCHEDULE

TAG	SERVICE	TYPE	MATERIAL	CFM RANGE	MODULE SIZE (IN.)	NECK SIZE (IN.)	MAX. PRES DROP (WG)	MAX. NOISE LEVEL (NC)	MANUFACTURER AND MODEL NUMBER	REMARKS
CD-1	SUPPLY	PERFORATED	ALUMINUM	0-150	24x24	6Ø	0.1	35	TITUS PAS	1, 2
CD-2	SUPPLY	PERFORATED	ALUMINUM	151-240	24x24	8Ø	0.1	35	TITUS PAS	1, 2
CD-3	SUPPLY	PERFORATED	ALUMINUM	241-320	24x24	10Ø	0.1	35	TITUS PAS	1, 2
CD-4	SUPPLY	PERFORATED	ALUMINUM	321-410	24x24	12Ø	0.1	35	TITUS PAS	1, 2
CD-5	SUPPLY	PERFORATED	ALUMINUM	411-530	24x24	14Ø	0.1	35	TITUS PAS	1, 2
CD-6	SUPPLY	PERFORATED	ALUMINUM	531-1250	24x24	16Ø	0.1	35	TITUS PAS	1, 2
CD-7	SUPPLY	PERFORATED	ALUMINUM	0-100	12x12	6Ø	0.1	35	TITUS PAS	1, 2
RD-1	SUPPLY	LOUVERED	ALUMINUM	400-650	27	12Ø	0.1	35	TITUS TMRA-AA	2
LD-1	SUPPLY	LINEAR SLOT	ALUMINUM	60-90 CFM	4 FEET	6Ø	0.1	35	TITUS ML-39 & MPI-39	3
LD-2	SUPPLY	LINEAR SLOT	ALUMINUM	91-130 CFM	4 FEET	6Ø	0.1	35	TITUS ML-39 & MPI-39	4
LD-3	SUPPLY	LINEAR SLOT	ALUMINUM	220-295 CFM	4 FEET	12Ø	0.1	35	TITUS ML-39 & MPI-39	5
H-CD-1	SUPPLY	-	ALUMINUM	0-600	24x48	12Ø	0.1	30	CLEAN ROOMS INTERNATIONAL (GS HEPA)	6
SR-1	SUPPLY	REGISTER	ALUMINUM	0-250	-	8x8	0.1	35	TITUS 301FL	2
SR-2	SUPPLY	REGISTER	ALUMINUM	251-400	-	12x8	0.1	35	TITUS 301FL	2
SR-3	SUPPLY	REGISTER	ALUMINUM	401-600	-	12x12	0.1	35	TITUS 301FL	2
SR-4	SUPPLY	REGISTER	ALUMINUM	601-950	-	18x12	0.1	35	TITUS 301FL	2
SR-5	SUPPLY	REGISTER	ALUMINUM	951-1350	-	24x12	0.1	35	TITUS 301FL	2
RR-1	RETURN	REGISTER	ALUMINUM	0-175	24x24	6Ø	0.1	35	TITUS PAR	2
RR-2	RETURN	REGISTER	ALUMINUM	551-640	24x24	14Ø	0.1	35	TITUS PAR	2
RR-3	RETURN	REGISTER	ALUMINUM	800-1150	24x24	18x18	0.1	35	TITUS PAR	2
RR-4	RETURN	REGISTER	ALUMINUM	1151-1651	24x24	22x22	0.1	35	TITUS PAR	2
RR-5	RETURN	REGISTER	ALUMINUM	0-100	12x12	6Ø	0.1	35	TITUS PAR	2
RG	RETURN	GRILLE	ALUMINUM	0-2000	24x24	-	0.1	35	TITUS PXP	
ER-1	EXH/RET	REGISTER	ALUMINUM	0-100	-	6x6	0.1	35	TITUS 355FL	2
ER-2	EXH/RET	REGISTER	ALUMINUM	101-150	-	8x6	0.1	35	TITUS 355FL	2
ER-3	EXH/RET	REGISTER	ALUMINUM	151-200	-	8x8	0.1	35	TITUS 355FL	2
ER-4	EXH/RET	REGISTER	ALUMINUM	201-250	-	12x6	0.1	35	TITUS 355FL	2
ER-5	EXH/RET	REGISTER	ALUMINUM	251-420	-	12x10	0.1	35	TITUS 355FL	2
ER-6	EXH/RET	REGISTER	ALUMINUM	421-500	-	12x12	0.1	35	TITUS 355FL	2
ER-7	EXH/RET	REGISTER	ALUMINUM	501-700	-	18x12	0.1	35	TITUS 355FL	2
TG	TRANSFER	GRILLE	ALUMINUM	0-100	-	6x6	0.1	35	TITUS 355FL	
TG	TRANSFER	GRILLE	ALUMINUM	101-200	-	10x6	0.1	35	TITUS 355FL	
TG	TRANSFER	GRILLE	ALUMINUM	250-500	-	12x12	0.1	35	TITUS 355FL	
TG	TRANSFER	GRILLE	ALUMINUM	501-700	-	18x12	0.1	35	TITUS 355FL	

REMARKS:

1. ALL DIFFUSERS SHALL BE 4-WAY THROW PATTERN UNLESS OTHERWISE NOTED.
2. PROVIDE OPPOSED BLADE DAMPER.
3. 1 SLOT LINEAR DIFFUSER 1" OPENING WITH INSULATED PLENUM. TITUS ML-39-(1)-1" SLOTS WITH MPI-39-PLENUM.
4. 2 SLOTS LINEAR DIFFUSER 1" OPENING WITH INSULATED PLENUM. TITUS ML-39-(2)-1" SLOTS WITH MPI-39-PLENUM.
5. 4 SLOTS LINEAR DIFFUSER 1" OPENING WITH INSULATED PLENUM. TITUS ML-39-(4)-1" SLOTS WITH MPI-39-PLENUM.
6. PROVIDE CLASS 100,000 HEPA TERMINAL MODULES.

SOUND ATTENUATOR SCHEDULE

TAG	SERVICE	LOCATION	FACE DIMENSIONS		OUTSIDE CASING DIMENSIONS		TOTAL MODULE LENGTH (IN.)	FLOW (CFM)	VELOCITY (FT/MIN)	SILENCER P.D. (IN WG)	P.D. INCL. SYSTEM EFFECTS (IN WG)	DYNAMIC INSERTION LOSS								MODEL	REMARKS
			W (IN.)	H (IN.)	W (IN.)	H (IN.)						63	125	250	500	1000	2000	4000	8000		
SA-1-S	AHU-1 SUPPLY	BASEMENT	26	36	34	36	84	12,200	+1,877	0.24	0.32	7	14	22	32	49	45	31	22	VIBRO-ACOUSTICS EXRED-HV-F9-L15881	1,2,4
SA-1-R	AHU-1 RETURN	BASEMENT	36	32	44	40	156	10,500	-1,312	0.2	0.24	17	35	50	50	50	34	23	19	VIBRO-ACOUSTICS EXRD-MHV-FG-L15881	1,2
SA-2-S	AHU-2 SUPPLY	BASEMENT	20	36	20	44	120	9,300	+1,860	0.19	0.25	13	25	29	46	50	42	30	28	VIBRO-ACOUSTICS RED-UHV-FE-L15881	1,2,6
SA-2-R	AHU-2 RETURN	BASEMENT	20	38	-	-	60	6,140	-1,163	0.12	0.18	9	11	11	23	20	22	17	15	VIBRO-ACOUSTICS RED-HV-FE-L15881	1,2,5
SA-3-S	AHU-3 SUPPLY	BASEMENT	36	44	-	-	144	21,000	+1,909	0.22	0.35	12	26	23	34	47	35	22	25	VIBRO-ACOUSTICS RED-UHV-FC-L15881	1,2,6
SA-3-R	AHU-3 RETURN	BASEMENT	36	48	-	-	156	18,400	-1,533	0.16	0.22	13	23	24	30	50	34	24	24	VIBRO-ACOUSTICS RED-UHV-FC-L15881	1,2,3

REMARKS

1. RED = RECTANGULAR ELBOW DISSIPATIVE.
   EXRD = EXTENDED RECTANGULAR DISSIPATIVE.
   EXRED = EXTENDED ELBOW DISSIPATIVE.
2. PROVIDE, FOR APPROVAL, ACOUSTICAL CALCULATIONS FOR ALL SYSTEMS WITH SILENCERS TO DEMONSTRATE THAT THE RESULTANT DUCTBORNE FAN SOUND LEVEL, INCLUDING AIRBORNE AND BREAKOUT NOISE, IN THE OCCUPIED SPACES MEET NC 30.
3. VERTICAL CENTERLINE LEG LENGTH SHALL BE 8'-0". REMAINING HORIZONTAL CENTERLINE LEG LENGTH SHALL BE THE DIFFERENCE BETWEEN THE VERTICAL AND THE TOTAL MODULE LENGTH.
4. VERTICAL CENTERLINE LEG LENGTH SHALL BE 5'-0". REMAINING HORIZONTAL CENTERLINE LEG LENGTH SHALL BE THE DIFFERENCE BETWEEN THE VERTICAL AND THE TOTAL MODULE LENGTH.
5. VERTICAL CENTERLINE LEG LENGTH SHALL BE 3'-0". REMAINING HORIZONTAL CENTERLINE LEG LENGTH SHALL BE THE DIFFERENCE BETWEEN THE VERTICAL AND THE TOTAL MODULE LENGTH.
6. VERTICAL CENTERLINE LEG LENGTH SHALL BE 9'-0". REMAINING HORIZONTAL CENTERLINE LEG LENGTH SHALL BE THE DIFFERENCE BETWEEN THE VERTICAL AND THE TOTAL MODULE LENGTH.

BLOWER COIL UNIT SCHEDULE

TAG	AREA SERVED	FAN CFM	O.A. CFM	FAN MOTOR		EXTERNAL STATIC PRESSURE. IN.	COOLING REQUIREMENTS WITH °F ENTR / LVG WATER TEMP (56 / 44)								HEATING COIL								MANUFACTURER AND MODEL NUMBER	REMARKS
				NOM. HP	PHASE VOLT		MAX. FACE VEL. FPM	MIN. SENS MBH	MIN. TOTAL MBH	ENT. AIR °F Db	ENT. AIR °F Wb	GPM	MAX. LOSS THRU COIL FT WATER	RUNOUT SIZE IN	ENTER. AIR (°F)	LEAVE. AIR (°F)	ENTER. WATER (°F)	LEAVE. WATER (°F)	TOTAL CAP. (MBH)	GPM	MAX. WATER PD (FT)	RUNOUT SIZE IN		
BCU-1	BAY TRUCK	2,500	-	1.0	3-460	0.5	400	67.33	97	80	67	20	7.2	1-1/8	70	111.73	180	160	112.85	11	7.2	1-1/8	TRANE BCHC090G1	1,2,3

REMARKS:

1. PROVIDE CONTROLS INTERFACE INCLUDING INTEGRAL COMBINATION STARTER / FUSIBLE DISCONNECT.
2. PROVIDE 30% PRE-FILTER (MERV 8).
3. PROVIDE 3-WAY VALVE FOR COOLING COIL.

FAN COIL UNIT SCHEDULE

TAG	CFM	LOCATION	COOLING COIL									HEATING COIL							ELECTRICAL DATA				MANUFACTURER AND MODEL NUMBER	REMARKS
			ENTERING AIR (°F)		ENTER. WATER (°F)	LEAVE. WATER (°F)	TOTAL CAP. (MBH)	SENSIBLE		GPM	MAX. WATER PD (FT)	ENTER. AIR (°F)	LEAVE. AIR (°F)	ENTER. WATER (°F)	LEAVE. WATER (°F)	TOTAL CAP. (MBH)	GPM	MAX. WATER PD (FT)	MOTOR RPM	HP	VOLT	PH		
			DB	WB				CAP. (MBH)																
FCU-1	666	STAIRWELL LEVEL 2	75	62.5	44	54	14.31	12.57	2.9	3.59		60	138.4	180	160	56.67	5.66	11.33	827	0.22	115	1	TRANE FCDB10	1,3
FCU-2	437	STAIRWELL LEVEL 1	75	62.5	44	54	10.08	8.65	2.1	6.88		60	99.3	180	160	18.60	1.86	7.64	1,580	0.13	115	1	TRANE FCBB04	2,3

REMARKS:

1. PROVIDE HORIZONTAL CABINET WITH FRONT BAR GRILLE OUTLET AND BOTTOM STAMPED LOUVER INLET.
2. PROVIDE HORIZONTAL CABINET WITH FRONT DUCT COLLAR OUTLET AND BOTTOM STAMPED LOUVER INLET.
3. PROVIDE 3-WAY VALVE FOR COOLING COIL.

HVAC PUMP SCHEDULE

TAG	LOCATION	SYSTEM	CASING TYPE	CIRCULATING FLUID								MOTOR			MANUFACTURER AND MODEL NUMBER	REMARKS
				FLUID	TEMP °F	GPM	NPSHR (FT)	HEAD (FT)	IMPELLER SIZE (IN)	PUMP RPM	PUMP EFF.	BHP	NOM. HP	PHASE-VOLT		
CHWP-1	BASEMENT	CHILLED WATER	END SUCTION	WATER	54	1,030	8.55	135	12.375	1,750	82.9	42.8	50	460/3/60	B&G 1510 5G	-
CHWP-2	BASEMENT	CHILLED WATER	END SUCTION	WATER	54	1,030	8.55	135	12.375	1,750	82.9	42.8	50	460/3/60	B&G 1510 5G	1
HWP-1	BASEMENT	HOT WATER	END SUCTION	WATER	180	160	5.63	70	8.6	1,750	70.2	4.29	7.5	460/3/60	B&G 1510 2BC	2
HWP-2	BASEMENT	HOT WATER	END SUCTION	WATER	180	160	5.63	70	8.6	1,750	70.2	4.29	7.5	460/3/60	B&G 1510 2BC	1,2

REMARKS:

1. STANDBY EQUIPMENT.
2. PROVIDE VFD.

EXPANSION TANK SCHEDULE

TAG	LOCATION	SERVICE	SYSTEM TEMP (°F)		SYSTEM PRESSURE (PSIG) AT TANK LOCATION		TANK PRESSURE RATING (PSI)	SYSTEM VOLUME (GAL)	TANK VOLUME (GAL)	TANK ACCEPTANCE VOLUME (GAL)	TANK AIR CHARGE (PSIG)	MANUFACTURER AND MODEL NUMBER	REMARKS
			MIN.	MAX.	MIN.	MAX.							
ET-1	BASEMENT	HOT WATER	50	180	12	30	125	570	44.4	22.6	12	B&G D-80V	-

REMARKS:

1.

AIR SEPARATOR SCHEDULE

TAG	LOCATION	SERVICE	WORKING PRESSURE (PSIG)	AIR SEPARATOR			PIPE SIZE TO TANK (IN)	SHIPPING WEIGHT (LBS)	MANUFACTURER AND MODEL NUMBER	REMARKS
				INLET SIZE (IN)	CAPACITY (GPM)	BUILT-IN STRAINER REQUIRED				
AS-1	BASEMENT	HOT WATER	125	3	190	NO	1-1/4	130	B&G ROLAIRTROL R-3F	-

REMARKS:

1.

REVISIONS					REVISIONS				
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SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
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			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL SCHEDULES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293522 | LATEST REV.

SHEET NO. M-802

12/16/2013 9:04:40 AM

SINGLE DUCT AIR TERMINAL UNIT SCHEDULE

TAG	LOCATION	TYPE	MAXIMUM COOLING (CFM)	MINIMUM COOLING (CFM)	HEATING (CFM)	INLET SIZE (IN.)	MAX. S.P. DROP (IN. W.G.)	NC RATINGM DISCHARGE (@ 2 IN. W.G.)	REHEAT COIL AT HEATING CFM							PIPE RUNOUT SIZE (IN)	MIN. BTUH	REMARKS	REMARKS
									EWT (°F)	LWT (°F)	EAT (°F)	LAT (°F)	P.D. (FT)	ROWS	MAX FLOW (GPM)				
1-1-01	FIRST FLOOR	CVR	290	290	290	6	0.35	35	180	160	55	100	2	2	1.1	3/4	14,160	TITUS DESV	1
1-1-02	FIRST FLOOR	VVR	930	470	470	10	0.35	35	180	160	55	90	2	2	1.8	3/4	17,850	TITUS DESV	1
1-1-03	FIRST FLOOR	VVR	860	430	430	10	0.35	35	180	160	55	90	2	2	1.6	3/4	16,350	TITUS DESV	1
1-1-04	FIRST FLOOR	VVR	650	330	330	8	0.35	35	180	160	55	85	2	2	1.1	3/4	10,740	TITUS DESV	1
1-1-05	FIRST FLOOR	VVR	1,200	600	600	12	0.35	35	180	160	55	90	2	2	2.3	3/4	22,790	TITUS DESV	1
1-1-06	FIRST FLOOR	VVR	900	450	450	10	0.35	35	180	160	55	90	2	2	1.7	3/4	17,090	TITUS DESV	1
1-1-07	FIRST FLOOR	VV	470	240	-	8	0.35	35	-	-	-	-	-	-	-	-	-	TITUS DESV	1
1-1-08	FIRST FLOOR	VVR	220	110	110	6	0.35	35	180	160	55	85	2	2	0.4	3/4	3,580	TITUS DESV	1
1-1-09	FIRST FLOOR	VVR	490	250	250	8	0.35	35	180	160	55	90	2	2	0.9	3/4	9,500	TITUS DESV	1
1-1-10	FIRST FLOOR	VVR	2,350	1,180	1,180	14	0.35	35	180	160	55	90	2	2	4.9	1	44,810	TITUS DESV	1
1-1-11	FIRST FLOOR	VVR	2,290	1,150	1,150	14	0.35	35	180	160	55	90	2	2	3.9	1	43,670	TITUS DESV	1
1-1-12	FIRST FLOOR	VVR	330	170	170	8	0.35	35	180	160	55	90	2	2	0.4	3/4	6,460	TITUS DESV	1
1-1-13	FIRST FLOOR	CVR	240	240	240	6	0.35	35	180	160	55	85	2	2	0.7	3/4	7,810	TITUS DESV	1
1-1-14	FIRST FLOOR	VV	260	130	-	6	0.35	35	-	-	-	-	-	-	-	-	-	TITUS DESV	1
1-1-15	FIRST FLOOR	VVR	720	360	360	6	0.35	35	180	160	55	90	2	2	1.4	3/4	13,670	TITUS DESV	1
2-3-01	SECOND FLOOR	VVR	2,930	1,470	1,470	14	0.35	35	180	160	55	95	2	2	5.4	1-1/4	63,800	TITUS DESV	1
2-3-02	SECOND FLOOR	VVR	1,130	570	570	10	0.35	35	180	160	55	95	2	2	2.5	1	24,740	TITUS DESV	1
2-3-03	SECOND FLOOR	VV	300	150	-	6	0.35	35	-	-	-	-	-	-	-	-	--	TITUS DESV	1
2-3-04	SECOND FLOOR	VVR	1,470	740	740	12	0.35	35	180	160	55	95	2	2	3.2	1	32,120	TITUS DESV	1
2-3-05	SECOND FLOOR	VVR	1,380	690	690	12	0.35	35	180	160	55	90	2	2	2.6	1	26,200	TITUS DESV	1
2-3-06	SECOND FLOOR	VVR	2,940	1,470	1,470	16	0.35	35	180	160	55	95	2	2	5.4	1-1/4	63,800	TITUS DESV	1
2-3-07	SECOND FLOOR	VVR	1,200	600	600	12	0.35	35	180	160	55	90	2	2	2.3	3/4	22,790	TITUS DESV	1
2-3-08	SECOND FLOOR	VVR	540	270	270	8	0.35	35	180	160	55	90	2	2	1.0	3/4	10,250	TITUS DESV	1
2-3-09	SECOND FLOOR	VVR	600	300	300	8	0.35	35	180	160	55	95	2	2	1.3	3/4	13,020	TITUS DESV	1
2-3-10	SECOND FLOOR	VV	290	150	-	6	0.35	35	-	-	-	-	-	-	-	-	-	TITUS DESV	1
2-3-11	SECOND FLOOR	VVR	640	320	320	8	0.35	35	180	160	55	95	2	2	1.4	3/4	13,890	TITUS DESV	1
2-3-12	SECOND FLOOR	VVR	300	150	150	6	0.35	35	180	160	55	90	2	2	0.6	3/4	5,700	TITUS DESV	1
2-3-13	SECOND FLOOR	CVR	290	150	150	6	0.35	35	180	160	55	95	2	2	1.3	3/4	12,580	TITUS DESV	1
2-3-14	SECOND FLOOR	CVR	360	180	180	8	0.35	35	180	160	55	100	2	2	1.3	3/4	17,580	TITUS DESV	1
2-3-15	SECOND FLOOR	VV	490	250	-	8	0.35	35	-	-	-	-	-	-	-	-	-	TITUS DESV	1
2-3-16	SECOND FLOOR	VVR	730	370	370	10	0.35	35	180	160	55	95	2	2	1.6	3/4	16,060	TITUS DESV	1
2-3-17	SECOND FLOOR	VVR	2,470	1,240	1,240	14	0.35	35	180	160	55	95	2	2	5.4	1	53,820	TITUS DESV	1
2-3-18	SECOND FLOOR	VVR	720	360	360	10	0.35	35	180	160	55	90	2	2	1.4	3/4	13,670	TITUS DESV	1
2-3-19	SECOND FLOOR	VVR	360	180	180	8	0.35	35	180	160	55	95	2	2	0.8	3/4	7,810	TITUS DESV	1
2-3-20	SECOND FLOOR	VVR	990	500	500	10	0.35	35	180	160	55	95	2	2	2.1	3/4	21,700	TITUS DESV	1
2-3-21	SECOND FLOOR	VVR	350	180	180	8	0.35	35	180	160	55	90	2	2	0.7	3/4	6,840	TITUS DESV	1
2-3-22	SECOND FLOOR	VVR	260	130	130	6	0.35	35	180	160	55	90	2	2	0.4	3/4	4,940	TITUS DESV	1
2-3-23	SECOND FLOOR	VVR	260	130	130	6	0.35	35	180	160	55	90	2	2	0.4	3/4	4,940	TITUS DESV	1

REMARKS:

1. ALL AIR TERMINAL BOXES SHALL BE PROVIDED EACH WITH A REMOTE SPACE THERMOSTAT, WHETHER INDICATED ON PLANS OR NOT.

LAB AIR TERMINAL UNIT SCHEDULE

TAG	LOCATION	TYPE	OCCUPIED SETPOINT (CFM)	UNOCCUPIED SETPOINT (CFM)	HEATING (CFM)	100 % EXHAUST BACKUP (CFM)	INLET SIZE (IN.)	MAX. S.P. DROP (IN. W.G.)	NC RATINGM DISCHARGE (@ 2 IN. W.G.)	REHEAT COIL AT HEATING CFM							PIPE RUNOUT SIZE (IN)	MIN. BTUH	MANUFACTURER	REMARKS
										EWT (°F)	LWT (°F)	EAT (°F)	LAT (°F)	P.D. (FT)	ROWS	MAX FLOW (GPM)				
1-2-01	FIRST FLOOR LAB	OCC./ UNOCC.	1,870	940	940	940	14	1.0	35	180	160	55	80	2	2	2.6	1	25,500	SIEMENS LGS	1, 2, 3, 4
1-2-02	FIRST FLOOR LAB	OCC./ UNOCC.	2,330	1,170	1,170	1,170	14	1.0	35	180	160	55	80	2	2	3.2	1	31,740	SIEMENS LGS	1, 2, 3, 4
1-2-03	FIRST FLOOR LAB	OCC./ UNOCC.	490	400	400	250	8	1.0	35	180	160	55	80	2	2	0.7	3/4	10,850	SIEMENS LGS	1, 2, 3, 4
1-2-04	FIRST FLOOR LAB	OCC./ UNOCC.	980	490	490	490	10	1.0	35	180	160	55	80	2	2	1.3	3/4	13,290	SIEMENS LGS	1, 2, 3, 4
1-2-05	FIRST FLOOR LAB	OCC./ UNOCC.	490	400	400	250	8	1.0	35	180	160	55	80	2	2	0.7	3/4	6,650	SIEMENS LGS	1, 2, 3, 4
1-2-06	FIRST FLOOR LAB	OCC./ UNOCC.	1,570	790	790	790	12	1.0	35	180	160	55	80	2	2	2.1	3/4	21,290	SIEMENS LGS	1, 2, 3, 4
1-2-07	FIRST FLOOR LAB	OCC./ UNOCC.	1,570	790	790	790	12	1.0	35	180	160	55	80	2	2	2.1	3/4	21,290	SIEMENS LGS	1, 2, 3, 4
1-2-08	FIRST FLOOR LAB	OCC./ UNOCC.	3,240	1,140	-	0	16	1.0	35	-	-	-	-	-	-	-	-	-	SIEMENS LGE	4
1-2-09	FIRST FLOOR LAB	OCC./ UNOCC.	130	40	-	0	4	1.0	35	-	-	-	-	-	-	-	-	-	SIEMENS LGE	4
1-2-10	FIRST FLOOR LAB	OCC./ UNOCC.	130	40	-	0	4	1.0	35	-	-	-	-	-	-	-	-	-	SIEMENS LGE	4
1-2-11	FIRST FLOOR LAB	OCC./ UNOCC.	1,010	230	-	0	10	1.0	35	-	-	-	-	-	-	-	-	-	SIEMENS LGE	4
1-2-12	FIRST FLOOR LAB	OCC./ UNOCC.	620	130	-	0	6	1.0	35	-	-	-	-	-	-	-	-	-	SIEMENS LGE	4
1-2-13	FIRST FLOOR LAB	OCC./ UNOCC.	1,010	230	-	0	10	1.0	35	-	-	-	-	-	-	-	-	-	SIEMENS LGE	4

REMARKS:

1. ALL SUPPLY AIR TERMINAL BOXES SHALL BE PROVIDED EACH WITH A REMOTE SPACE THERMOSTAT, WHETHER INDICATED ON PLANS OR NOT.
2. PROVIDE SINGLE ROOM CONTROLER.
3. PROVIDE INTEGRAL SOUND ATTENUATOR.
4. PROVIDE LAB GRADE AIR TERMINAL UNIT.

ELECTRIC UNIT HEATER SCHEDULE

TAG	LOCATION	TYPE	HEATING		ELEMENT ELECTRICAL CHARACTERISTIC	MOTOR			MANUFACTURER AND MODEL NUMBER	REMARKS
			MBH	KW		VOLT	PH	VOLT		
EUH-1	SEE PLANS	WALL MOUNTED	10.2	3.0	STEEL SHEATH	208	1	60	TRANE UHWA-03	1, 2, 3
EUH-2	SEE PLANS	WALL MOUNTED	6.8	2.0	STEEL SHEATH	208	1	60	TRANE UHWA-01	1, 2, 3
EUH-3	SEE PLANS	WALL MOUNTED	10.2	3.0	STEEL SHEATH	208	1	60	TRANE UHWA-03	1, 2, 3

REMARKS:

1. PROVIDE INTEGRAL THERMOSTAT.
2. MAINTAIN SETPOINT OF 68°F (ADJUSTABLE).
3. COORDINATE FINISH WITH ARCHITECT.

HYDRONIC UNIT HEATER SCHEDULE

TAG	LOCATION	TYPE	AIR FLOW (CFM)	HEATING CAPACITY (MBH)	EAT (°F)	EWT (°F)	GPM	MAX WTR PD (FT)	MOTOR				MANUFACTURER AND MODEL NUMBER	REMARKS
									RPM	HP	VOLT	PH		
UH-1	TRUCK BAY	WALL MOUNTED	1,800	78.4	60	180	7.9	0.36	1,000	1/12	115	1	TRANE UH-S-108	1, 2

REMARKS:

1. PROVIDE INTEGRAL THERMOSTAT.
2. MAINTAIN SETPOINT OF 68°F (ADJUSTABLE).

ELECTRIC BASEBOARD RADIATOR SCHEDULE

TAG	LOCATION	CAPACITY WATTS/ FT	HEATING ELEMENT			ENCLOSURE TYPE	ELECTRICAL DATA			MANUFACTURER AND MODEL NUMBER	REMARKS
			FINS/ FT	LENGTH (FT)	MATERIAL		VOLT	PH	HZ		
EWF-1	TOILET 105	250	50	4	ALUMINUM SHEATH	WALL MOUNTED	208	1	60	TRANE CB	1, 2
EWF-2	TOILET 106	250	50	4	ALUMINUM SHEATH	WALL MOUNTED	208	1	60	TRANE CB	1, 2
EWF-3	TOILET 206	250	50	4	ALUMINUM SHEATH	WALL MOUNTED	208	1	60	TRANE CB	1, 2
EWF-4	TOILET 207	250	50	4	ALUMINUM SHEATH	WALL MOUNTED	208	1	60	TRANE CB	1, 2

REMARKS:

1. PROVIDE INTEGRAL THERMOSTAT.
2. COORDINATE FINISH WITH ARCHITECT.

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SEAL AREA

COMMONWEALTH OF VIRGINIA
JOO H. IM
No. 037023
PROFESSIONAL ENGINEER
11/6/2013

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED ID	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED AG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED JI	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE √

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL SCHEDULES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293523 | LATEST REV.

SHEET NO. M-803

12/16/2013 9:04:44 AM

STEAM TRAP SCHEDULE

TAG	LOCATION	SERVICE	MIN. INLET PRESSURE (PSIG)	MIN. DIFF. PRESSURE (PSIG)	MINIMUM CAPACITY (LB/HR)	TRAP SEAT RATING (PSI)	TYPE	BODY SIZE (IN)	MANUFACTURER AND MODEL NUMBER	REMARKS
TP-1A	BASEMENT	HX - 1A	15	0.25	3,200	30	F&T	2	ITT HOFFMAN SPECIALITY FT030X	-
TP-1B	BASEMENT	HX - 1B	15	0.25	3,200	30	F&T	2	ITT HOFFMAN SPECIALITY FT030X	-
TP-2	BASEMENT	PRV-1A/1B	100	90	175	125	IB w/ TV	1/2	ITT HOFFMAN SPECIALITY B1125B-2	-
TP-3	BASEMENT	2.5 HPS DRIP LEG	100	90	175	125	IB w/ TV	1/2	ITT HOFFMAN SPECIALITY B1125B-2	-
TP-4	BASEMENT	SWH-1 WATER HEATER	15	5	840	30	F&T	3/4	ITT HOFFMAN SPECIALITY FT030H	-

REMARKS:
1.

PRESSURE POWERED CONDENSATE PUMP SCHEDULE

TAG	LOCATION	FLUID	MOTIVE AIR PRESSURE (PSIG)	FLOW RATE (LB/HR)	TOTAL BACK PRESSURE (PSIG)	FILL HEAD (IN)	PUMP CONFIGURATION	PACKAGE STYLE	RECEIVER TANK (GAL)	MANUFACTURER AND MODEL NUMBER	REMARKS
PPCP-1	BASEMENT	CONDENSATE	120	2,500	20	6	VERTICAL	SIMPLEX	25	CEMLINE V18CCP-1.5X1.5-S-25	1,2,3

REMARKS:
1. PROVIDE PACKAGED SKID-MOUNTED PUMP ASSEMBLY INCLUDING RECEIVER TANK, INLET/OUTLET CHECK VALVES, DIGITAL CYCLE COUNTER, INSULATION JACKET, AND SIGHT GLASS.
2. PROVIDE CARBON STEEL PUMP MECHANISM WITHOUT EXTERNAL PACKING OR SEALS.
3. PROVIDE SEPARATE INLET PORTS FOR BOTH LPR AND HPR SIZED PER MANUFACTURER RECOMANDATIONS.

CONDENSATE PUMP SCHEDULE

TAG	LOCATION	SERVICE	GPH	SHUTOFF (FT)	MOTOR		MANUFACTURER AND MODEL NUMBER	REMARKS
					WATTS	PHASE / VOLT		
CP-1	BASEMENT	AHU-1	24	42	93	115/1/60	LITTLE GIANT VCMX-20UL	-
CP-2	BASEMENT	AHU-2	22	42	93	115/1/60	LITTLE GIANT VCMX-20UL	-
CP-3	BASEMENT	AHU-3	30	42	93	115/1/60	LITTLE GIANT VCMX-20UL	-
CP-4	STAIRWELL	FCU-2	1.7	29	-	120/1/60	LITTLE GIANT EC-OP-K	-
CP-5	STAIRWELL	FCU-1	1.7	29	-	120/1/60	LITTLE GIANT EC-OP-K	-

REMARKS:
1.

FLOW METER SCHEDULE

TAG	LOCATION	SERVICE	FLOW RATE (GPM)	FLOW RATE (LB/HR)	TYPE	PRESSURE DROP (PSI)	SIZE (IN)	RANGE (GPM)	RANGE (LB/HR)	MANUFACTURER AND MODEL NUMBER	REMARKS
FM-1	BASEMENT	CHILLED WATER	405	-	DUAL TURBINE INSERTION	1.0	4.0	8-800	-	ONICON F-1210 SERIES	1,2,3
FM-2	BASEMENT	STEAM	-	2,200	VORTEX	1.0	1.5	-	179-2,860	ONICON F-2200 SERIES	1,2,3
FM-3	BASEMENT	HEATING HOT WATER	245	-	DUAL TURBINE INSERTION	1.0	2.5	2.5-230	-	ONICON F-1210 SERIES	1,2,3

REMARKS:
1. CONTRACTOR TO COORDINATE WITH MANUFACTURER FOR RECOMMENDED STRAIGHT PIPE LENGTH FOR UPSTREAM AND DOWNSTREAM METER RUN.
2. PROVIDE BTU METER AND DISPLAY.
3. PROVIDE FLOW STRAIGHTENER.

CLEAN STEAM GENERATOR SCHEDULE

TAG	LOCATION	STEAM PRESSURE		CAPACITY (LB/HR)	MAKEUP EWT (F)	UNIT CONFIG.	FEEDWATER INLET (IN)	VESSEL		MANUFACTURER AND MODEL NUMBER	REMARKS
		IN (PSIG)	OUT (PSIG)					DIAMETER (IN)	LENGTH (IN)		
CSG-1	BASEMENT	100	15	150	40	VERTICAL	3/4	34	59	CEMLINE V45USG618	1,2,3,4,5

REMARKS:
1. PROVIDE STAINLESS STEEL VESSEL WITH STAINLESS STEEL PIPING, CHECK VALVE, AND WETTED PARTS.
2. PROVIDE VACUUM BREAKER.
3. PROVIDE ELECTRIC OPERATED HIGH WATER CUTOFF.
4. PROVIDE CENTRIFUGAL BOILER BLOWOFF CONDENSATE COOLER.
5. PROVIDE SOLID STATE CONTROL MODULE.

SAFETY RELIEF VALVE SCHEDULE

TAG	SERVICE	FLUID	TEMP. (°F)	MINIMUM CAPACITY (LBS / HR)	SET PRESS. (PSIG)	SIZE & ORIFICE (IN)	MANUFACTURER AND MODEL NUMBER	REMARKS
SRV-1	PRV-1A/1B	STEAM	331	2,730	25	2" MNPT x 2.5" FNPT	KUNKLE MODEL 6010JM01-LM0025	-

REMARKS:

PRESSURE REDUCING VALVE SCHEDULE

TAG	LOCATION	STEAM				PIPE SIZE		BYPASS LINE SIZE	MANUFACTURER AND MODEL NUMBER	REMARKS
		PRESS (PSIG)		CAPACITY (LBS / HR)						
		IN	OUT	RATED OPER. CAP.	MAX. FLOW WIDE OPEN	UPSTREAM	DOWNSTREAM			
PRV-1A	BASEMENT	100	15	1,452	1,850	1	-	-	ITT HOFFMAN SPECIALITY	1
PRV-1B	BASEMENT	100	15	748	1,000	1	-	-	ITT HOFFMAN SPECIALITY	1

REMARKS:
1. PROVIDE SAFETY RELIEF VALVE (SRV-1) WITH 25 PSIG SET PRESSURE.

CONVERTOR SCHEDULE

TAG	LOCATION	CIRCULATING FLUID					STEAM (PSIG)		CONTROL VALVE (LBS/HR)	MANUFACTURER AND MODEL NUMBER	REMARKS
		FLUID	GPM	TEMP. IN °(F)	TEMP. OUT °(F)	FLUID MAX. LOSS (FT.)	ENT. CONTROL VALVE	ENT. CONVERTOR			
HX-1A	BASEMENT	WATER	155	160	180	1.6	15	15	1,600	B&G SU 8 4-2	-
HX-1B	BASEMENT	WATER	155	160	180	1.6	15	15	1,600	B&G SU 8 4-2	1

REMARKS:
1. PROVIDE STAND-BY EQUIPMENT.

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SEAL AREA

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BUILDING NO. 1230
SHEET NO. M-804
SIZE D
DRAWING NO. 1293524
LATEST REV.

12/16/2013 9:04:47 AM

POWER DISTRIBUTION

DESCRIPTION

- (J) JUNCTION BOX OR PULL BOX. WHERE SHOWN BESIDE EQUIPMENT. PROVIDE LEADS, TERMINAL STRIPS OR CONTROL PANEL INCLUDING ALL CONDUCTORS, CONDUIT, FLEXIBLE CONDUIT, CONNECTORS, FITTINGS, ETC. REQUIRED FOR PROPER EQUIPMENT CONNECTION.
- (E) CONNECTION TO SYSTEMS FURNITURE/EQUIPMENT. PROVIDE LEADS, TERMINAL STRIPS OR CONTROL PANEL INCLUDING ALL CONDUCTORS, CONDUIT, FLEXIBLE CONDUIT, JUNCTION BOXES, CONNECTORS, FITTINGS, ETC. REQUIRED FOR PROPER CONNECTION.
- (M) MOTOR CONNECTION
- MH E EXISTING MANHOLE
- PANELBOARD, FLUSH MOUNTED AT 72" AFF TO TOP.
- PANELBOARD, SURFACE MOUNTED AT 72" AFF TO TOP.
- DISTRIBUTION PANELBOARD, SURFACE MOUNTED AT 72" AFF TO TOP.
- GROUNDING BUS BAR
- AF/AT J FUSED/NONFUSED DISCONNECT SWITCH. MOUNT AT 72" AFF TO TOP. WHERE INDICATED --AF/--AT PROVIDE FUSED DISCONNECT SWITCH.
- CB1 ENCLOSED CIRCUIT BREAKER. MOUNT AT 72" AFF TO TOP
- J COMBINATION MAGNETIC STARTER/DISCONNECT SWITCH. MOUNT AT 72" AFF TO CENTER.
- BREAK-GLASS TYPE SHUNT TRIP STATION. MOUNT AT 48" AFF TO CENTER.
- VFD VARIABLE FREQUENCY DRIVE.
- T DRY TYPE TRANSFORMER.

WIRING DEVICES

SUBSCRIPTS INDICATE THE FOLLOWING: (FOR ALL RECEPTACLES)

- G - DUPLEX RECEPTACLE WITH INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER (GFCI).
- C - MOUNT DEVICE ABOVE THE COUNTER TOP. SEE SHEET E0-100 NOTE #3 ON THIS SHEET FOR REQUIREMENTS.
- TR - TAMPER RESISTANT RECEPTACLE
- +48" - MOUNT DEVICE AT 48" AFF TO CENTER. OTHER MOUNTING HEIGHTS AS INDICATED.
- WP - WEATHER PROOF COVER
- H - MOUNT RECEPTACLE HORIZONTALLY.
- TV - MOUNT DEVICE AT 60" AFF TO CENTER.

- 20A, 125V DUPLEX RECEPTACLE. WALL MOUNT AT 18" AFF TO CENTER UON.
- 20A, 125V QUADRUPLEX RECEPTACLE. WALL MOUNT AT 18" AFF TO CENTER UON.
- 20A, 125V CEILING MOUNTED DUPLEX RECEPTACLE. COORDINATE FINAL LOCATION WITH ARCHITECTURAL DRAWINGS AND A/V VENDOR.
- NEMA SPECIAL RECEPTACLE WITH NEMA CONFIGURATION. COORDINATE NEMA CONFIGURATION WITH EQUIPMENT MANUFACTURER. WALL MOUNT AT 18" AFF TO CENTER UON.
- RECESSED FLOOR BOX / POKE-THRU DEVICE WITH SEPARATE POWER AND COMMUNICATIONS COMPARTMENTS.
- S 20A, 120/277V SINGLE POLE SWITCH. WALL MOUNT AT 48" AFF TO CENTER UON. SUBSCRIPTS INDICATE THE FOLLOWING:
  - 3 - THREE WAY
  - 4 - FOUR WAY
  - a,b,c... - INDICATES SWITCH LEGS
  - D - DIMMING CONTROLLER
  - OS - SWITCH WITH OCCUPANCY SENSOR
  - M - MANUAL MOTOR STARTER WITH MELTING ALLOY HEATER ELEMENTS.
  - P - SWITCH WITH PILOT LIGHT
  - WP WEATHERPROOF SWITCH
- EPO "EMERGENCY POWER OFF" PUSH BUTTON. 1 3/8" DIAMETER RED MOMENTARY CONTACT MUSHROOM HEAD PUSH BUTTON WITH ALUMINUM GUARD. NORMALLY OPEN CONTACT RATED FOR 20A, 120VAC. MOUNT 48" AFF TO CENTER.
- BUS WAY AS INDICATED ON POWER PLANS.
- CABLE TRAY AS INDICATED ON POWER PLANS.
- RACE WAY AS INDICATED ON POWER PLANS.

SENSORS

- OC a SWITCH LEG (WHEN PRESENT).
  CEILING MOUNTED LOW VOLTAGE OCCUPANCY SENSOR. ALL SENSORS SHALL BE DUAL TECHNOLOGY TYPE. REFER TO DRAWING E-501.

NOTES:

SHEET NOTES:

1. INSTALL ALL EQUIPMENT AND DEVICES AT THE HEIGHT INDICATED ON THIS SHEET UNLESS OTHERWISE NOTED. REFER TO ARCHITECTURAL INTERIOR ELEVATIONS FOR SPECIAL MOUNTING HEIGHTS AND LOCATIONS OF ELECTRICAL DEVICES. MOUNTING HEIGHTS AND LOCATIONS INDICATED ON ARCHITECTURAL ELEVATIONS TAKE PRECEDENCE OVER MOUNTING HEIGHTS AND LOCATIONS INDICATED ON ELECTRICAL PLANS.
2. LUMINAIRES INDICATED AS FOLLOWS: UPPER CASE LETTER WITH NUMERAL DENOTES FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE), LOWER CASE LETTER (IF SHOWN) DENOTES SWITCHING ARRANGEMENT AND NUMERAL BY ITSELF (IF SHOWN) DENOTES CIRCUIT NUMBER.
3. WHERE DEVICES ARE INDICATED TO BE MOUNTED ABOVE A COUNTERTOP, MOUNT DEVICE SUCH THAT BOTTOM OF COVER PLATE IS 51mm (2") ABOVE TOP OF BACK SPLASH. IF THERE IS NO BACK SPLASH, MOUNT DEVICE 51mm (2") ABOVE FINSHED COUNTER TOP SURFACE TO BOTTOM OF DEVICE COVER PLATE.
4. WHERE MULTIPLE TOGGLE SWITCHES ARE SHOWN TO BE MOUNTED ADJACENT TO ONE ANOTHER, MOUNT SWITCHES IN A SINGLE BOX UP TO 4-GANG (NORMAL AND EMERGENCY CIRCUITS SHALL NOT OCCUPY THE SAME ENCLOSURE).
5. ALL MATERIALS AND EQUIPMENT SHALL BE LISTED AS COMPLYING WITH THE APPLICABLE STANDARDS OF UNDERWRITERS LABORATORIES, INC.
6. PROVIDE DISCONNECTING MEANS FOR ALL ELECTRICALLY OPERATED AUTOMATIC DOOR OPERATORS. DISCONNECTING MEANS SHALL BE A 20A, 120V TOGGLE SWITCH MOUNTED ABOVE THE FINISHED ACCESSIBLE CEILING ADJACENT TO THE DOOR OPERATOR.
7. PROVIDE OVERCURRENT PROTECTIVE DEVICES THAT ARE SELECTIVELY COORDINATED. SELECTIVE COORDINATION IS DEFINED AS "LOCALIZATION OF AN OVERCURRENT CONDITION TO RESTRICT OUTAGES TO THE CIRCUIT OR EQUIPMENT AFFECTED, ACCOMPLISHED BY THE CHOICE OF OVERCURRENT PROTECTIVE DEVICES AND THEIR RATINGS OR SETTINGS."
8. VERIFY LOCATION OF ALL FLOOR-MOUNTED OUTLETS WITH CONTRACTING OFFICER PRIOR TO ROUGH-IN. X-RAY FLOOR SLAB PRIOR TO CORE DRILLING TO AVOID STRUCTURAL ELEMENTS.

CONDUIT AND CONDUCTORS

- BRANCH CIRCUIT CONCEALED IN CEILING SPACE OR WALL.
  BRANCH CIRCUIT WIRING IN CONDUIT. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL CONDUCTOR. SHARING OF A NEUTRAL CONDUCTOR BETWEEN TWO OR MORE BRANCH CIRCUITS IS NOT ALLOWED. MINIMUM 2 #12 + 1 #12 EQUIPMENT GROUND WITH 3/4" CONDUIT, UNLESS OTHERWISE NOTED.
- 1ALN1-1,3,5
  - PANELBOARD DESIGNATION.
  - HOMERUN TO PANELBOARD.
  - CIRCUIT DESIGNATION. "1,3" INDICATES A TWO-POLE CIRCUIT BREAKER. "1,3,5" INDICATES A THREE-POLE CIRCUIT BREAKER.
- CONDUIT TERMINATION, CAPPED, BUSHED, GROUND BUSHING.
- [——] 4" EMPTY CONDUIT SLEEVES, STUB 6" FROM BOTH SIDES THE WALL AND PROVIDE WITH NYLON BUSHINGS.

ABBREVIATIONS

A	AMPERES
AAP	AREA ALARM PANEL
ADO	AUTOMATIC DOOR OPENER
AE	ARCHITECT AND ENGINEER
AF	AMPERE FRAME
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERES INTERUPTING CAPACITY
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
BC	BARE COPPER
BFC	BELOW FINISHED CEILING
BFG	BELOW FINISHED GRADE
BKR	BREAKER
BRIP	BOILER PLANT INSTRUMENTATION PANEL
C	CONDUIT
CAB	CABINET
CB, C/B	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CLG	CEILING
CL	CENTERLINE
CT's	CURRENT TRANSFORMERS
CU	COPPER
DISC	DISCONNECT(ING)
DWG	DRAWING(S)
EA	EACH
EF	EXHAUST FAN
EG	EQUIPMENT GROUND
ELEC	ELECTRIC
EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
ESM	ELECTRIC STRIP MOLD
EUH	ELECTRIC UNIT HEATER
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
E, EX	EXISTING
EXH	EXHAUST
EP0	EMERGENCY POWER OFF
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FATC	FIRE ALARM TERMINAL CABINET
FCU	FAN COIL UNIT
FI	FILM ILLUMINATOR
FIXT	FIXTURE
FLA	FULL LOAD AMPERES
FLUOR	FLUORESCENT
FSCP	FLAME SAFEGUARD CONTROL PANEL
FSS	FUSED SAFETY SWITCH
G, GND	GROUND
GEN	ENGINE GENERATOR SET
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFGI	GOVERNMENT FURNISHED GOVERNMENT INSTALLED
>=	GREATER THAN OR EQUAL TO
GFI	GROUND FAULT INTERRUPTER
GFP	GROUND FAULT PROTECTION
HGT	HEIGHT
HID	HIGH INTENSITY DISCHARGE
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HV	HIGH VOLTAGE
INCAND	INCANDESCENT
JB	JUNCTION BOX
KCMIL	THOUSANDS OF CIRCULAR MIL
KVA	KILO-VOLTS-AMPERES
KW	KILO-WATTS
<=	LESS THAN OR EQUAL TO
LAN	LOCAL AREA NETWORK
LTG	LIGHTING
LTS	LIGHTS
m	METER
mm	MILLIMETER
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MTR	MOTOR
MTD	MOUNTED
MTG	MOUNTING
MTG HGT	MOUNTING HEIGHT
MTS	MANUAL TRANSFER SWITCH
NEC	NATIONAL ELECTRICAL CODE
NFSS	NON-FUSED SAFETY SWITCH
N.O.	NORMALLY OPEN
P	POLE
PB	PULL BOX
PNL	PANEL
PVC	POLYVINYL CHLORIDE
PWR	POWER
RECEPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
SS	SAFETY SWITCH
SE	SEWAGE EJECTOR
SWB	SWITCHBOARD
TEL	TELEPHONE
TYP	TYPICAL
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VOLTAGE
VA	VOLT-AMPERES
W	WIRE
W/	WITH
WP	WEATHER PROOF
WT	WATER TIGHT
XFMR	TRANSFORMER
Δ	DELTA
Y	WYE

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL SYMBOLS & LEGENDS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293525 | LATEST REV.

SHEET NO. E-001

12/16/2013 7:19:30 AM

DEMOLITION NOTES:

1. PRIOR TO BID SUBMISSION, THE CONTRACTOR SHALL VISIT THE SITE AND AREA OF WORK TO FAMILIARIZE HIM, OR HERSELF WITH THE EXISTING CONDITIONS.
2. REMOVAL AND RELOCATION OF SOME EXISTING ELECTRICAL WORK SHALL BE NEEDED FOR SATISFACTORY PERFORMANCE OF THIS AND OTHER TRADES. PROPOSALS SHALL INCLUDE CONSIDERATION FOR ANY AND ALL REQUIRED CHANGES. THE INTENT OF THIS DRAWING IS TO RELATE THE GENERAL EXTENT OF DEMOLITION REQUIRED AND NOT TO INDICATE ALL DEVICES, REMOVALS, RECONNECTIONS, OR ADDITIONAL WORK REQUIRED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR DISCONNECTING AND DISPOSING OF ALL ELECTRICAL EQUIPMENT, CONDUIT, WIRE, DEVICES, ETC. AS REQUIRED FOR A COMPLETE DEMOLITION. ALL FLUORESCENT LAMPS AND PCB BALLASTS SHALL BE DISPOSED OF IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS.
4. ANY CONCEALED CONDUITS MADE OBSOLETE DUE TO THE DEMOLITION SHALL BE CUT BACK TO FLOOR, WALL, OR CEILING WITH THE REMAINING ENDS PLUGGED TO ALLOW REFINISHING OF THE SURFACES, EXISTING CONDUITS THAT ARE IN WALLS OR FLOORS WHICH ARE TO REMAIN AND THE CONDUIT DOES NOT, AND WILL NOT INTERFERE WITH THE WORK OF ANY TRADE, MAY REMAIN. ALL ABANDONED WIRE SHALL BE REMOVED IN ITS ENTIRETY.
5. WHILE PERFORMING DEMOLITION WORK, ALL CIRCUITING AND FEEDERS SERVING AREAS BEYOND THE DEMOLITION AREA SHALL BE MAINTAINED AND REPAIRED AS REQUIRED, AT THE CONTRACTOR'S EXPENSE, SO THAT ALL SUCH SYSTEMS REMAIN IN OPERATION. CONTINUITY SHALL REMAIN AT ALL TIMES WHILE DISCONNECTING EQUIPMENT AND DEVICES FROM CIRCUITS THAT ARE TO REMAIN. CONTINUOUS SERVICE ON FEEDERS, CIRCUITS, PARTIAL CIRCUITS AND OUTLET EFFECTED BY DEMOLITION WORK SHALL BE MAINTAINED, EXCEPT WHEN WRITTEN PERMISSION IS PROVIDED BY THE OWNER. ALL WORK REQUIRING SHUT-DOWN OF EXISTING SYSTEMS SHALL BE PERFORMED DURING OVERTIME HOURS, WITH OWNER'S APPROVAL, AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL PLAN AND PERFORM WORK IN SUCH A WAY AS TO MINIMIZE THE OUTAGES AND SUBMIT TO THE OWNER A SCHEDULE OF THE REQUIRED OUTAGES.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO EXISTING MATERIAL NOT EFFECTED BY THE SCOPE OF DEMOLITION WORK WHICH IS DAMAGE BY HIS WORK. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY/ALL DAMAGED MATERIALS OR EQUIPMENT AS DIRECTED, AT NO ADDITIONAL COST TO THE OWNER. REPAIRING AND PATCHING SHALL BE DONE BY THE RESPECTIVE TRADES INVOLVED. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND RESTORATION OF EXISTING CONSTRUCTION IN AREAS WHICH ARE NOT IN THE RENOVATION WORK AREA, BUT REQUIRED TO ACCOMMODATE NEW WORK AND REMOVAL OF ABANDONED SYSTEMS.
7. NOT USED.
8. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR DEMOLITION/RELOCATION OF MECHANICAL OR PLUMBING EQUIPMENT. THE CONTRACTOR SHALL DISCONNECT AND REMOVE ALL CONDUIT, WIRE AND ASSOCIATED DEVICES RELATING TO EQUIPMENT BEING REMOVED.
9. PRIOR TO THE INTERRUPTION OF EXISTING FEEDERS OR PANELS, THE CONTRACTOR SHALL VERIFY, BY MEANS OF TRACING ALL EXISTING CIRCUITS, THAT ALL BRANCH CIRCUITS BEING FED FROM DEMOLISHED/RELOCATED FEEDERS AND PANELS ARE NOT SERVING AREAS WHICH ARE TO REMAIN, WHERE NECESSARY, RECONNECT CIRCUITS TO CORRESPONDING NEW OR EXISTING TO REMAINING BRANCH CIRCUIT PANELS. THESE SAME CONDITIONS SHALL APPLY TO FIRE ALARM, COMMUNICATIONS, CONTROL AND SPECIAL SYSTEMS.
10. WHERE EXISTING DEVICES OR EQUIPMENT ARE DEMOLISHED, CONDUITS, CONDUCTORS SERVING THE DEVICES OR EQUIPENT SHALL BE DEMOLISHED BACK TO THE SOURCE PANEL.
11. WHERE EXISTING PANELS ARE DEMOLISHED, FEEDERS SHALL BE DEMOLISHED BACK TO THE SOURCE PANEL.
12. EXISTING ABANDONED DEVICES, EQUIPMENT, PAQNELS, ELECTRICAL ENCLOSURES, CONDUITS AND CONDUCTORS SHALL BE DEMOLISHED IN THE AREA OF RENOVATION.

TELEPHONE / DATA SYSTEM

- COMBINATION DUAL DATA / DUAL TELEPHONE OUTLET. MOUNT AT 18" AFF TO CENTER U.O.N. PROVIDE 1-1/4" CONDUIT TO CABLE TRAY, REFER TO DETAIL #5 ON DRAWING E-501. WITH A 4" J-BOX WHERE EACH SYMBOL IS SHOWN.
- COMBINATION POWER/COMMUNICATION SYSTEM OUTLETS FLUSH MOUNTED IN FLOOR.
- CR — CARD READER. MOUNT AT 42" AFF TO CENTER U.O.N. PROVIDE 3/4" CONDUIT TO 6" ABOVE CEILING (AIM CONDUIT TOWARD NEAREST IT ROOM) WITH A 4" J-BOX WHERE EACH SYMBOL IS SHOWN. SEE DETAILS #2 & #3 ON SHEET E-501 FOR MOUNTING DETAIL.
- PB — PUSH BUTTON. MOUNT AT 42" AFF TO CENTER, UON. PROVIDE 3/4" CONDUIT TO MOTOR.

LUMINARIES

- A1 / a — UPPER CASE LETTER INDICATES FIXTURE TYPE. REFER TO FIXTURE SCHEDULE. LOWER CASE LETTER REFERS TO SWITCH LEG (WHEN PRESENT).
- LIGHTING FIXTURES. REFER TO FIXTURE SCHEDULE.
- LIGHTING FIXTURES. REFER TO FIXTURE SCHEDULE. PROVIDE WITH BATTERY PACK. BATTERY PACK SHALL MAINTAIN 50% OF THE FIXTURE LIGHT OUTPUT FOR 90 MINUTES.
- EXIT SIGN, CEILING OR PENDANT MOUNTED. SHADED PORTION DENOTES FACE(S). DIRECTIONAL ARROWS AS INDICATED.
- EXIT SIGN, WALL MOUNTED. SHADED PORTION DENOTES FACE(S). DIRECTIONAL ARROWS AS INDICATED.

SINGLE LINE DIAGRAM

- 3P 100A — CIRCUIT BREAKER WITH TRIP RATING AS INDICATED.
- 3P 100A — DRAW-OUT TYPE CIRCUIT BREAKER WITH TRIP RATING AS INDICATED.
- M — MULTIFUNCTION DIGITAL POWER CIRCUIT MONITOR.
- POWER TRANSFORMER WITH DELTA CONNECTED PRIMARY, WYE CONNECTED SECONDARY AND RATING AS INDICATED.
- PANELBOARD:
  - SEE PANEL SCHEDULE FOR SIZE.
  - 1AHN1 — WHEN PRESENT, INDICATES PANELBOARD WITH FEED THROUGH LUGS.
- SPD — SURGE PROTECTION DEVICE (INTERNAL).
- PANEL BAR/BUS.

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
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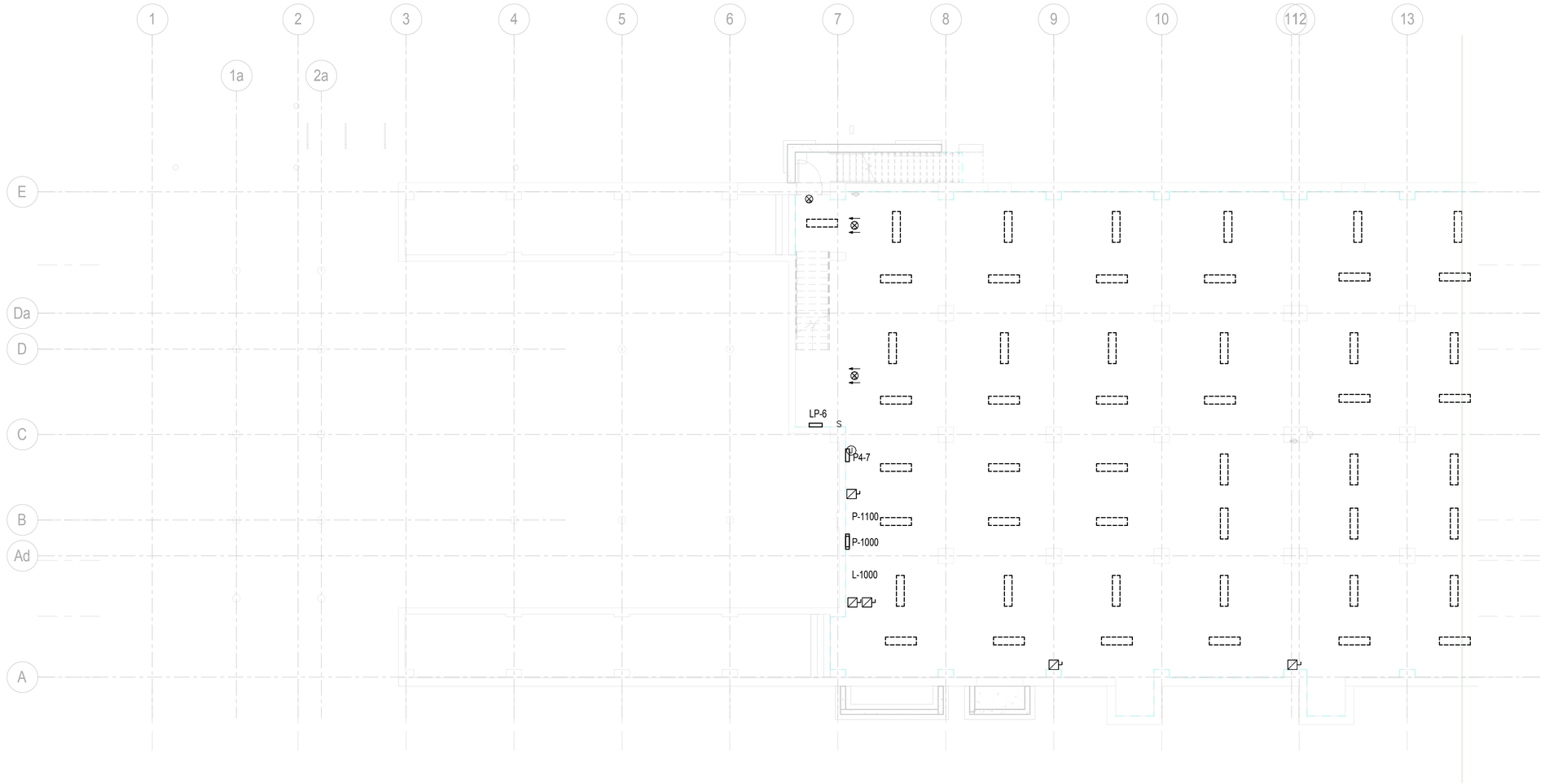
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL SYMBOLS & LEGENDS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293526 | LATEST REV.
SHEET NO. E-002

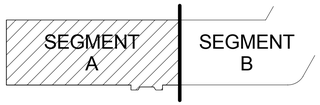
12/16/2013 7:20:00 AM



GENERAL NOTES:

1. ALL DEVICE/EQUIPMENT SHOW ON THE DEMOLITION PLAN SHALL BE DEMOLISHED. UNLESS NOTED OTHERWISE.
2. EXTEND THE CONDUCTORS AND CONDUIT FOR LIGHTING TO PANEL "BHME" TO SERVE THE LIGHTING FIXTURES IN THE BASEMENT, REFER TO BASEMENT LIGHTING PLANS.
3. ALL ELECTRICAL DEVICES/EQUIPMENT ON THE FIRST AND SECOND FLOORS ARE EXISTING TO BE DEMOLISHED, UNLESS INDICATED OTHERWISE.
4. REFER TO DRAWING E-601 FOR ADDITIONAL DEMOLITION REQUIREMENTS.

SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.		
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SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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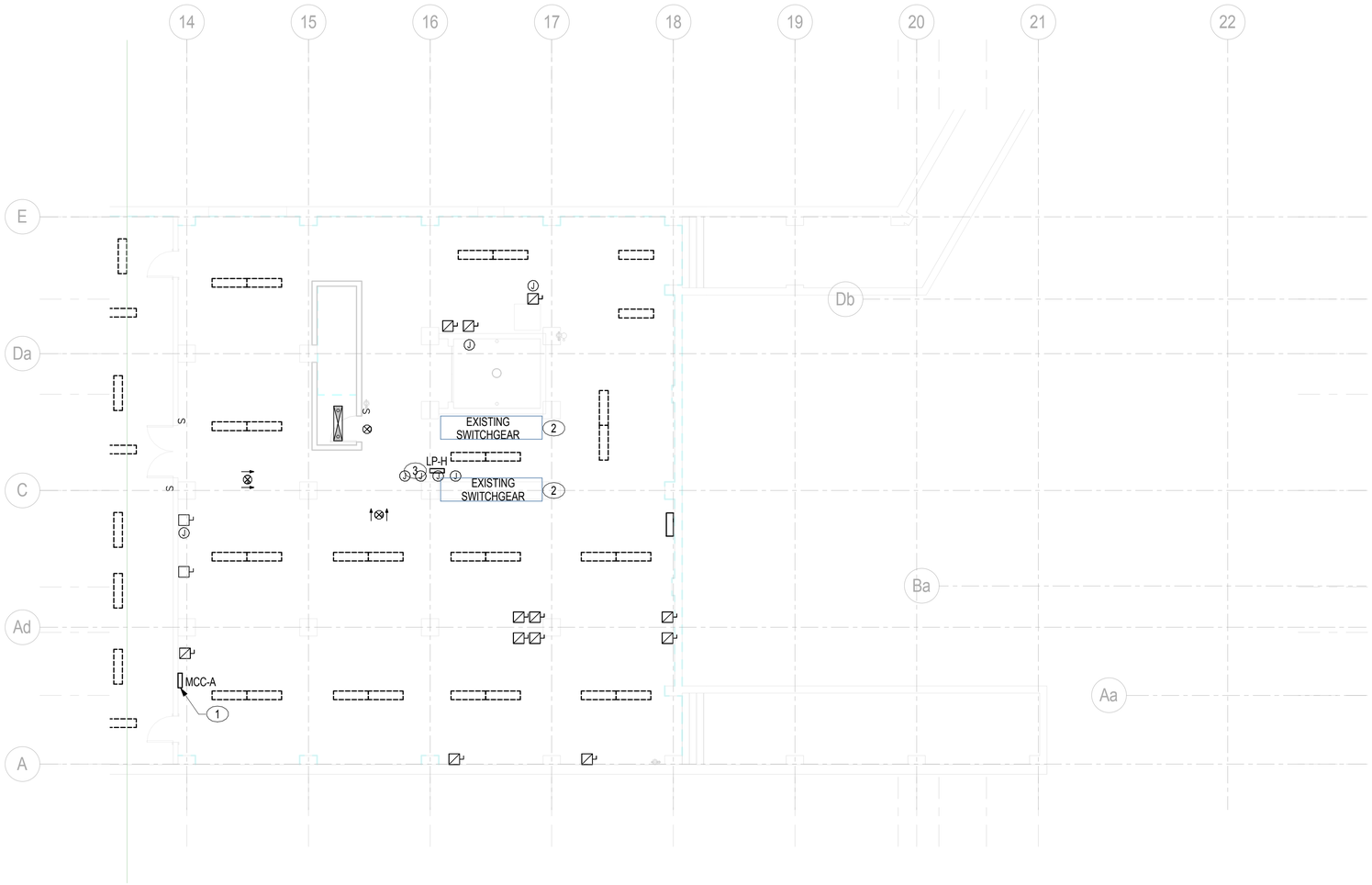
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT - DEMOLITION PLAN SEGMENT A

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293527 | LATEST REV.

SHEET NO.: ED-100A

12/16/2013 7:27:54 AM



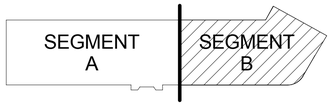
SEGMENT A
SEGMENT B

GENERAL NOTES:

1. ALL OF THE DEVICE/EQUIPMENT SHOW ON THE DEMOLITION PLAN SHALL BE DEMOLISHED. UNLESS NOTED OTHERWISE.
2. EXTEND THE CONDUCTORS AND CONDUIT FOR LIGHTING TO PANEL "BHME" TO SERVE THE LIGHTING FIXTURES IN THE BASEMENT, REFER TO BASEMENT LIGHTING PLANS.
3. ALL ELECTRICAL DEVICES/EQUIPMENT ON THE FIRST AND SECOND FLOORS ARE EXISTING TO BE DEMOLISHED, UNLESS INDICATED OTHERWISE.
4. REFER TO DRAWING E-601 FOR ADDITIONAL DEMOLITION REQUIREMENTS.

KEYNOTES:

1. EXISTING MOTOR CONTROL CENTER SHALL REMAIN. ALL FEEDER AND BRANCH CIRCUITS FROM THE MOTOR CONTROL CENTER (MCC-A) SHALL BE EXISTING TO REMAIN AND PROTECTED FROM DAMAGE.
2. EXISTING SWITCHGEAR SHALL BE DEMOLISHED. PROVIDE TEMPORARY POWER TO THE (2) OUTDOOR CHILLERS VIA THE EXISTING MCC-A, POWER TO CONTROL CIRCUITS SHALL BE BY NEW PANEL BLME. OUTAGES TO THE (2) OUTDOOR CHILLERS SHALL ONLY BE ALLOWED DURING THE WEEKEND. PROVIDE A MOBILE GENERATOR AS NEEDED.
3. INTERCEPT EXISTING COOLING TOWER CONTROL CIRCUIT AND HEAT TRACE CIRCUIT FED FROM DEMOLISHED PANEL LP-H. EXTEND CONDUIT AND CONDUTCORS TO PANEL BLME. REFER TO DRAWING E-210B.



KEY PLAN

N

1/8"=1'-0"
8' 4' 0 8' 16'

GRAPHIC SCALES

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SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT - DEMOLITION PLAN SEGMENT B

BUILDING NO. 1230
SIZE D
DRAWING NO. 1293528
LATEST REV.
SHEET NO. ED-100B

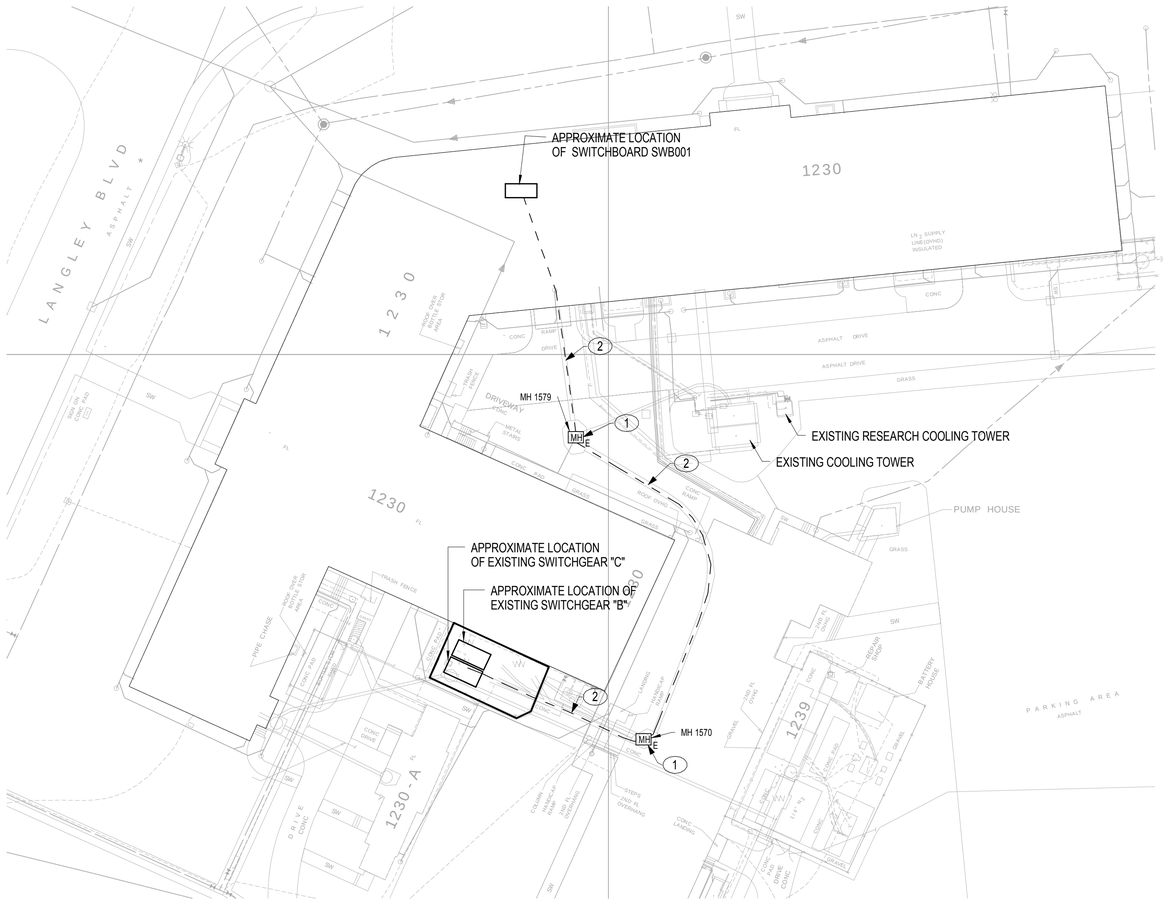
12/16/2013 7:27:56 AM

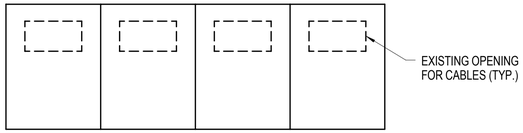
GENERAL NOTES:

1. REFER TO ELECTRICAL DEMOLITION ONE-LINE DIAGRAM E-601 FOR ADDITION INFORMATION.
2. REFER TO DRAWING E-112 FOR MANHOLE BUTTERFLY DIAGRAMS.

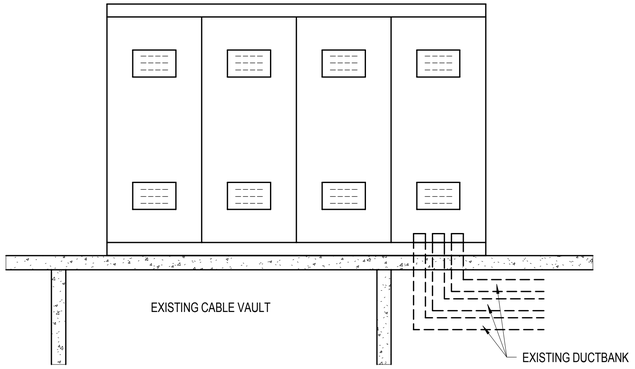
KEYNOTES:

1. EXISTING MANHOLE.
2. REUSE EXISTING DUCTBANK FOR NEW FEEDERS FROM EXISTING SWITCHGEAR TO SWITCHBOARD SWB001. REFER TO ONE-LINE DIAGRAM.





PLAN VIEW



FRONT VIEW

2 EXISTING SWITCHGEAR "C"
NOT TO SCALE

NOTE: VERIFY EXISTING SERVICE ENTRANCE BOND JUMPER AT TRANSFORMER SERVING SWITCHGEAR "C"/ SUBMIT CONFIRMATION PHOTO WITH SWITCHBOARD SUBMITTAL.

N

1" = 30'-0" 0 30' 60'

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SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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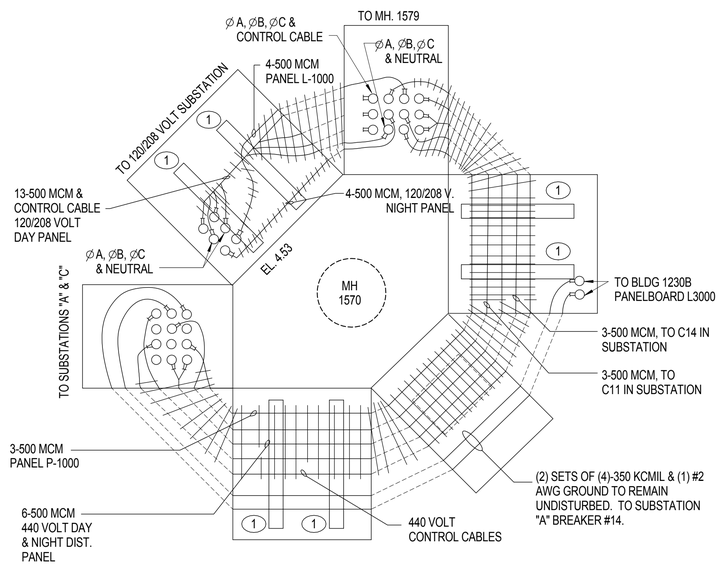
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

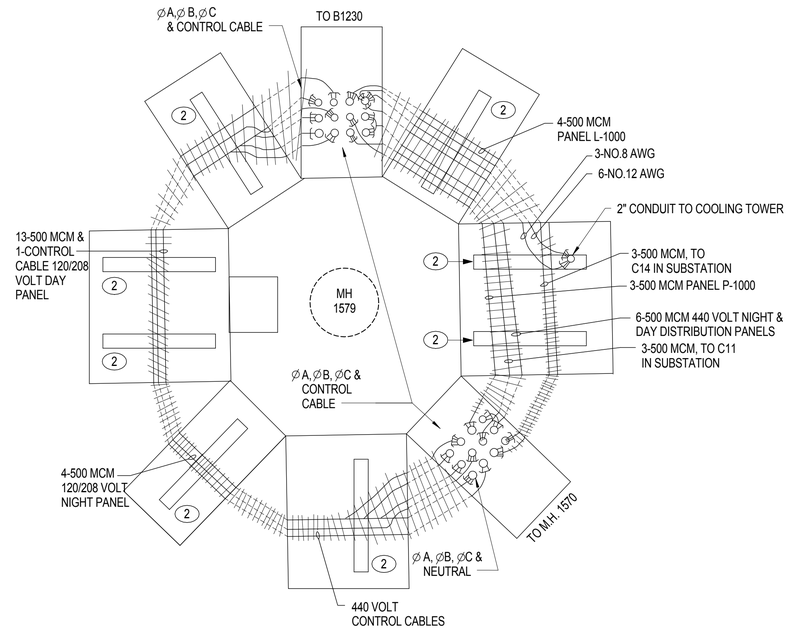
DRAWING TITLE: ELECTRICAL POWER SITE PLAN

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293529 | LATEST REV.:

SHEET NO.: E-111

12/16/2013 8:28:39 AM





GENERAL NOTES:

1. CONTRACTOR TO PROVIDE REDLINE DRAWINGS TO INDICATE EXISTING CABLES AND ASBUILT CONDITIONS OF ALL MANHOLES BEING USED IN THIS PROJECT.
2. DEMOLISH ALL CABLE SUPPORTS WHERE EXISTING TO BE DEMOLISHED CABLES ARE REMOVED. NEW CABLES SHALL BE PROVIDED WITH NEW CABLE SUPPORTS.

GRAPHICAL NOTES:

EXISTING CONDUCTORS TO BE REMOVED. REFER TO DRAWING E-601 FOR REFERENCE.

KEYNOTES:

(1) REMOVE ALL THE EXISTING METAL STANCHIONS AND ARMS WHERE EXISTING CABLES ARE REMOVED. PROTECT THE EXISTING TO REMAIN CABLES AND STANCHIONS AND ARMS. PROVIDE (6) NEW NON-METALLIC STANCHIONS WITH (3) NON-METALLIC CABLE ARMS IN THE MANHOLE WHERE INDICATED.

(2) REMOVE ALL THE EXISTING METAL STANCHIONS AND ARMS WHERE EXISTING CABLES ARE REMOVED. PROVIDE (9) NEW NON-METALLIC STANCHIONS EACH WITH (3) NON-METALLIC CABLE ARMS IN THE MANHOLE.

(1) EXISTING MANHOLE
NO SCALE

REVISIONS

Date	No.	Description	BY	Issued to

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
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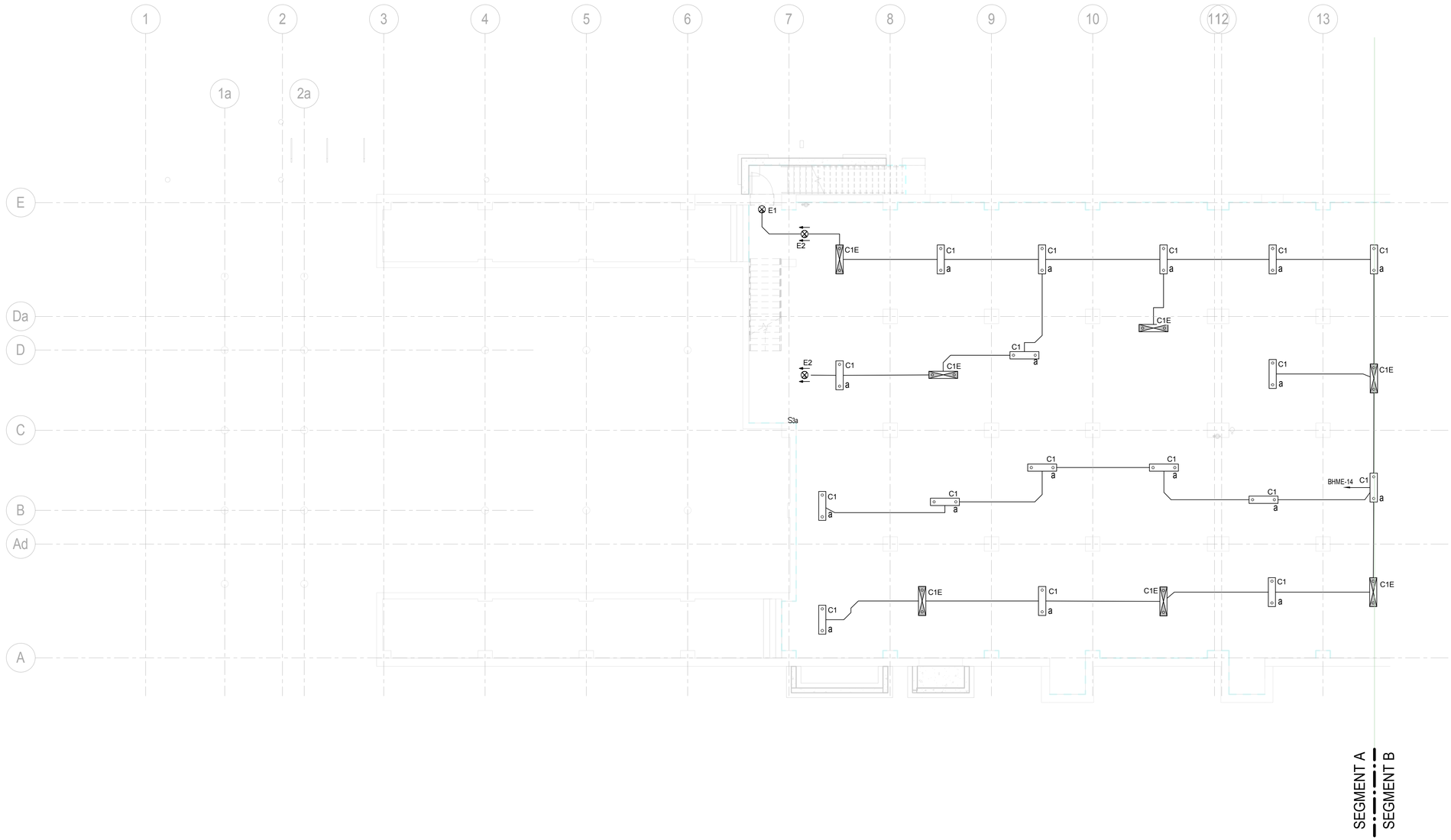
DRAWING TITLE: EXISTING MANHOLE BUTTERFLY DIAGRAM

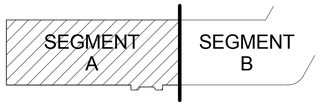
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293530 | LATEST REV.
SHEET NO. E-112

12/16/2013 7:20:48 AM

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO DRAWING E-701 FOR LIGHTING FIXTURE SCHEDULE.
3. REFER TO ARCHITECTURAL DRAWINGS FOR LIGHTING FIXTURE LOCATIONS.





KEY PLAN

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
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Arlington, Va. 22201

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WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN TT	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED TT	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT - ELECTRICAL LIGHTING PLAN SEGMENT A

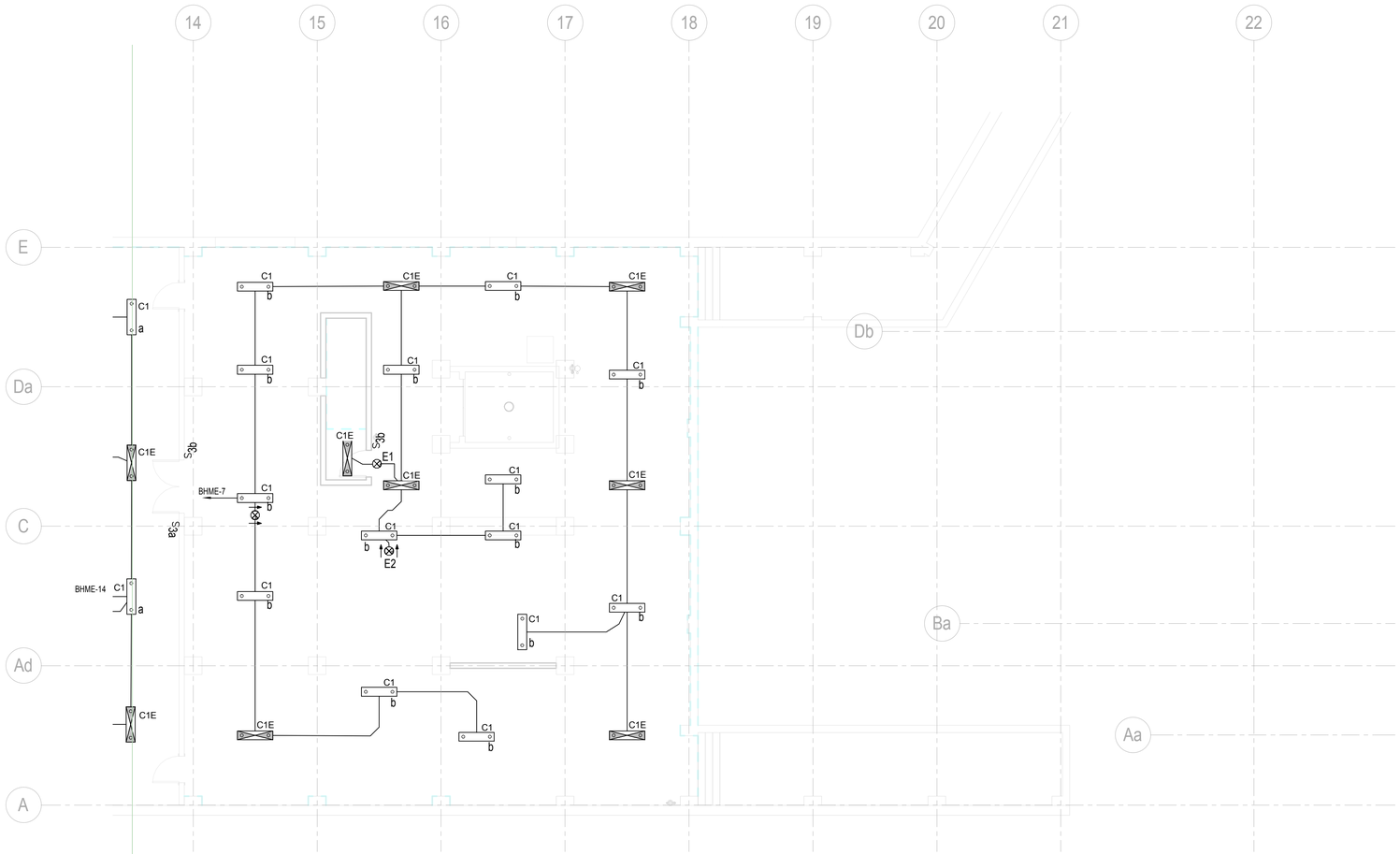
BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293531 | LATEST REV.

SHEET NO.: E-200A

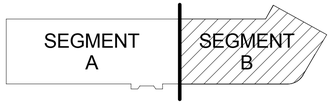
12/16/2013 7:26:29 AM

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO DRAWING E-701 FOR LIGHTING FIXTURE SCHEDULE.
3. REFER TO ARCHITECTURAL DRAWINGS FOR LIGHTING FIXTURE LOCATIONS.



SEGMENT A
SEGMENT B



KEY PLAN

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT - ELECTRICAL LIGHTING PLAN SEGMENT B

BUILDING NO. 1230
SIZE D
DRAWING NO. 1293532
LATEST REV.
SHEET NO. E-200B

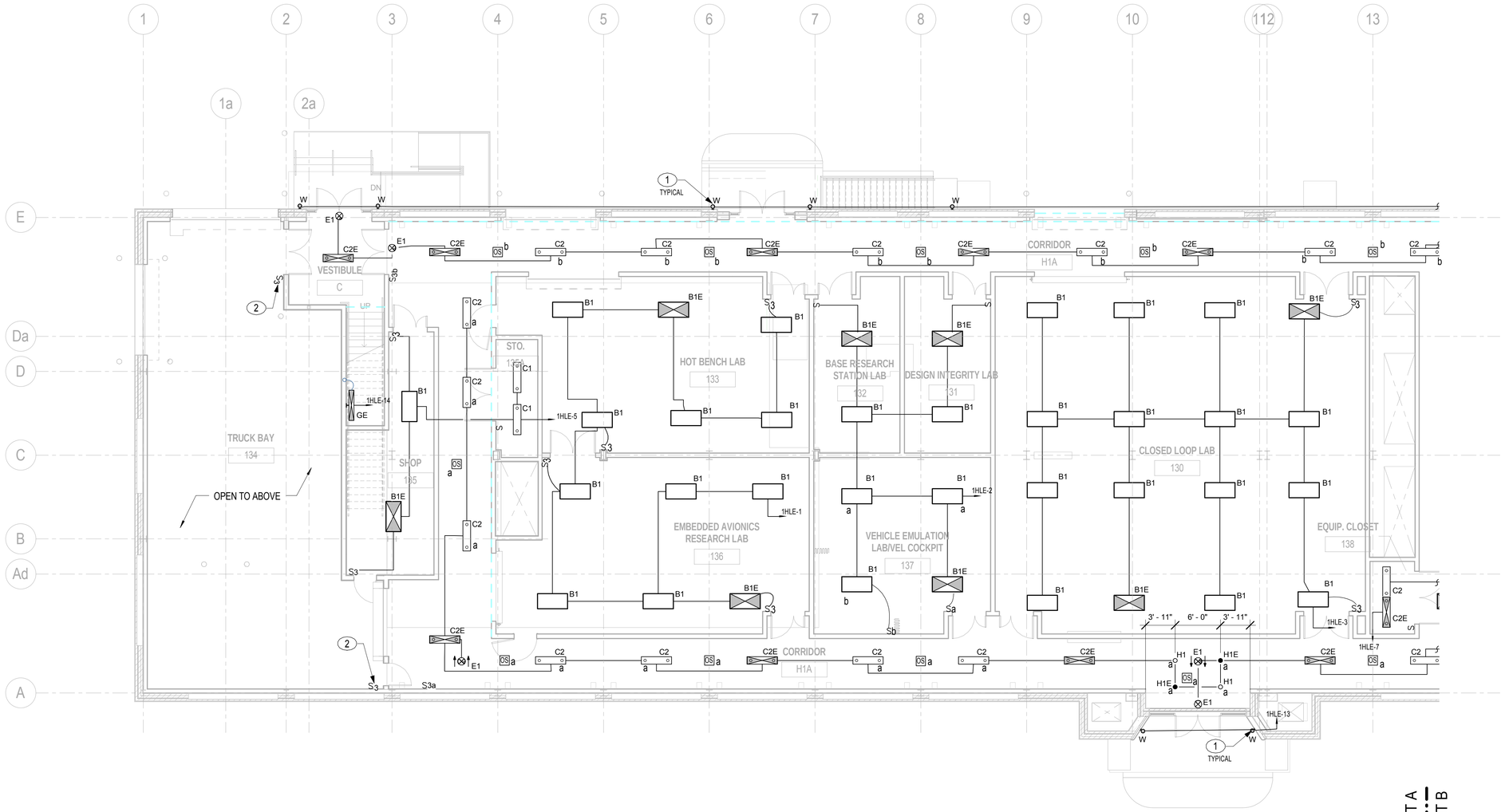
12/16/2013 7:26:30 AM

GENERAL NOTES:

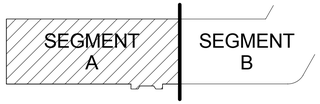
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO DRAWING E-701 FOR LIGHTING FIXTURE SCHEDULE.
3. REFER TO ARCHITECTURAL DRAWINGS FOR LIGHTING FIXTURE LOCATIONS.

KEYNOTES:

1. PROVIDE PHOTOCELL ON / TIME CLOCK OFF FOR EXTERIOR LIGHTING. REFER TO EXTERIOR LIGHTING CONTACTOR DETAIL.
2. SWITCH SHOULD CONTROL LIGHTING IN THE TRUCK BAY. REFER TO DRAWING E202A.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0"

GRAPHIC SCALES

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02, X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - ELECTRICAL LIGHTING PLAN SEGMENT A

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293533 | LATEST REV.:

SHEET NO.: E-201A

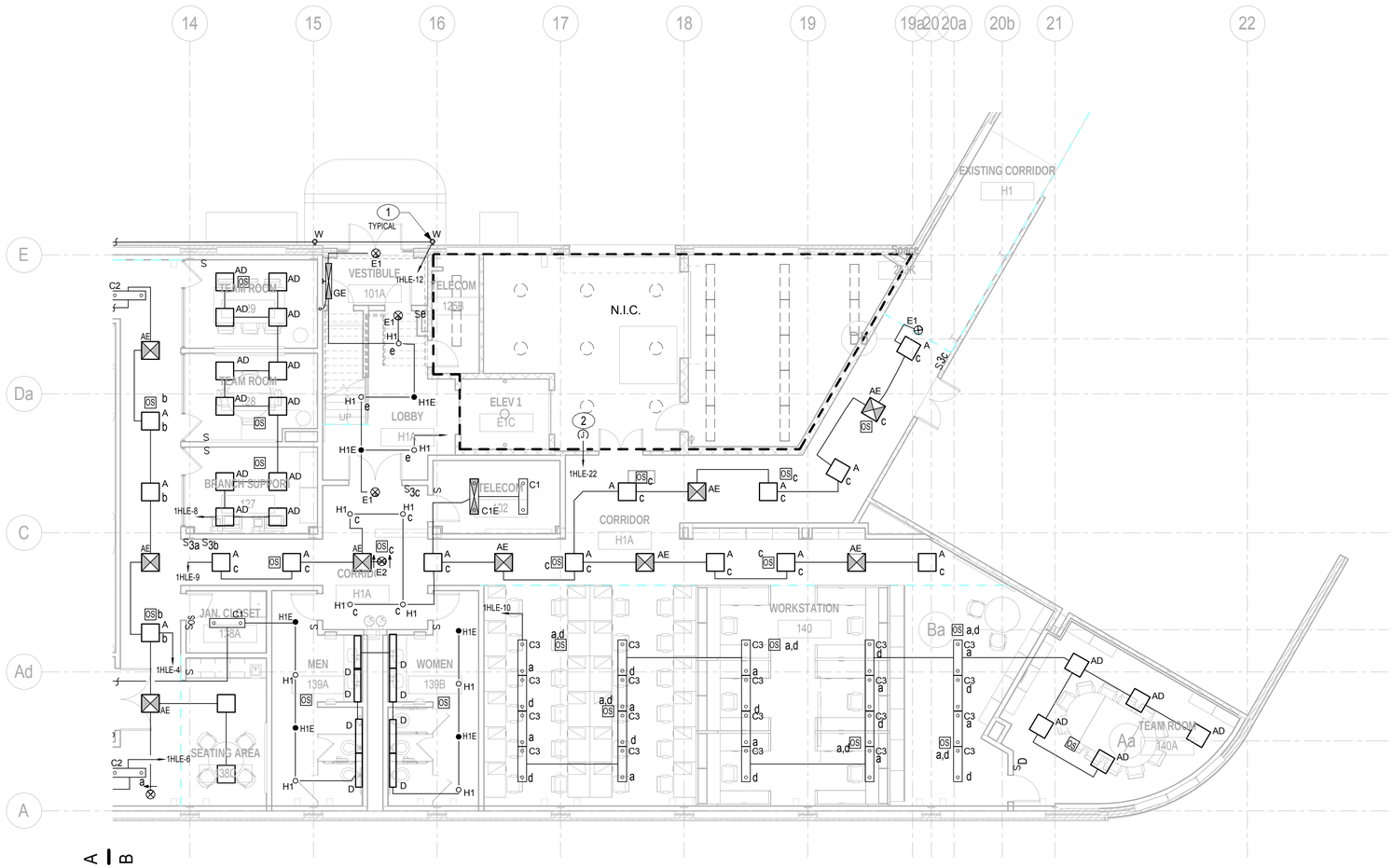
12/16/2013 7:26:33 AM

GENERAL NOTES:

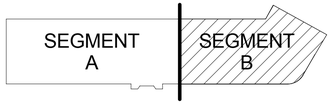
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO DRAWING E-701 FOR LIGHTING FIXTURE SCHEDULE.
3. REFER TO ARCHITECTURAL DRAWINGS FOR LIGHTING FIXTURE LOCATIONS.

KEYNOTES:

1. PROVIDE PHOTOCELL ON / TIME CLOCK OFF FOR EXTERIOR LIGHTING. REFER TO EXTERIOR LIGHTING CONTACTOR DETAIL.
2. JUNCTION BOX- RECONNECT EXISTING FIXTURES IN THIS (NIC) AREA. EXTEND EXISTING CONDUCTORS AND CONDUIT.



SEGMENT A
SEGMENT B



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED TT	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - ELECTRICAL LIGHTING PLAN
SEGMENT B

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293534 | LATEST REV.
SHEET NO. E-201B

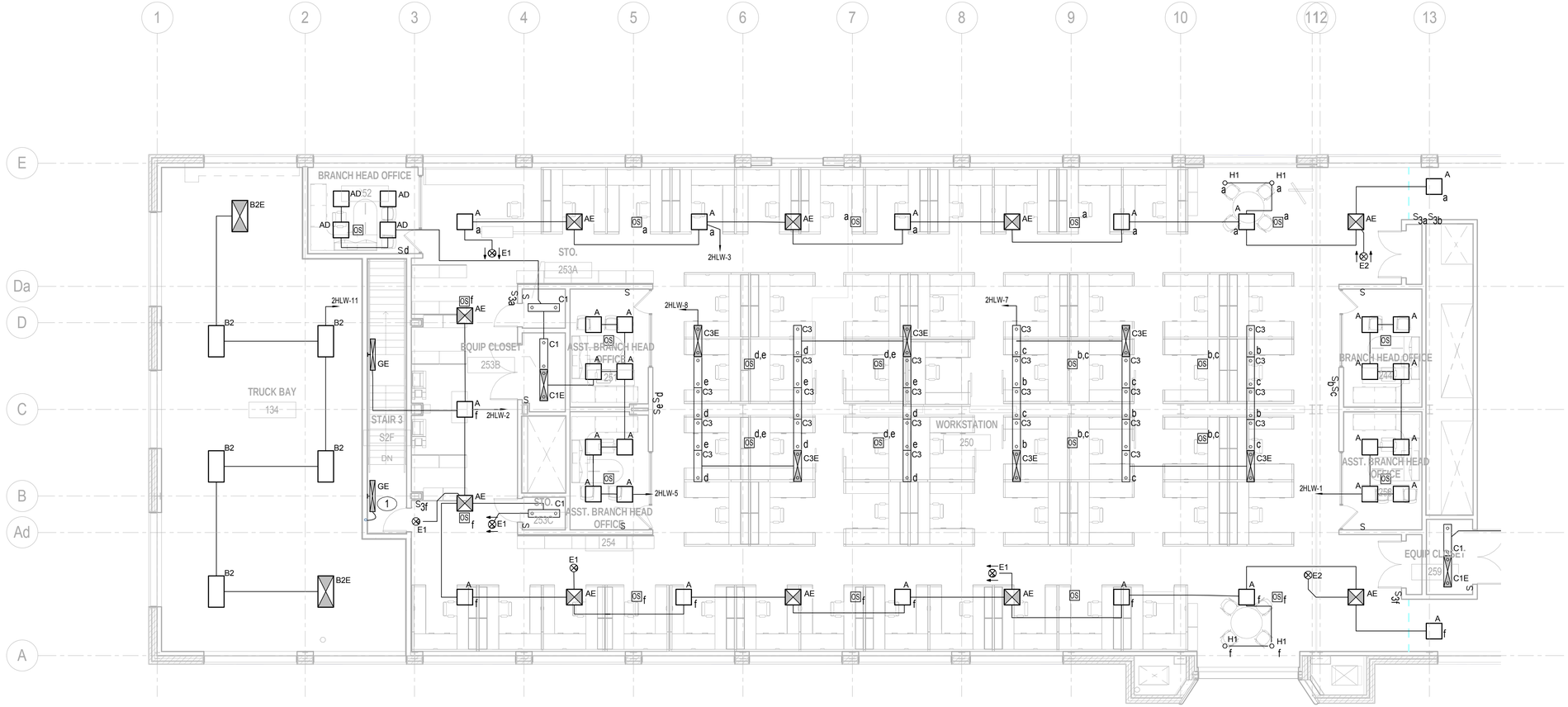
12/16/2013 7:26:36 AM

GENERAL NOTES:

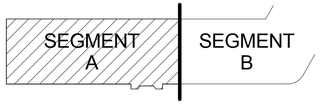
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO DRAWING E-701 FOR LIGHTING FIXTURE SCHEDULE.
3. REFER TO ARCHITECTURAL DRAWINGS FOR LIGHTING FIXTURE LOCATIONS.

KEYNOTES:

1. CONNECT TO THE STAIR CIRCUIT IN FIRST FLOOR. SEE DRAWING E-201A FOR CIRCUITRY INFORMATION.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR - ELECTRICAL LIGHTING PLAN SEGMENT A

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293535 | LATEST REV.

SHEET NO. E-202A

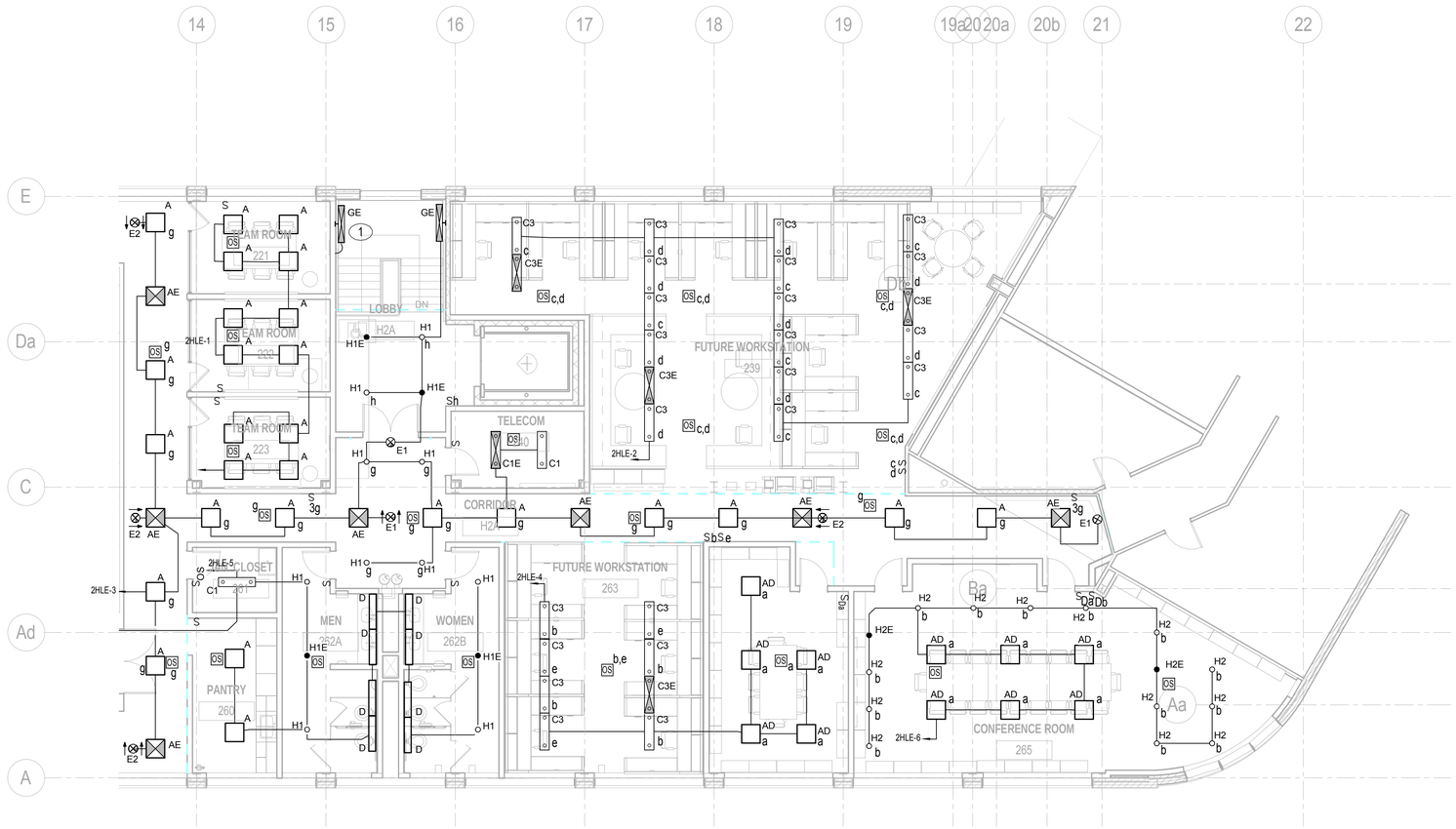
12/16/2013 7:26:41 AM

GENERAL NOTES:

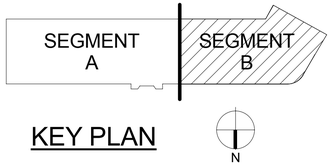
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO DRAWING E-701 FOR LIGHTING FIXTURE SCHEDULE.
3. REFER TO ARCHITECTURAL DRAWINGS FOR LIGHTING FIXTURE LOCATIONS.

KEYNOTES:

1. CONNECT TO THE STAIR CIRCUIT IN FIRST FLOOR. SEE DRAWING E-201B FOR CIRCUITRY INFORMATION.



SEGMENT A
SEGMENT B



KEY PLAN

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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JIEER REN
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11/18/2013
PROFESSIONAL ENGINEER

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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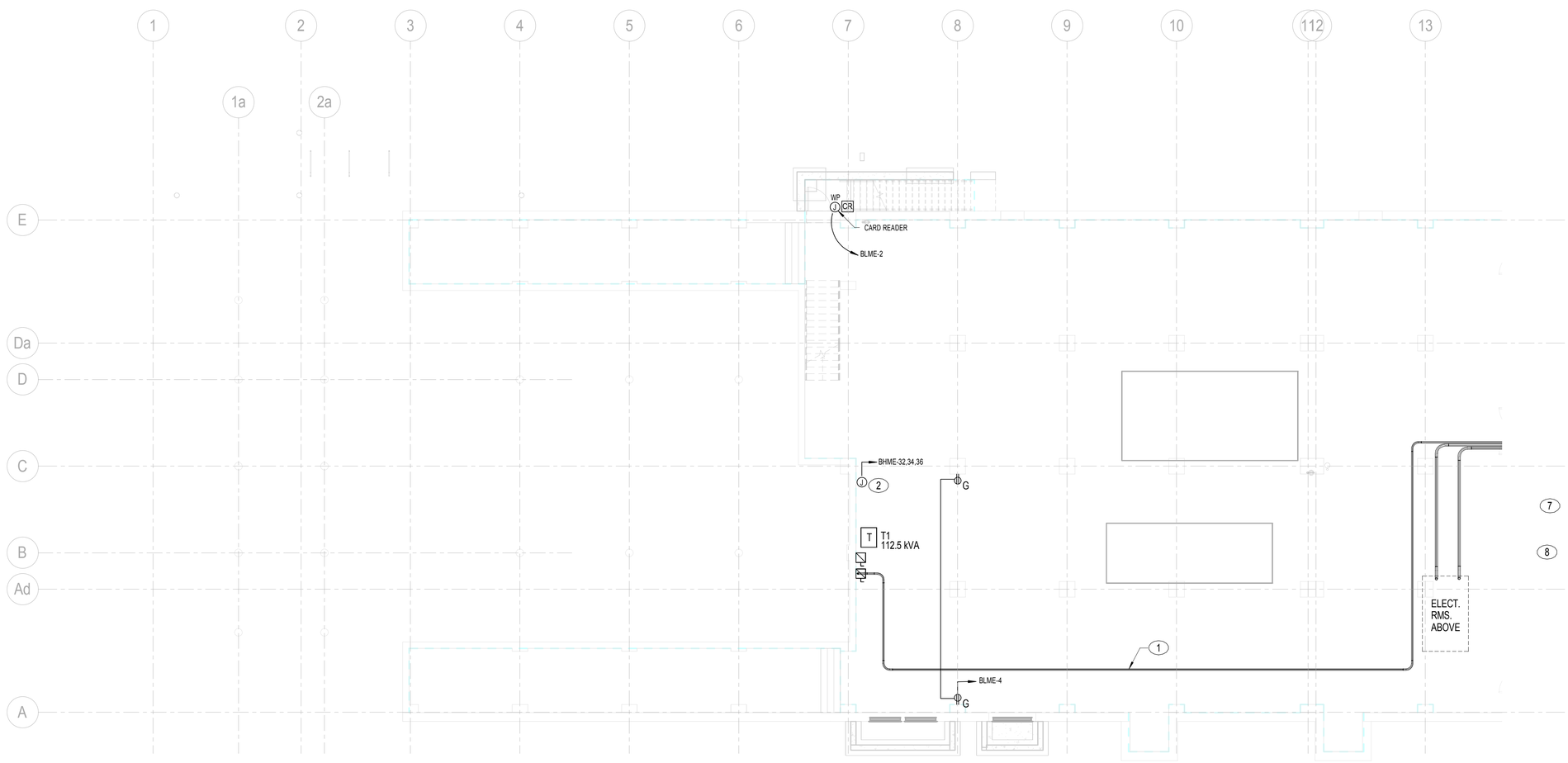
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR - ELECTRICAL LIGHTING PLAN SEGMENT B

BUILDING NO.: 1230 — SIZE: D — DRAWING NO.: 1293536 — LATEST REV.

SHEET NO.: E-202B

12/16/2013 7:26:45 AM



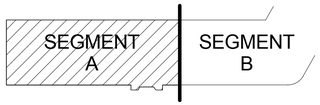
GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.

KEYED NOTES:

1. CONDUITS INDICATED ON DRAWINGS ARE APPROXIMATE PATHS. CONTRACTOR SHALL FIELD VERIFY EXACT CONDUIT ROUTING AND COORDINATE WITH OTHER TRADES BEFORE INSTALLATION.
2. INTERCEPT EXISTING CIRCUIT SERVING EXISTING RESEARCH COOLING TOWER FROM DEMOLISHED PANEL P4-7. EXTEND CONDUITS AND CONDUCTOR FROM INTERCEPT POINT TO PANEL BHME. CONDUCTORS, CONDUITS AND BREAKER SHALL MATCH EXISTING TYPE AND SIZE.

SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

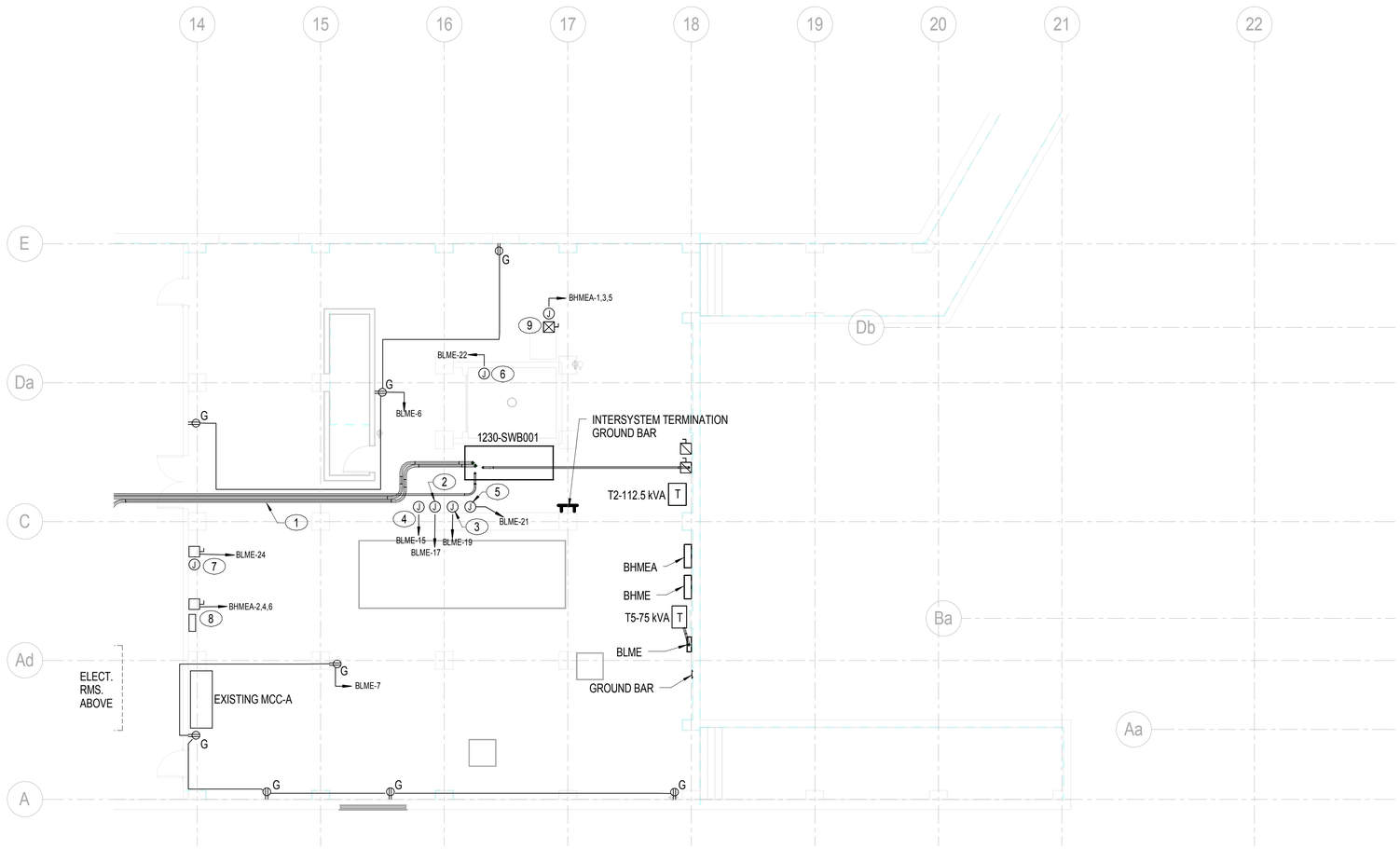
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT - ELECTRICAL POWER PLAN SEGMENT A

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293537 | LATEST REV.

SHEET NO. E-210A

12/16/2013 7:26:47 AM



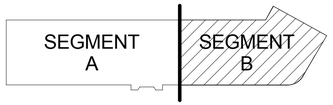
SEGMENT A
SEGMENT B

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.

KEYED NOTES:

1. CONDUITS INDICATED ON DRAWINGS ARE APPROXIMATE PATHS. CONTRACTOR SHALL FIELD VERIFY EXACT CONDUIT ROUTING AND COORDINATE WITH OTHER TRADES BEFORE INSTALLATION.
2. INTERCEPT EXISTING COOLING TOWER CONTROL CIRCUIT FED FROM DEMOLISHED PANEL LP-H.
3. INTERCEPT EXISTING COOLING TOWER HEAT TRACE CIRCUIT FED FROM DEMOLISHED PANEL LP-H. PROVIDE BREAKER WITH GFCI PROTECTION.
4. INTERCEPT EXHAUST FAN STARTER CIRCUIT FED FROM DEMOLISHED PANEL LP-H.
5. INTERCEPT CHILLER CONTROL PANEL CIRCUIT FED FROM DEMOLISHED PANEL LP-H.
6. INTERCEPT EXISTING ELEVATOR PIT LIGHT FIXTURE AND RECEPTACLE.
7. INTERCEPT EXISTING ELEVATOR CAB LIGHTS.
8. PROTECT EXISTING ELEVATOR DISCONNECT AND CONTROLLER. DEMOLISH EXISTING FEEDER TO ELEVATOR DISCONNECT AND PROVIDE NEW CONDUIT AND CONDUCTORS FROM PANEL BHME.
9. PROVIDE A COMBINATION NEMA 2 MOTOR STARTER FOR THE EXISTING CONDENSER WATER PUMP. RECONNECT TO PANEL BLMEA. PROVIDE (3)#10 +(1)#10 GND IN 1" C. COORDINATE WITH DIV. 23 FOR CONTROL CIRCUIT REQUIREMENTS.



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

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11/13/2013
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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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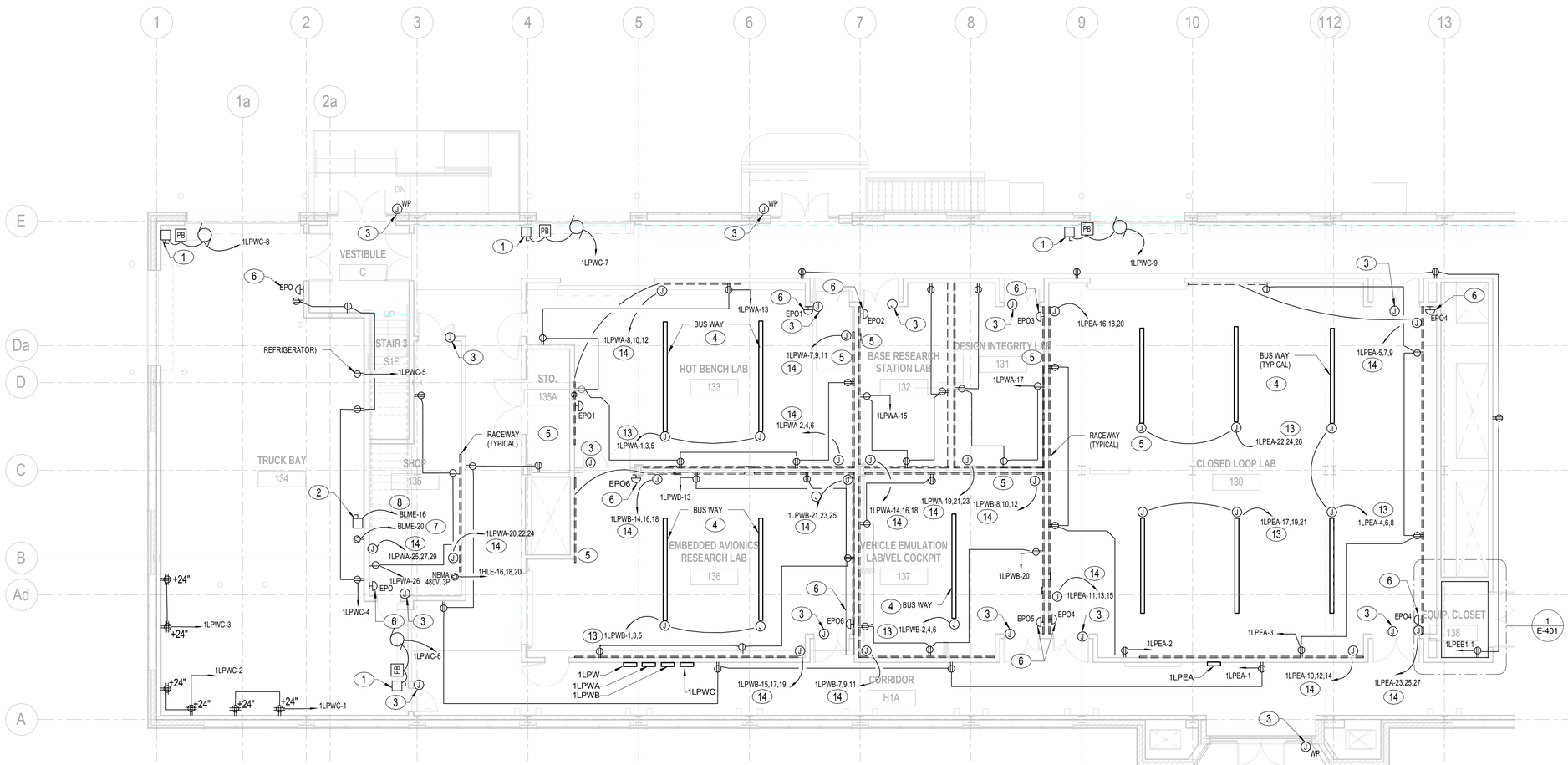
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT - ELECTRICAL POWER PLAN SEGMENT B

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293538 | LATEST REV.

SHEET NO. E-210B

12/16/2013 7:26:49 AM



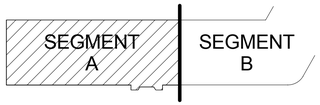
GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.

KEYNOTES:

1. COORDINATE LOCATION OF DISCONNECT SWITCH AND THE INSTALLATION OF PUSH-BUTTON CONTROL PANEL WITH ROLL-UP DOOR SUPPLIER. PROVIDE ALL ACCESSORIES FOR COMPLETE INSTALLATION.
2. REFER TO DRAWING E502 FOR MOS SHORE POWER CONNECTION DETAILS.
3. JUNCTION BOX FOR CARD READER DOOR. CONNECT TO PANEL 1LPWB CIRCUIT #22. REFER TO DRAWING E-501.
4. REFER TO BUSWAY MOUNTING DETAIL ON DWG. E-502. BASIS OF DESIGN STARLINE B100A-4P SERIES. PROVIDE PLUG MODULES EVERY 3'. BASIS OF DESIGN STARLINE: E12X4 SERIES PLUGS OR EQUAL.
5. PLUG-IN MODULAR RACEWAY, TYPICAL BASIS OF DESIGN: STARLINE SBD6OEF-4P OR EQUAL. PROVIDE PLUG-IN MODULES EVERY 3'. BASIS OF DESIGN: STARLINE SB60E31-520Q-IS OR EQUAL. RACEWAY SHALL BE PROVIDED WITH A SEPERATE DATA SECTION.
6. CONNECT THE EPO BUTTONS OF THIS SEGMENT A TO PANEL 1LPWA CIRCUIT #30.
7. 2-#10 + 1-#10 GND. IN 3/4" CONDUIT.
8. 2-3/0 + 1-#6 GND. IN 2" CONDUIT.
9. COORDINATE LOCATION OF DISCONNECT SWITCH AND THE INSTALLATION OF PUSH-BUTTON CONTROL PANEL WITH POLL-UP DOOR SUPPLIER. PROVIDE ALL ACCESSORIES FOR COMPLETE INSTALLATION.
10. NOT USED
11. CONNECT THE EPO BUTTONS OF THIS SEGMENT A TO PANEL 1LPWA CIRCUIT #30.
12. 2-#10 + 1-#10 GND. IN 3/4" CONDUIT.
13.
14. 4-#4 + 1-#10 GND. IN 1-1/4" CONDUIT.

SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
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JIEER REN
Lic. No. 42740
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PROFESSIONAL ENGINEER

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3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED TT	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

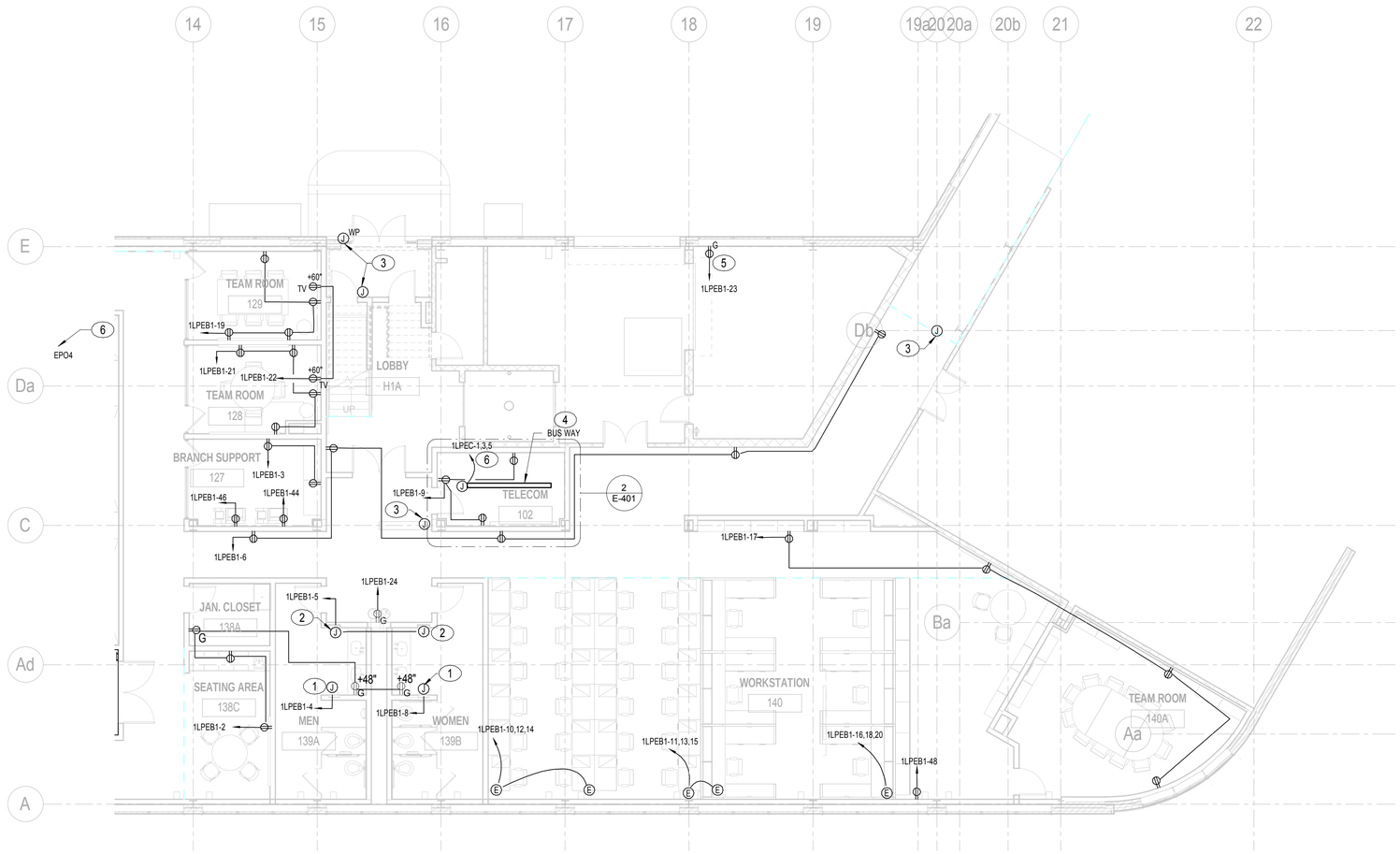
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - ELECTRICAL POWER PLAN SEGMENT A

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293539 | LATEST REV.

SHEET NO. E-211A

12/16/2013 7:26:52 AM

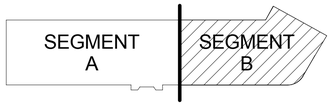


GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.

KEYNOTES:

1. CONNECTION FOR HAND DRYER.
2. CONNECTION FOR PAPER TOWEL.
3. JUNCTION BOX FOR CARD READER DOOR. CONNECT TO PANEL 1LPEB2 CIRCUIT #6.REFER TO DRAWING E-501.
4. REFER TO BUSWAY MOUNTING DETAIL ON DWG. E-502. BASIS OF DESIGN STARLINE B100A-4P SERIES. PROVIDE PLUG MODULES EVERY 3'. BASIS OF DESIGN STARLINE: E12X4 SERIES PLUGS OR EQUAL.
5. INTERSECT EXISTING RECEPTACLE CIRCUIT AT THIS LOCATION. PROVIDE NEW GFCI RECEPTACLE.
6. 4-#1 + 1-#8 GND. IN 1-1/2" CONDUIT.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED TT	
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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ± .02 ; X.XXX (3 DECIMAL PLACES) ± .005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - ELECTRICAL POWER PLAN SEGMENT B

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293540 | LATEST REV.

SHEET NO. E-211B

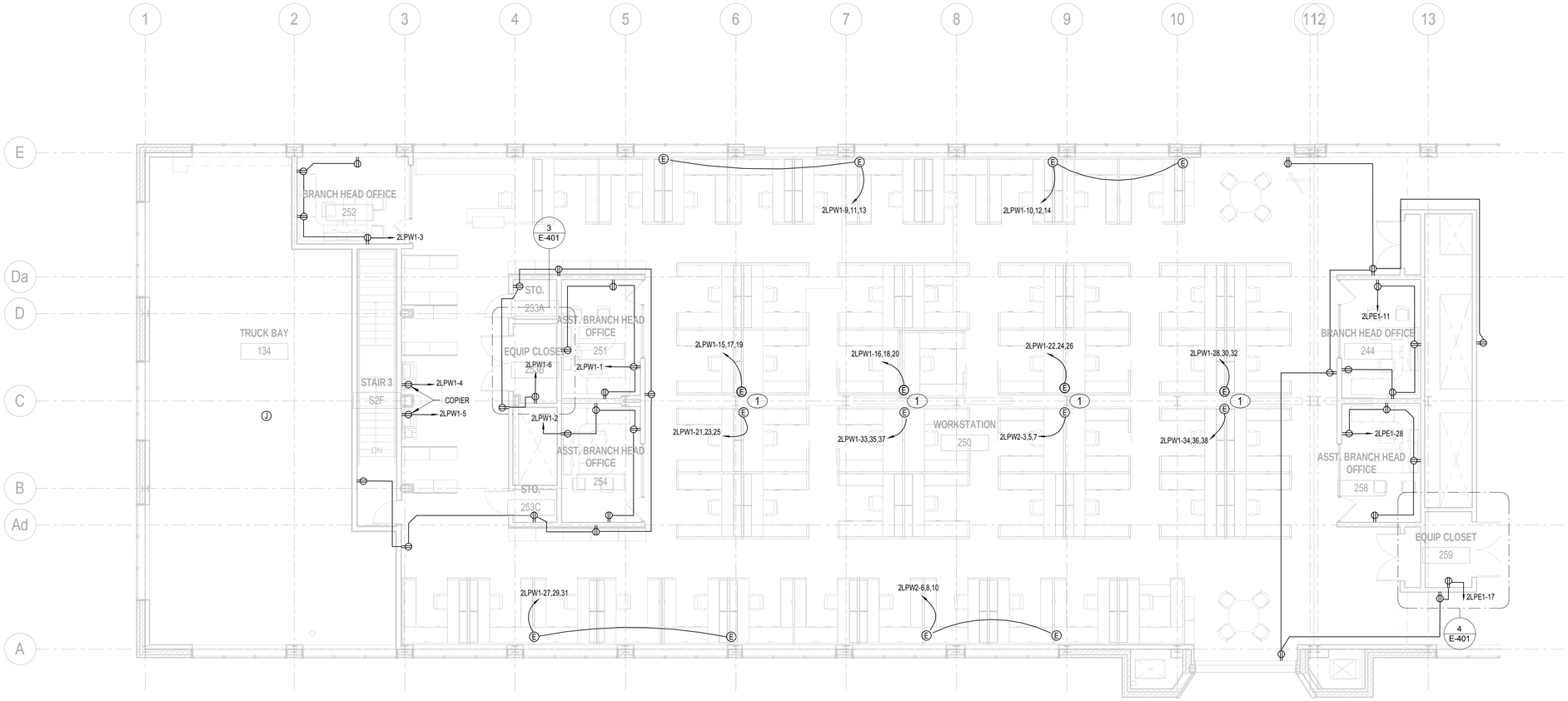
12/16/2013 7:26:55 AM

GENERAL NOTES:

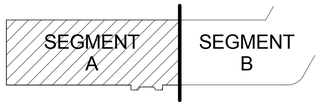
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.

KEYNOTES:

1. CONDUITS SHALL RUN DOWN THE INSIDE FACE OF THE COLUMN TO SYSTEMS FURNITURE CONNECTIONS. POWER POLES SHALL NOT BE ALLOWED.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR - ELECTRICAL POWER PLAN SEGMENT A

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293541 | LATEST REV.

SHEET NO. E-212A

12/16/2013 7:26:59 AM

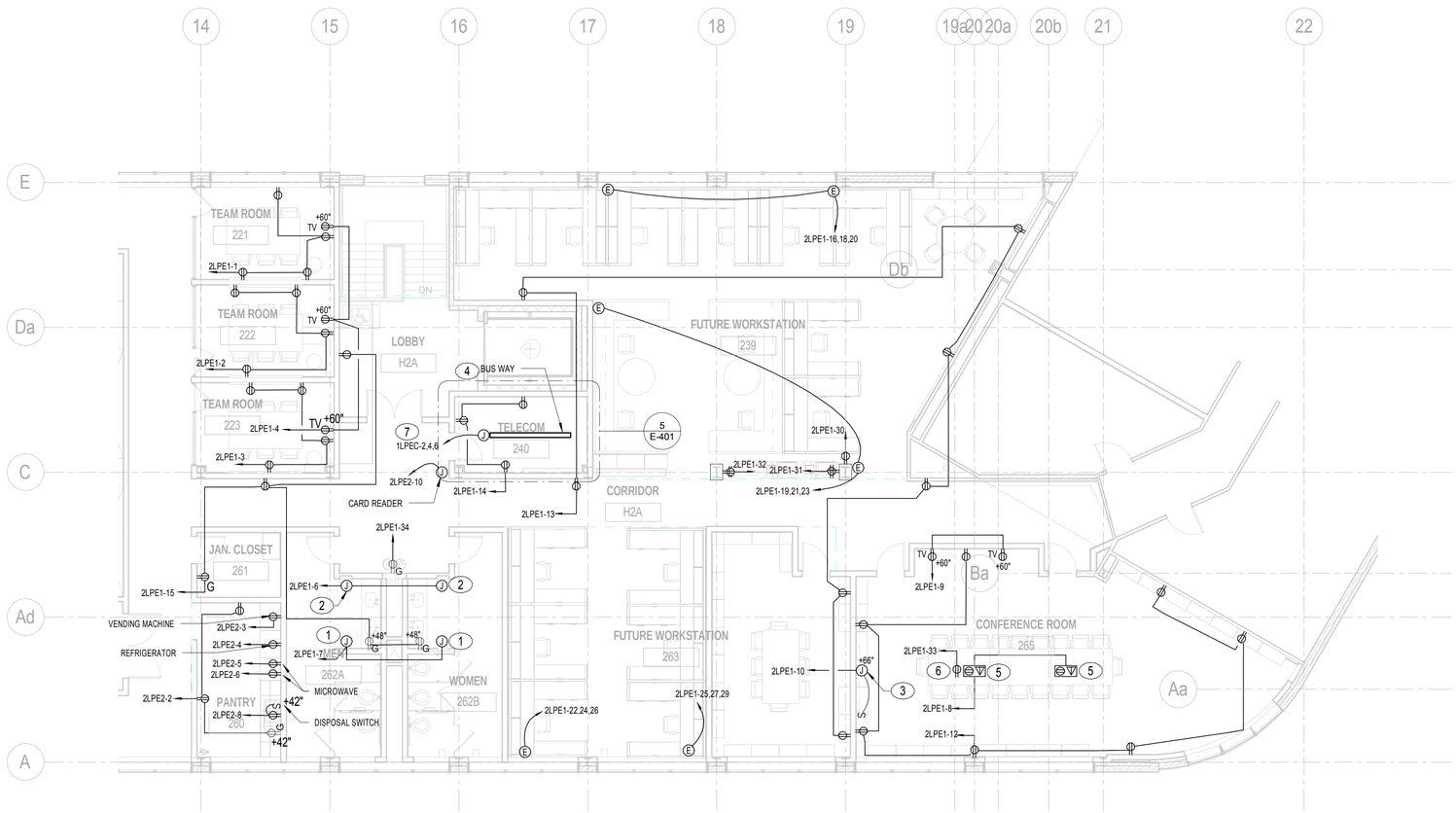
GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.

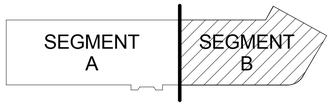
KEYNOTES:

1. CONNECTION FOR HAND DRYER.
2. CONNECTION FOR PAPERTOWEL DISPENSER.
3. CONNECTION FOR PROJECTION SCREEN. MOUNT ABOVE CEILING. PROVIDE ASSESSORY FOR COMPLETE INSTALLATION.
4. REFER TO BUSWAY MOUNTING DETAIL. BASIS OF DESIGN STARLINE B100A-4P SERIES. PROVIDE PLUG MODULES EVERY 4'. BASIS OF DESIGN STARLINE: E12X4 SERIES PLUGS.
5. APPROXIMATE LOCATION OF POKE-THRU DEVICES. X-RAY FLOORS BEFORE CORE DRILLING. POKE-THRU BASIS OF DESIGN: LEGRAND 8ATCPB2 PROVIDE (2) 1" EMPTY CONDUITS ABOVE CEILING SPACE ON THIS FLOOR FOR DATA CABLING.
6. PROVIDE CEILNG MOUNTED RECEPTACLE FOR PROJECTOR. REFER TO DRAWING A-112 FOR EXACT LOCATION.

7 4-#1 + 1-#8 GND. IN 1-1/2" CONDUIT.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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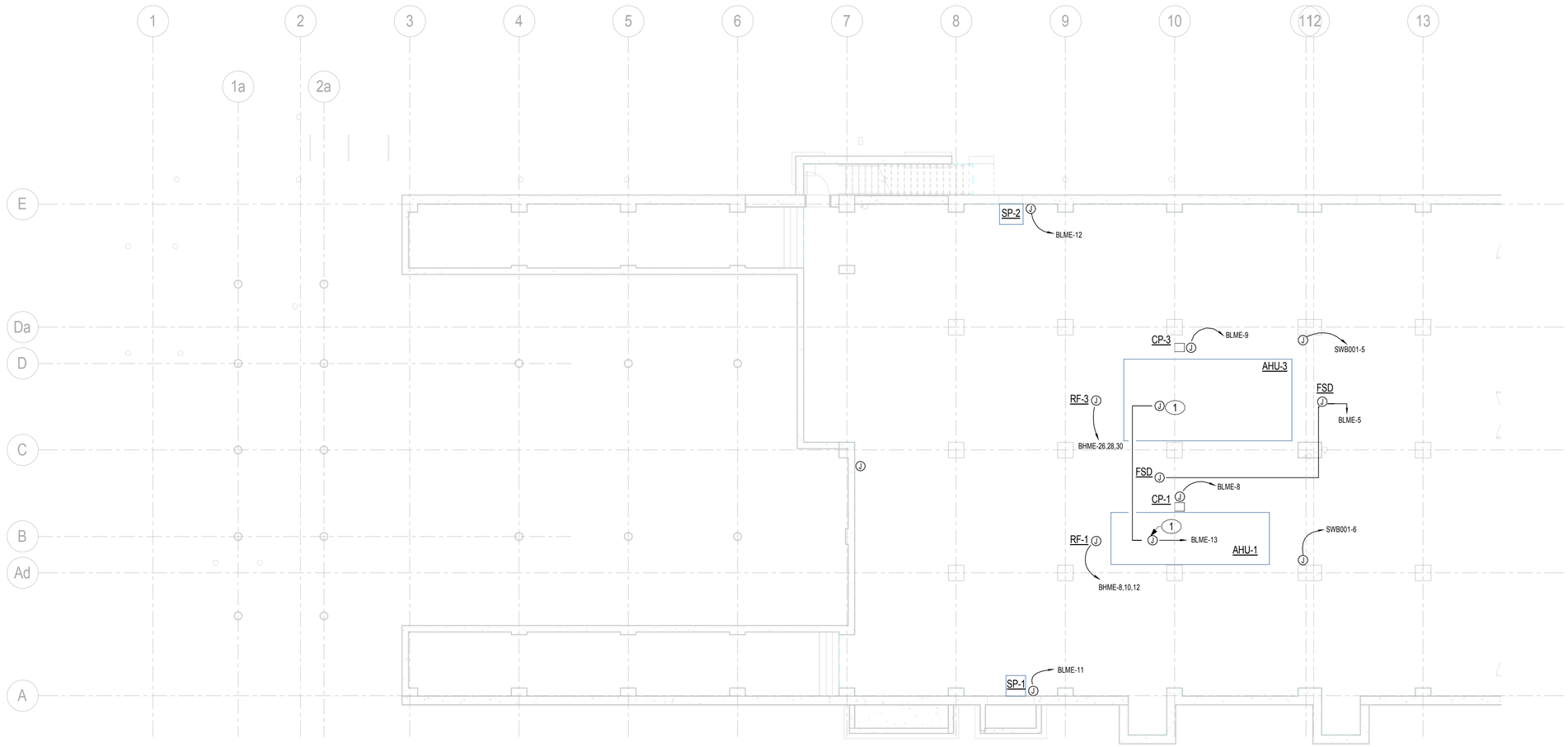
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR - ELECTRICAL POWER PLAN SEGMENT B

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293542 | LATEST REV.

SHEET NO. E-212B

12/16/2013 7:27:02 AM



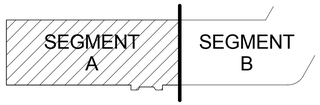
GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR CONNECTIONREQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.

KEYNOTES:

1. JUNCTION BOX FOR AIR HANDLING UNIT LIGHT CONNECTION.

SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT A

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293543 | LATEST REV.

SHEET NO. E-220A

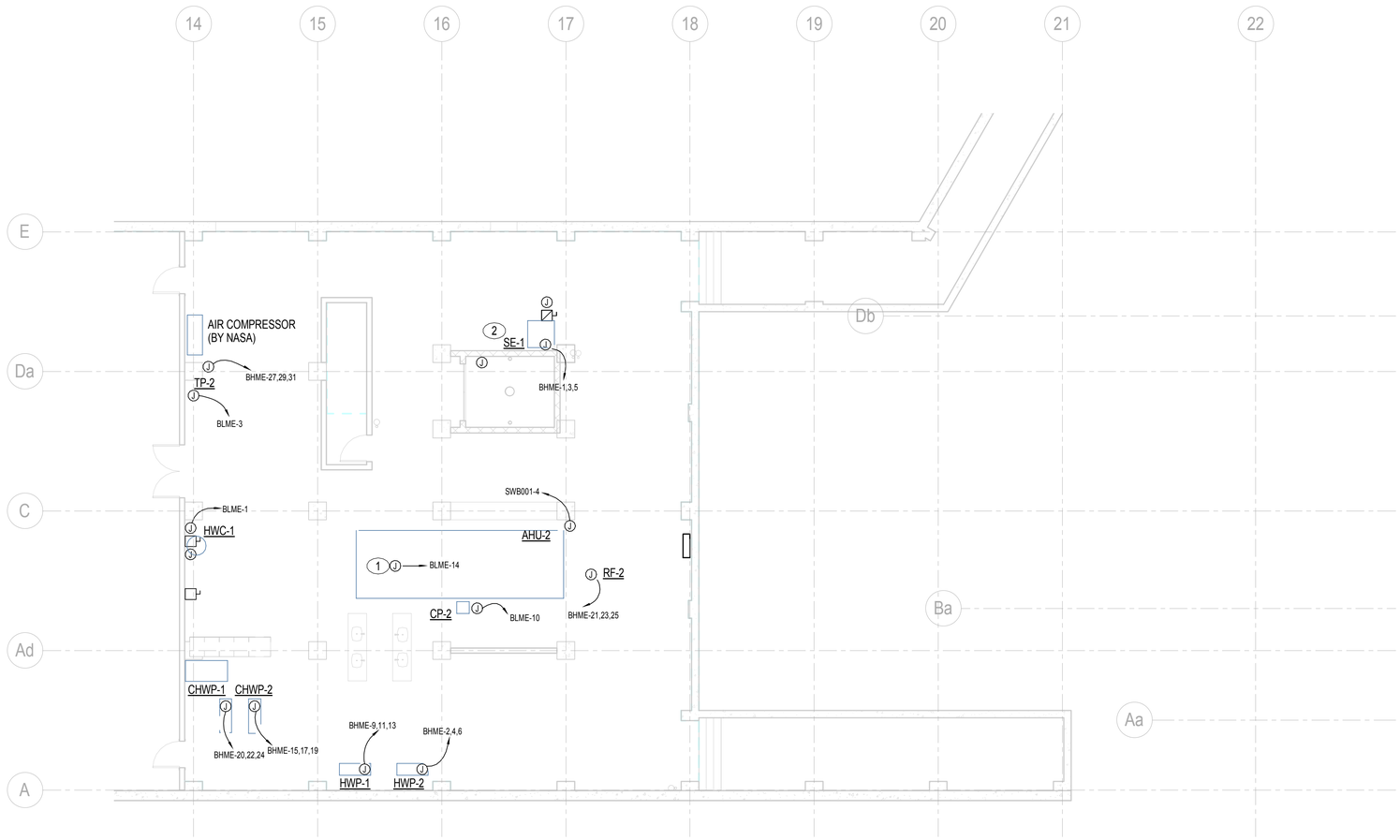
12/16/2013 7:27:05 AM

GENERAL NOTES:

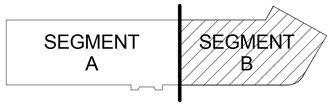
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE ON E-702 FOR CONNECTION REQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.

KEYNOTES:

1. JUNCTION BOX FOR AIR HANDLING UNIT LIGHT CONNECTION.
2. SEWAGE EJECTOR PUMP (SE)



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

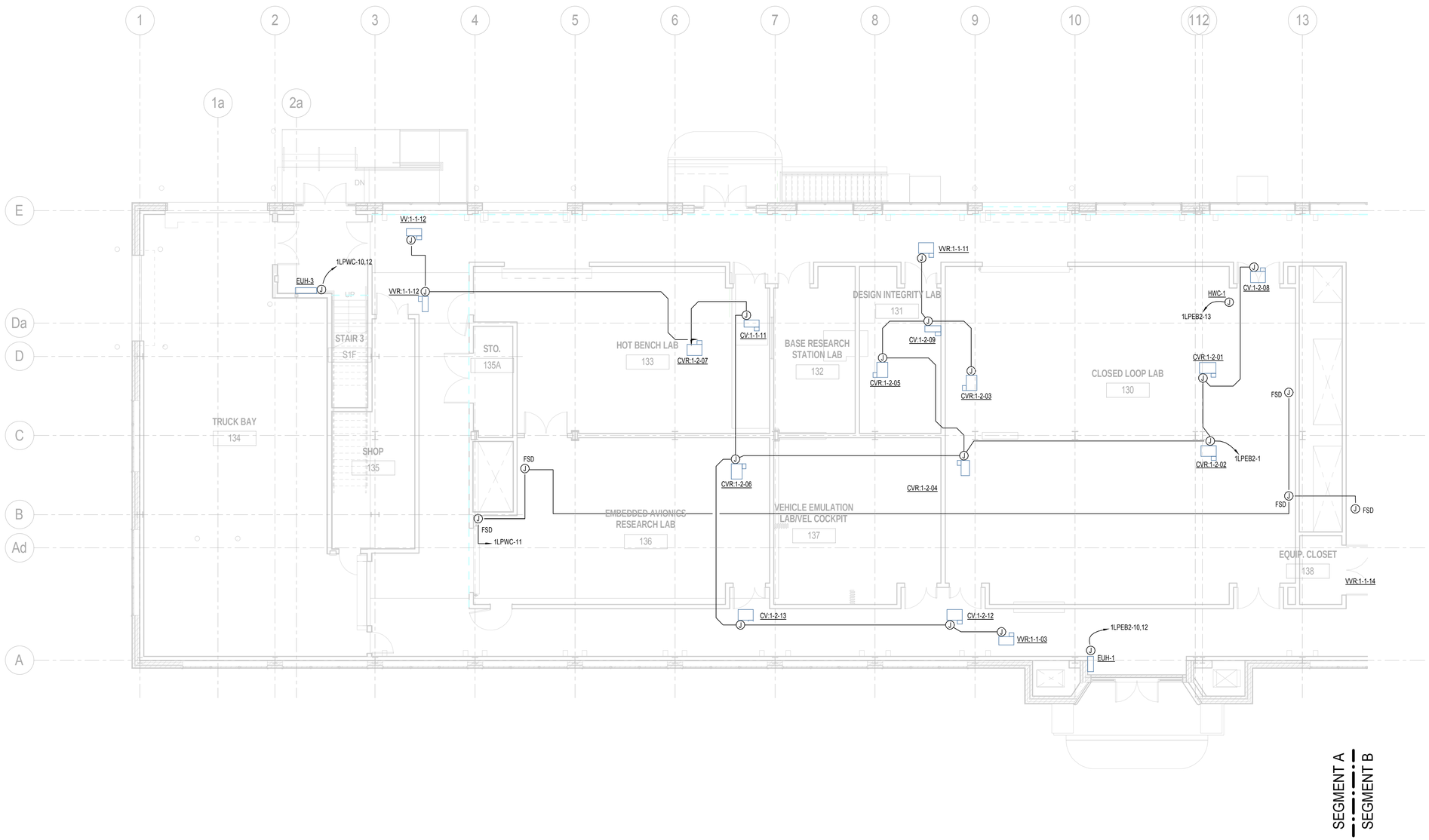
DRAWING TITLE: BASEMENT - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT B

BUILDING NO.: 1230
SIZE: D
DRAWING NO.: 1293544
SHEET NO.: E-220B
LATEST REV.:

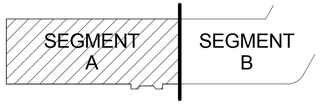
12/16/2013 7:27:06 AM

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE ON E-702 FOR CONNECTION REQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

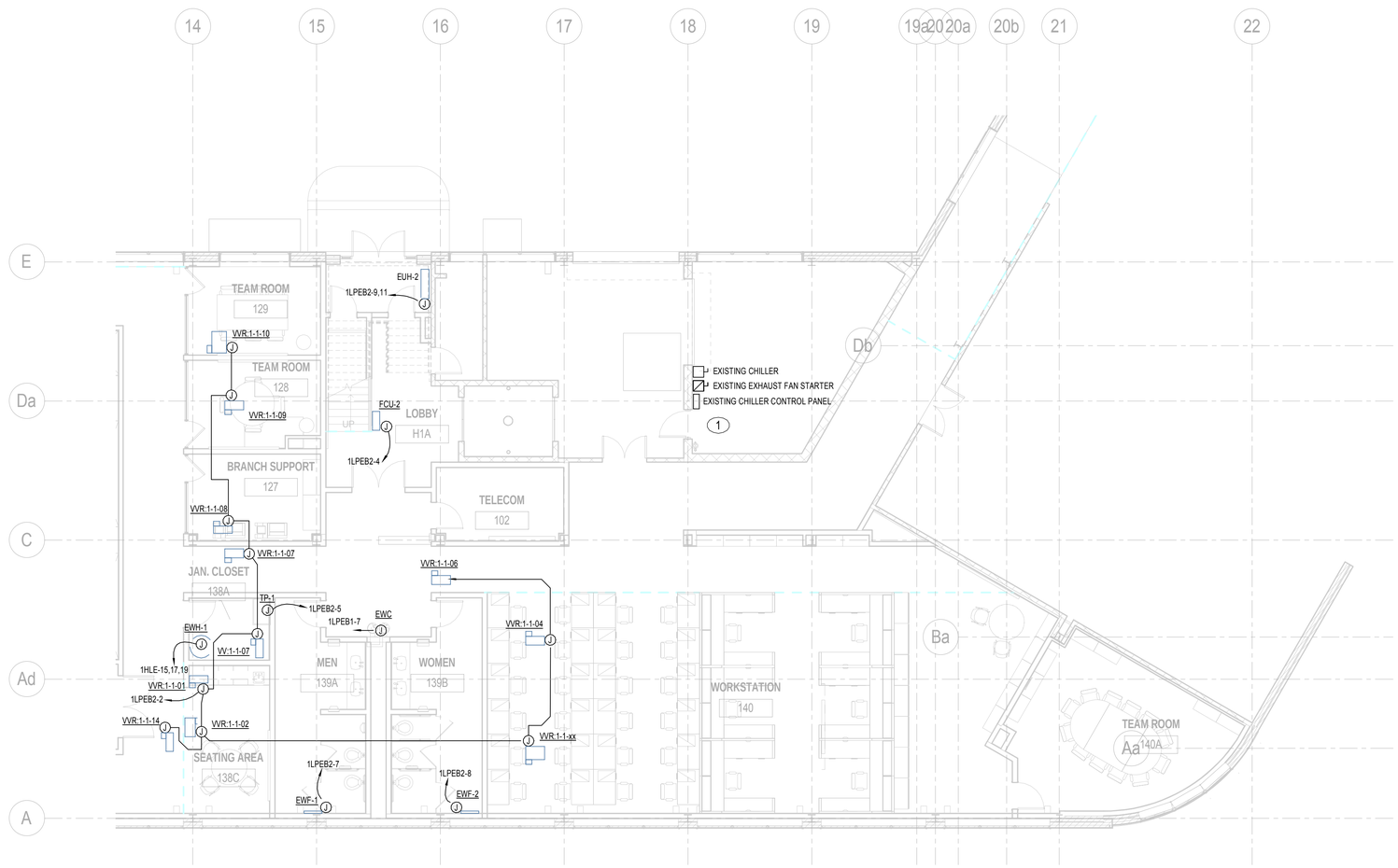
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT A

BUILDING NO.: 1230 | SIZE: D | DRAWING NO.: 1293545 | LATEST REV.:

SHEET NO.: E-221A

12/16/2013 7:27:09 AM



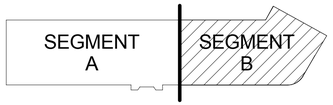
SEGMENT A
SEGMENT B

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE ON E-702 FOR CONNECTION REQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.

KEYNOTES:

1 REFER TO DRAWING E-210B FOR NEW CIRCUITS TO EXISTING EQUIPMENT IN THIS ROOM.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED TT	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT B

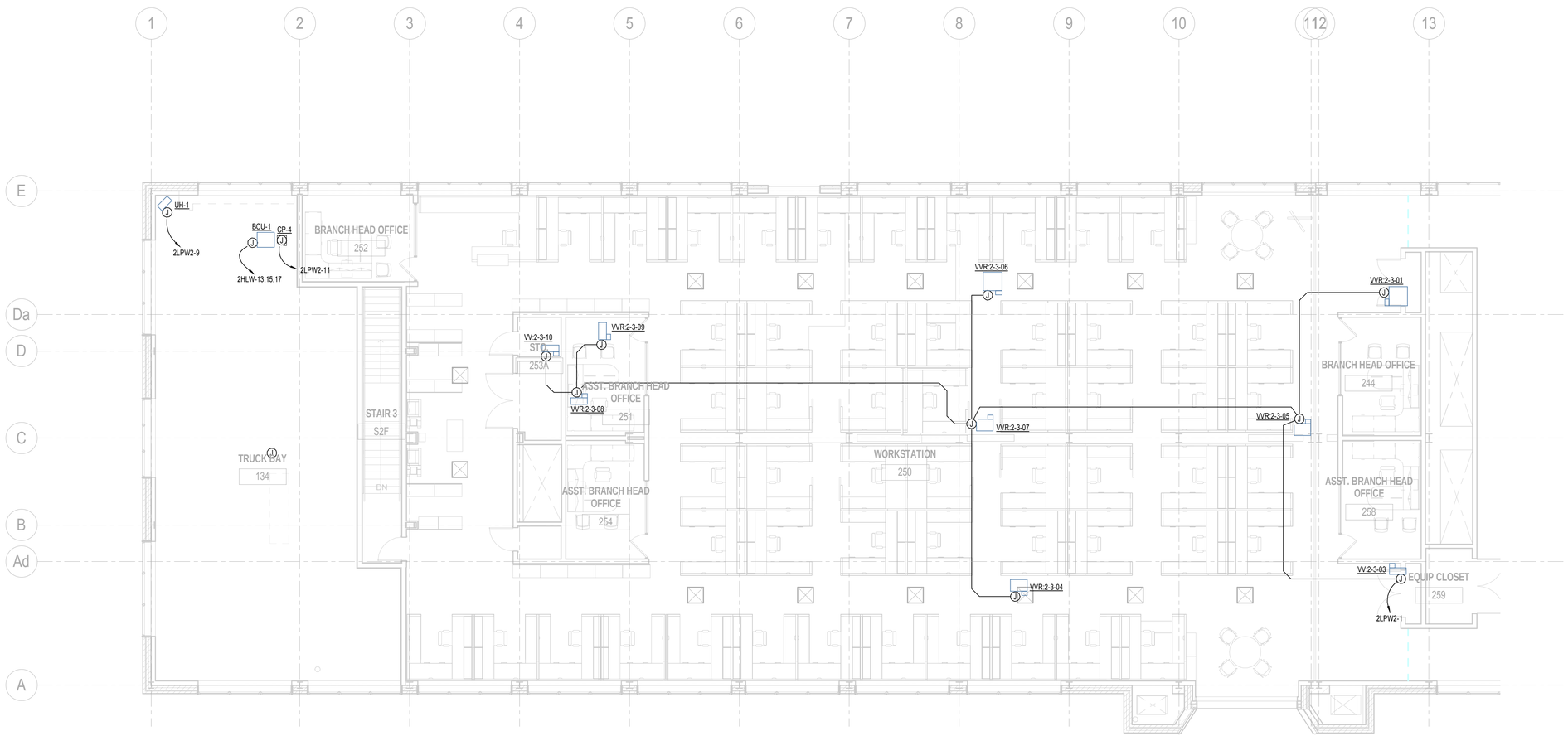
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293546 | LATEST REV.

SHEET NO. E-221B

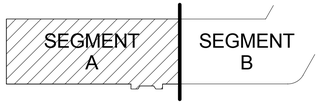
12/16/2013 7:27:12 AM

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE ON E-702 FOR CONNECTION REQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT A

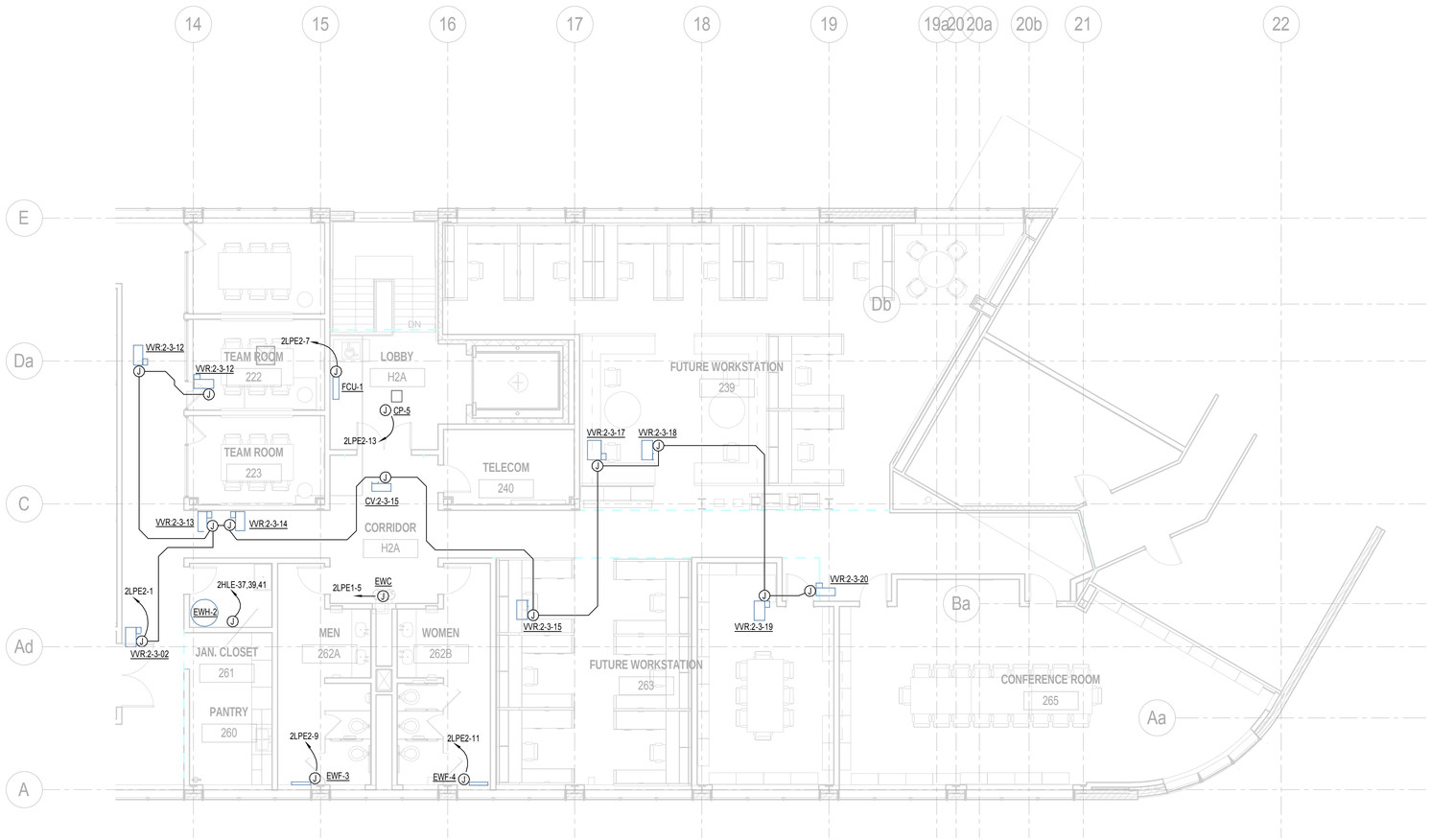
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293547 | LATEST REV.

SHEET NO. E-222A

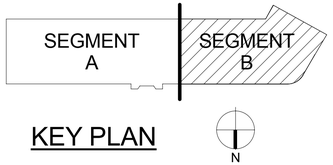
12/16/2013 7:27:15 AM

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE ON E-702 FOR CONNECTION REQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.



SEGMENT A
SEGMENT B



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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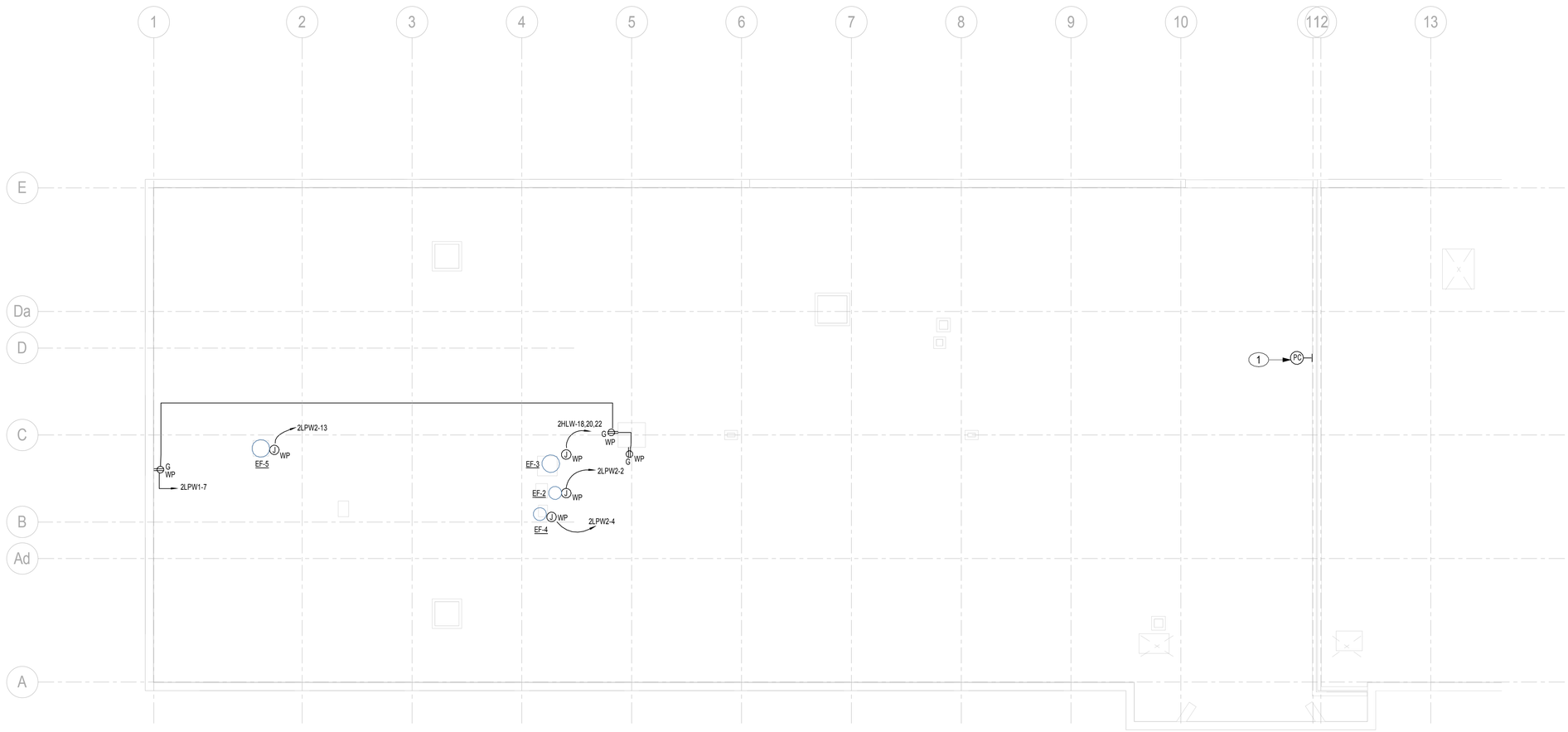
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT B

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293548 | LATEST REV.

SHEET NO. E-222B

12/16/2013 7:27:19 AM



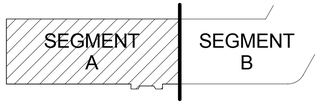
GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE ON E-702 FOR CONNECTION REQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.

KEYNOTES:

1. MOUNT THE PHOTOCELL CONTROL ON THE WEST SIDE OF THE BUILDING TO CONTROL THE EXTERIOR LIGHTING FIXTURES.

SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT A

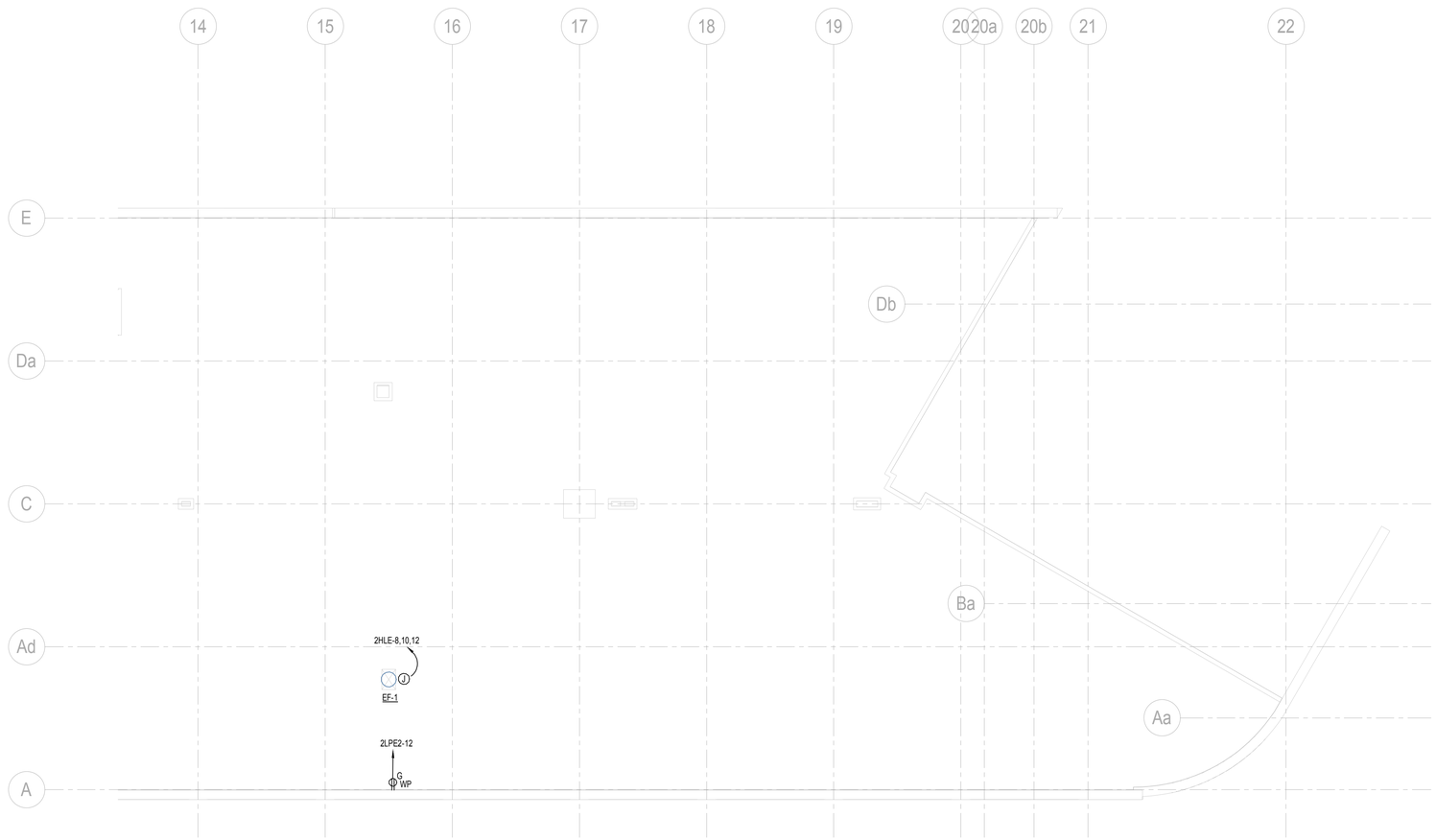
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293549 | LATEST REV.

SHEET NO. E-223A

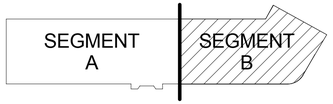
12/16/2013 7:27:21 AM

GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO MECHANICAL DRAWINGS FOR EXACT EQUIPMENT LOCATIONS.
3. REFER TO MECHANICAL EQUIPMENT SCHEDULE ON E-702 FOR CONNECTION REQUIREMENT.
4. XXX-# INDICATES MECHANICAL EQUIPMENT TAG. REFER TO MECHANICAL DRAWINGS.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	TT	
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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF - MECHANICAL EQUIPMENT CONNECTION PLAN SEGMENT B

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293550 | LATEST REV.

SHEET NO. E-223B

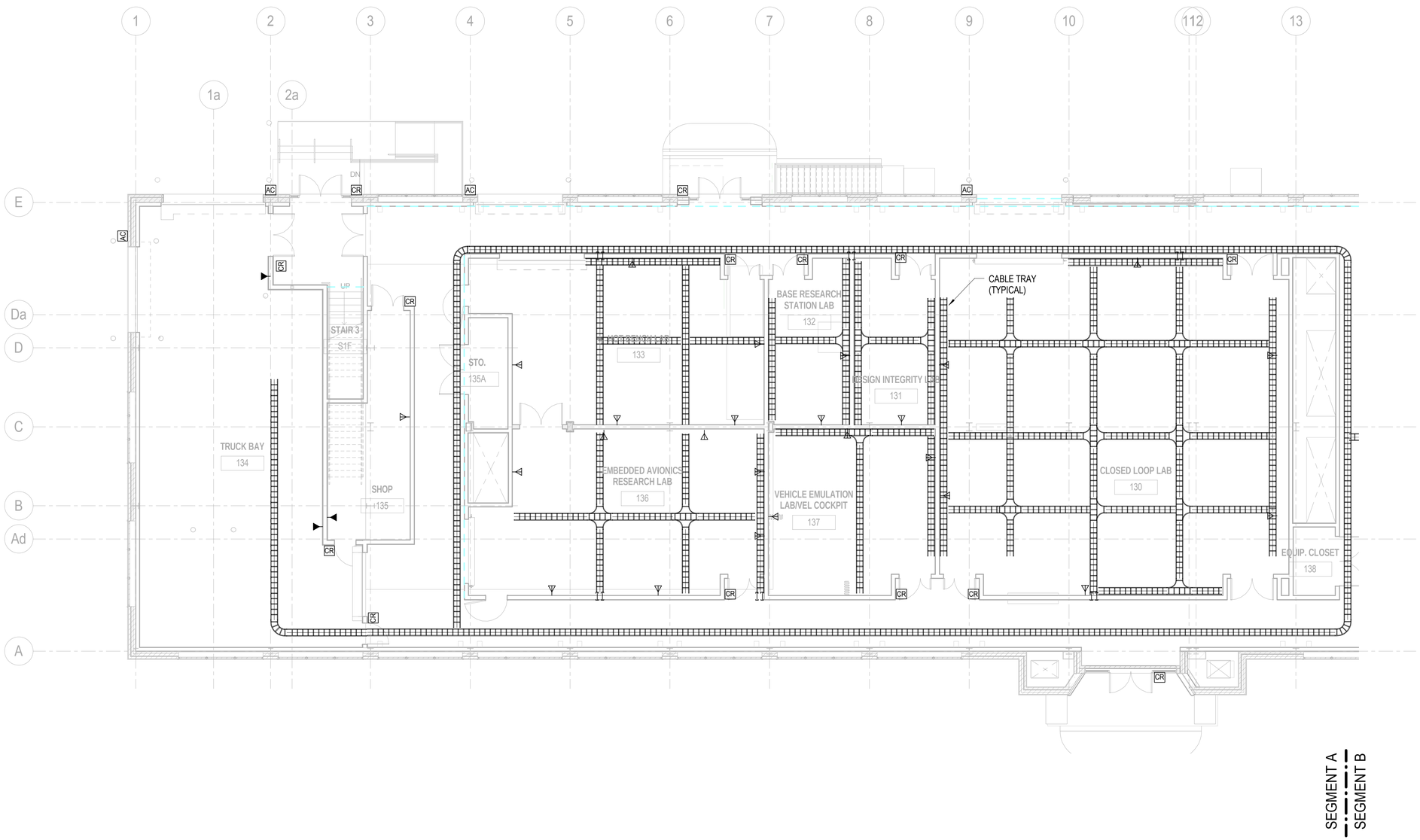
12/16/2013 7:27:22 AM

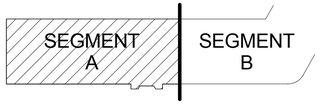
GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. REFER TO DRAWING Q-401 FOR CABLE TRAY MOUNTING HEIGHTS IN LABS.
3. MOUNT CABLE TRAY AT 10'-6" IN THE CORRIDORS.
4. REFER TO DRAWINGS E-503, E-504 FOR ADDITIONAL DETAILS.

KEYED NOTES:

1. REFER TO DRAWINGS E-401 FOR ENLARGED TELCOM ROOM PLANS.





KEY PLAN

N

1/8"=1'-0"

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - TELECOM PLAN SEGMENT A

BUILDING NO.: 1230

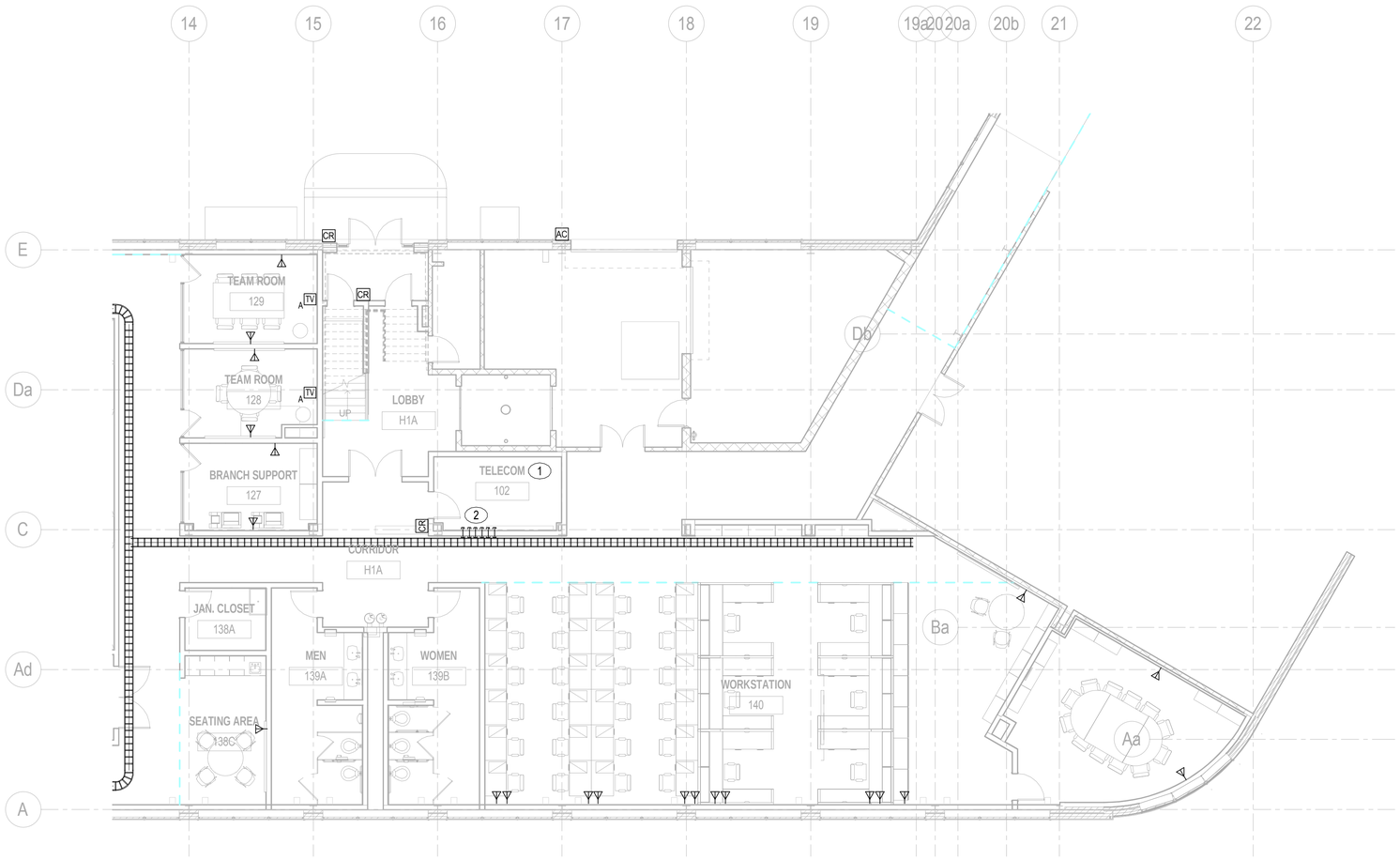
SIZE: D

DRAWING NO.: 1293551

LATEST REV.

SHEET NO.: E-231A

12/16/2013 7:27:24 AM



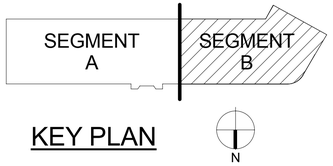
GENERAL NOTES:

1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. MOUNT CABLE TRAY AT 10'-6" IN THE CORRIDORS.
3. REFER TO DRAWINGS E-503, E-504 FOR ADDITIONAL DETAILS.

KEYED NOTES:

1. REFER TO DRAWING E-401 FOR ENLARGED TELECOM ROOM PLANS.
2. (6) 4" CONDUITS FOR TELECOM CABLING. REFER TO DETAIL #1 ON DRAWING E-503.

SEGMENT A
SEGMENT B



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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11/8/2013
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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.		
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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR - TELECOM PLAN SEGMENT B

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293552 | LATEST REV.

SHEET NO. E-231B

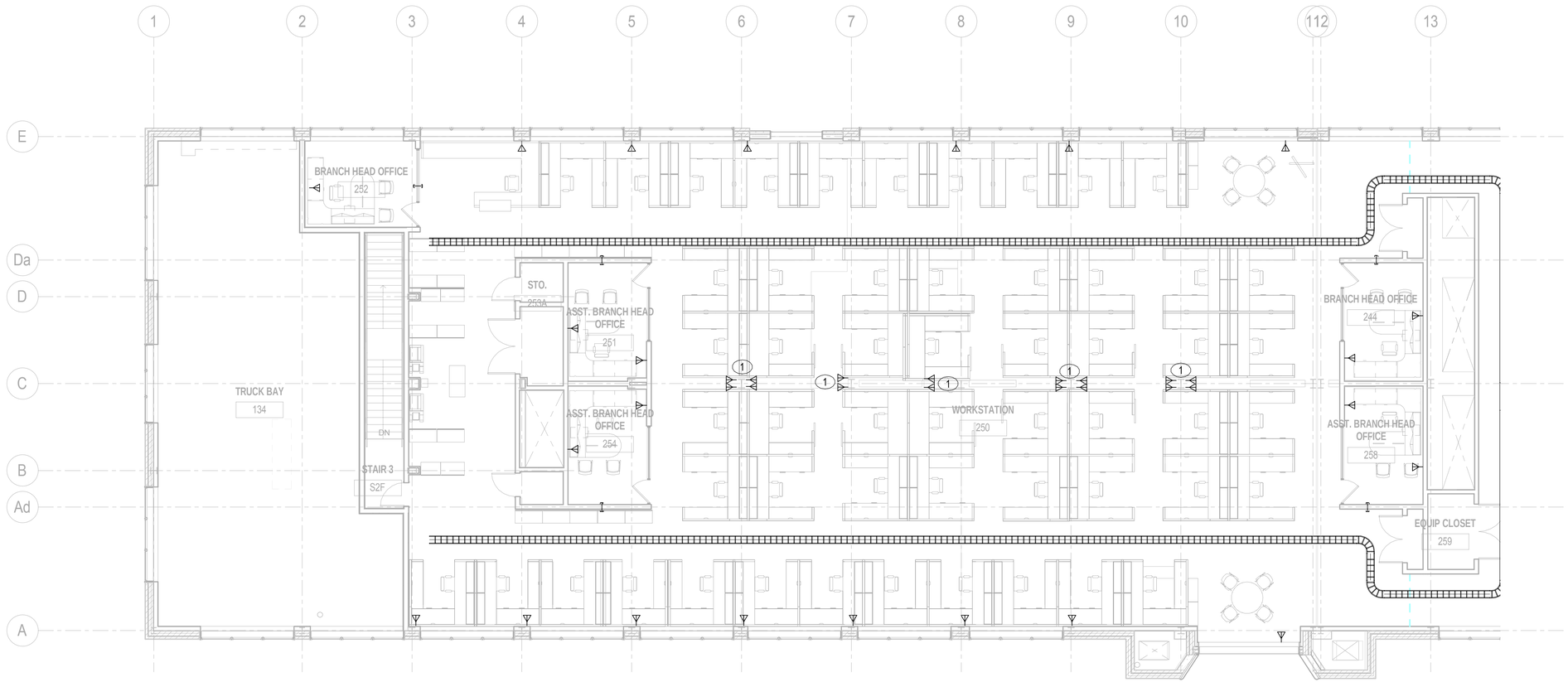
12/16/2013 7:27:28 AM

GENERAL NOTES:

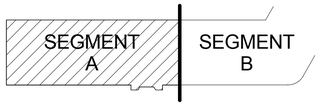
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. MOUNT CABLE TRAY AT 10'-6" IN THE CORRIDORS.
3. REFER TO DRAWINGS E-503, E-504 FOR ADDITIONAL DETAILS.

KEYED NOTES:

1. CONDUITS SHALL RUN DOWN THE INSIDE FACE OF THE COLUMN TO SYSTEM WORKSTATION.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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11/18/2013
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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR - TELECOM PLAN SEGMENT A

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293553 | LATEST REV.

SHEET NO. E-232A

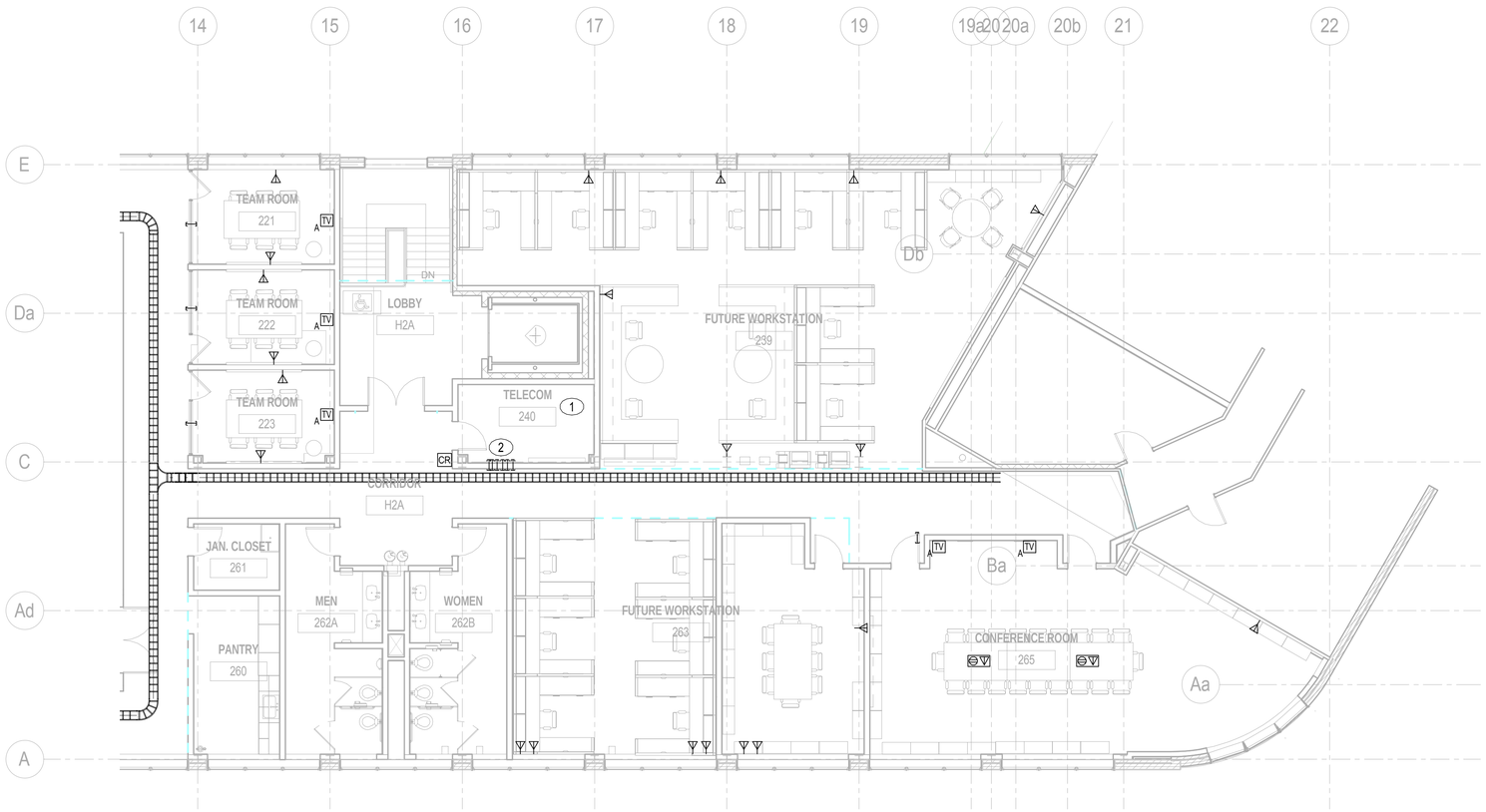
12/16/2013 7:27:32 AM

GENERAL NOTES:

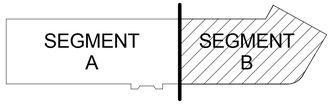
1. REFER TO DRAWINGS E-001 AND E-002 FOR LEGENDS, ABBREVIATIONS, AND GENERAL NOTES.
2. MOUNT CABLE TRAY AT 10'-6" IN THE CORRIDORS.
3. REFER TO DRAWINGS E-503, E-504 FOR ADDITIONAL DETAILS.

KEYED NOTES:

1. REFER TO DRAWING E-401 FOR ENLARGED TELECOM ROOM PLANS.
2. (6) 4" CONDUITS FOR TELECOM CABLING. REFER TO DETAIL #1 ON DRAWING E-503.



SEGMENT A
SEGMENT B



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALES

REVISIONS					REVISIONS				
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JEER REN
Lic. No. 42740
11/18/2013
PROFESSIONAL ENGINEER

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
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SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
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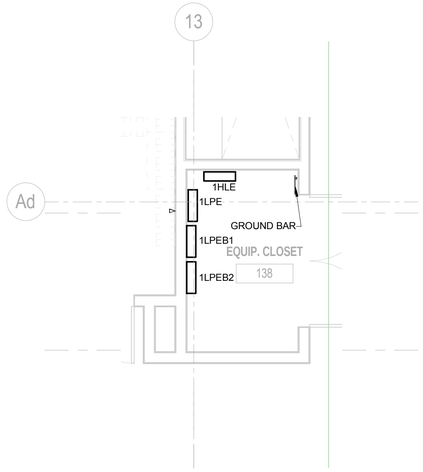
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

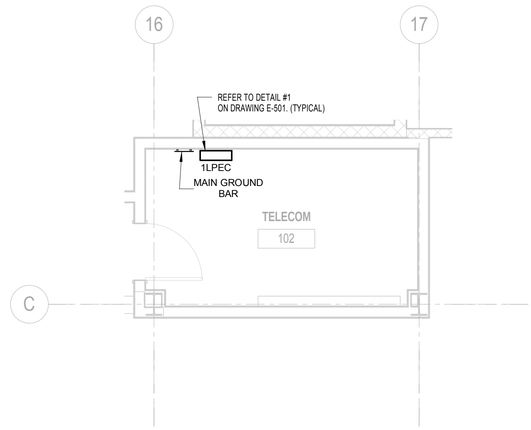
DRAWING TITLE: SECOND FLOOR - TELECOM PLAN SEGMENT B

BUILDING NO.: 1230
SIZE: D
DRAWING NO.: 1293554
LATEST REV.:
SHEET NO.: E-232B

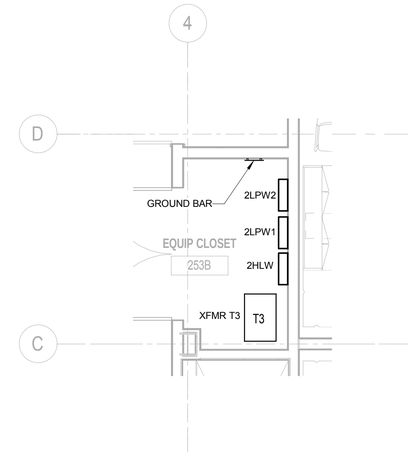
12/16/2013 7:27:36 AM



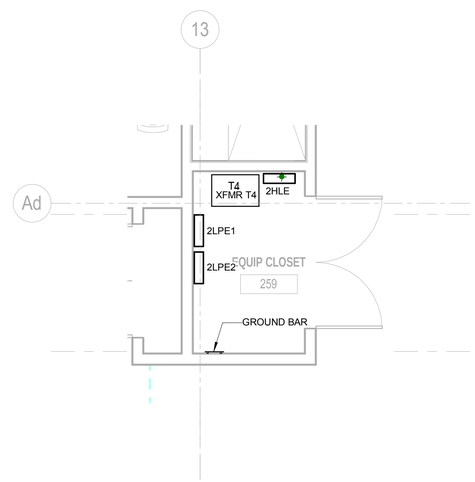
1 FIRST FLOOR - EQUIP. CLOSET 138
1/4" = 1'-0"



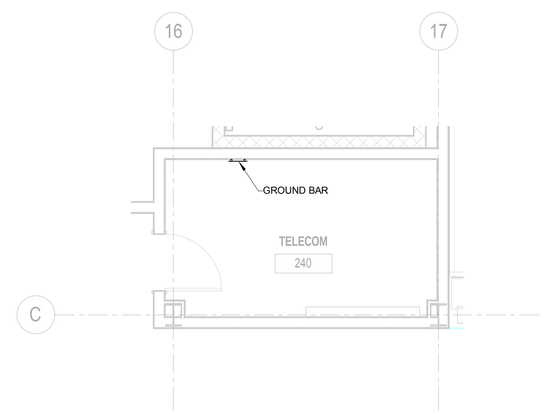
2 FIRST FLOOR - TELECOM ROOM 102
1/4" = 1'-0"



3 SECOND FLOOR - EQUIP. CLOSET 253B
1/4" = 1'-0"



4 SECOND FLOOR - EQUIP. CLOSET 259
1/4" = 1'-0"



5 SECOND FLOOR - TELECOM ROOM 240
1/4" = 1'-0"

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MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± — X.XX (2 DECIMAL PLACES) ±.02 — X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
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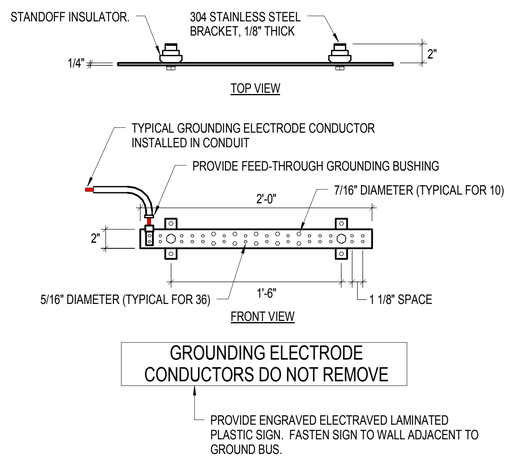
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ENLARGED ELECTRICAL PLANS

BUILDING NO.: 1230
SIZE: D
DRAWING NO.: 1293555
LATEST REV.:
SHEET NO.: E-401

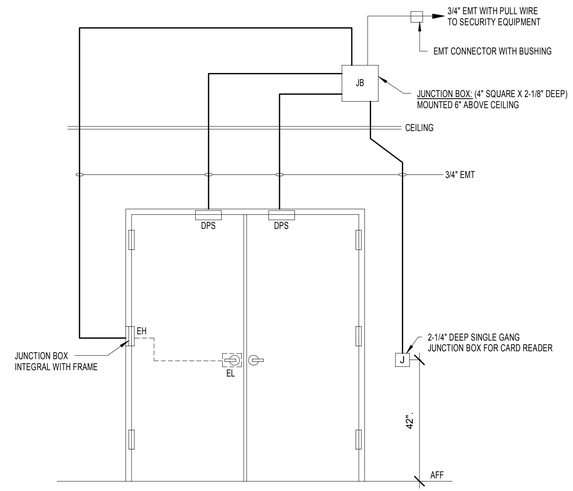
12/16/2013 7:27:40 AM



NOTES :

1. PROVIDE GROUND BUS WITH DIMENSIONS AS INDICATED UNLESS NOTED OTHERWISE ON PLANS.

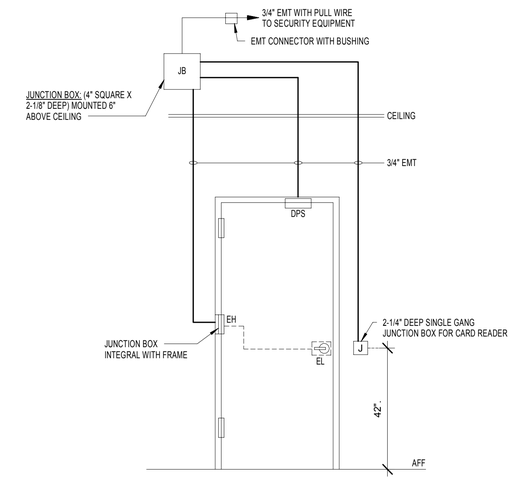
1 GROUND BAR DETAIL
NO SCALE



NOTES:

1. ALL SECURITY CABLING SHALL BE IN 3/4" CONDUIT BACK TO TELECOM/SECURITY ROOM.

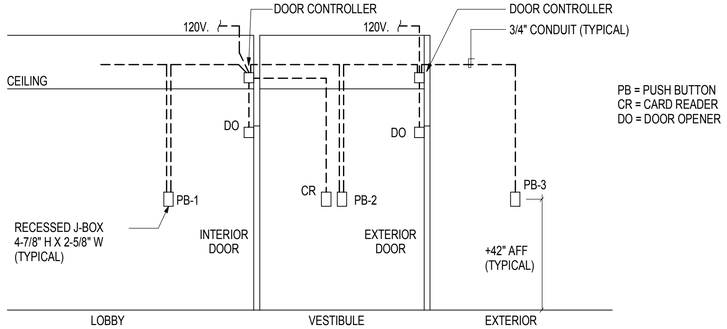
2 TYPICAL CARDREADER ROUGH-IN FOR DOUBLE DOORS - ELECTRIC LOCK
NO SCALE



NOTES:

1. ALL SECURITY CABLING SHALL BE IN 3/4" CONDUIT BACK TO TELECOM/SECURITY ROOM.

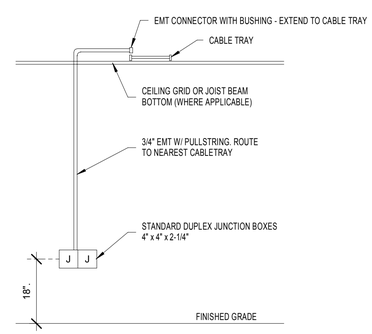
3 TYPICAL CARDREADER ROUGH-IN FOR SINGLE DOORS - ELECTRIC LOCK
NO SCALE



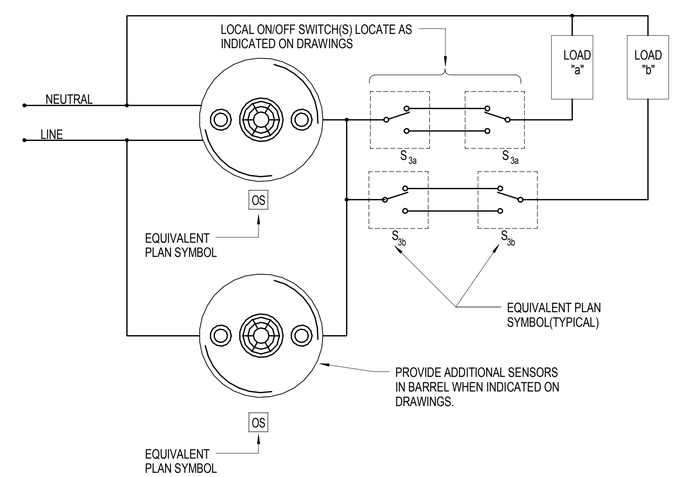
NOTES:

1. PROVIDE ALL NECESSARY COMPONENTS AND COORDINATE AS REQUIRED BY AUTOMATIC DOOR SYSTEM MANUFACTURER.
2. DOOR CONTROLLER SHALL BE COMPATIBLE WITH BUILDING SECURITY CONTROL SYSTEM.
3. NORMAL OPERATION: ALL PUSH BUTTONS SHALL OPEN BOTH SETS OF DOORS.
   AFTER HOURS OPERATION:
   PB-1 SHALL OPEN BOTH SETS OF DOORS.
   PB-2 & PB-3 SHALL ONLY OPEN EXTERIOR DOORS.
   PB-2 SHALL OPEN INTERIOR DOORS ONLY WHEN CARD READER ACCESS HAS BEEN GRANTED.
4. ALL SECURITY CABLING SHALL BE IN 3/4" CONDUIT BACK TO TELECOM/SECURITY ROOM.

4 TYPICAL DOOR ACTUATOR & CONDUIT ROUGH-IN DIAGRAM
NONE



5 ROUGH-IN FOR TELEPHONE / LAN
NO SCALE



6 TYPICAL LINE VOLTAGE OCCUPANCY SENSOR
NO SCALE

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
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X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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HAMPTON, VIRGINIA 23681-2199

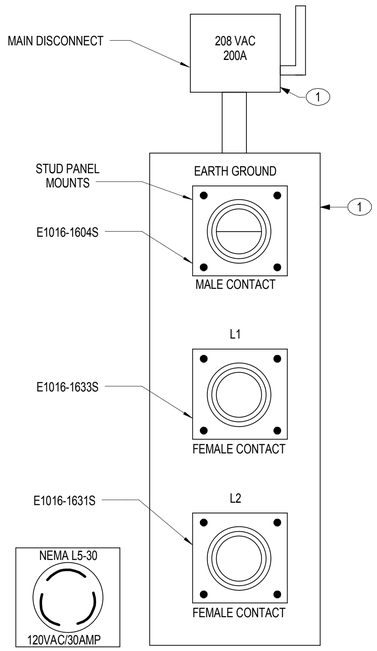
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL DETAILS

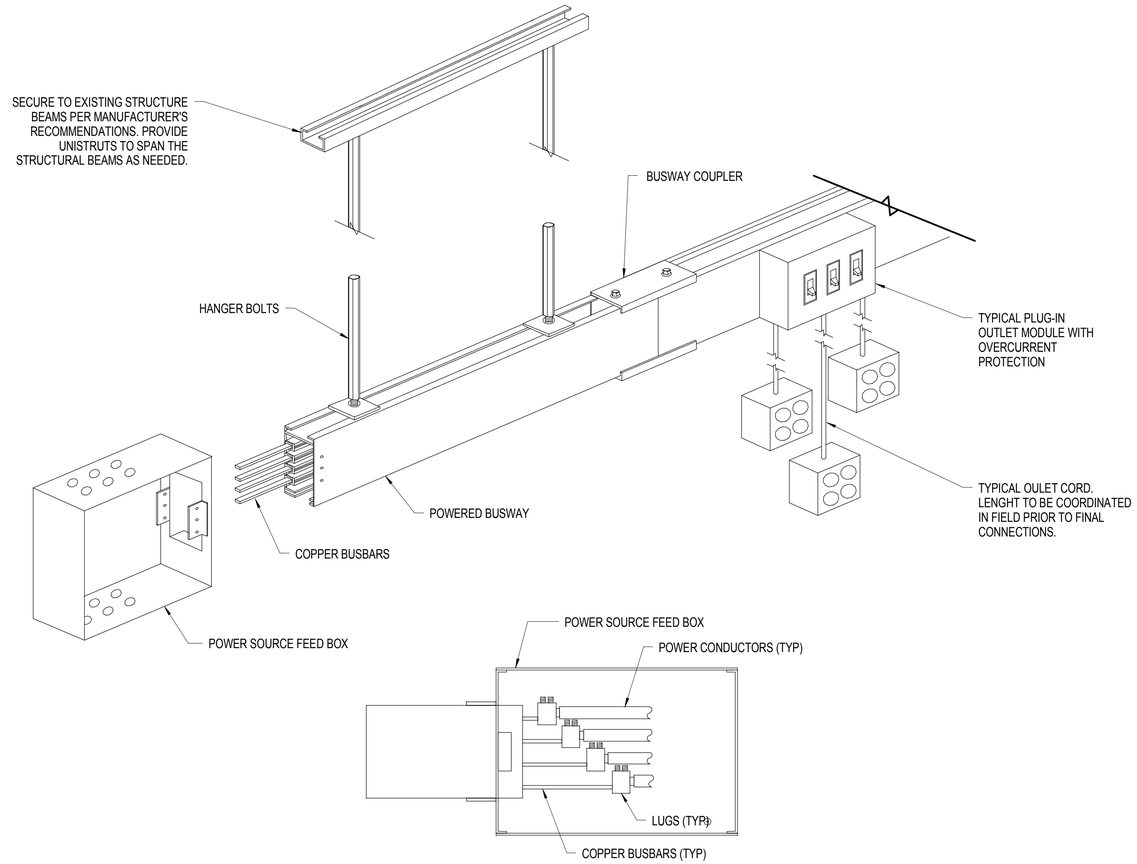
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293556 | LATEST REV.
SHEET NO. E-501

12/16/2013 7:27:41 AM

FACILITY POWER SOURCE



1 MOS SHORE POWER CONNECTION DETAIL
NO SCALE



2 BUSWAY MOUNTING DETAIL
NO SCALE

KEYED NOTES:

1. THE MOS UNIT (DISCONNECT SWITCH AND PLUG CONNECTION CABINET) WILL BE GOVERNMENT FURNISHED AND SHALL BE CONTRACTOR INSTALLED. THE CONSTRUCTION CONTRACTOR SHALL REMOVE THE MOS UNIT FROM B1220 AND INSTALL IT IN B1230. THE CONSTRUCTION CONTRACTOR SHALL REMOVE THE WIRING FROM THE EXISTING CONDUIT BACK TO THE B1220 POWER SOURCE. THE CONDUIT CAN REMAIN. THE MOS DISCONNECT SWITCH IS 200 AMPERE, HEAVY DUTY, 3-POLE, WITH 200 AMPERE FUSES. THE WIRES FROM THE DISCONNECT SWITCH TO THE THREADED POLE PANEL MOUNTS ARE #4/0 AWG AND ARE COLOR CODED TO MATCH THE COLOR OF THE THREADED PLUG MOUNTS. THE ENCLOSURE IS NEMA 1. THE EXISTING ENCLOSURE IS 24" TALL, 8" WITH AND 8" DEEP.

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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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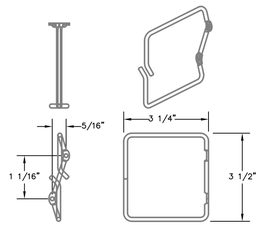
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL DETAILS

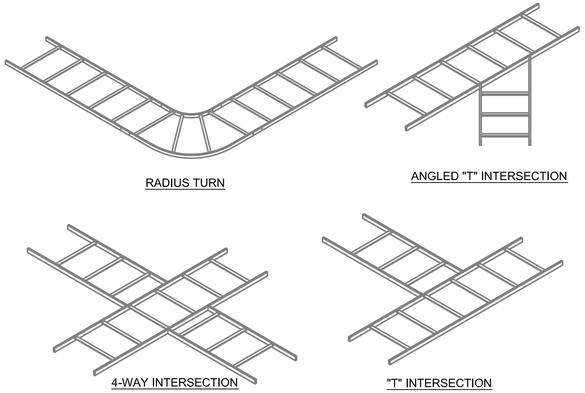
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293557 | LATEST REV.

SHEET NO. E-502

12/16/2013 7:27:42 AM



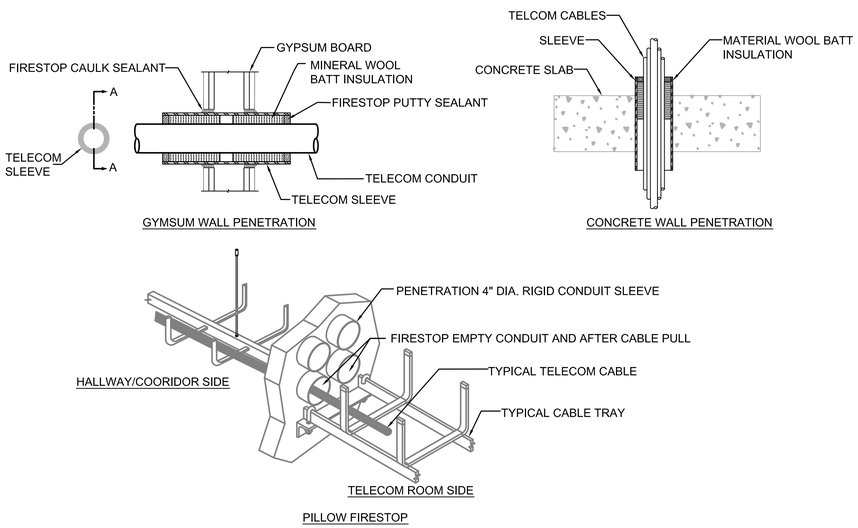
3 CABLE MANAGEMENT "D-RING"
NOT TO SCALE



2 TYPICAL CABLE TRAY INTERSECTIONS
NOT TO SCALE

DRAWING NOTES

1. SUPPORT ACCESSORIES AND HARDWARE MAY BE SUPPLIED AS COMPLETE KITS FROM CABLE TRAY MANUFACTURER.
2. ALL DETAILS ON THIS DRAWING ARE EXAMPLES OF TYPICAL INSTALLTION AND MAY VARY BY MANUFACTURER AND FROM FIELD CONDITIONS. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION GUIDELINES FOR CABLE TRAY INSTALLATION.



1 TYPICAL FIRE STOPPING AND WALL PENETRATION
NOT TO SCALE

NOTE:

1. FIRESTOP SYSTEMS ARE BASED ON NELSON FIRESTOP PRODUCTS.
2. SEAL ALL WALL PENETRATIONS WITH ONLY UL LISTED FIRESTOP SYSTEMS.
3. PRECISELY FOLLOW MANUFACTURERS INSTALLATION DIRECTIONS
4. USE APPROPRIATE FIRESTOP SYSTEM DESIGNATED FOR THE TYPE OF PARTITION PENETRATION.
5. FIRESTOP ON PENETRATIONS WHERE APPLICABLE
6. USE FIRESTOP SYSTEM THAT AT LEAST EQUAL TO THAT FIRE RATING OF PARTITION TYPE.

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			RES. PROJ. ENG.		

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL DETAILS

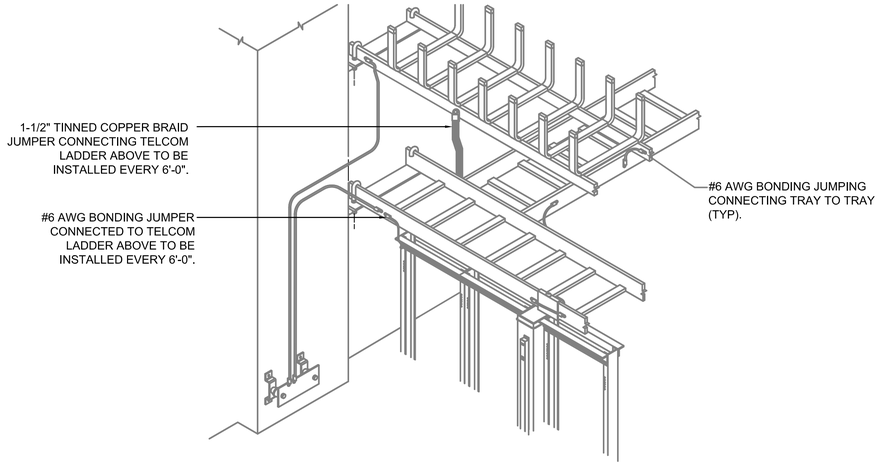
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293558 | LATEST REV.

SHEET NO. E-503

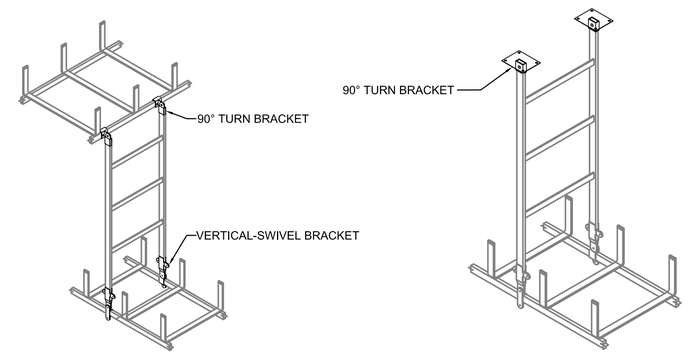
10/9/2013 2:18:19 PM

DRAWING NOTES

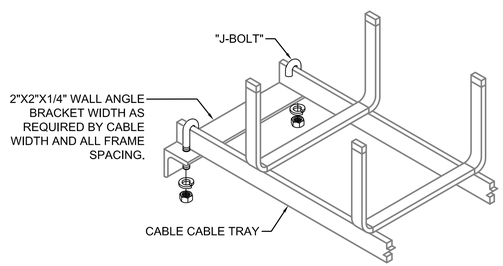
1. SUPPORT ACCESSORIES AND HARDWARE MAY BE SUPPLIED AS COMPLETE KITS FROM CABLE TRAY MANUFACTURER.
2. ALL DETAILS ON THIS DRAWING ARE EXAMPLES OF TYPICAL INSTALLTION AND MAY VARY BY MANUFACTURER AND FROM FIELD CONDITIONS. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION GUIDELINES FOR CABLE TRAY INSTALLATION.



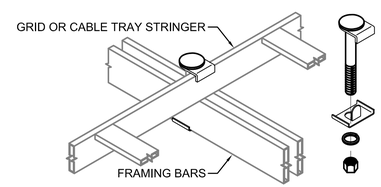
7 **GROUND BAR JUMPER SPLICE**
NOT TO SCALE



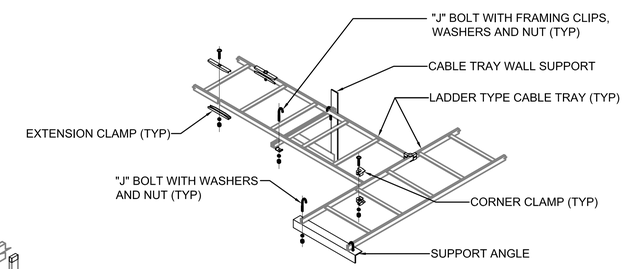
4 **CEILING TO CABLE TRAY/ELEVATION CHANGE CABLE SUPPORT**
NOT TO SCALE



6 **CABLE TRAY WALL SUPPORT**
NOT TO SCALE



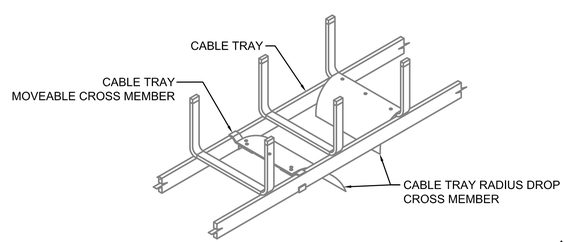
5 **CABLE TRAY TO FRAMING BAR ATTACHMENT**
NOT TO SCALE



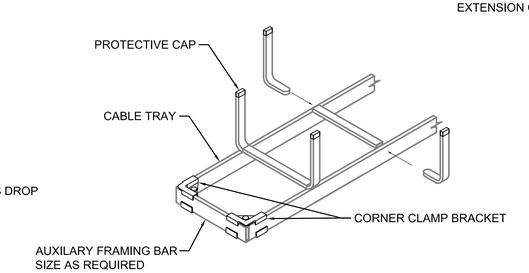
NOTE:

1. FOR CABLE TRAY SUPPORT AND SUPPORT ANGLE, PROVIDE SUPPORT SPACING PER MANUFACTURER'S RECOMMENDATION. USE MANUFACTURER'S MOUNTING HARDWARE AND WALL ANCHORS.
2. USE HARDWARE KITS RECOMMENDED BY MANUFACTURER FOR EXTENSION CLAMPS, FRAMING CLIPS AND CORNER CLAMPS.

1 **HORIZONTAL CABLE TRAY**
NOT TO SCALE



3 **CABLE DROPUT**
NOT TO SCALE



2 **CABLE TRAY END**
NOT TO SCALE

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANG/LAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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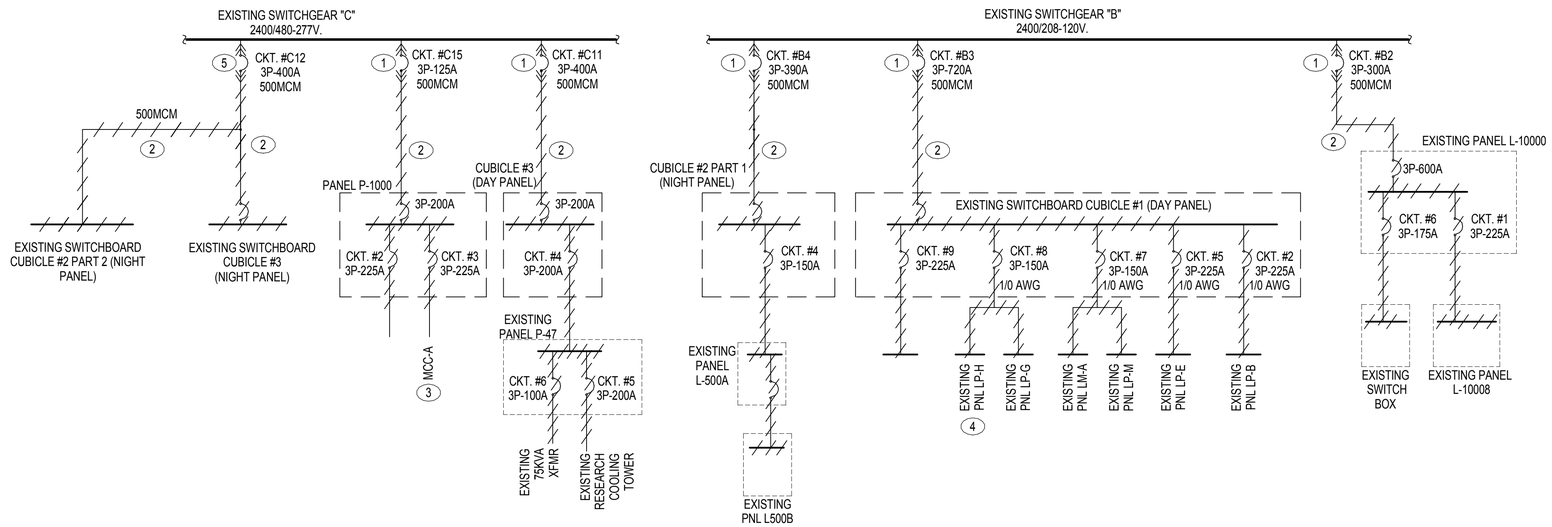
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293559 | LATEST REV.

SHEET NO. E-504

10/8/2013 2:18:19 PM



GENERAL NOTES

1) ### EXISTING TO BE DEMOLISHED.

2) UNLESS NOTED OTHERWISE, ALL EXISTING ELECTRICAL DISTRIBUTION EQUIPMENT WITHIN THE BUILDING ARE EXISTING TO BE DEMOLISHED.

KEYNOTES:

1. LABEL EXISTING TO REMAIN BREAKER AS "SPARE".
2. EXISTING UNDERGROUND DUCTBANK SHALL REMAIN. CONDUCTOR WITHIN THE DUCTBANK SHALL BE DEMOLISHED.
3. EXISTING MOTOR CONTROL CENTER SHALL BE EXISTING TO REMAIN.
4. EXTEND EXISTING CHILLER CONTROL/HEATER CIRCUITS FROM THIS PANEL TO NEW PANEL BLME. PROVIDE JUNCTION BOX, CONDUCTORS, AND CONDUITS AS REQUIRED.
5. REFER TO DRAWING E-602, ONE-LINE DIAGRAM.

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JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

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SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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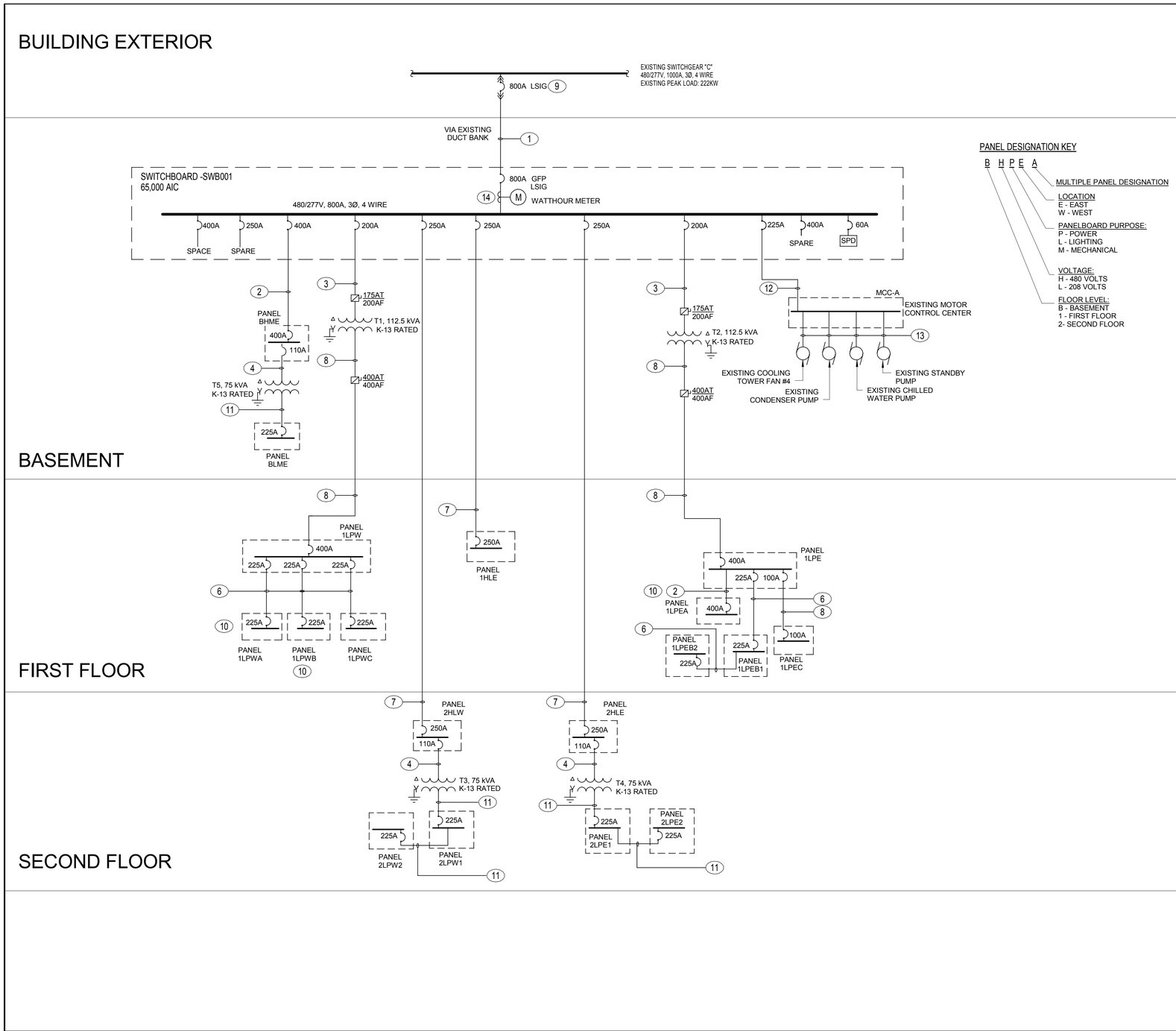
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL DEMOLITION ONE-LINE DIAGRAM

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293560 | LATEST REV.

SHEET NO. E-601

12/16/2013 7:27:43 AM



PANEL DESIGNATION KEY

B H P E A

- MULTIPLE PANEL DESIGNATION
- LOCATION
  E - EAST
  W - WEST
- PANELBOARD PURPOSE:
  P - POWER
  L - LIGHTING
  M - MECHANICAL
- VOLTAGE:
  H - 480 VOLTS
  L - 208 VOLTS
- FLOOR LEVEL:
  B - BASEMENT
  1 - FIRST FLOOR
  2- SECOND FLOOR

TRANSFORMER SCHEDULE								
NAME	KVA	PHASE	TYPE	K-RATING	SHIELDED	GROUND ELECTRODE CONDUCTOR SIZE	PRIMARY	SECONDARY
T1	112.5	3	DRY TYPE	K-13	NO	#1/0 AWG	480V.	120/208V.
T2	112.5	3	DRY TYPE	K-13	NO	#1/0 AWG	480V.	120/208V.
T3	75	3	DRY TYPE	K-13	NO	#2 AWG	480V.	120/208V.
T4	75	3	DRY TYPE	K-13	NO	#2 AWG	480V.	120/208V.
T5	75	3	DRY TYPE	K-13	NO	#2 AWG	480V.	120/208V.

EPO CHART	
EMERGENCY POWER OFF	SHUNT PANEL
EP01	**1LPWA**
EP02	**1LPWA**
EP03	**1LPWA**
EP04	**1LPEA**
EP05	**1LPWB**
EP06	**1LPWB**

KEY NOTES

1. 3 SETS - (4) 400KCMIL + 1- #2/0 GND, INSTALL EACH SET IN A SEPERATE EXISTING CONDUIT.
2. 2 SETS - (4) #3/0 + 1- #3 GND, IN EACH OF (2) 2" CONDUITS.
3. 3- #3/0 + 1- #6 GND, IN 2" CONDUIT
4. 3- #1 + 1- #6 GND, IN 1-1/2" CONDUIT
5. 4- #4/0 + 1- #4 GND, IN 2-1/2" CONDUIT
6. 4- 250KCMIL + 1- #4 GND, IN 3" CONDUIT
7. 4- 250KCMIL + 1- #4 GND, IN 3" CONDUIT
8. 2 SETS - 5- #3/O + 1- #3 GND, INSTALLED IN EACH OF THE (2) 2-1/2" CONDUITS.
9. EXISTING 3P-400A MERLIN GERIN MPO8H1 CIRCUIT BREAKER SHALL BE REPLACED WITH 800A, 3P CIRCUIT BREAKER COMPATIBLE WITH EXISTING SWITCHGEAR. BREAKER BUS STABS AND NEUTRAL BUS SHALL BE MODIFIED TO ACCOMMODATE ADDITIONAL CONDUCTORS. SUBMIT BUS MODIFICATION PLANS ALONG WITH THE NEW BREAKER AS PART OF THE BREAKER SUBMITTAL. PROVIDE RE-LISTING SERVICE FOR THE MODIFIED SWITCHGEAR.
10. PROVIDE SHUNT TRIP MCB FOR THIS PANEL. MCB SHALL TRIP WHEN ASSOCIATED EPO IS ACTIVATED. REFER TO EPO CHART.
11. 5-250KCM+1#4 G, IN 3" CONDUIT.
12. 3#4/O+1#4G, IN 2-1/2" CONDUIT.
13. EXISTING FEEDERS.
14. WATTHOUR METER. PROVIDE COMMUNICATION CABLING FROM METER TO THE LOCAL GATEWAY IN ROOM 149. COMMUNICATION CABLING SHALL BE IN 3/4" CONDUIT. COORDINATE WITH OWNER FOR EXACT LOCATION OF GATEWAY AND ROUTING. APPROXIMATE DISTANCE TO GATEWAY IS 300'. ROUTING MAY GO THROUGH EXISTING OCCUPIED AREAS OF THE BUILDING.

REVISIONS					REVISIONS				
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SEAL AREA

COMMONWEALTH OF VIRGINIA
JIEER REN
Lic. No. 42740
11/18/2013
PROFESSIONAL ENGINEER

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

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ISSUE DATE
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED TT	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED MM	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED EH	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

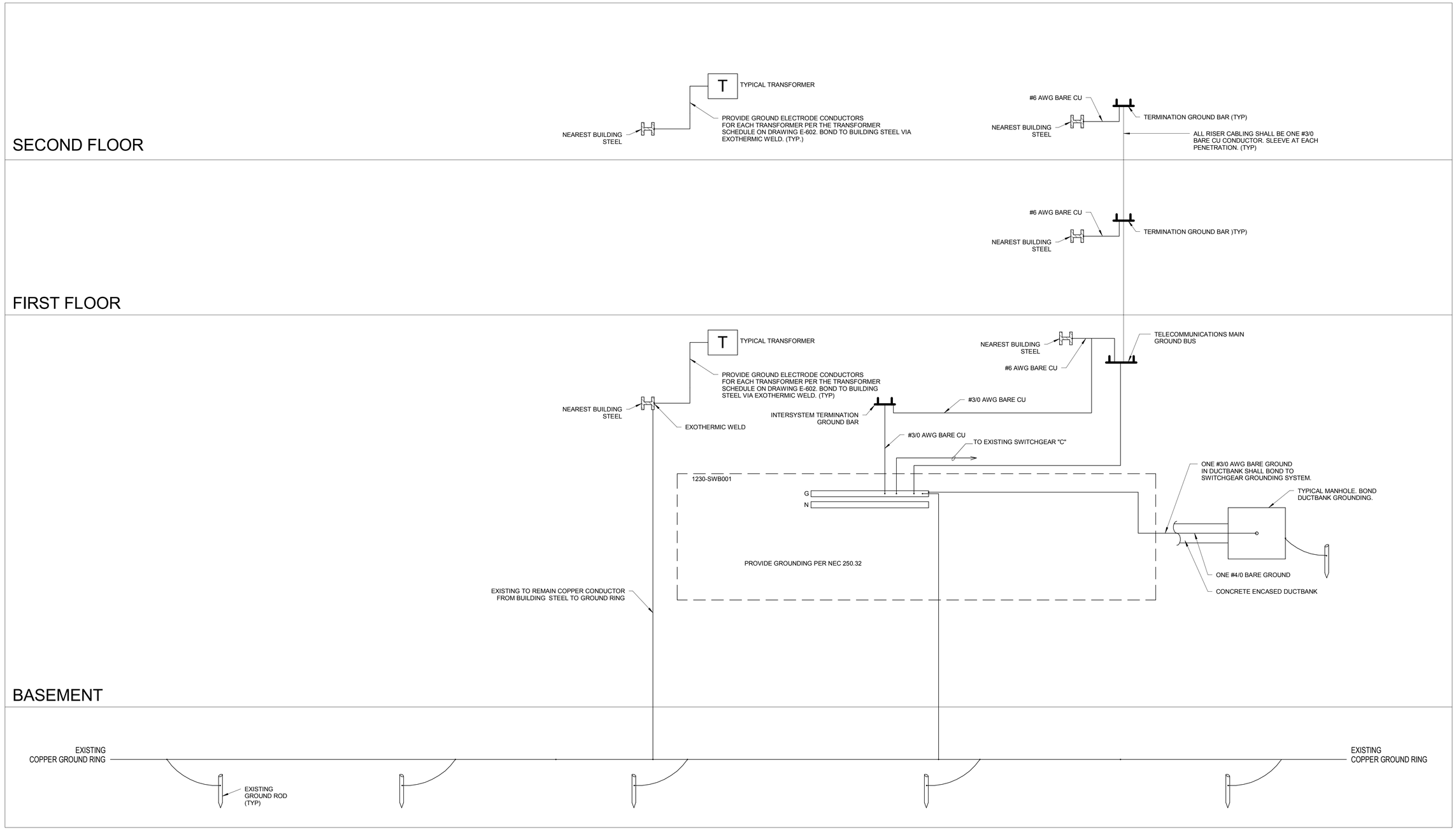
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL ONE-LINE DIAGRAM

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293561 | LATEST REV.

SHEET NO. E-602

12/16/2013 7:27:44 AM



NOTE:
1. VERIFY EXISTING SERVICE ENTRANCE BOND JUMPER AT TRANSFORMER SERVING SWITCHGEAR "C". SUBMIT CONFIRMATION PHOTO WITH SWITCHBOARD SUBMITTAL.

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL GROUNDING ONE LINE DIAGRAM

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293562 | LATEST REV.
SHEET NO. E-603

12/16/2013 8:30:17 AM

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	VOLTAGE /LAMPS/WATTAGE	MOUNTING	MANUFACTURER	MODEL NUMBER	NOTES
A	2 x 2 LED	277 / LED / 45	RECESSED		LFP22E-277-45W-4000K	
AE	2 x 2 LED	277 / LED / 45	RECESSED		LFP22E-277-45W-4000K	NOTE-2
AD	2 x 2 LED	277 / LED / 45	RECESSED		LFP22E-277-45W-4000K	
B1	4' FLUORESCENT HIGH BAY	277 / 4 / 54	PENDANT		IBZ-454L-WD-A12125-GEB10PS90	
B1E	4' FLUORESCENT HIGH BAY	277 / 4 / 54	PENDANT		IBZ-454L-WD-A12125-GEB10PS90	NOTE-2
B2	4' FLUORESCENT HIGH BAY	277 / 6 / 54	PENDANT		IBZ-654L-WD-A12125-GEB10PS90	
C1	4' UTILITY FIXTURE	277 / 2/ 28	PENDANT		C228 MV-2-28-277	
C1E	4' UTILITY FIXTURE	277 / 2/ 28	PENDANT		C228 MV-2-28-277	NOTE-2
C2	4' SQUARE-BASKET WRAPS FIXTURE	277 / 2/ 28	PENDANT		SB-2-28T8-GEB95-277	MOUNT AT 12'-0" AFF.
C2E	4' SQUARE-BASKET WRAPS FIXTURE	277 / 2/ 28	PENDANT		SB-2-28T8-GEB95-277	MOUNT AT 12'-0" AFF. NOTE-2
C3	4' SUSPENDED INDIRECT FIXTURE	277 / 2/ 28	PENDANT		BRM7-3-28T8-20/80-SPR-R4-277-GEB10	MOUNT AT 8'-0" AFF. NOTE-5
C3E	4' SUSPENDED INDIRECT FIXTURE	277 / 2/ 28	PENDANT		BRM7-3-28T8-20/80-SPR-R4-277-GEB10	MOUNT AT 8'-0" AFF. NOTE-2,5
D	COVE LIGHT	277 / 2 / 28	RECESSED		SS-2-28T8-MVOLT-GEB10PS	
E1	SINGLE FACE EXIT SIGN	277 / LED / 5	SURFACE		EDG-1-R	
E2	DOUBLE FACE EXIT SIGN	277 / LED / 5	SURFACE		EDG-2-R	
G	STAIR FIXTURE	277 / 2 / 28	SURFACE		WP-2-28-MVOLT-GEB10IS	MOUNT AT 8'-0" AFF.
GE	STAIR FIXTURE	277 / 2 / 28	SURFACE		WP-2-28-MVOLT-GEB10IS	NOTE-2
H1	6" COMPACT FLUORESCENT DOWNLIGHT	277 / 2 / 13	RECESSED		LF6N-2/13DTT-F602A-PCL-MVOLT	
H1E	6" COMPACT FLUORESCENT DOWNLIGHT	277 / 2 / 13	RECESSED		LF6N-2/13DTT-F602A-PCL-MVOLT	NOTE-2
H2	6" DIMMABLE COMPACT FLUORESCENT DOWNLIGHT	277 / 2 / 26	RECESSED		LF6N-2/26DTT-F602A-PCL-MVOLT-ADEZ	PROVIDE WITH DIMMABLE BALLAST
H2E	6" DIMMABLE COMPACT FLUORESCENT DOWNLIGHT	277 / 2 / 26	RECESSED		LF6N-2/26DTT-F602A-PCL-MVOLT-ADEZ	NOTE-2
W1	WALL PACK	277 / 2 / 32	SURFACE		TWH-2/32TRT-MVOLT-PE-VG-LPI	MOUNT AT 8'-0" AFF.
W1E	WALL PACK	277 / 2 / 32	SURFACE		TWH-2/32TRT-MVOLT-PE-VG-LPI	MOUNT AT 8'-0" AFF, NOTE-2

NOTES:

1. PROVIDE ALL LIGHTING FIXTURE ACCESSORIES FOR COMPLETE FIXTURE INSTALLATION. REFER TO ARCHITECTURE DRAWING LOCATIONS.
2. PROVIDE BATTERY PACK FOR THE EMERGENCY FIXTURE AS INDICATED ON THE FLOOR PLANS. BATTERY PACK SHALL MAINTAIN A MINIMUM OF 50% LIGHT OUTPUT OF ORIGINAL FIXTURE FOR 90 MINUTES.
3. PROVIDE BALLAST DISCONNECTS FOR ALL FIXTURES.
4. ALL LAMPS SHALL BE 4000K COLOR TEMPERATURE.
5. FIXTURES MOUNTED IN ROWS MAY BE ORDERED IN FULL LENGTHS AS INDICATED ON THE LIGHTING PLANS, E-201A, E-201B, E-202A, AND E-202B.

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JEER REN
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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL LIGHTING FIXTURE SCHEDULE

BUILDING NO. 1230
SHEET NO. E-701
SIZE D
DRAWING NO. 1293563
LATEST REV.

12/16/2013 7:27:46 AM

MECHANICAL CONNECTION SCHEDULE

DESIGNATION	HP	KW	FLA	VOLTAGE	PHASE	WIRE SIZE	LOCATION	NEAR COLUMN	MOTOR STARTER				LOCAL DISCONNECT			REMARKS
									POLES	SIZE	MANUAL STARTER	COMBINATION STARTER	POLES	AMPS	FUSE	
AHU-1			56.5	480	3	3#4+1#8GND, IN 1"C	BASEMENT	Ad-10	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
AHU-2			50	480	3	3#3+1#8GND, IN 1 1/4"C	BASEMENT	C-16	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
AHU-3			86	480	3	3#2+1#6GND, IN 1 1/4"C	BASEMENT	C-10	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
BCU-1	1			480	3	3#12+1#12GND, IN 3/4"C	TRUCK BAY	E-2	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
UH-1			2.2	120	1	2#12+1#12GND, IN 3/4"C	TRUCK BAY	E-1	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
CP-1			1.5	120	1	2#12+1#12GND, IN 3/4"C	BASEMENT	C-10	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
CP-2			1.5	120	1	2#12+1#12GND, IN 3/4"C	BASEMENT	Ad-16	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
CP-3			1.5	120	1	2#12+1#12GND, IN 3/4"C	BASEMENT	Da-10	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
CP-4		0.1		120	1	2#12+1#12GND, IN 3/4"C	SECOND FLOOR	E-2	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
CP-5		0.1		120	1	2#12+1#12GND, IN 3/4"C	SECOND FLOOR	Da-16	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
CHWP-1	30			480	3	3#8+1#10GND, IN 1"C	BASEMENT	Ad-14	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
CHWP-2	30			480	3	3#8+1#10GND, IN 1"C	BASEMENT	Ad-14	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EF-1	3/4			480	3	3#12+1#12GND, IN 3/4"C	ROOF		FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EF-2	1/2			120	1	2#12+1#12GND, IN 3/3"C	ROOF		FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EF-3	1 1/2			480	3	3#12+1#12GND, IN 3/4"C	ROOF		FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EF-4	1/4			120	1	2#12+1#12GND, IN 3/4"C	ROOF		FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EF-5	0.60			120	1	2#12+1#12GND, IN 3/4"C	ROOF		FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EWF-1		0.5		120	1	2#12+1#12GND, IN 3/4"C	FIRST FLOOR	A-15	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EWF-2		0.5		120	1	2#12+1#12GND, IN 3/4"C	FIRST FLOOR	A-16	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EWF-3		0.5		120	1	2#12+1#12GND, IN 3/4"C	SECOND FLOOR	A-15	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EWF-4		0.5		120	1	2#12+1#12GND, IN 3/4"C	SECOND FLOOR	A-16	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EUH-1		3		208	1	2#12+1#12GND, IN 3/4"C	FIRST FLOOR	A-10	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EUH-2		2		208	1	2#12+1#12GND, IN 3/4"C	FIRST FLOOR	E-16	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EUH-3		3		208	1	2#12+1#12GND, IN 3/4"C	FIRST FLOOR	Da-2a	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EWH-1		5		480	3	3#12+1#12GND, IN 3/4"C	FIRST FLOOR	Ad-14	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
EWH-2		5		480	3	3#12+1#12GND, IN 3/4"C	SECOND FLOOR	Ad-14	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
FCU-1			6.0	120	1	2#12+1#12GND, IN 3/4"C	SECOND FLOOR	Da-15	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
FCU-2			6.0	120	1	2#12+1#12GND, IN 3/4"C	FIRST FLOOR	Da-15	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
HWC-1	1/6			120	1	2#12+1#12GND, IN 3/4"C	FIRST FLOOR	C-14	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
HWP-1	7.5			480	3	3#12+1#12GND, IN 3/4"C	BASEMENT	Ad-15	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
HWP-2	7.5			480	3	3#12+1#12GND, IN 3/4"C	BASEMENT	Ad-15	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
SE-1	1			480	3	3#12+1#12GND, IN 3/4"C	BASEMENT	Da-17	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
SP-1	1			120	1	2#12+1#12GND, IN 3/4"C	BASEMENT	A-8	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
SP-2	1			120	1	2#12+1#12GND, IN 3/4"C	BASEMENT	E-8	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
SP-3	1/3			120	1	2#12+1#12GND, IN 3/4"C			FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
SP-4	1/3			120	1	2#12+1#12GND, IN 3/4"C			FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
SWH-1			20.0	120	1	2#12+1#12GND, IN 3/4"C			FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
TP-1		0.1		120	1	2#12+1#12GND, IN 3/4"C	BASEMENT		FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							
TP-2		0.1		120	1	2#12+1#12GND, IN 3/4"C	BASEMENT	Da-17	FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.							

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: MECHANICAL EQUIPMENT SCHEDULE

BUILDING NO.: 1230
SHEET NO.: E-702
SIZE: D
DRAWING NO.: 1293564
LATEST REV.:

12/16/2013 7:27:47 AM

SWB001

Location: MECHANICAL 20
Supply From:
Mounting: FREE STANDING
Enclosure: NEMA 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 65000
Mains Type: MCB
Mains Rating: 800 A
MCB Rating: 800 A

Notes:

CKT	Circuit Description	Wire Size	# of Poles	Frame Size	Trip Rating	Load	Remarks
1	BHME	3-#750, 1-#750, 1-#3	3	400 A	400 A	142 kVA	
2	XFMR T2 - 112.5kVA	3-#250, 1-#250, 1-#6	3	200 A	200 A	65 kVA	
3	XFMR T1 - 112.5kVA	3-#250, 1-#250, 1-#6	3	200 A	200 A	0 kVA	
4	AHU-2	3-#3, 1-#3, 1-#8	3	80 A	80 A	22 kVA	
5	AHU-3	3-#1, 1-#1, 1-#6	3	110 A	110 A	33 kVA	
6	AHU-1	3-#4, 1-#4, 1-#8	3	70 A	70 A	22 kVA	
7	2HLW	3-#350, 1-#350, 1-#4	3	250 A	250 A	66 kVA	
8	2HLE	3-#350, 1-#350, 1-#4	3	250 A	250 A	51 kVA	
9	1HLE	3-#350, 1-#350, 1-#4	3	250 A	250 A	23 kVA	
10							
11							
12							

Total Conn. Load: 424 kVA
Total Amps: 510 A

Legend:

Branch Panel: BHMEA

Location: MECHANICAL 20
Supply From: BHME
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 65000
Mains Type: MCB
Mains Rating: 200 A
MCB Rating: 200 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	CWP-1; MECHANICAL 20	3-#6, 1-#6, 1-#10	50 A	3	0 kVA	0 kVA					3	70 A	3-#4, 1-#4, 1-#8	EXIST. ELEV DISCONNECT; MECHANICAL 20	2
3							0 kVA	0 kVA							4
5									0 kVA	0 kVA					6
7	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	8
9	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	10
11	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	12
13	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	14
15	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	16
17	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	18
19	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	20
21	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	22
23	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	24
25	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	26
27	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	28
29	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	30
31	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	32
33	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	34
35	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	36
37	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	38
39	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	40
41	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	42
				Total Load:	0 kVA		0 kVA		0 kVA						
				Total Amps:	0 A		0 A		0 A						

Legend:

Branch Panel: BHME

Location: MECHANICAL 20
Supply From: SWB001
Mounting: SURFACE
Enclosure: NEMA1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 65000
Mains Type: MCB
Mains Rating: 400 A
MCB Rating: 400 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	SE-1 MECHANICAL 20	3-#12, 1-#12, 1-#12	20 A	3	1 kVA	3 kVA					3	20 A	3-#12, 1-#12, 1-#12	HWP-2 MECHANICAL 20	2
3							1 kVA	3 kVA							4
5									1 kVA	3 kVA					6
7	Lighting Room 20	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	4 kVA					3	25 A	3-#10, 1-#10, 1-#10	RF-1-BASEMENT	8
9	HWP-1 MECHANICAL 20	3-#12, 1-#12, 1-#12	20 A	3			3 kVA	4 kVA							10
11									3 kVA	4 kVA					12
13					3 kVA	2 kVA					1	20 A	1-#10, 1-#10, 1-#10	Lighting BASEMENT...	14
15	CHWP-2 MECHANICAL 20	3-#4, 1-#4, 1-#8	70 A	3			11...								16
17									11...						18
19					11...	11...									20
21	RF-2 MECHANICAL 20	3-#12, 1-#12, 1-#12	20 A	3			3 kVA	11...			3	70 A	3-#4, 1-#4, 1-#8	CHWP-1-MECHANICAL 20	22
23									3 kVA	11...					24
25					3 kVA	6 kVA									26
27	AIRCOMP-J-BOX MECHANICAL 20	3-#12, 1-#12, 1-#12	20 A	3			2 kVA	6 kVA			3	30 A	3-#10, 1-#10, 1-#10	RF-3-BASEMENT	28
29									2 kVA	6 kVA					30
31					2 kVA	0 kVA									32
33	Spare	--	20 A	1			0 kVA	0 kVA			3	100 A	3-#1, 1-#1, 1-#8	EXISTING RESEARCH COOLING TOWER	34
35	Spare	--	20 A	1					0 kVA	0 kVA					36
37	PANEL BHMEA	3-#250, 1-#250, 1-#6	200 A	3	0 kVA	2 kVA					3	225 A	3-#300, 1-#300, 1-#4	PANEL BLME VIA XFMR T5	38
39							0 kVA	1 kVA							40
41									0 kVA	3 kVA					42
				Total Load:	49 kVA		45 kVA		47 kVA						
				Total Amps:	179 A		163 A		172 A						

Legend:

Branch Panel: BLME

Location: MECHANICAL 20
Supply From: XFMR T5
Mounting: Surface
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	HWC-1 MECHANIC...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	0 kVA					1	20 A	1-#12, 1-#12, 1-#12	Junction Box Card...	2
3	TP-2- MECHANICAL...	1-#12, 1-#12, 1-#12	20 A	1			0 kVA	0 kVA			1	20 A	1-#12, 1-#12, 1-#12	RECEPTS-...	4
5	FSD- BASEMENT	1-#12, 1-#12, 1-#12	20 A	1					0 kVA	1 kVA	1	20 A	1-#12, 1-#12, 1-#12	RECEPTS-...	6
7	RECEPTS -...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	0 kVA					1	20 A	1-#12, 1-#12, 1-#12	CP-1- BASEMENT	8
9	CP-3-BASEMENT	1-#12, 1-#12, 1-#12	20 A	1			0 kVA	0 kVA			1	20 A	1-#12, 1-#12, 1-#12	CP-2- BASEMENT	10
11	SP-1- BASEMENT	1-#10, 1-#10, 1-#10	20 A	1					1 kVA	1 kVA	1	20 A	1-#10, 1-#10, 1-#10	SP-2- BASEMENT	12
13	AHU LIGHTS-...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	0 kVA					1	20 A	1-#12, 1-#12, 1-#12	AHU LIGHTS-...	14
15	EXHAUST FAN -...	1-#12, 1-#12, 1-#12	20 A	1			0 kVA	0 kVA			2	200 A	--	SHORE POWER	16
17	COOLING TOWER...	1-#12, 1-#12, 1-#12	20 A	1					0 kVA	0 kVA					18
19	COOLING TOWER...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	0 kVA					1	30 A	--	SHORE POWER	20
21	CHILLER CONTROL...	1-#12, 1-#12, 1-#12	20 A	1			0 kVA	0 kVA			1	20 A	1-#12, 1-#12, 1-#12	EXIST. ELEV PIT...	22
23	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	1-#12, 1-#12, 1-#12	EXIST. ELEV CAB...	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	2 kVA		1 kVA		3 kVA						
				Total Amps:	17 A		7 A		26 A						

Legend:

Branch Panel: 1HLE

Location: EQUIP. CLOSET 138
Supply From: SWB001
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 65,000
Mains Type: MCB
Mains Rating: 250 A
MCB Rating: 250 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	Lighting Room 133,...	1-#12, 1-#12, 1-#12	20 A	1	3 kVA	2 kVA					1	20 A	1-#12, 1-#12, 1-#12	Lighting Room 132,...	2
3	Lighting CLOSED...	1-#12, 1-#12, 1-#12	20 A	1			3 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	Lighting Room C, H1...	4
5	Lighting Room 135,...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	1 kVA	1	20 A	1-#12, 1-#12, 1-#12	Lighting CORRIDOR...	6
7	Lighting Room 138,...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	Lighting Room 129,...	8
9	Lighting Room H1A,...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	2 kVA			1	20 A	1-#12, 1-#12, 1-#12	Lighting Room 140,...	10
11	Lighting Room H1A,...	1-#12, 1-#12, 1-#12	20 A	1					0 kVA	0 kVA	1	20 A	1-#12, 1-#12, 1-#12	Exterior Lighting North	12
13	Exterior Lighting South	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	0 kVA					1	20 A	1-#12, 1-#12, 1-#12	Lighting Room S1F,...	14
15	EWH-1	3-#12, 1-#12, 1-#12	20 A	3			2 kVA	1 kVA			3	30 A	3-#10, 1-#10, 1-#10	SPECIAL EQUIPMENT SHOP 116	16
17									2 kVA	1 kVA					18
19					2 kVA	1 kVA									20
21	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	1-#12, 1-#12, 1-#12	Lighting	22
23	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	24
25	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	8 kVA		10 kVA		4 kVA						
				Total Amps:	31 A		39 A		16 A						

Legend:

Branch Panel: 1LPW

Location: CORRIDOR H1A
Supply From:
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 400 A
MCB Rating: 400 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	Spare	--	20 A	1	0 kVA	6 kVA					1	225 A	1-#300, 1-#300, 1-#4	1LPWC	2
3	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	4
5	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	6
7	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	8
9	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	10
11	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	12
13	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	14
15	Space	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	16
17	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	18
19	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	20
21	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	22
23	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37					7 kVA	7 kVA									38
39	1LPWA	3-#300, 1-#300, 1-#4	225 A	3			6 kVA	6 kVA			3	225 A	3-#300, 1-#300, 1-#4	1LPWB	40
41									6 kVA	6 kVA					42
				Total Load:	20 kVA		17 kVA		16 kVA						
				Total Amps:	168 A		140 A		137 A						

Legend:

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JEER REN
Lic. No. 42740
11/13/2013
PROFESSIONAL ENGINEER

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% FINAL SUBMISSION

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA CODD	12/02/2013	DRAWN	TT	
BRYAN HAAS	NASA CODD	12/02/2013	DESIGNED	TT	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	MW	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EH	
JOHN T. INGE	NASA CODD	12/06/2013	TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL PANEL SCHEDULES

BUILDING NO.: 1230
SHEET NO.: E-801
SIZE: D
DRAWING NO.: 1293565
LATEST REV.:

12/16/2013 7:27:48 AM

Branch Panel: 1LPE

Location: EQUIP. CLOSET 138
Supply From: XFMR T2
Mounting: SURFACE
Enclosure: NEMA 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 400 A
MCB Rating: 400 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1					2 kVA	9 kVA									2
3	PANEL 1LPEC	3-#1, 1-#1, 1-#8	100 A	3			2 kVA	7 kVA			3	225 A	3-#300, 1-#300, 1-#4	PANEL 1LPEB1	4
5									2 kVA	7 kVA					6
7					10...	2 kVA									8
9	PANEL 1LPEA	3-#750, 1-#750, 1-#3	400 A	3			9 kVA	3 kVA			3	225 A	3-#300, 1-#300, 1-#4	PANEL 1LPEB2	10
11									9 kVA	3 kVA					12
13	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	14
15	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	16
17	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	18
19	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	20
21	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	22
23	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	24
25	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	23 kVA		22 kVA		20 kVA						
				Total Amps:	194 A		184 A		169 A						

Legend:

Branch Panel: 1LPWA

Location: CORRIDOR H1A
Supply From: 1LPW
Mounting: SURFACE
Enclosure: NEMA 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1					2 kVA	0 kVA									2
3	BUSWAY-HOT BENCH LAB 133	3-#1, 1-#1, 1-#8	100 A	3			2 kVA	0 kVA			3	60 A	3-#4, 1-#4, 1-#10	RACEWAY- LAB 133	4
5									2 kVA	0 kVA					6
7					0 kVA	0 kVA									8
9	BUSWAY-HOT BENCH LAB 133	3-#4, 1-#4, 1-#10	60 A	3			0 kVA	0 kVA			3	60 A	3-#4, 1-#4, 1-#10	RACE WAY LAB 133	10
11									0 kVA	0 kVA					12
13	RECEPTS- Room 133	1-#10, 1-#10, 1-#10	20 A	1	1 kVA	0 kVA									14
15	RECEPTS-RESEAR...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	0 kVA			3	60 A	3-#4, 1-#4, 1-#10	RACEWAY- LAB 132	16
17	RECEPTS-DESIGN...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	0 kVA					18
19					0 kVA	0 kVA									20
21	RACEWAY-DESIGN INTEGRITY LAB 131	3-#4, 1-#4, 1-#10	60 A	3			0 kVA	0 kVA			3	60 A	3-#4, 1-#4, 1-#10	RACE WAY SHOP 135	22
23									0 kVA	0 kVA					24
25					0 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES...	26
27	RACE WAY SHOP 135	3-#4, 1-#4, 1-#10	60 A	3			0 kVA								28
29									0 kVA	0 kVA	1	20 A	1-#12, 1-#12, 1-#12	EPO- DESIGN...	30
31	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	32
33	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	34
35	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	36
37	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	38
39	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	40
41	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	42
				Total Load:	7 kVA		6 kVA		6 kVA						
				Total Amps:	60 A		52 A		53 A						

Legend:

Branch Panel: 1LPWB

Location: CORRIDOR H1A
Supply From: 1LPW
Mounting: SURFACE
Enclosure: NEMA 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1					2 kVA	1 kVA									2
3	BUS WAY-RESEARCH LAB 136	3-#1, 1-#1, 1-#8	100 A	3			2 kVA	1 kVA			3	100 A	3-#1, 1-#1, 1-#8	BUS WAY -VEHICLE EMULATION LAB 137	4
5									2 kVA	1 kVA					6
7					0 kVA	0 kVA									8
9	RACEWAY-VEHICLE EMULATION LAB 137	3-#4, 1-#4, 1-#10	60 A	3			0 kVA	0 kVA			3	60 A	3-#4, 1-#4, 1-#10	RACEWAY-VEHICLE EMULATION LAB 137	10
11									0 kVA	0 kVA					12
13	RECEPTACLES...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	0 kVA									14
15	RECEPTS-RESEARCH LAB 136	3-#4, 1-#4, 1-#10	60 A	3			0 kVA	0 kVA			3	60 A	3-#4, 1-#4, 1-#10	RACEWAY-AVIONICS RESEARCH LAB 136	16
17									0 kVA	0 kVA					18
19					0 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTS. VEHICL...	20
21	RACEWAY-RESEARCH LAB 136	3-#4, 1-#4, 1-#10	60 A	3			0 kVA	0 kVA			1	20 A	--	Spare	22
23									0 kVA	0 kVA	1	20 A	--	Spare	24
25					0 kVA	0 kVA					1	20 A	--	Spare	26
27	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	28
29	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	30
31	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	32
33	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	34
35	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	7 kVA		6 kVA		6 kVA						
				Total Amps:	62 A		47 A		47 A						

Legend:

Branch Panel: 1LPEA

Location: CORRIDOR H1A
Supply From: 1LPE
Mounting: SURFACE
Enclosure: NEMA 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 400 A
MCB Rating: 400 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	RECEPTS- Room...	1-#10, 1-#10, 1-#10	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTS- CLOSED...	2
3	RECEPTS.- Room 130	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	2 kVA							4
5	RACE WAY CLOSED LOOP LAB 130	3-#4, 1-#4, 1-#10	60 A	3					0 kVA	2 kVA	3	100 A	3-#1, 1-#1, 1-#8	BUS WAY CLOSED LOOP LAB 130	6
7					0 kVA	2 kVA									8
9							0 kVA	0 kVA							10
11	RACE WAY CLOSED LOOP LAB 130	3-#4, 1-#4, 1-#10	60 A	3					0 kVA	0 kVA	3	60 A	3-#4, 1-#4, 1-#10	RACE WAY CLOSED LOOP LAB 130	12
13					0 kVA	0 kVA									14
15							0 kVA	0 kVA							16
17	BUS WAY CLOSED LOOP LAB 130	3-#1, 1-#1, 1-#8	100 A	3					2 kVA	0 kVA	3	60 A	3-#4, 1-#4, 1-#10	RACE WAY CLOSED LOOP LAB 130	18
19					2 kVA	0 kVA									20
21							2 kVA	2 kVA							22
23	RACE WAY CLOSED LOOP LAB 130	3-#4, 1-#4, 1-#10	60 A	3					0 kVA	2 kVA	3	100 A	3-#1, 1-#1, 1-#8	BUS WAY CLOSED LOOP LAB 130	24
25					0 kVA	2 kVA									26
27							0 kVA	0 kVA			1	20 A	--	Spare	28
29	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	30
31	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	32
33	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	34
35	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	36
37	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	38
39	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	40
41	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	42
				Total Load:	10 kVA		9 kVA		9 kVA						
				Total Amps:	86 A		78 A		71 A						

Legend:

Branch Panel: 1LPEB1

Location: EQUIP. CLOSET 138
Supply From: 1LPE
Mounting: SURFACE
Enclosure: NEMA 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	RECEPTS- Room 138	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPT- Room 139...	2
3	RECEPTS.- ROOM...	1-#12, 1-#12, 1-#12	20 A	1			0 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	J-BOX -HAND DRYE...	4
5	PAPER TOWEL DIS...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	1 kVA	1	20 A	1-#12, 1-#12, 1-#12	RECEPTS.-...	6
7	E.W.C.- COORIDOR...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	J-BOX-HAND DRYE...	8
9	RECEPTS.-...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	2 kVA							10
11	EQUIP. CONNECTION- RM. 140	3-#12, 1-#12, 1-#12	20 A	3					2 kVA	2 kVA	3	20 A	3-#12, 1-#12, 1-#12	EQUIP. CONNECTION RM.- 140	12
13					2 kVA	2 kVA									14
15							2 kVA	1 kVA							16
17	RECEPTS.- Room...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	1 kVA	3	20 A	3-#12, 1-#12, 1-#12	EQUIP. CONNECTION RM.- 140	18
19	RECEPTS.- TEAM...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA									20
21	RECEPTS.- TEAM...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	RECEPTS.- FOR TV...	22
23	EXISTING...	1-#12, 1-#12, 1-#12	20 A	1					0 kVA	0 kVA	1	20 A	1-#12, 1-#12, 1-#12	CORRIDOR H1A	24
25	Spare	--	0 A	1	0 kVA	0 kVA					1	0 A	--	Spare	26
27	Spare	--	0 A	1			0 kVA	0 kVA			1	0 A	--	Spare	28
29	Spare	--	0 A	1					0 kVA	0 kVA	1	20 A	--	Spare	30
31	Spare	--	0 A	1	0 kVA	0 kVA					1	20 A	--	Spare	32
33	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	34
35	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	9 kVA		7 kVA		7 kVA						
				Total Amps:	73 A		60 A		58 A						

Legend:

Branch Panel: 1LPEB2

Location: EQUIP. CLOSET 138
Supply From: 1LPE
Mounting: SURFACE
Enclosure: NEMA 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	VAV BOXES - RMS...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	0 kVA					1	20 A	1-#12, 1-#12, 1-#12	VAV- RMS- 127, 28,...	2
3								1 kVA			1	20 A	1-#12, 1-#12, 1-#12	LOBBY H1A- FCU-2	4
5	JAN. CLOSET 138A-...	1-#12, 1-#12, 1-#12	20 A	1					0 kVA	0 kVA	1	20 A	1-#12, 1-#12, 1-#12	RMS- H1A, H1, 101A...	6
7	MENS 138A- EWF-1	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	EWF-2 WOMEN 139B	8
9	VESTIBULE 101A-EUH-2	2-#12, 1-#12, 1-#12	20 A	2			1 kVA	2 kVA			2	20 A	2-#12, 1-#12, 1-#12	EUH-1 CORRIDOR H1A	10
11									1 kVA	2 kVA					12
13	LAB 130- HWC-1	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	0 kVA					1	20 A	--	Spare	14
15	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	16
17	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	18
19	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	20
21	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	22
23	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	2 kVA		3 kVA		3 kVA						
				Total Amps:	17 A		28 A		23 A						

Legend:

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
JEER REN
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NASA
LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% FINAL SUBMISSION

APPROVALS

NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN (Author)	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED (Designer)	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL PANEL SCHEDULES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293566 | LATEST REV.

SHEET NO. E-802

12/16/2013 7:27:50 AM

Branch Panel: 2HLW

Location: EQUIP CLOSET 253B
Supply From: SWB001
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 65,000
Mains Type: MCB
Mains Rating: 250 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	Lighting Room 244,...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	Lighting Room 250,...	2
3	Lighting Room 250,...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	0 kVA			1	0 A	--	Spare	4
5	Lighting Room 252,...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	0 kVA	1	0 A	--	Spare	6
7	Lighting...	1-#12, 1-#12, 1-#12	20 A	1	2 kVA	2 kVA					1	20 A	1-#12, 1-#12, 1-#12	Lighting...	8
9	Spare	--	0 A	1			0 kVA	0 kVA			1	0 A	--	Spare	10
11	Lighting TRUCK BAY...	1-#12, 1-#12, 1-#12	20 A	1					2 kVA	0 kVA	1	0 A	--	Spare	12
13	BCU-1 TRUCK BAY 134	3-#12, 1-#12, 1-#12	20 A	3	1 kVA	0 kVA					1	0 A	--	Spare	14
15							1 kVA	0 kVA			1	0 A	--	Spare	16
17									1 kVA	0 kVA	3	20 A	3-#12, 1-#12, 1-#12	EF-3	18
19	Space	--	--	--	0 kVA	0 kVA									20
21	Space	--	--	--			0 kVA	0 kVA							22
23	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	PANEL 2LPW1 VIA XFMR T3	3-#1, 1-#1, 1-#6	110 A	3	19...	0 kVA					--	--	--	Space	38
39							18...	0 kVA			--	--	--	Space	40
41									18...	0 kVA	--	--	--	Space	42
				Total Load:	25 kVA		19 kVA		22 kVA						
				Total Amps:	91 A		69 A		79 A						

Legend:

Branch Panel: 2HLE

Location: EQUIP CLOSET 259
Supply From: SWB001
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 480/277 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 65,000
Mains Type: MCB
Mains Rating: 250 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	Lighting Room 221,...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	2 kVA					1	20 A	1-#12, 1-#12, 1-#12	Lighting FUTURE...	2
3	Lighting Rooms H2A,...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	Lighting FUTURE...	4
5	Lighting Room 259,...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	1 kVA	1	20 A	1-#12, 1-#12, 1-#12	Lighting...	6
7	Spare	--	0 A	1	0 kVA	0 kVA									8
9	Spare	--	0 A	1			0 kVA	0 kVA			3	20 A	3-#12, 1-#12, 1-#12	EF-1	10
11	PANEL 2LPE1 VIA XFMR T4	3-#1, 1-#1, 1-#6	110 A	3					14...	0 kVA					12
13					12...	0 kVA					1	20 A	--	Spare	14
15							12...	0 kVA			1	20 A	--	Spare	16
17	Spare	--	0 A	1					0 kVA	0 kVA	1	20 A	--	Spare	18
19	Spare	--	0 A	1	0 kVA	0 kVA					1	20 A	--	Spare	20
21	Space	--	--	--			0 kVA	0 kVA			1	20 A	--	Spare	22
23	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	EWC-2 JAN. CLOSET 261	3-#12, 1-#12, 1-#12	20 A	3	2 kVA	0 kVA					--	--	--	Space	38
39							2 kVA	0 kVA			--	--	--	Space	40
41									2 kVA	0 kVA	--	--	--	Space	42
				Total Load:	17 kVA		17 kVA		17 kVA						
				Total Amps:	60 A		60 A		62 A						

Legend:

Branch Panel: 2LPW1

Location: EQUIP CLOSET 253B
Supply From: XFMR T3
Mounting: Surface
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	RECEPTACLES-OF...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES-...	2
3	RECEPTACLES-BR...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	COPIER-WORK...	4
5	COPIER- WORK...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	2 kVA	1	20 A	1-#10, 1-#10, 1-#10	RECEPTS.-Rooms...	6
7	RECEPTACLES-RO...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA										8
9							2 kVA	2 kVA							10
11	WORKSTATION 250	3-#12, 1-#12, 1-#12	20 A	3					2 kVA	2 kVA	3	20 A	3-#12, 1-#12, 1-#12	WORKSTATION 250	12
13					2 kVA	2 kVA									14
15							2 kVA	2 kVA							16
17	WORKSTATION 250	3-#12, 1-#12, 1-#12	20 A	3					2 kVA	2 kVA	3	20 A	3-#12, 1-#12, 1-#12	WORKSTATION 250	18
19					2 kVA	2 kVA									20
21							1 kVA	2 kVA							22
23	WORKSTATION 250	3-#12, 1-#12, 1-#12	20 A	3					1 kVA	2 kVA	3	20 A	3-#12, 1-#12, 1-#12	WORKSTATION 250	24
25					1 kVA	2 kVA									26
27							2 kVA	2 kVA							28
29	WORKSTATION 250	3-#12, 1-#12, 1-#12	20 A	3					2 kVA	2 kVA	3	20 A	3-#12, 1-#12, 1-#12	WORKSTATION 250	30
31					2 kVA	2 kVA									32
33							1 kVA	1 kVA							34
35	WORKSTATION 250	3-#12, 1-#12, 1-#12	20 A	3					1 kVA	1 kVA	3	20 A	3-#12, 1-#12, 1-#12	WORKSTATION 250	36
37					1 kVA	1 kVA									38
39	Space	--	--	--			0 kVA	0 kVA			1	20 A	--	Spare	40
41	Space	--	--	--					0 kVA	0 kVA	1	20 A	--	Spare	42
				Total Load:	19 kVA		18 kVA		18 kVA						
				Total Amps:	161 A		147 A		146 A						

Legend:

Branch Panel: 2LPW2

Location: EQUIP CLOSET 253B
Supply From: 2LPW1
Mounting: Surface
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	VAV'S-Rooms 250,...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	EF-2	2
3							1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	EF-4	4
5	WORKSTATION 250	3-#12, 1-#12, 1-#12	20 A	3					1 kVA	2 kVA	3	20 A	3-#12, 1-#12, 1-#12	WORKSTATION 250	6
7					1 kVA	2 kVA									8
9	UH-1 TRUCK BAY 134	1-#12, 1-#12, 1-#12	20 A	1			0 kVA	2 kVA							10
11	CP-4 TRUCK BAY 134	1-#12, 1-#12, 1-#12	20 A	1					0 kVA	0 kVA	1	0 A	--	Spare	12
13	EF-5	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	0 kVA					1	0 A	--	Spare	14
15	Spare	--	20 A	1			0 kVA	0 kVA			1	0 A	--	Spare	16
17	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	18
19	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	20
21	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	22
23	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	24
25	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	26
27	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	28
29	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	30
31	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	4 kVA		3 kVA		2 kVA						
				Total Amps:	37 A		28 A		20 A						

Legend:

Branch Panel: 2LPE1

Location: EQUIP CLOSET 259
Supply From: XFMR T4
Mounting: Surface
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	RECEPTS- TEAM...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES-TE...	2
3	RECEPTS.- TEAM...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	RECEPTS.- Rooms...	4
5	EWC- CORRIDOR...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	1 kVA	1	20 A	1-#12, 1-#12, 1-#12	PAPER TOWEL...	6
7	HAND DRYERS-...	1-#12, 1-#12, 1-#12	20 A	1	2 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTS.-CONFE...	8
9	RECEPTS-...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	PROJECTOR-CONF...	10
11	RECEPTS- Room 244	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	1 kVA	1	20 A	1-#8, 1-#8, 1-#8	RECEPTS- Room 265	12
13	RECEPTS- FUTURE...	1-#8, 1-#8, 1-#8	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES-TEL...	14
15	RECEPTS- Rooms...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	2 kVA							16
17	RECEPTS- Rooms...	1-#10, 1-#10, 1-#10	20 A	1					1 kVA	2 kVA	3	20 A	3-#10, 1-#10, 1-#10	RECEPTS.-FUTURE WORKSTATION-239	18
19	RECEPTS- FUTURE WORKSTATION 239	3-#10, 1-#10, 1-#10	20 A	3	2 kVA	2 kVA									20
21							2 kVA	1 kVA							22
23									2 kVA	1 kVA	3	20 A	3-#12, 1-#12, 1-#12	RECEPTS.-FUTURE WORKSTATION-263	24
25	RECEPTS.-TEAM RM. 264	3-#12, 1-#12, 1-#12	20 A	3	1 kVA	1 kVA									26
27							1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES-...	28
29									1 kVA	0 kVA	1	20 A	1-#12, 1-#12, 1-#12	FUTURE...	30
31	FUTURE...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	0 kVA					1	20 A	1-#12, 1-#12, 1-#12	FUT. WORKSTATIO...	32
33	CONFERENCE...	1-#12, 1-#12, 1-#12	20 A	1			0 kVA	0 kVA			1	20 A	1-#12, 1-#12, 1-#12	CORRIDOR H2A	34
35	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	36
37	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	38
39	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	40
41	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	42
				Total Load:	14 kVA		12 kVA		12 kVA						
				Total Amps:	115 A		100 A		103 A						

Legend:

Branch Panel: 2LPE2

Location: EQUIP CLOSET 259
Supply From: 2LPE1
Mounting: Surface
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	VAV J-BOX-...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES...	2
3	VENDING MACHINE...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	REFRIGERATOR...	4
5	MICROWAVE...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	1 kVA	1	20 A	1-#12, 1-#12, 1-#12	MICROWAVE...	6
7	FCU-1- LOBBY H2A	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	DISPOSAL PANTRY...	8
9	EWF-3 MEN 262A	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	0 kVA			1	20 A	1-#12, 1-#12, 1-#12	Junction Box Card...	10
11	EWF-4 WOMEN 262B	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	0 kVA	1	20 A	1-#12, 1-#12, 1-#12	ROOF RECEPTACLE	12
13	CP-5- LOBBY H2A	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	14
15	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	16
17	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	18
19	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	20
21	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	22
23	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	3 kVA		3 kVA		2 kVA						
				Total Amps:	22 A		21 A		19 A						

Legend:

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

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SEAL AREA

COMMONWEALTH OF VIRGINIA
JEER REN
Lic. No. 42740
11/13/2013
PROFESSIONAL ENGINEER

AECOM
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Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% FINAL SUBMISSION

APPROVALS

NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN (Author)	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED (Designer)	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED (Checker)	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
JOHN T. INGE	NASA COD	12/06/2013	TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL PANEL SCHEDULES

BUILDING NO. 1230
SHEET NO. E-803
SIZE D
DRAWING NO. 1293567
LATEST REV.

12/16/2013 7:27:51 AM

Branch Panel: 1LPEC

Location: TELECOM 102
Supply From: 1LPE
Mounting: Surface
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 100 A
MCB Rating: 100 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	BUSWAY- TELECOM 102	3-#4, 1-#4, 1-#10	60 A	3	1 kVA	1 kVA					3	60 A	3-#4, 1-#4, 1-#10	BUSWAY- TELECOM 240	2
3							1 kVA	1 kVA							4
5									1 kVA	1 kVA					6
7	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	8
9	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	10
11	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	12
13	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	14
15	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	16
17	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	18
19	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	20
21	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	22
23	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37															38
39															40
41															42
				Total Load:	2 kVA		2 kVA		2 kVA						
				Total Amps:	18 A		18 A		18 A						

Legend:

Branch Panel: 1LPWC

Location: CORRIDOR H1A
Supply From: 1LPW
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Mains Rating: 225 A
MCB Rating: 225 A

Notes:

CKT	Circuit Description	Wire Size	Trip	Poles	A		B		C		Poles	Trip	Wire Size	Circuit Description	CKT
1	RECEPTACLES...	1-#12, 1-#12, 1-#12	20 A	1	1 kVA	1 kVA					1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES...	2
3	RECEPTACLES...	1-#12, 1-#12, 1-#12	20 A	1			1 kVA	1 kVA			1	20 A	1-#12, 1-#12, 1-#12	RECEPTACLES...	4
5	REFRIGERATOR...	1-#12, 1-#12, 1-#12	20 A	1					1 kVA	2 kVA	1	20 A	1-#12, 1-#12, 1-#12	MOTORIZED DOOR...	6
7	MOTORIZED DOOR...	1-#12, 1-#12, 1-#12	20 A	1	2 kVA	2 kVA					1	20 A	1-#10, 1-#10, 1-#10	MOTORIZED DOOR...	8
9	MOTORIZED...	1-#10, 1-#10, 1-#10	20 A	1			2 kVA	2 kVA			2	20 A	2-#10, 1-#10, 1-#10	EUH-3- VESTIBULE C	10
11	FSD- RMS. 136, 130...	1-#12, 1-#12, 1-#12	20 A	1					0 kVA	2 kVA					12
13	CARD READER RM...	1-#12, 1-#12, 1-#12	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	14
15	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	16
17	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	18
19	Spare	--	20 A	1	0 kVA	0 kVA					1	20 A	--	Spare	20
21	Spare	--	20 A	1			0 kVA	0 kVA			1	20 A	--	Spare	22
23	Spare	--	20 A	1					0 kVA	0 kVA	1	20 A	--	Spare	24
25	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	26
27	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	28
29	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	30
31	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	32
33	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	34
35	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	36
37	Space	--	--	--	0 kVA	0 kVA					--	--	--	Space	38
39	Space	--	--	--			0 kVA	0 kVA			--	--	--	Space	40
41	Space	--	--	--					0 kVA	0 kVA	--	--	--	Space	42
				Total Load:	6 kVA		5 kVA		4 kVA						
				Total Amps:	47 A		41 A		37 A						

Legend:

REVISIONS

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REVISIONS

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SEAL AREA

COMMONWEALTH OF VIRGINIA
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NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ELECTRICAL PANEL SCHEDULES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293568 | LATEST REV.

SHEET NO. E-804

12/16/2013 7:27:53 AM

PIPING AND SYMBOL LEGEND

(E)	EXISTING PIPING TO REMAIN
	EXISTING PIPING TO BE REMOVED
	SANITARY DRAIN
	SANITARY VENT
SD	STORM DRAIN
SSD	SUBSOIL DRAIN, FOOTING DRAIN
OFD	OVERFLOW DRAIN
D	INDIRECT DRAIN
PD	PUMP DISCHARGE PIPING
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER SUPPLY
	DOMESTIC HOT WATER CIRCULATING
TW	TEMPERED WATER
TP	TRAP PRIMER
NP	NON-POTABLE WATER
DI	DISTILLED WATER
DE	DEIONIZED WATER
RO	REVERSE OSMOSIS WATER
CA	COMPRESSED AIR
MA	MEDICAL COMPRESSED AIR
LA	LABORATORY COMPRESSED AIR
VAC	VACUUM
MV	MEDICAL VACUUM
LV	LABORATORY VACUUM
O2	OXYGEN
N2	NITROGEN
N2O	NITROUS OXIDE
AW	ACID WASTE DRAIN
AV	ACID VENT
	GATE VALVE
	GLOBE VALVE
	DRAIN VALVE WITH CAP
	BALL VALVE
	BUTTERFLY VALVE
	GAS COCK
	BALALNCING VALVE
	CHECK VALVE
	AUTOMATIC CONTROL VALVE, 2 WAY
	AUTOMATIC CONTROL VALVE, 3 WAY
	ACCESS PANEL (CEILING)
AP	ACCESS PANEL (WALL)
	FLOOR SINK

	PRESSURE REDUCING VALVE
	TEMPERATURE AND PRESSURE RELIEF VALVE
BFP	BACKFLOW PREVENTER
HB	HOSE BIBB
WH	WALL HYDRANT
	UNION
	STRAINER
	PIPE ANCHOR
	PIPE GUIDE
	EXPANSION JOINT
	FLEXIBLE PIPE CONNECTION
	INCREASER OR REDUCER
	THERMOSTATIC MIXING VALVE
	CAP
	PRESSURE GAUGE
	VACUUM GAUGE
	THERMOMETER
	OS&Y VALVE
	FLUID FLOW DIRECTION
	PIPE UP (ELBOW)
	PIPE DOWN (ELBOW)
	BRANCH BOTTOM CONNECTION
WHA	SHOCK ARRESTOR, SIZE INDICATED
AV	AUTOMATIC AIR VENT
WCO	WALL CLEANOUT
CO	CLEANOUT PLUG
FCO	FLOOR CLEANOUT
GCO	GRADE CLEANOUT
	VENT THROUGH ROOF, RISER DIAGRAMS
	FLOOR DRAIN, AREA DRAIN, GARAGE DRAIN
	ROOF DRAIN
	TRAP, PLAN
	TRAP, RISER DIAGRAMS
	OPEN SITE DRAIN
	COMBINATION EMERGENCY SHOWER AND EYE/FACE WASH
	PIPE CONTINUATION
	POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
	POINT BETWEEN EXISTING WORK TO REMAIN AND EXISTING WORK TO REMAIN

W	DOMESTIC WATER RISER DESIGNATION	G	NATURAL GAS RISER DESIGNATION
S	SANITARY RISER DESIGNATION	OFD	OVERFLOW DRAIN RISER DESIGNATION
SD	STORM DRAIN RISER DESIGNATION		

ABBREVIATIONS

ABV	ABOVE
ACS	ACCESS
ACFM	ABSOLUTE CUBIC FEET PER MINUTE
AD	AREA DRAIN
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AP	ACCESS PANEL
APPR	APPROVED
APPROX	APPROXIMATE
ARCH.	ARCHITECTURAL
ASSE	AMERICAN SOCIETY OF SANITARY ENGINEERING
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AV	AIR VENT
AUX	AUXILIARY
BAS	BUILDING AUTOMATION SYSTEM
BET.	BETWEEN
BFP	BACKFLOW PREVENTER
BLDG	BUILDING
BLW	BELOW
BLW FL	BELOW FLOOR
BOT	BOTTOM
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
BU	BUILT-UP
BWV	BACKWATER VALVE
°C	DEGREES CELCIUS
CA	COMPRESSED AIR
CAP	CAPACITY
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CENT.	CENTRIFUGAL
CI	CAST IRON
CLG	CEILING
CO	CLEANOUT
COL	COLUMN
COMB.	COMBINATION
COMP	COMPRESSED, COMPRESSOR
CONC	CONCRETE
CONN	CONNECT, CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS, CONTINUATION
CONTR	CONTRACT, CONTRACTOR
COORD	COORDINATE
COP	COPPER
CP	CIRCULATING PUMP
CSEFW	COMBINATION EMERGENCY SHOWER AND EYE/FACE WASH
CTD	COOLING TOWER DRAIN
CW	COLD WATER
CWFU	COLD WATER FIXTURE UNIT
D	DRAIN LINE
DBP	DOMESTIC BOOSTER PUMP
DEG	DEGREES
DEMO	DEMOLITION, DEMOLISH
DFU	DRAINAGE FIXTURE UNIT
DIA	DIAMETER
DIAG	DIAGRAM
DIM.	DIMENSION
DISC.	DISCONNECT
DISCH	DISCHARGE
DN	DOWN
DS	DOWNSPOUT
DWG	DRAWING
E	EAST
EA	EACH
EFF	EFFICIENCY
EJ	EXPANSION JOINT
ELEC	ELECTRICAL
ELEV	ELEVATION
EMER	EMERGENCY
ENGR	ENGINEER
EP	EJECTOR PUMP
EQPT	EQUIPMENT
EST	ESTIMATED
ET	EXPANSION TANK
ETP	ELECTRONIC TRAP PRIMER
ETWH	ELECTRIC TANKLESS WATER HEATER
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EXH	EXHAUST
EXP	EXPOSED
EXPN	EXPANSION
EXT	EXTERIOR
EXTN	EXTENSION
°F	DEGREES FAHRENHEIT
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FL	FLOOR
FLEX	FLEXIBLE
FLG	FLANGE
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FS	FLOOR SINK
FT	FEET
FT WG	FEET OF WATER GAUGE

G	GAS
GA	GAUGE
GALV	GALVANIZE, GALVANIZED
GCO	GRADE CLEANOUT
GD	GARAGE DRAIN
GND	GROUND
GOVT	GOVERNMENT
GPF	GALLONS PER FLUSH
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRADE
GTV	GATE VALVE
GWH	GAS FIRED WATER HEATER
HB	HOSE BIBB
HG	MERCURY
HGT	HEIGHT
HORIZ	HORIZONTAL
HP	HORSE POWER
HR	HOUR
HTR	HEATER
HW	HOT WATER
HWC	HOT WATER CIRCULATING LINE
HWFU	HOT WATER FIXTURE UNIT
HWL	HIGH-WATER LINE
HX	HEAT EXCHANGER
HYD	HYDRANT
HZ	HERTZ
IE	INVERT ELEVATION
IN	INCH
IN HG	INCHES OF MERCURY
INV	INVERT
IN WG	INCHES OF WATER GAUGE
INSTL	INSTALL
INSUL	INSULATION, INSULATED, INSULATING
INTMD	INTERMEDIATE
IP	IRON PIPE
JC	JANITOR CLOSET
KG	KILOGRAM
KW	KILOWATT
KWH	KILOWATT HOUR
L	LITER
LAB	LABORATORY
LAV	LAVATORY
LBS	POUNDS
LBS/HR	POUNDS PER HOUR
LG	LENGTH, LONG
LIQ	LIQUID
LWL	LOW-WATER LEVEL
M	METER
MATL	MATERIAL
MAX	MAXIMUM
MB	MOP BASIN
MBH	1000 BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MET.	METAL
MFR	MAUFACTURER
MH	MAN HOLE, MOUNTING HEIGHT
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MM	MILLIMETER
MP	MEDIUM PRESSURE
MPH	MILES PER HOUR
MT	MOUNT
MTD	MOUNTED
MTG	MOUNTING
MTR	MOTOR
MTZ	MOTORIZED
N	NORTH
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED, NOISE CRITERIA
N.I.C.	NOT IN CONTRACT
NO	NORMALLY OPEN, NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OFD	OVERFLOW DRAIN
OL	OVERLOAD
OPNG	OPENING
OSD	OPEN SIGHT DRAIN
OS&Y	OUTSIDE SCREW AND YOKE
OVHD	OVERHEAD

P	PUMP
PA	PIPE ANCHOR
PART.	PARTIAL
PD	PUMP DISCHARGE, PLANTER DRAIN, PRESSURE DROP
PDCV	PRESSURE DIFFERENTIAL CONTROL VALVE
PG	PIPE GUIDE
PH	PHASE, PENTHOUSE
PNL	PANEL
PPH	POUNDS PER HOUR
PRESS.	PRESSURE
PRI	PRIMARY
PROP	PROPELLAR
P.R.S.	PRESSURE REDUCING STATION
PRI	PRIMARY
PRV	PRESSURE REDUCING VALVE, PRESSURE RELIEF VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	POINT
PVC	POLYVINYL CHLORIDE
PWR	POWER
R	RISER, RIGHT
RAD	RADIUS
REC	RECOVERY
RD	ROOF DRAIN
RECIR	RECIRCULATING
RECT	RECTANGULAR
RED	REDUCER, REDUCING
REIN	REINFORCE, REINFORCEMENT, REINFORCED
REQD	REQUIRED
REV	REVISION
RF	ROOF
RFH	ROOF HATCH
RL	RAIN LEADER
RLA	RUNNING LOAD AMPS
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RTE	ROUTE
RV	RELIEF VALVE, RELIEF VENT
S	SOUTH
SA	SHOCK ARRESTOR
SAN	SANITARY
SCFM	STANDARD CUBIC FEET PER MINUTE
SCHED	SCHEDULE
SD	STORM DRAIN
SEC	SECONDARY
SH	SHOWER
SK	SINK, SKETCH
SLP	SLOPE
SP	SUMP PUMP
SPEC	SPECIFICATION(S)
SPRT	SUPPORT
SQ.FT	SQUARE FEET
SS	STAINLESS STEEL, SANITARY SEWER
ST	STEAM
STD	STANDARD
SYS	SYSTEM
T	TOP
T&P	TEMPERATURE AND PRESSURE
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
THERM.	THERMOMETER
TOT	TOTAL
TMV	THERMOSTATIC MIXING VALVE
TPV	TEMPERATURE AND PRESSURE RELIEF VALVE
TYP	TYPICAL
UR	URINAL
V	VOLT, VENT, VALVE
VAC	VACUUM
VB	VAPOR BARRIER
VEL	VELOCITY
VERT	VERTICAL
VEST.	VESTIBULE
VFC	VARIABLE FREQUENCY CONTROLLER
VFD	VARIABLE FREQUENCY DRIVE
VIB	VIBRATION
VOL	VOLUME
VP	VENT PIPE
VS	VENT STACK
VTR	VENT THRU ROOF
W	WATT, WEST
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WCO	WALL CLEANOUT
WFU	WASTE FIXTURE UNIT
WG	WATER GAUGE
WH	WALL HYDRANT
WP	WASTE PIPE
WPD	WATER PRESSURE DROP
WSFU	WATER SUPPLY FIXTURE UNIT
WST	WASTE
WTR	WATER

GENERAL NOTES

1. CHARACTER IDENTIFIERS IN LINES ON PIPING LEGEND ARE ALSO USED FOR ABBREVIATIONS.
2. CONTRACTOR SHALL COORDINATE THIS WORK WITH THAT OF OTHER TRADES, INCLUDING BUT NOT LIMITED TO, ELECTRICAL, HVAC, PROCESS PIPING, SPRINKLER, STRUCTURAL AND GENERAL ARCHITECTURE.
3. ANY INTERFERENCE SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF THE WORK.
4. NO WORK SHALL BE INSTALLED IN VIOLATION OF ANY GOVERNING CODES. ANY WORK SHOWN ON THE DRAWINGS WHICH IS IN VIOLATION OF SUCH CODES SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF THE WORK.
5. ALL PIPING PENETRATING CEILINGS AND WALLS SHALL BE INSTALLED WITH ESCUTCHEONS AT THE PENETRATION. ALL PI PING PENETRATING EXTERIOR WALLS AND ROOFS SHALL BE FLASHED IN AN APPROVED MANOR AND SHALL BE SEALED WEATHER TIGHT. PIPING PENETRATING FIRE RATED PARTITIONS SHALL BE PROVIDED WITH FIRE RATED SEAL AS REQUIRED BY LOCAL CODE AUTHORITY.
6. PROVIDE ACCESS PANELS FOR SYSTEM COMPONENTS THAT ARE CONCEALED AND REQUIRE PERIODIC SERVICE. ACCESS PANELS SHALL BE A MINIMUM 12" X 12" AND LOCATED NO MORE THAN 2'-0" FROM VALVES.
7. PROVIDE SHUT-OFF VALVES ON BRANCH PIPING AND ON ALL SUPPLIES TO INDIVIDUAL FIXTURES AND EQUIPMENT. PROVIDE VALVES ON ALL WATER MAIN BRANCHES IN CORRIDORS AND WHERE INDICATED ON DRAWINGS.
8. PRIOR TO THE INSTALLATION OR FABRICATION OF ANY WORK, THE CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH THE ACTUAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND SHALL FULLY COORDINATE ALL WORK WITH THE ARCHITECTURAL PLANS, BUILDING STRUCTURE, AND WORK OF OTHER TRADES. CONTRACTOR SHALL VERIFY EXISTING INVERTS PRIOR TO CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ALL PERMITS AND PAYING ALL FEES REQUIRED FOR WORK SHOWN ON DRAWINGS AND IN SPECIFICATIONS.
10. CONSULT ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSION, LOCATION, AND ELEVATION OF PLUMBING FIXTURES.
11. ALL SANITARY AND STORM DRAIN PIPING SMALLER THAN 3" SHALL BE INSTALLED AT 1/4" PER FOOT FALL. 3" AND LARGER PIPING SHALL BE INSTALLED AT 1/8" PER FOOT FALL UNLESS NOTED OTHERWISE.
12. PLUMBING LAYOUTS ARE SCHEMATIC. IT IS NOT POSSIBLE TO INDICATE EVERY OFFSET, ELBOW, UNION, VALVE, TRAP, ACCESS PANEL, ETC. THAT IS REQUIRED FOR A PROPER WORKING SYSTEM. NO ADDITIONAL COST WILL BE ALLOWED FOR THESE ADDITIONAL FITTINGS THAT ARE REQUIRED TO INSTALL THE PIPING SYSTEM WITHIN THE SPACE PROVIDED AND THAT ARE REQUIRED FOR A COMPLETE WORKING SYSTEM.
13. FIELD VERIFY EXACT SIZES AND LOCATIONS OF EXISTING WORK BEFORE PURCHASING OR FABRICATIONG NEW WORK FOR CONNECTION TO OR INSTALLATION IN EXISTING WORK
14. UNLESS OTHERWISE INDICATED, ROUTE ALL PIPING ABOVE CEILINGS. ROUTE ALL PIPING AS HIGH AS POSSIBLE IN AREAS WITHOUT CEILINGS.
15. ALL EXPOSED PIPING AND FITTINGS IN TOILET ROOMS AND BREAKROOMS SHALL BE CHROME PLATED.
16. ALL CUTTING, DRILLING, AND PATCHING OF WALLS, FLOORS, AND/OR STRUCTURAL MEMBERS FOR THE INSTALLATION OF THE PLUMBING SYSTEMS SHALL BE PROVIDED. STRUCTURAL COMPONENTS SHALL NOT BE CUT, DRILLED, OR MODIFIED IN ANY WAY WITHOUT THE STRUCTURAL ENGINEER'S REVIEW AND PRIOR APPROVAL.
17. EXISTING STORM DRAINAGE SYSTEM TO REMAIN AS IS.
18. FOR PLUMBING PIPING INSULATION REFER TO SPECS SEC. 23 07 00.

GENERAL DEMOLITION NOTES

1. THE REQUIRED DEMOLITION SHALL NOT BE LIMITED TO THAT PORTION SHOWN ON THE PLANS ALONE, BUT SHALL INCLUDE ALL NECESSARY WORK COINCIDENTAL THERETO AND WORK INDICATED ELSEWHERE ON THE DRAWINGS OR IN THE SPECIFICATION WHICH IS NECESSARY TO ACCOMPLISH THE INTENT OF THE CONTRACT DOCUMENTS.
2. DEMOLITION SHALL GENERALLY BE ARRANGED TO AGREE WITH THE ACCOMPLISHMENT OF WORK UNDER THE VARIOUS PHASES AND IN COORDINATION WITH THE REQUIRED MODIFICATIONS.
3. UNLESS OTHERWISE NOTED, ALL EQUIPMENT INDICATED TO BE REMOVED SHALL ALSO HAVE ALL ASSOCIATED PIPING REMOVED BACK TO THE NEAREST HORIZONTAL MAIN AND SHALL BE CAPPED IN A CONCEALED LOCATION.
4. FOR SANITARY AND STORM DRAINS, THE CONTRACTOR SHALL SNAKE AND CLEAN THE PIPING DOWNSTREAM OF THE EXTENT OF DEMOLITION PRIOR TO CAPPING PIPE. THE CONTRACTOR SHALL SNAKE AND CLEAN THE PIPING IN THE PRESENCE OF THE COTR AND SUBMIT A REPORT ON THE FINDINGS OF THE CONDITION OF THE DRAINS.
5. UNLESS OTHERWISE INDICATED, EXISTING PIPING TO REMAIN FOLLOWING REMOVAL OF ADJACENT PORTIONS OF PIPING SHALL BE CAPPED/PLUGGED IN A CONCEALED LOCATION OR MADE READY FOR EXTENSION UNDER NEW WORK. FOR AREAS WITHOUT AN EXISTING CEILING IN WHICH A NEW CEILING WILL NOT BE INSTALLED, THE PIPING SHALL BE CAPPED/PLUGGED IN A LOCATION TO PROVIDE THE MAXIMUM POSSIBLE HEADROOM. UNDER NO CIRCUMSTANCE MAY AN EXISTING PIPE BE LEFT OPEN.
6. "CONCEALED LOCATION" IS DEFINED AS BEING ABOVE FINISHED CEILING, BELOW FINISHED FLOOR, OR WITHIN FINISHED WALL OR PARTITION. SEE ARCHITECTURAL PLANS FOR FINISH INFORMATION.
7. COPPER AND STEEL PIPING SHALL BE CAPPED USING COMMERCIALLY MANUFACTURED "CAPS". CAP/PLUG INSTALLATION SHALL BE IN ACCORDANCE WITH NEW WORK INSTALLATION PROCEDURES. CRIMPING OF TUBE IS NOT ACCEPTABLE.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING AT EXISTING WALL, FLOOR, AND ROOF WHERE REQUIRED. FIELD VERIFY EXISTING CONDITIONS.
9. CONTRACTOR SHALL BE RESPONSIBLE TO REMOVE ALL ASSOCIATED EXISTING PIPING NO LONGER IN SERVICE FROM THE FIRST AND SECOND FLOOR LEVELS. CONTRACTOR TO PATCH WALL OR FLOOR TO MATCH EXISTING SURFACES.

WATER SUPPLY AVAILABILITY

TEST HYDRANT, STATIC PRESSURE: 70 PSIG
TEST HYDRANT, RESIDUAL PRESSURE: 29 PSIG

FLOW HYDRANT #56 LOCATION: EAST WING OF BUILDING 1230
FLOW HYDRANT #56 FLOW: 1,633 GPM

REVISIONS

Date	No.	Description	BY	Issued to

REVISIONS

Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
DAVOOD TASHAKKORI
No. 19533
PROFESSIONAL ENGINEER
11/5/13

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS

NAME	ORGANIZATION	DATE		DATE
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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED MK	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED RW	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ±; X.XX (2 DECIMAL PLACES) ±.02; X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: PLUMBING ABBREVIATIONS, NOTES, & SYMBOLS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293569 | LATEST REV.

SHEET NO. P-001

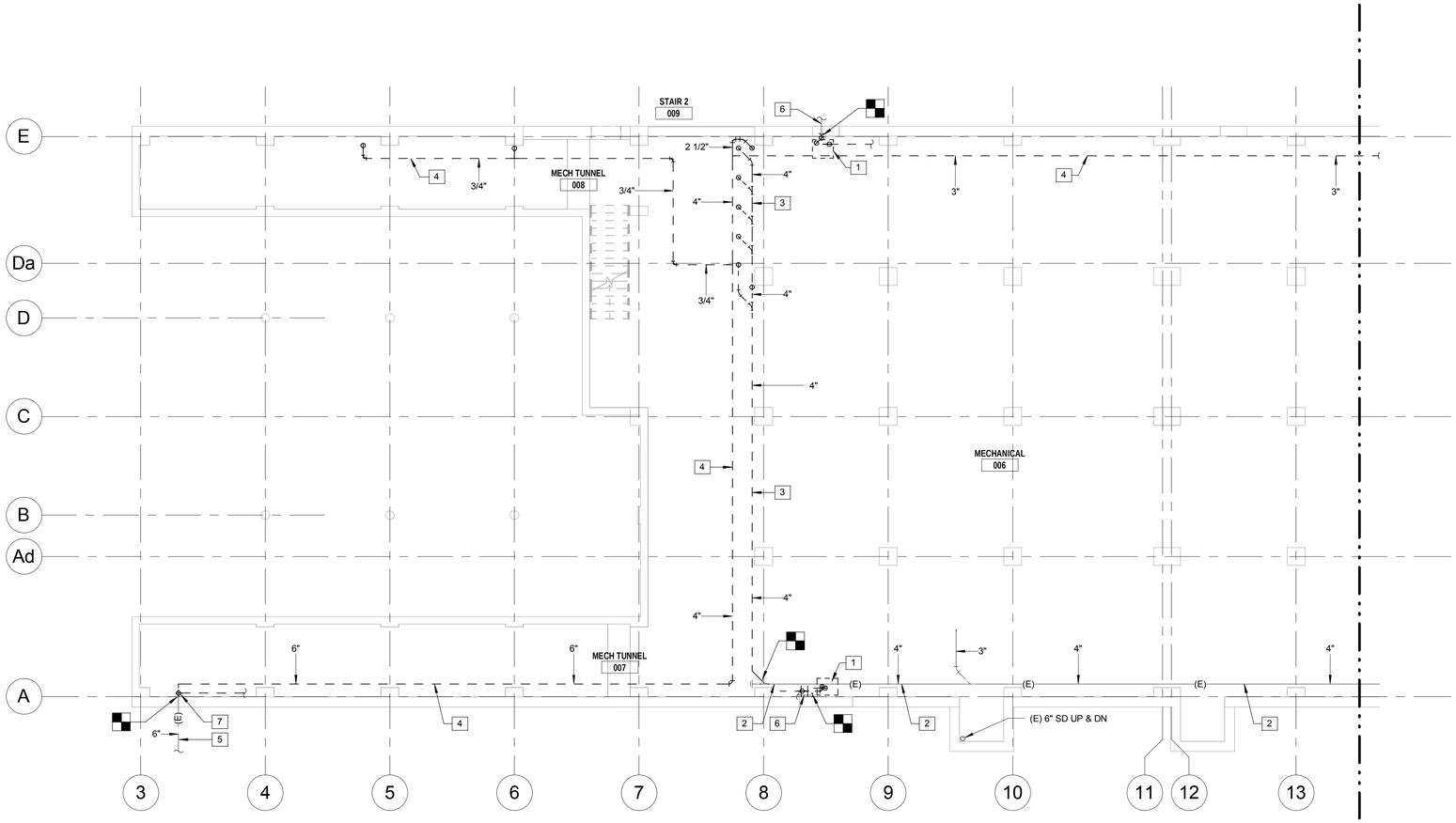
12/16/2013 8:31:37 AM

FLOOR PLAN GENERAL NOTES:

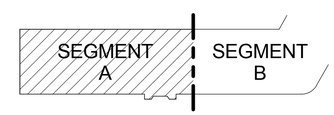
1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

DEMOLITION FLOOR PLAN KEY NOTES:

1. REMOVE EXISTING SUMP PUMP, ASSOCIATED PIPING, AND VALVES, AND REPLACE WITH NEW. SUMP PIT TO REMAIN.
2. EXISTING SANITARY PIPE TO REMAIN.
3. REMOVE SANITARY PIPE.
4. REMOVE CW PIPE.
5. EXISTING 6" DOMESTIC WATER SERVICE TO REMAIN.
6. EXISTING STORM DRAIN PIPING TO REMAIN.
7. REMOVE EXISTING FIRE PROTECTION SYSTEM THROUGHOUT THE ENTIRE BUILDING.



1 BASEMENT DEMOLITION - WEST
1/8" = 1'-0"



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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SEAL AREA

COMMONWEALTH OF VIRGINIA
DAVOOD TASHAKKORI
No. 19533
PROFESSIONAL ENGINEER
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			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

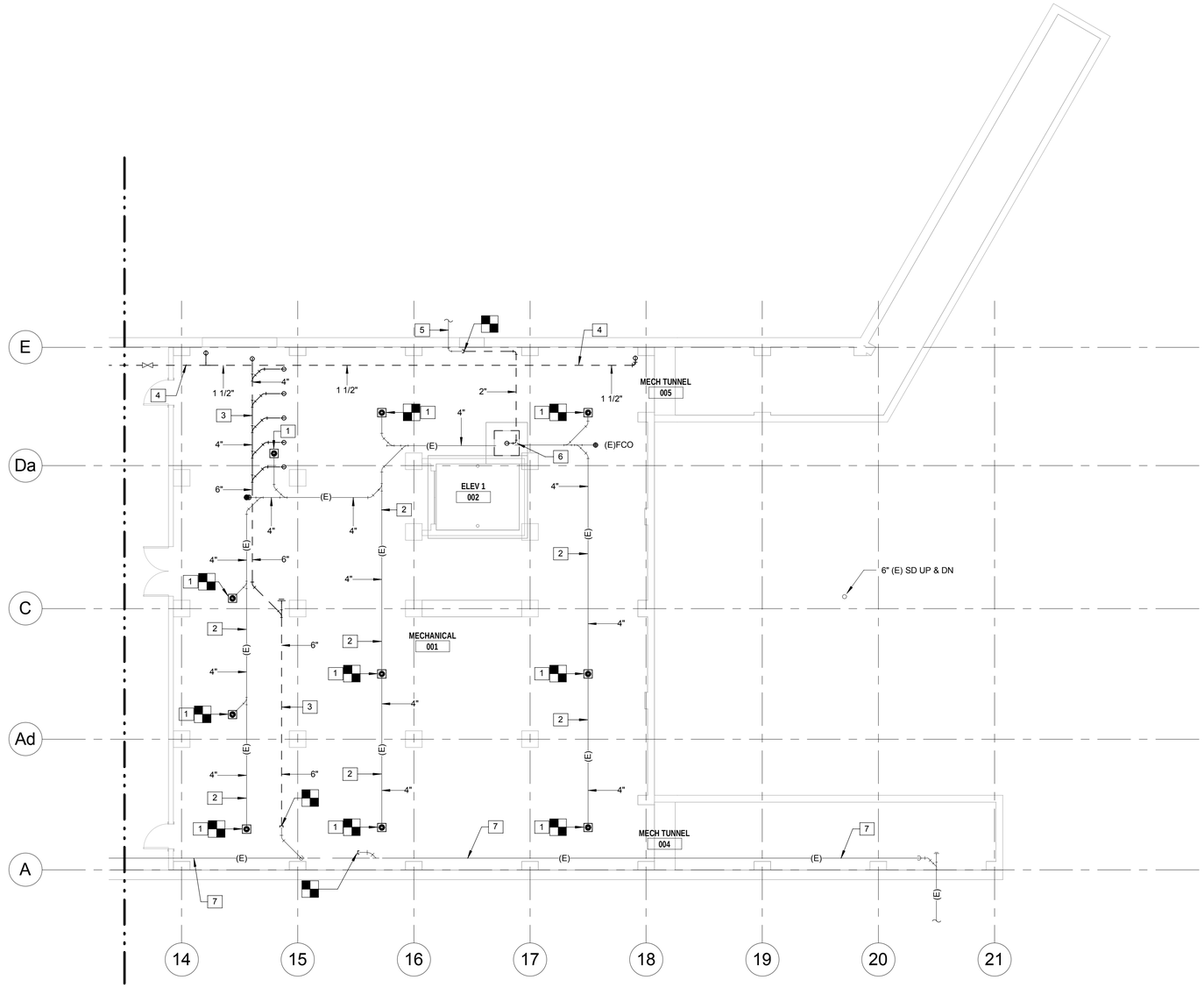
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT AREA A PLUMBING DEMOLITION PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293570 | LATEST REV.

SHEET NO. PD-100A

12/16/2013 8:32:07 AM



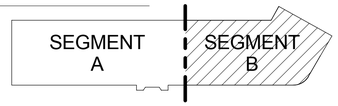
1 BASEMENT DEMOLITION - EAST
1/8" = 1'-0"

FLOOR PLAN GENERAL NOTES:

1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

DEMOLITION FLOOR PLAN KEY NOTES:

1. REMOVE EXISTING FLOOR DRAINS.
2. EXISTING SANITARY PIPE BELOW SLAB TO REMAIN.
3. REMOVE EXISTING SANITARY PIPE.
4. REMOVE CW PIPE.
5. EXISTING STORM DRAIN PIPING TO REMAIN.
6. REMOVE EXISTING DUPLEX SUMP PUMP, ASSOCIATED PIPING, AND VALVES, AND REPLACE WITH NEW, SUMP PIT TO REMAIN.
7. EXISTING SANITARY PIPE TO REMAIN.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
DAVOOD TASHAKKORI
No. 19533
PROFESSIONAL ENGINEER
11/15/13

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
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HAMPTON, VIRGINIA 23681-2199

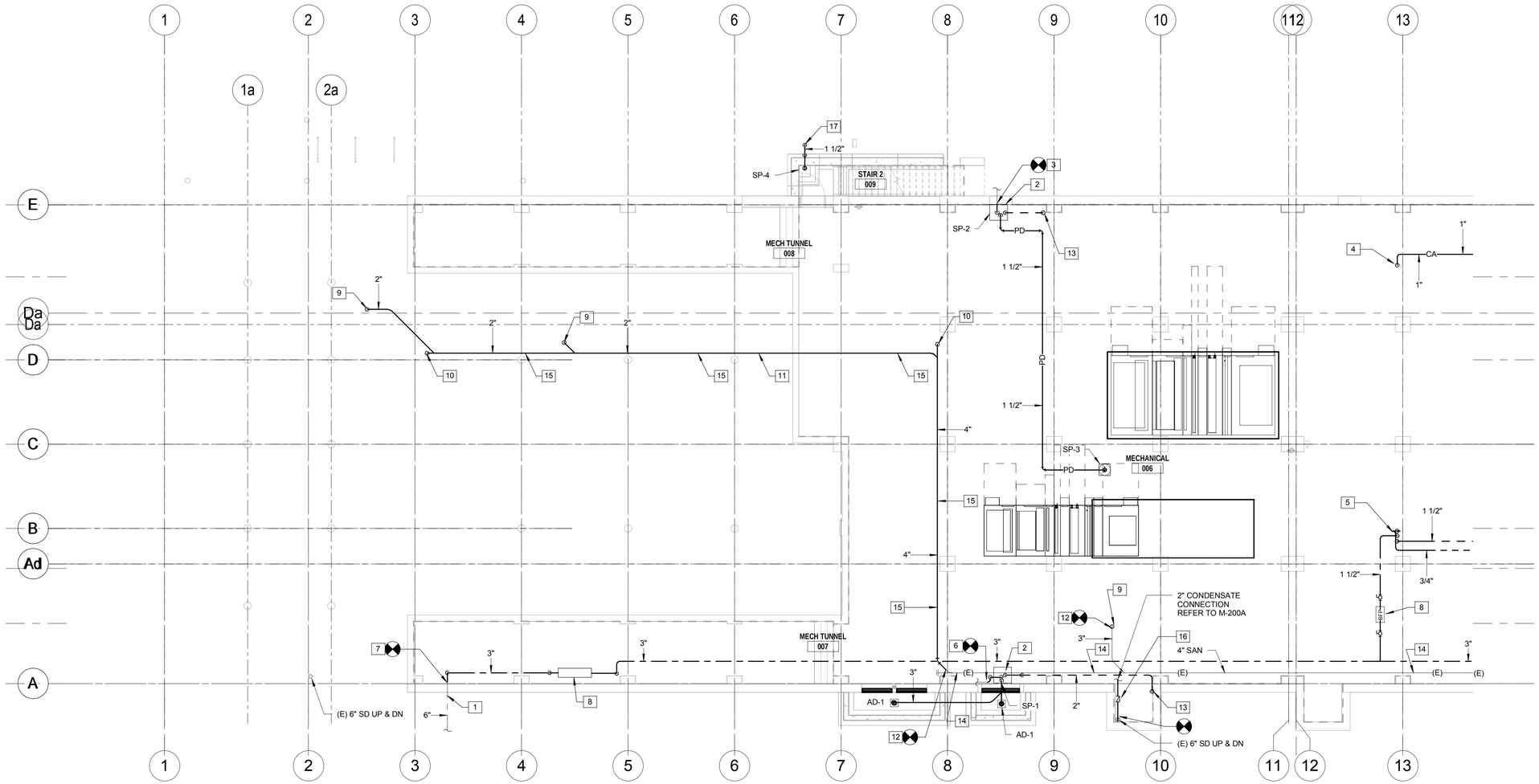
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT AREA B PLUMBING DEMOLITION PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293571 | LATEST REV.

SHEET NO. PD-100B

12/16/2013 8:32:09 AM



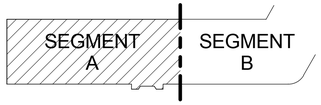
1 BASEMENT - WEST
1/8" = 1'-0"

FLOOR PLAN GENERAL NOTES:

1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

FLOOR PLAN KEY NOTES:

1. EXISTING 6" DOMESTIC WATER SERVICE.
2. NEW SUMP PUMP. PUMP CHARACTERISTICS TO MATCH EXISTING.
3. CONNECT EXISTING 4" STORM PIPE TO NEW SUMP PUMP.
4. COMPRESSED AIR UP.
5. 1 1/2" CW, 1 1/2" HW AND 3/4" HWC FOR LAB UP.
6. CONNECT TO EXISTING 1 1/2" STORM PIPE TO NEW SUMP PUMP.
7. CONNECT NEW DOMESTIC CW TO EXISTING WATER SERVICE.
8. REDUCED PRESSURE BACKFLOW PREVENTER.
9. 2" SAN UP.
10. 2" SAN UP TO FCO.
11. RUN PIPE TIGHT TO STRUCTURE.
12. CONNECT NEW SAN PIPE TO EXISTING.
13. 2" VENT UP.
14. EXISTING SANITARY SUSPENDED FROM STRUCTURE ABOVE.
15. ABOVE CEILING.
16. PROVIDE BACKWATER VALVE.
17. 1 1/2" PUMP DISCHARGE SPILL OVER SPLASH BLOCK AT GRADE.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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SEAL AREA

COMMONWEALTH OF VIRGINIA
DAVOOD TASHAKKORI
No. 19533
PROFESSIONAL ENGINEER
11/5/13

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TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

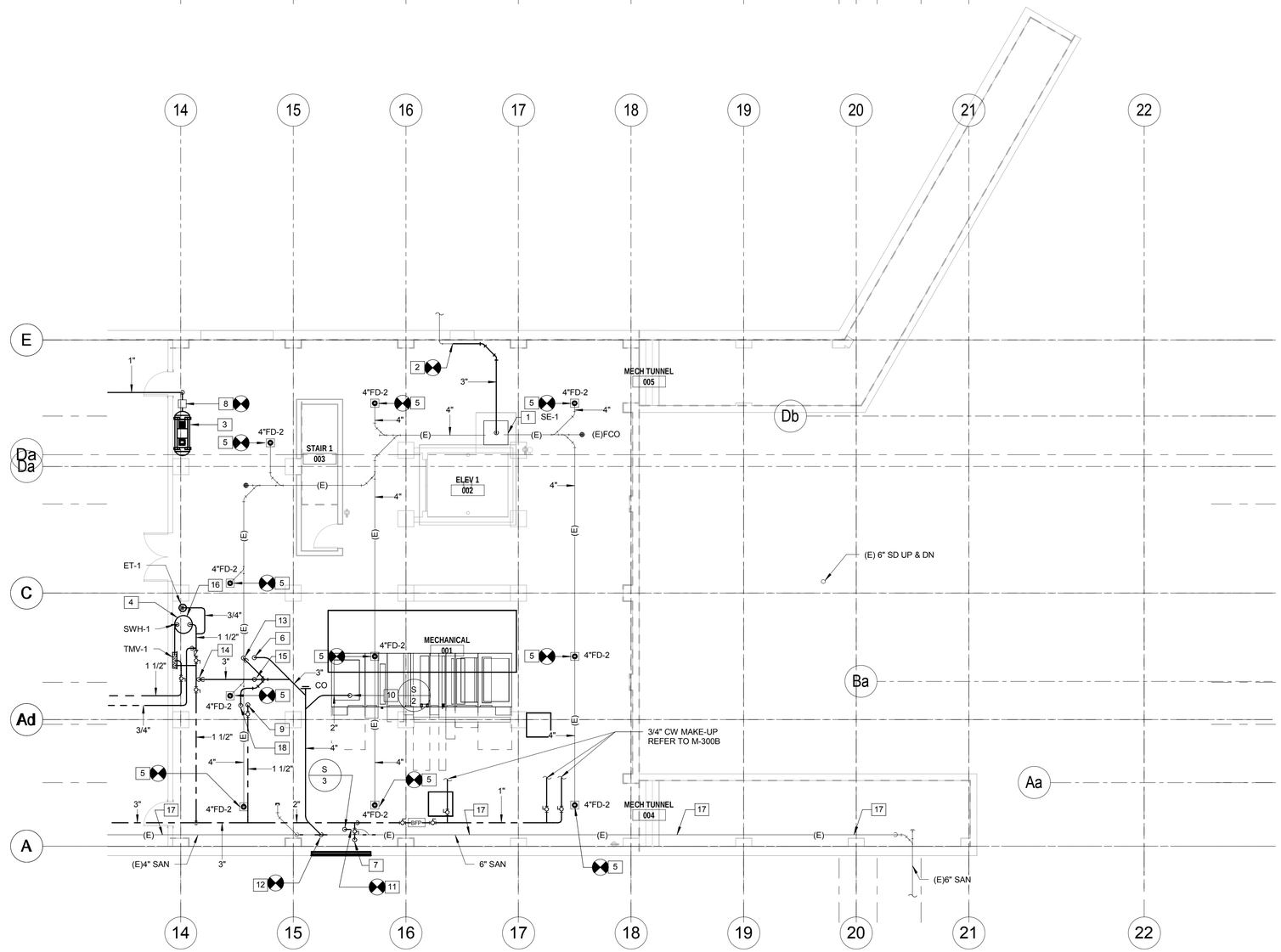
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT AREA A PLUMBING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293572 | LATEST REV.

SHEET NO. P-100A

12/16/2013 8:31:37 AM



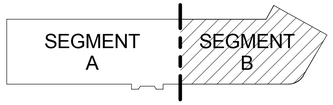
1 BASEMENT - EAST
1/8" = 1'-0"

FLOOR PLAN GENERAL NOTES:

1. SEE SHEET P-001 FOR LEGEND AND GENERAL NOTES.
2. CONTRACTOR TO FIELD VERIFY EXISTING VENT LOCATION AND CONNECT TO SANITARY STACK S/3 OR NEAREST NEW VENT PIPING.

FLOOR PLAN KEY NOTES:

1. PROVIDE NEW SEWAGE EJECTOR PUMPS AND DISCHARGE PIPING WITHIN EXISTING PIT.
2. CONNECT NEW FORCED MAIN TO EXISTING SANITARY PIPE.
3. EXISTING AIR COMPRESSOR AND AIR DRYER PROVIDED BY NASA.
4. NEW STEAM STORAGE TYPE HOT WATER HEATER. FOR STEAM PIPE SEE MECANICAL DRAWINGS.
5. CONNECT NEW 4" FD-2 TO EXISTING SANITARY PIPING BELOW SLAB.
6. 3" SAN UP.
7. 2" CW UP.
8. CONNECT NEW COMPRESSED AIR PIPING TO EXISTING AIR COMPRESSOR.
9. 1 1/2" CW UP.
10. 2" SAN UP.
11. CONNECT NEW 4" SAN UP TO EXISTING.
12. CONNECT NEW 4" SAN PIPE TO EXISTING
13. 3" SAN UP TO MB-1.
14. 3" SAN UP TO FD-1.
15. 1 1/2" V UP.
16. FOR STEAM CONNECTION TO WATER HEATER, REFER TO MECHANICAL DRAWINGS.
17. EXISTING SANITARY SUSPENDED FROM STRUCTURE ABOVE.
18. 1 1/2" SAN UP TO S-2.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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SEAL AREA

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X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT AREA B PLUMBING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293573 | LATEST REV.

SHEET NO. P-100B

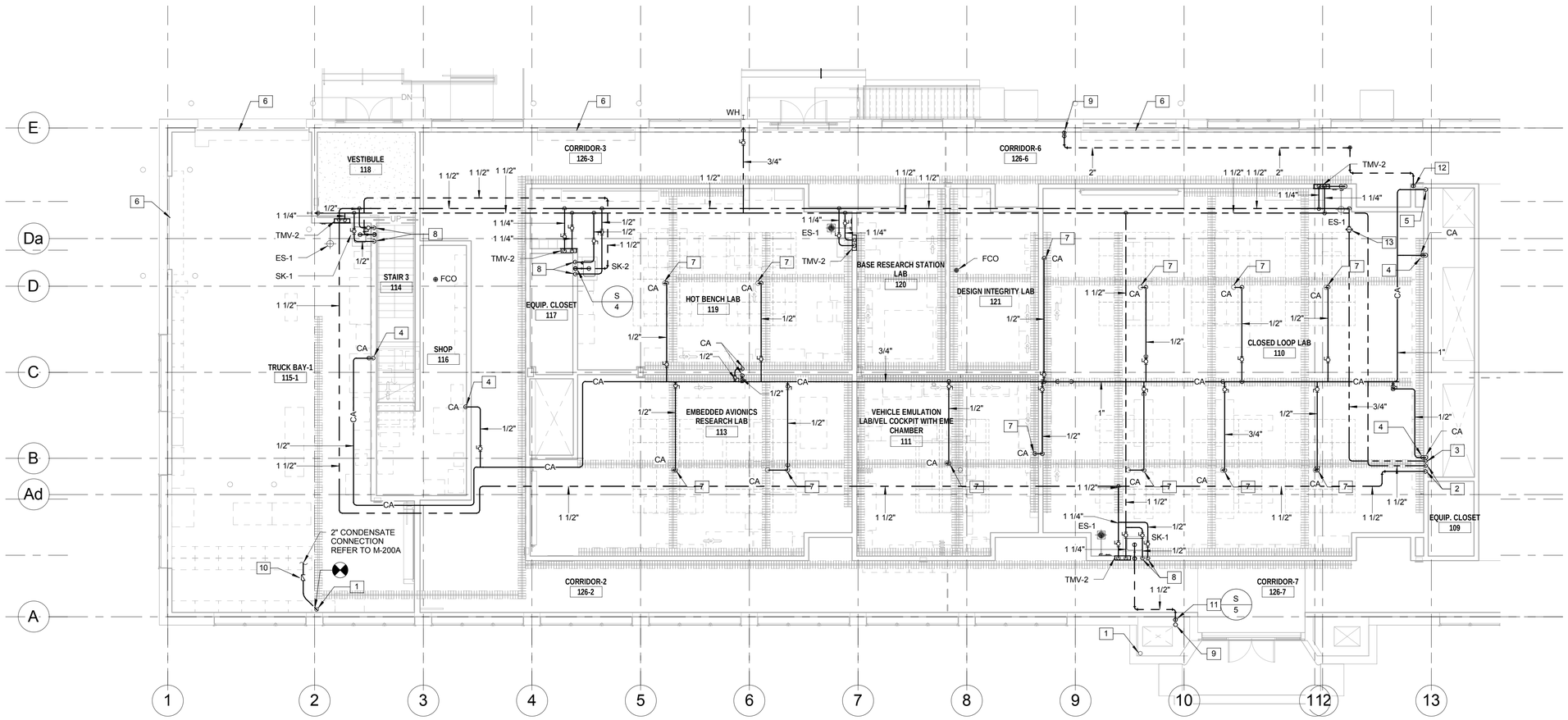
12/16/2013 8:31:39 AM

FLOOR PLAN GENERAL NOTES:

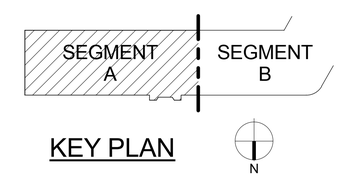
1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

FLOOR PLAN KEY NOTES:

1. EXISTING 6" SD UP AND DN.
2. 1 1/2" CW AND 1 1/2" HW FROM BELOW.
3. HWC DN.
4. 1/2" CA TO WALL OUTLET. REFER TO LAB EQUIPMENT DRAWINGS FOR LOCATION.
5. 1" COMPRESSED AIR FROM BELOW.
6. REMOVE EXISTING TRENCH DRAIN. REFER TO STRUCTURAL DRAWING FOR PATCHING.
7. 1/2" CA TO OVERHEAD CARRIER. REFER TO LAB EQUIPMENT DRAWINGS FOR LOCATION AND INSTALLATION.
8. 1/2" H AND CW DOWN TO SK-1/SK-2.
9. 2" V FROM BELOW AND UP
10. PROVIDE BACKWATER VALVE.
11. 1 1/2" V UP.
12. 2" V UP.
13. BALANCING VALVE.



1 FIRST FLOOR - WEST
1/8" = 1'-0"



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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SEAL AREA

COMMONWEALTH OF VIRGINIA
DAVOOD TASHAKKORI
No. 19533
PROFESSIONAL ENGINEER
11/5/13

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			RES. PROJ. ENG.	

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SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR AREA A PLUMBING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293574 | LATEST REV.

SHEET NO. P-101A

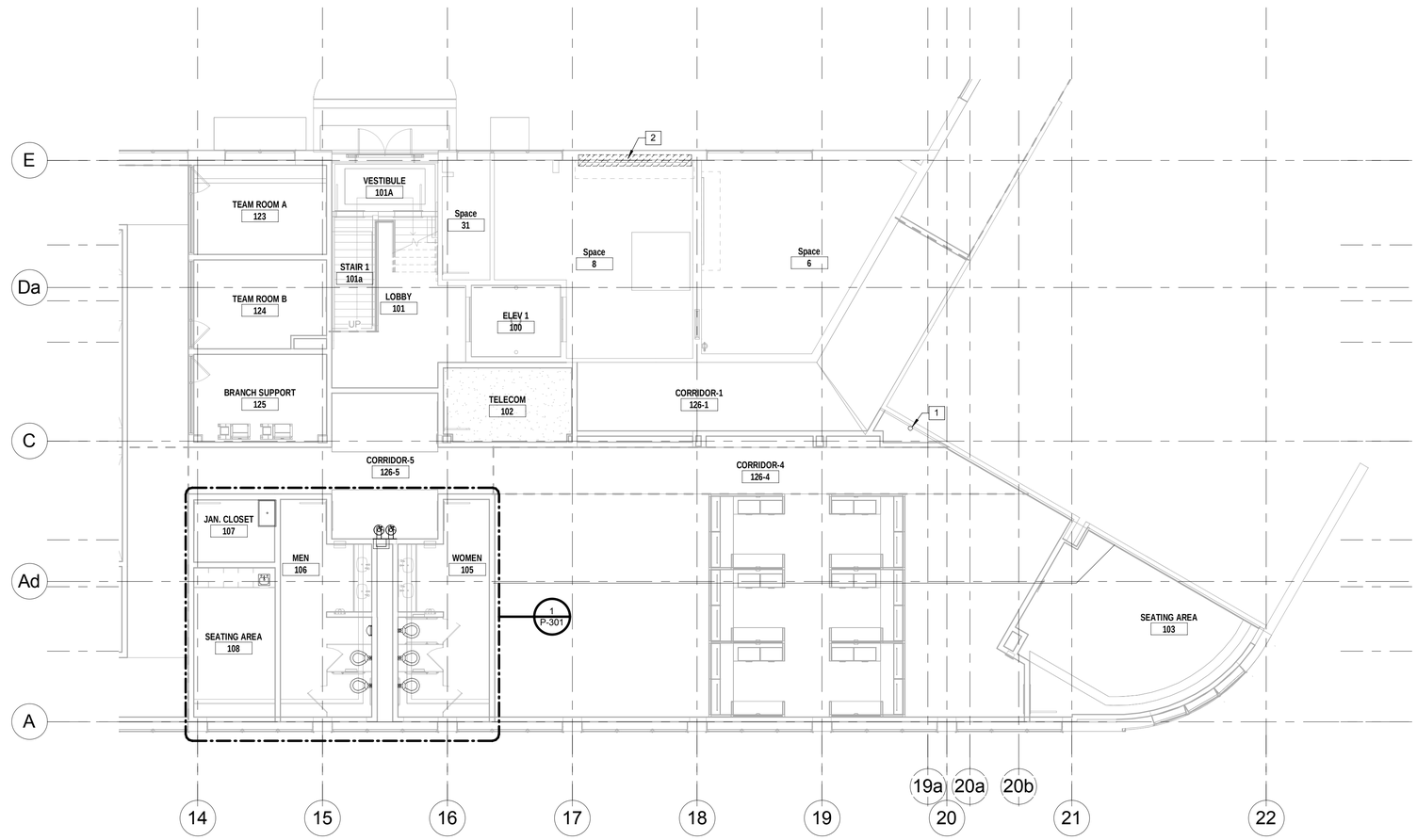
12/16/2013 8:31:41 AM

FLOOR PLAN GENERAL NOTES:

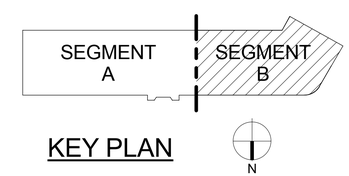
1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

FLOOR PLAN KEY NOTES:

1. EXISTING 8" STORM RISER.
2. EXISTING TRENCH DRAIN TO REMAIN.



1 FIRST FLOOR - EAST
1/8" = 1'-0"



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

SEAL AREA

COMMONWEALTH OF VIRGINIA
DAVOOD TASHAKKORI
No. 19533
PROFESSIONAL ENGINEER
11/15/13

AECOM
3101 Wilson Boulevard, Suite 900
Arlington, Va. 22201

LANGLEY RESEARCH CENTER

ISSUE DATE
2013.11.06 100% Final Submission

APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN MZ	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED MK	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED RW	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR AREA B PLUMBING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293575 | LATEST REV.

SHEET NO. P-101B

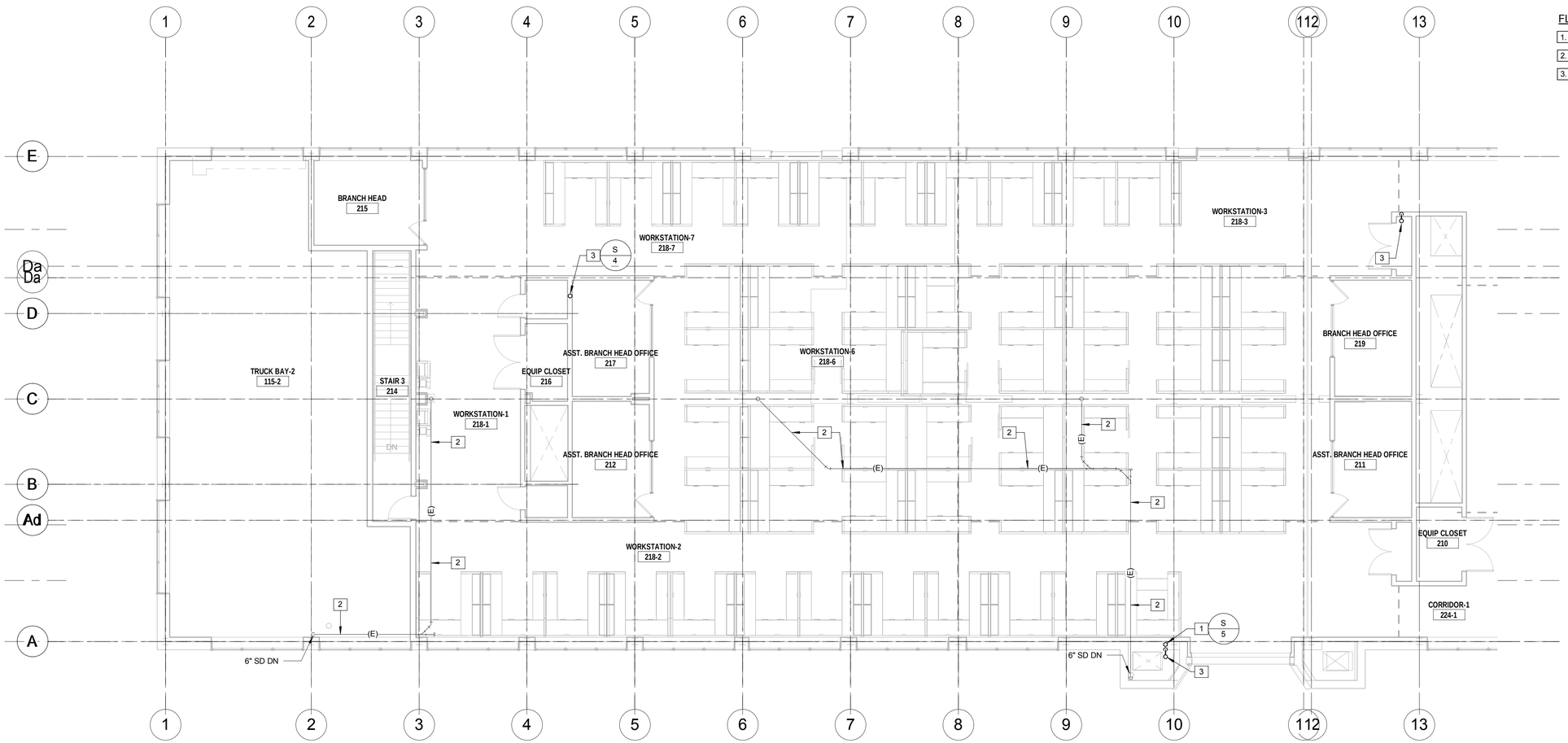
12/16/2013 8:31:49 AM

FLOOR PLAN GENERAL NOTES:

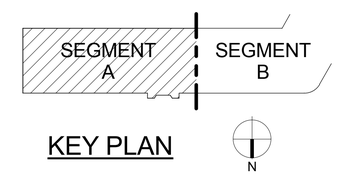
1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

FLOOR PLAN KEY NOTES:

1. 1 1/2" V FROM BELOW, 2" V UP.
2. EXISTING 6" STORM PIPE.
3. 2" V FROM BELOW, 3" V UP.



1 SECOND FLOOR - WEST
1/8" = 1'-0"



KEY PLAN

1/8"=1'-0"
8' 4' 0 8' 16'

GRAPHIC SCALE

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SEAL AREA

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DAVOOD TASHAKKORI
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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

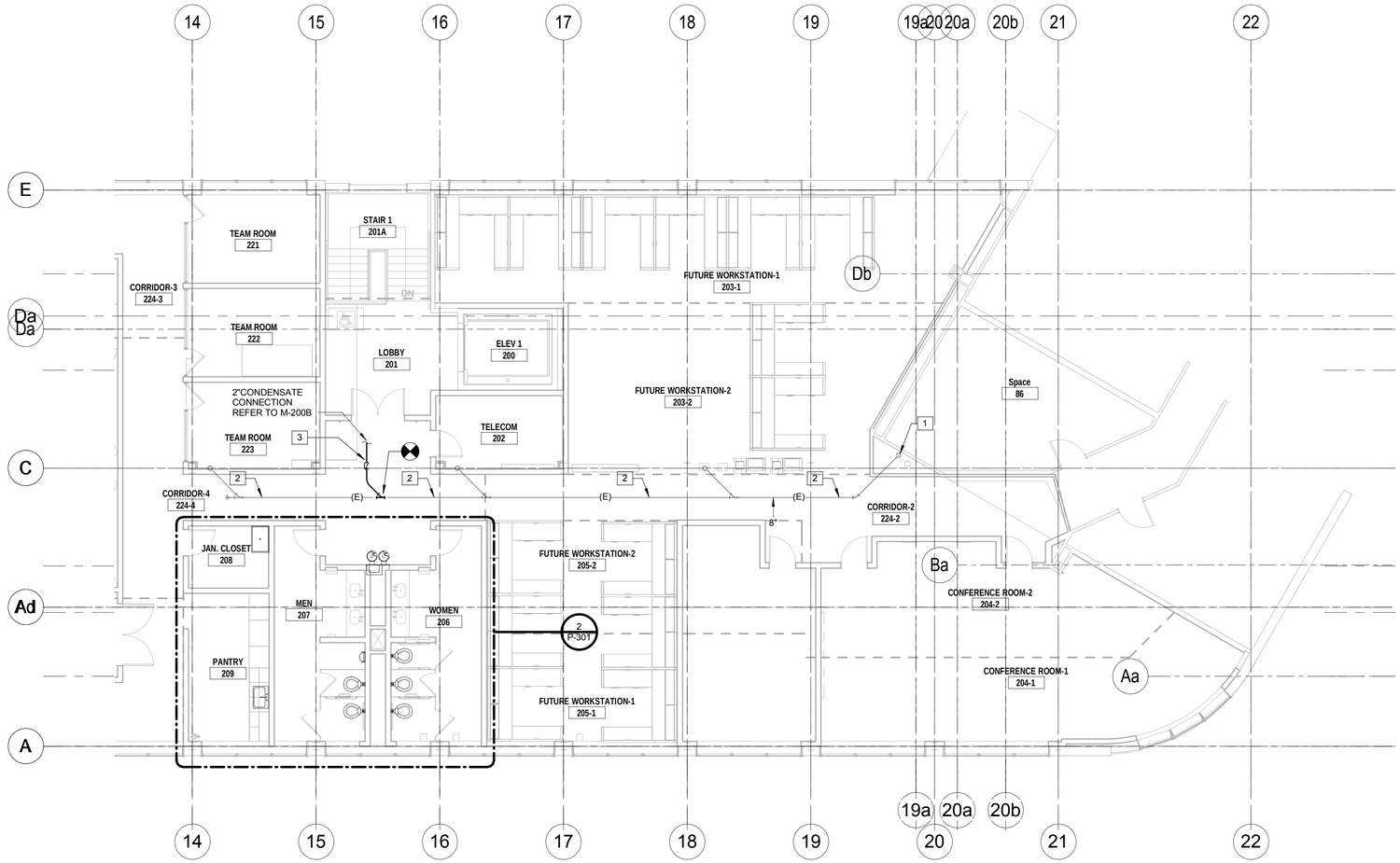
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR AREA A PLUMBING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293576 | LATEST REV.

SHEET NO. P-102A

12/16/2013 8:31:53 AM



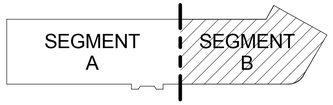
1 SECOND FLOOR - EAST
1/8" = 1'-0"

FLOOR PLAN GENERAL NOTES:

1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

FLOOR PLAN KEY NOTES:

1. EXISTING 8" STORM DOWN .
2. EXISTING STORM PIPE.
3. PROVIDE BACKWATERVALVE.



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
Date	No.	Description	BY	Issued to	Date	No.	Description	BY	Issued to

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± X.XX (2 DECIMAL PLACES) ± .02; X.XXX (3 DECIMAL PLACES) ± .005
SURFACE FINISH IN MICRONCHES RMS UNLESS SHOWN OTHERWISE

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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR AREA B PLUMBING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293577 | LATEST REV.

SHEET NO. P-102B

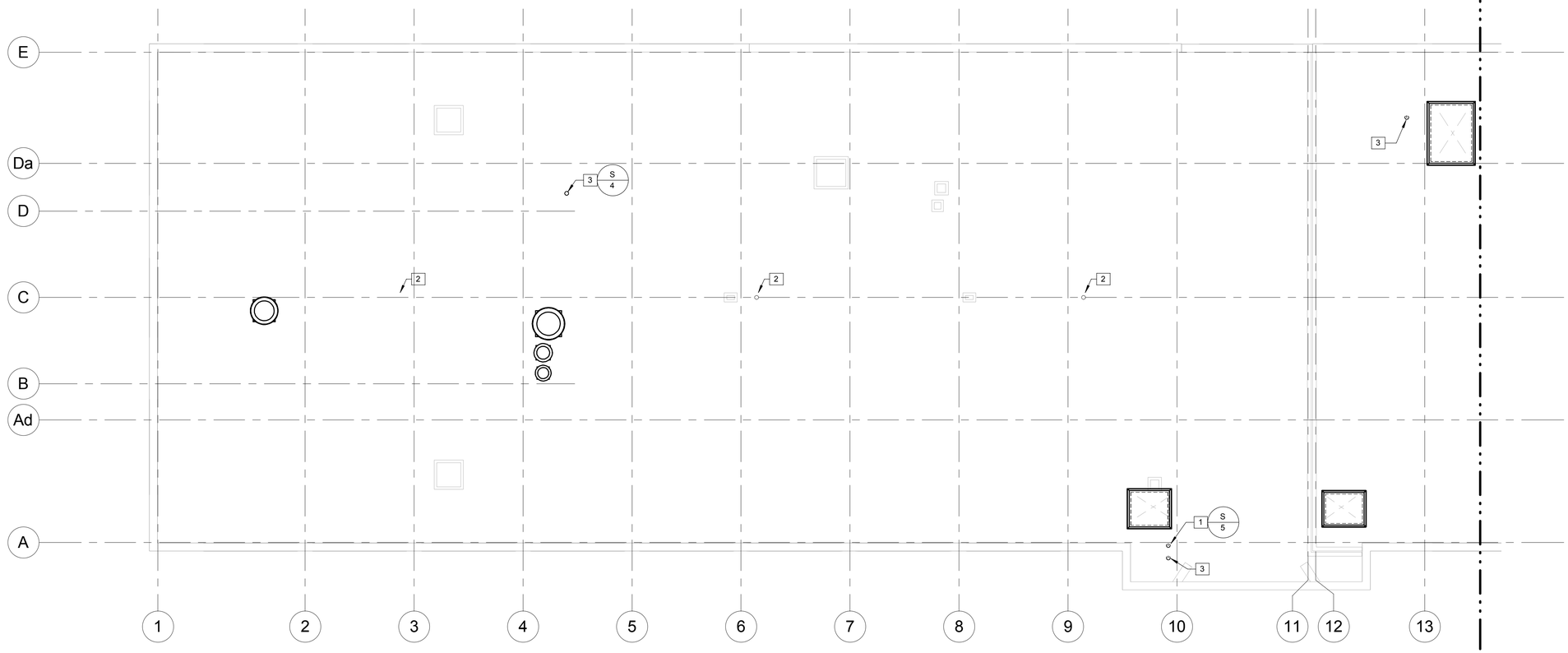
12/16/2013 8:31:55 AM

FLOOR PLAN GENERAL NOTES:

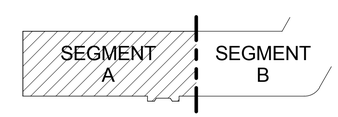
1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

FLOOR PLAN KEY NOTES:

1. NEW 2" VTR.
2. EXISTING ROOF DRAIN.
3. NEW 3" VTR



1 T.O. ROOF SLAB - WEST
1/8" = 1'-0"



KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF AREA A PLUMBING PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293578 | LATEST REV.

SHEET NO. P-103A

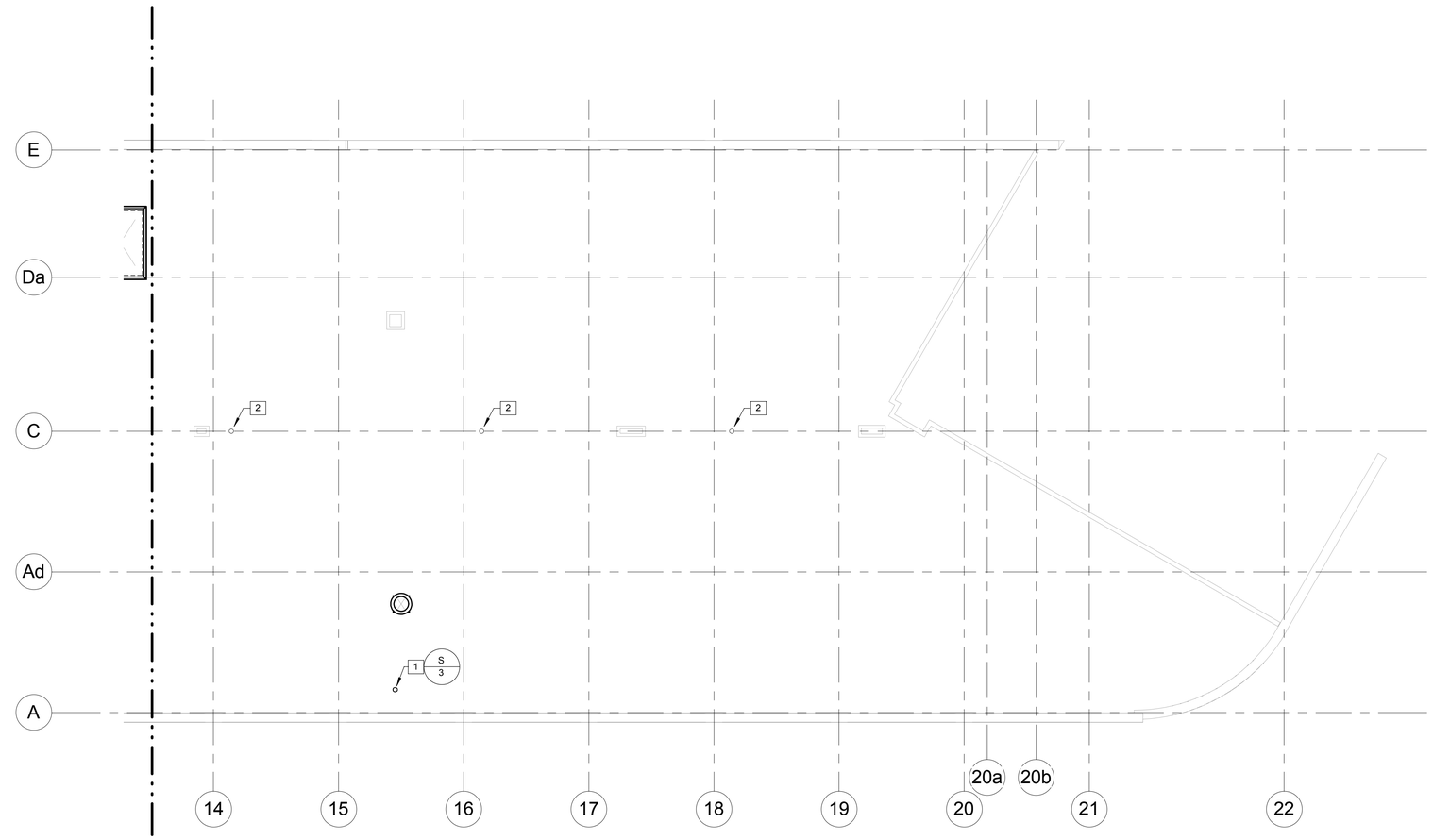
12/16/2013 8:31:57 AM

FLOOR PLAN GENERAL NOTES:

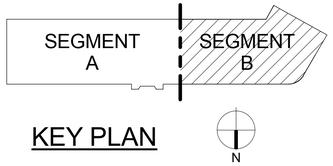
1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

FLOOR PLAN KEY NOTES:

1. NEW 4" VTR.
2. EXISTING ROOF DRAIN.



1 T.O. ROOF SLAB - EAST
1/8" = 1'-0"



KEY PLAN

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: ROOF AREA B PLUMBING PLAN

BUILDING NO. 1230
SHEET NO. P-103B
SIZE D
DRAWING NO. 1293579
LATEST REV.

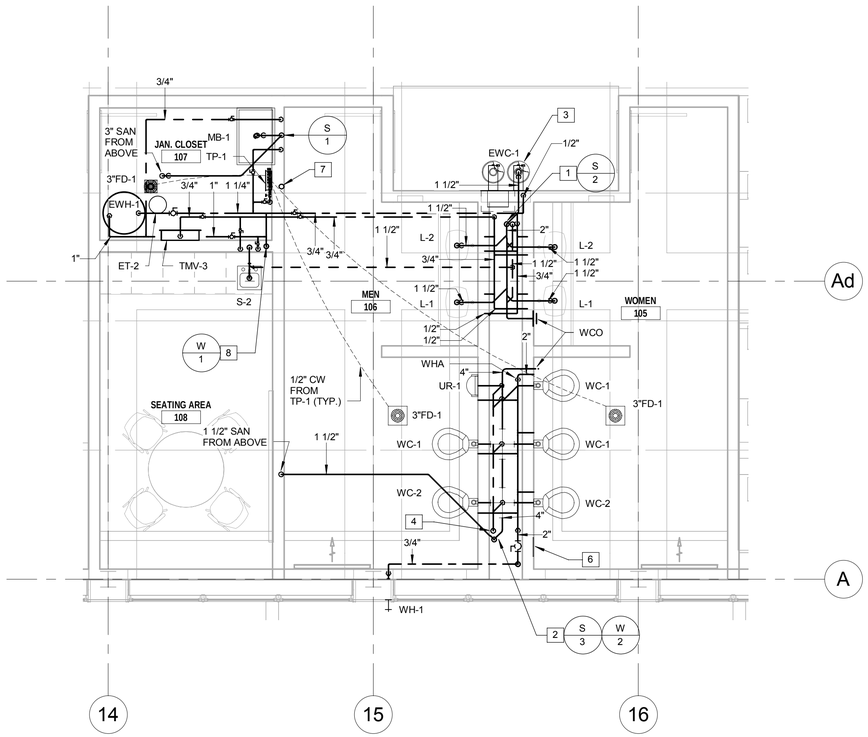
12/16/2013 8:31:58 AM

FLOOR PLAN GENERAL NOTES:

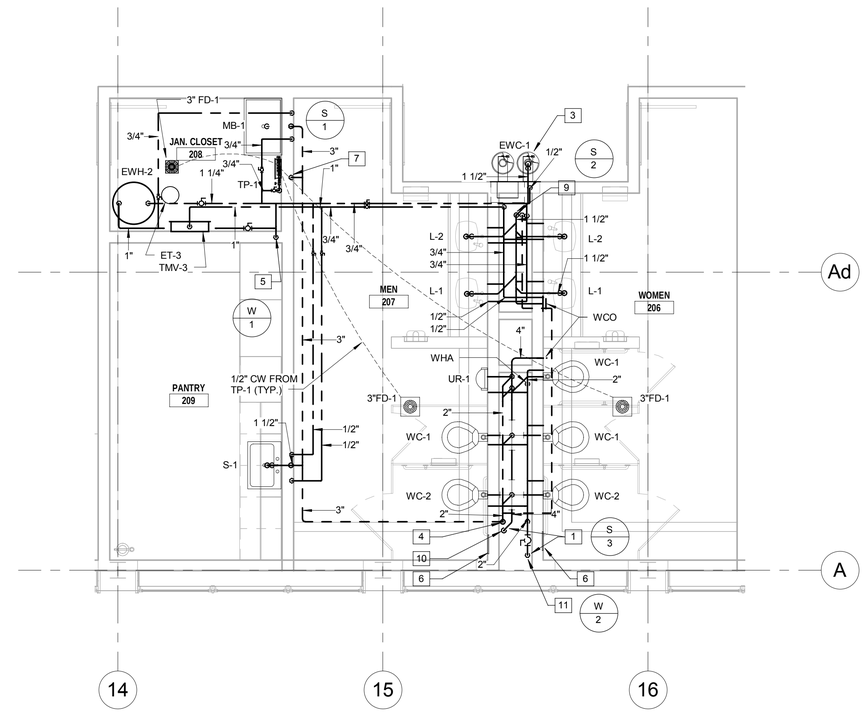
1. SEE SHEET P-001 FOR LEGEND AND GENERAL NOTES.
2. FOR SIZES NOT SHOWN ON PLANS SEE RISER DIAGRAMS.

FLOOR PLAN KEY NOTES:

1. 2" SAN FROM ABOVE AND DOWN, 1 1/2" V UP.
2. 4" SAN FROM ABOVE AND DOWN.
3. PROVIDE WATER FILTER FOR EWC.
4. 3" V FROM BELOW AND UP.
5. 1 1/4" CW FROM BELOW.
6. PROVIDE 12" X 12" ACCESS PANEL.
7. 1 1/2" V FROM BELOW AND UP.
8. 1 1/2" CW FROM BELOW, 1 1/4" CW UP.
9. 2" SAN DN, 2" V FROM BELOW.
10. 4" SAN DN.
11. 2" CW FROM BELOW.



1 FIRST FLOOR RESTROOMS
1/4" = 1'-0"



2 SECOND FLOOR RESTROOMS
1/4" = 1'-0"

N

1/4"=1'-0" 4' 2' 0 4' 8'

GRAPHIC SCALE

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE
ANGULAR ±
X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

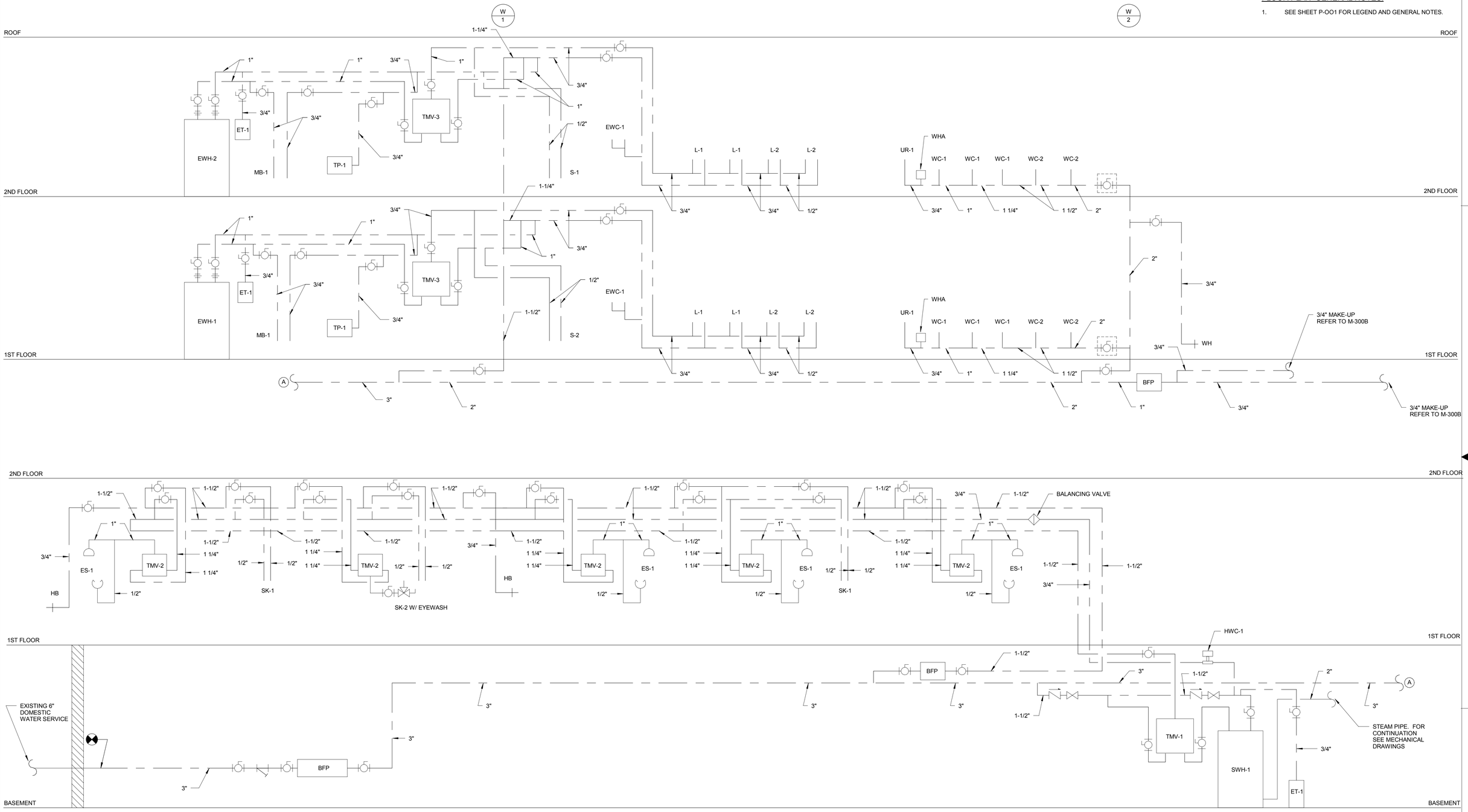
DRAWING TITLE: ENLARGED PLANS

BUILDING NO. 1230
SIZE D
DRAWING NO. 1293580
SHEET NO. P-301
LATEST REV.

12/16/2013 8:32:00 AM

FLOOR PLAN GENERAL NOTES:

1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.



REVISIONS					REVISIONS				
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			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: PLUMBING RISER DIAGRAMS

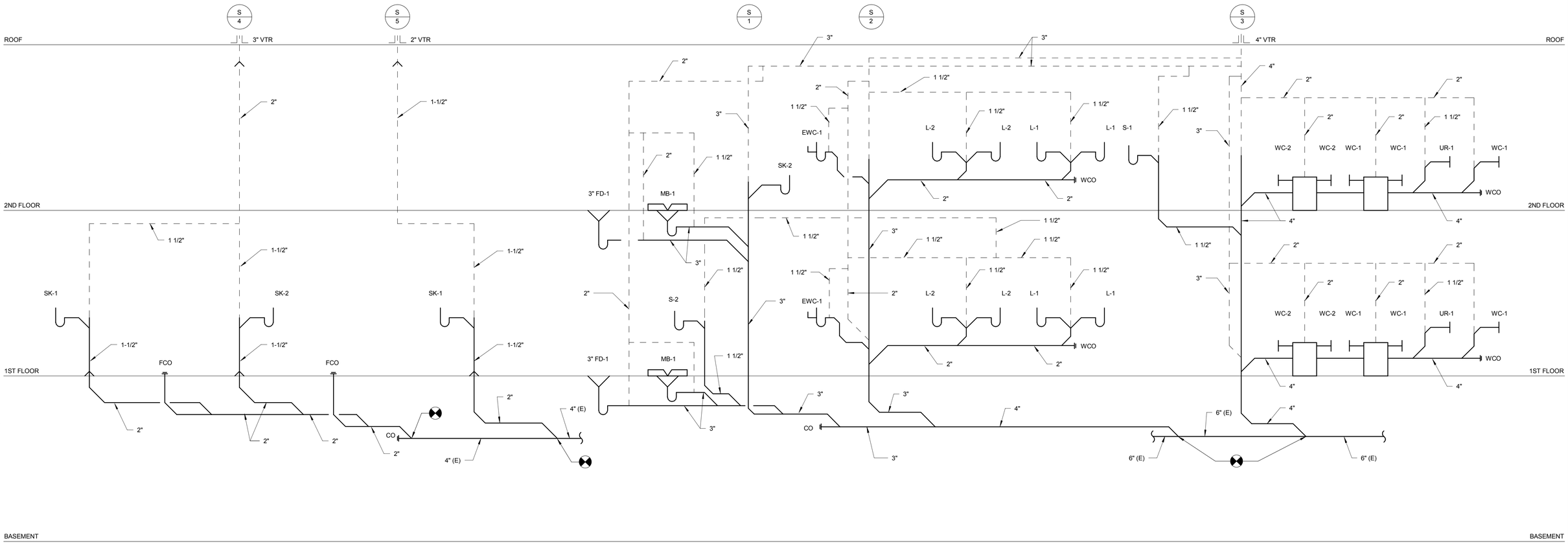
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293581 | LATEST REV.

SHEET NO. P-401

12/16/2013 8:35:35 AM

FLOOR PLAN GENERAL NOTES:

1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.



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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	DT	
			TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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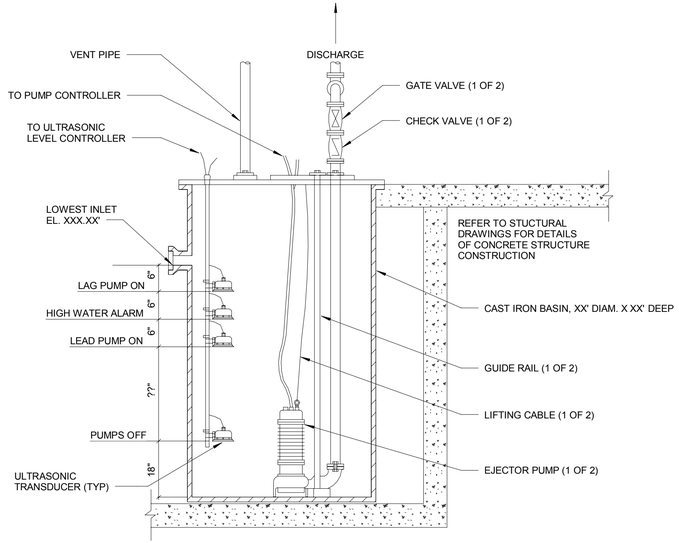
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

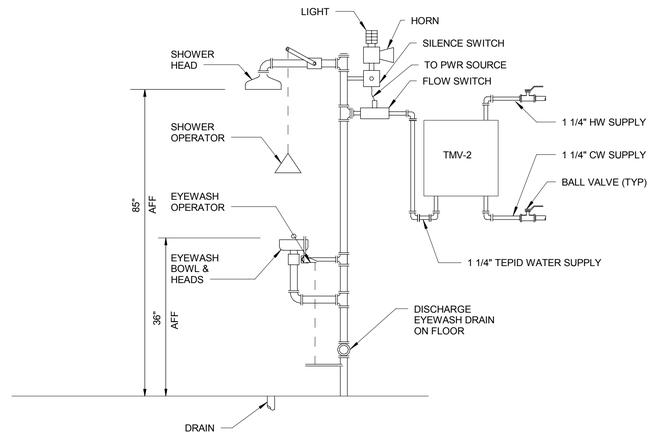
DRAWING TITLE: PLUMBING RISER DIAGRAMS

BUILDING NO.: 1230
SIZE: D
DRAWING NO.: 1293582
SHEET NO.: P-402
LATEST REV.:

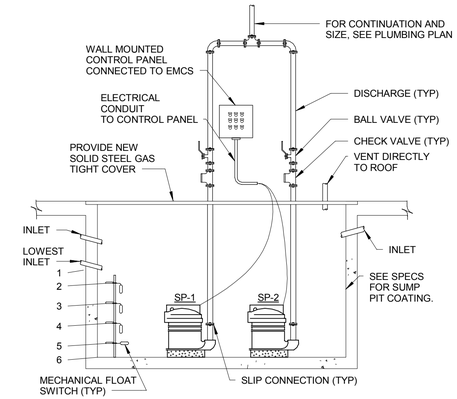
12/16/2013 8:32:03 AM



9 DUPLEX SEWAGE EJECTOR DETAIL (EXISTING PIT W/ NEW PUMPS)
NO SCALE



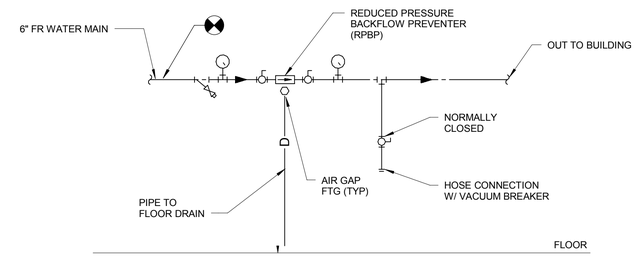
8 EMERGENCY SHOWER WITH EYEWASH DETAIL
NO SCALE



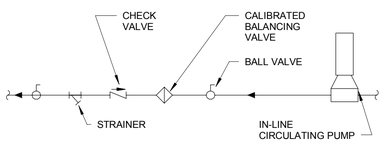
7 SUMP PUMP DETAIL (DUPLEX) (EXISTING PIT W/ NEW PUMPS)
NO SCALE

FLOOR PLAN GENERAL NOTES:

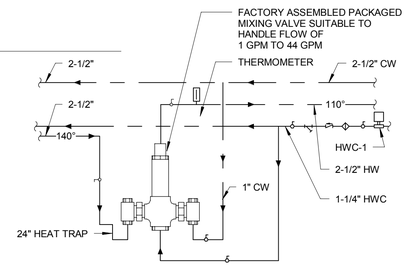
1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.



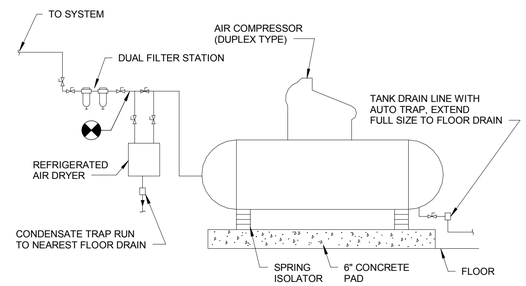
1 WATER SERVICE ENTRANCE DETAIL
NO SCALE



6 DOMESTIC HOT WATER CIRCULATING PUMP DETAIL
NO SCALE



5 MIXING VALVE SCHEMATIC (TMV-1)
NO SCALE



4 AIR COMPRESSOR PIPING (EXISTING)
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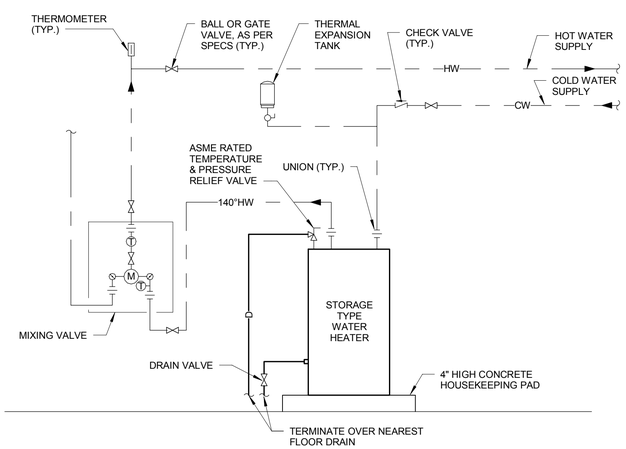

3 ELECTRIC WATER HEATER
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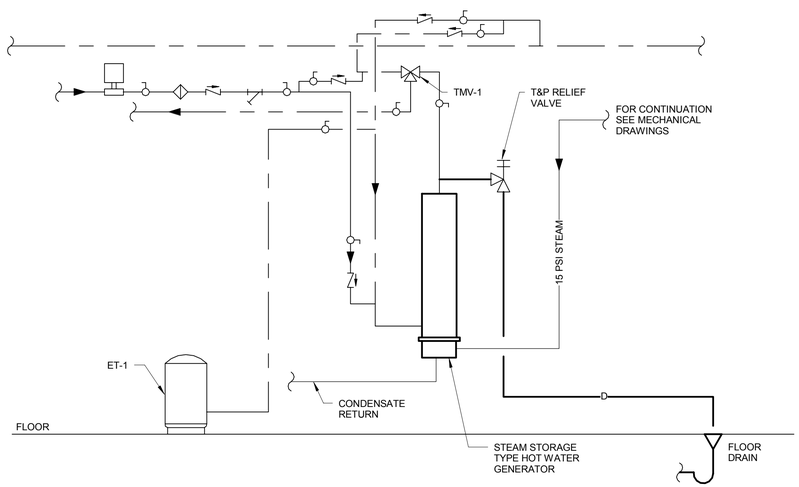

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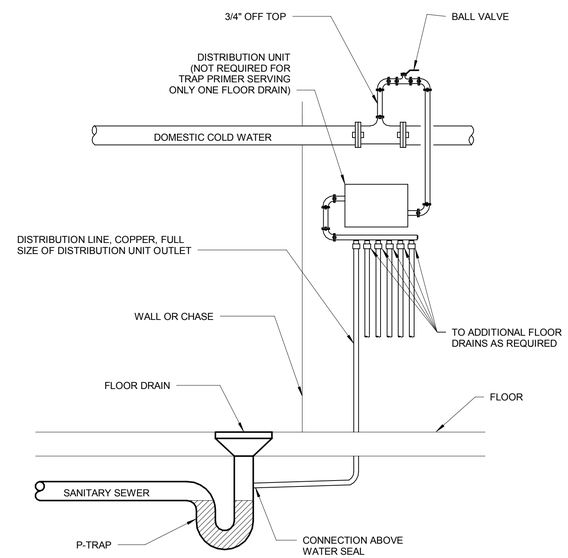

10 TRAP PRIMER MANIFOLD DETAIL
NO SCALE

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COMMONWEALTH OF VIRGINIA
DAVOOD TASHAKKORI
No. 19533
PROFESSIONAL ENGINEER
11/15/13

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ISSUE DATE
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APPROVALS				
NAME	ORGANIZATION	DATE		DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN MZ	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED MK	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED RW	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED DT	
			TECH. PROJ. ENG.	
			RES. PROJ. ENG.	

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE — ANGULAR ± X.XX (2 DECIMAL PLACES) ±.02 X.XXX (3 DECIMAL PLACES) ±.005 — SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE √

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: PLUMBING DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293583 | LATEST REV.

SHEET NO. P-501

12/16/2013 8:35:36 AM

PLUMBING FIXTURE CONNECTION SCHEDULE

DESIGNATION	FIXTURE	WASTE	VENT	CW	HW	REMARKS
WC-1	WATER CLOSET	4"	2"	1"	--	WALL-HUNG, FLUSH VALVE, BATTERY OPERATED, 1.28 GPF
WC-2	WATER CLOSET	4"	2"	1"	--	WALL-HUNG, FLUSH VALVE, ADA, BATTERY OPERATED, 1.28 GPF
UR-1	URINAL	2"	1-1/2"	3/4"	--	WALL-HUNG, FLUSH VALVE, BATTERY OPERATED, 0.125GPF
L-1	LAVATORY	1-1/2"	1-1/2"	1/2"	1/2"	UNDERMOUNT, ADA SENSOR OPERATED, FAUCET, BATTERY OPERATED, 0.5 GPM AERATOR
EWC-1	ELECTRIC WATER COOLER	1-1/2"	1-1/2"	1/2"	--	RECESSED MOUNT, BI-LEVEL, STAINLESS STEEL
S-1	SINK	1-1/2"	1-1/2"	1/2"	1/2"	COUNTER MOUNTED, STAINLESS STEEL, ADA, 3/4" H.P. DISPOSER
S-2	SINK	1-1/2"	1-1/2"	1/2"	1/2"	COUNTER MOUNTED, STAINLESS STEEL,
MB-1	MOP BASIN	3"	1-1/2"	1/2"	1/2"	FLOOR MOUNTED, 24"x36"x12", UTILITY FAUCET WITH VACUUM BREAKER, 50" HOSE, HOSE BRACKET
ES-1	EMERGENCY SHOWER	-	-	1-1/4"	1-1/4"	SPECIFIED IN SEC. 12 30 90/ PROVIDE THERMOSTATIC MIXING VALVE.
SK-1	LAB SINK	1-1/2"	1-1/2"	1/2"	1/2"	SPECIFIED IN SEC. 12 36 10/ PROVIDE THERMOSTATIC MIXING VALVE.
SK-2	LAB SINK	1-1/2"	1-1/2"	1/2"	1/2"	SPECIFIED IN SEC. 12 36 10/ PROVIDE THERMOSTATIC MIXING VALVE.

DRAIN SCHEDULE

ITEM DESIGNATION	LOCATION	DRAIN SIZE	MOUNTING HEIGHT	TRAP	VENT	REMARKS
FD-1	PUBLIC AREAS	3"	FLOOR	3"	1 1/2"	W/ TRAP PRIMER CONNECTION
FD-2	MECHANICAL AREAS	4",6"	FLOOR	4",6"	2"	W/ TRAP PRIMER CONNECTION
FD-3	MECHANICAL AREAS	4"	FLOOR	4"	2"	W/ TRAP PRIMER CONNECTION
FD-4	MECHANICAL AREAS	4"	FLOOR	4"	2"	W/ TRAP PRIMER CONNECTION
AD-1	AREAWAY	3"	FLOOR	-	-	

ELECTRIC WATER HEATER SCHEDULE

ITEM DESIGNATION	LOCATION	SERVICES	STORAGE CAPACITY (GAL)	RECOVERY AT 100°F RISE (GPH)	INPUT (kW)	VOLTS	PHASE	REMARKS
EWH-1, 2	RESTROOM	RESTROOMS	40	18	5	480	3	-

STEAM FIRED WATER HEATER SCHEDULE

ITEM DESIGNATION	LOCATION	SERVICES	STORAGE CAPACITY (GAL)	RECOVERY AT 100°F RISE (GPM)	INPUT STEAM PRESSURE	REMARKS
SWH-1	BASEMENT	LABS	N/A	60	15 PSI	DOUBLE WALL, 140° TEMPERATURE

THERMOSTATIC MIXING VALVE SCHEDULE

ITEM	LOCATION	SERVICES	DEMAND (GPM)	PRESSURE DROP (PSI)	INLET TEMPERATURE	OUTLET TEMPERATURE	REMARKS
TMV-1	BASEMENT	WATER HEATER	54	20	140°F	120°F	
TMV-2	FIRST FLOOR LABS	EMERGENCY SHOWER	20	10	120°F	85°F	
TMV-3	JANITOR CLOSET	WATER HEATER	20	5	120°F	120°F	

FLOOR PLAN GENERAL NOTES:

1. SEE SHEET P-OO1 FOR LEGEND AND GENERAL NOTES.

EXPANSION TANK SCHEDULE

ITEM DESIGNATION	LOCATION	MAX. EXPANDED WATER (GAL)	TOTAL VOLUME (GAL)	REMARKS
ET-1	MECHANICAL ROOM 001	1.3	7.4	150 PSI MAX WORKING PRESSURE, ASME
ET-2	JANITOR CLOSET 107	1.3	7.4	150 PSI MAX WORKING PRESSURE, ASME
ET-3	JANITOR CLOSET 208	1.3	7.4	150 PSI MAX WORKING PRESSURE, ASME

TRAP PRIMER SCHEDULE

ITEM DESIGNATION	LOCATION	INLET SIZE	OUTLET SIZE	VOLTAGE/PHASE	REMARKS
TP-1	JANITOR CLOSETS	3/4"	1/2"	115/1	ELECTRIC ACTIVATED, IN PANEL BOX
TP-2	MECHANICAL ROOM	3/4"	5/8"	115/1	ELECTRIC ACTIVATED, IN PANEL BOX

SUMP PUMP SCHEDULE

ITEM DESIGNATION	LOCATION	TYPE	CAPACITY (GPM)	TDH (FT. WG)	MOTOR				BASIN SIZE	REMARKS
					RPM	HP	VOLTS	PHASE		
SP-1	BASEMENT	SIMPLEX SUBMERSIBLE, EFFLUENT	30	18	1750	1	115	1	EXISTING BASIN	
SP-2	BASEMENT	SIMPLEX SUBMERSIBLE, EFFLUENT	30	18	1750	1	115	1	EXISTING BASIN	
SP-3	BASEMENT	SIMPLEX SUBMERSIBLE, EFFLUENT	30	18	1750	1/3	115	1	18" DIA. x18" DEEP	PROVIDE FIBERGLASS BASIN
SP-4	BASEMENT	SIMPLEX SUBMERSIBLE, EFFLUENT	30	18	1750	1/3	115	1	18"x18"x24" DEEP	SEE STRUCTURAL FOR COORDINATION

RECIRCULATING PUMP SCHEDULE

ITEM DESIGNATION	LOCATION	SERVICES	PUMP TYPE	CAPACITY (GPM)	TDH (FT. WG)	MOTOR				REMARKS
						RPM	HP	VOLTS	PHASE	
HWC-1	BASEMENT	LABS	IN-LINE	2.1	13	3300	1/6	115	1	PROVIDE AQUASTAT ON PIPING

SEWAGE EJECTOR SCHEDULE

ITEM DESIGNATION	LOCATION	TYPE	CAPACITY (GPM)	TDH (FT. WG)	MOTOR				BASIN SIZE	REMARKS
					RPM	HP	VOLTS	PHASE		
SE-1	BASEMENT	DUPLEX SUBMERSIBLE, GRINDER	30	15	1750	1	480	3	EXISTING BASIN	PROVIDE NEW COVER

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: PLUMBING SCHEDULES

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293584 | LATEST REV.

SHEET NO. P-601

12/16/2013 8:32:06 AM

LEGEND:

- F — FIRE PROTECTION SUPPLY PIPE
- F — FIRE PROTECTION SUPPLY PIPE (UNDERGROUND)
- SP — FIRE PROTECTION SPRINKLER PIPE
- D — DRAIN PIPE
- U — FLEXIBLE COUPLING AT EXPANSION JOINT
- REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER
- CHECK VALVE
- OS&Y VALVE
- POST INDICATOR VALVE (WALL-TYPE)
- CAP
- ELBOW
- ELBOW, TURNED UP OR RISER
- ELBOW, TURNED DOWN
- TEE
- TEE, OUTLET TURNED UP
- TEE, OUTLET TURNED DOWN
- WATER FLOW SWITCH
- TAMPER SWITCH
- FIRE TEST HEADER
- FIRE DEPARTMENT CONNECTION
- TP — TOTALPAC WET SYSTEM ALARM CHECK VALVE
- FCA — FLOOR CONTROL VALVE ASSEMBLY
- AUX — AUXILIARY DRAIN
- AREA NOT IN CONTRACT
- 1 — KEYNOTE
- BOUNDARY OF SPRINKLER COVERAGE

FIRE PROTECTION HAZARD CLASSIFICATIONS:

OCCUPANCY:	ORDINARY HAZARD 1	ORDINARY HAZARD 2
MINIMUM SPRINKLER DENSITY:	0.15 GPM/SQFT	0.20 GPM/SQFT
REMOTE AREA:	1500 SQFT	1500 SQFT
MAX. SPRINKLER SPACING:	130 SQFT	130 SQFT
HOSE STREAM ALLOWANCE:	250 GPM	250 GPM

ALL SPRINKLERS SHALL BE QUICK-RESPONSE TYPE.
DESIGN AREA MAY NOT BE REDUCED TO LESS THAN 1500 SQFT, PER GSA P100 SECTION 7.8.

APPLICABLE CODES AND STANDARDS:

INTERNATIONAL BUILDING CODE (IBC), 2009
INTERNATIONAL FIRE CODE (IFC), 2009
NASA STD 8719.11A, SAFETY STANDARD FOR FIRE PROTECTION, NOVEMBER, 2008
NASA LPR 1710.11, FIRE PROTECTION PROGRAM
GSA P100, FACILITIES STANDARDS FOR THE PUBLIC BUILDINGS SERVICE, 2010
NFPA 1, FIRE PREVENTION CODE, 2009
NFPA 10, STANDARD FOR PORTABLE FIRE EXTINGUISHERS, 2010
NFPA 13, INSTALLATION OF SPRINKLER SYSTEMS, 2010
NFPA 24, INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES, 2010
NFPA 101, LIFE SAFETY CODE, 2012
SAFETY CODE FOR ELEVATORS AND ESCALATORS, ASME A17.1, 2010

ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
EL	ELEVATION
F	FIRE PROTECTION SUPPLY
FCA	FLOOR CONTROL ASSEMBLY
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISHED FLOOR
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OS&Y	OUTSIDE SCREW & YOKE
SP	SPRINKLER SUPPLY
TP	TOTALPAC
TS	TAMPER SWITCH
TBD	TO BE DETERMINED
UON	UNLESS OTHERWISE NOTED
WF	WATER FLOW

PLANNED SPRINKLER AND STANDPIPE SYSTEMS:

A STANDPIPE SYSTEM IS NOT PLANNED, AS THE TOP FLOOR IS LESS THAN 30 FEET ABOVE GRADE.

AUTOMATIC SPRINKLER PROTECTION WILL BE PROVIDED BASED ON NFPA 13 REQUIREMENTS. PER NASA STD 8719.11A, THE MINIMUM HAZARD CLASSIFICATION ARE INCREASED BY ONE CLASSIFICATION FOR LIGHT HAZARD OCCUPANCIES. OH1 AREAS ARE NOT INCREASED TO OH2 FOR THIS PROJECT, PER AHJ JUDGEMENT.

ON THE INCOMING FIRE SERVICE MAIN, PROVIDE: POST INDICATING VALVE, REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER, AND TOTALPAC2 ALARM CHECK VALVE.

PROVIDE TEST HEADER FOR TESTING BACKFLOW PREVENTER AT FULL FLOW.

WATER SUPPLY DATA:

70 PSI STATIC PRESSURE
29 PSI RESIDUAL PRESSURE
1633 GPM FLOW

LOCATION: HYDRANT 56, E WALCOTT ST

DATE: OCTOBER 23, 2012

FIRE PROTECTION NOTES:

1. THE EAST WING OF BUILDING 1230 SHALL BE BROUGHT INTO FULL COMPLIANCE WITH CURRENT CODES TO THE EXTENT PRACTICABLE. ALL DESIGN ELEMENTS SHALL BE EXECUTED AND REVIEWED FOR CONFORMANCE TO CURRENT REQUIREMENTS, PER LPR 1710.11 1.1.4.

2. EQUIPMENT SHALL NOT BE ORDERED NOR PIPE FABRICATED OR INSTALLED UNTIL SUCH TIME AS THE CONTRACTOR'S SUBMITTAL OF THE SHOP DRAWINGS, HYDRAULIC CALCULATIONS, AND CUT SHEETS HAVE RECEIVED APPROVAL FROM THE NASA FIRE CHIEF.

3. PROVIDE SPRINKLER COVERAGE BELOW ALL DUCTWORK OR OTHER OBSTRUCTIONS GREATER THAN 48 INCHES.

4. PROVIDE SPRINKLER GUARDS FOR SPRINKLERS WITHIN 7 FT OF THE FLOOR. PROVIDE GUARDS FOR SPRINKLERS INSTALLED WITHIN ELEVATOR MACHINE ROOMS AND ELEVATOR PITS. PROVIDE GUARDS FOR SPRINKLERS INSTALLED WITHIN ELECTRICAL CLOSETS AND ELECTRICAL EQUIPMENT ROOMS.

5. PROVIDE DESIGN AND INSTALLATION OF THE FIRE SUPPRESSION SYSTEM TO PROVIDE A FULLY SPRINKLERED BUILDING, WITH THE EXCEPTION OF OMITTING SPRINKLERS FROM ELEVATOR SHAFTS.

6. SPRINKLERS IN FINISHED CEILINGS SHALL BE RECESSED PENDENT TYPE AND SHALL BE CENTERED ON CEILING TILES. CONTRACTOR SHALL COORDINATE SPRINKLER HEAD LOCATIONS WITH CEILING LIGHTS AND DIFFUSERS. CONCEALED SPRINKLERS SHALL NOT BE PERMITTED.

7. ALL SPRINKLER CONTROL WATER SUPPLY VALVES SHALL BE PROVIDED WITH TAMPER ALARMS.

8. THIS BUILDING HAS BEEN ASSIGNED A SEISMIC CATEGORY OF "B." NO SPECIAL SEISMIC DESIGN FOR SPRINKLER SYSTEMS IS REQUIRED.

9. ALL FIRE PROTECTION PIPING AND MAINS SHALL BE RUN ABOVE SUSPENDED CEILINGS, EXCEPT IN ROOMS WITHOUT SUSPENDED CEILINGS.

10. CONTRACTOR SHALL COORDINATE THE EXACT REQUIREMENTS AND LOCATION OF WORK WITH THE WORK OF VARIOUS TRADES PRIOR TO FABRICATION. THE CONTRACTOR SHALL COORDINATE EXACT ROUTING OF SPRINKLERS SO THAT NO CONFLICTS OCCUR WITH LIGHTS, DIFFUSERS, BEAMS, CEILING BULKHEADS, ETC.

11. ALL PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES SHALL BE SEALED WITH LISTED FIRESTOP ASSEMBLIES, AND FINISHED FLUSH AND NEAT WITH ADJACENT SURFACES. ALL PENETRATIONS OF FLOOR ASSEMBLIES THAT ARE NOT LOCATED WITHIN A FIRE RATED SHAFT SHALL BE FIRE-STOPPED WITH A LISTED FIRESTOP SYSTEM RATED FOR 2 HOURS.

12. ALL FIRE PROTECTION PIPING SHALL BE SUPPORTED INDEPENDENTLY BY THE BUILDING STRUCTURAL MEMBERS.

13. SPRINKLERS EQUIPPED WITH "O-RING" WATER SEALS ARE NOT PERMITTED TO BE INSTALLED.

14. SPRINKLER PIPING ARRANGEMENTS ON THESE DRAWINGS ARE INTENDED TO PROVIDE GENERAL GUIDANCE FOR SYSTEM ARRANGEMENT AND LAYOUT. CONTRACTOR IS RESPONSIBLE FOR ALL FINAL DESIGN OF SYSTEM PER THE REQUIREMENTS OF THE SPECIFICATIONS.

15. THE SPRINKLER SYSTEMS SHALL BE HYDRAULICALLY CALCULATED USING THE HYDRAULICALLY MOST REMOTE AREA, USING CRITERIA PRESCRIBED BY NFPA 13.

16. PROVIDE PERMANENT SIGN READING "AUTOMATIC SPRINKLER SYSTEM" AT THE BASE OF EACH RISER.

17. PROVIDE COORDINATION DRAWING TO DESIGNERS PRIOR TO FABRICATION.

18. BUILDING 1230 DOES NOT FALL WITHIN THE NFPA OR STD 8719.11 DEFINITION OF A "LAB," AND SHALL BE TREATED AS ORDINARY HAZARD BUSINESS USE. THE NEW LABS IN BUILDING 1230 DO NOT NEED TO COMPLY WITH SECTION 10.8 (LABORATORIES) OF STD 8719.11. FIRE PROTECTION REQUIREMENTS FOR THESE SPACES SHALL BE THE SAME AS REQUIRED FOR THE REST OF THE BUILDING.

19. PROVIDE A NEW 6 INCH INCOMING FIRE PROTECTION SERVICE MAIN TO SUPPLY THE SPRINKLER RISER AND FLOOR CONTROL ASSEMBLIES FOR SPRINKLER FEEDS. TIE-INS FOR DOMESTIC WATER USE ARE STRICTLY PROHIBITED.

20. EACH FLOOR CONTROL ASSEMBLY CONSISTS OF A CONTROL VALVE WITH TAMPER SWITCH, CHECK VALVE, WATER FLOW SWITCH, AND INSPECTOR'S TEST AND DRAIN CONNECTION.

21. CONTRACTOR SHALL FURNISH AND INSTALL A NEW REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER FOR INCOMING FIRE WATER SERVICE LINE, AHEAD OF THE TOTALPAC2 SYSTEM.

22. THE HYDRAULIC DESIGN OF THIS SPRINKLER SYSTEM SHALL INCORPORATE A MINIMUM 5 PSI SAFETY FACTOR.

23. CONTRACTOR SHALL FURNISH AND INSTALL A TOTALPAC2 INTEGRATED FIRE PROTECTION SYSTEM WITH RETARD CHAMBER, CONTROL VALVE, VIKING ALARM VALVE, AND VIKING HARDWARE, DOWNSTREAM OF THE BACKFLOW PREVENTER ON THE INCOMING CONNECTION.

24. A POST INDICATING VALVE IS TO BE PROVIDED FOR THE NEW DEDICATED 6 INCH FIRE WATER SERVICE LINE.

25. PROVIDE A FLEXIBLE COUPLING WHERE PIPING 2 1/2" OR GREATER CROSSES THE EXPANSION JOINT AT COLUMNS 11 AND 12.

26. ALL SPRINKLER PIPING SHALL BE LABELED, AND IN ADDITION EXPOSED SPRINKLER PIPING SHALL BE PAINTED RED.

27. PROVIDE SPRINKLERS AT TOP OF INTERIOR STAIRS AND BELOW LOWEST LANDING, PER NFPA 13.

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SEAL AREA

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ROGER BAILEY	NASA, D320	12/09/2013	APPROVED (Approver)	
DOUGLAS M. SMITH JR.	NASA COD	12/08/2013	TECH. PROJ. ENG.	
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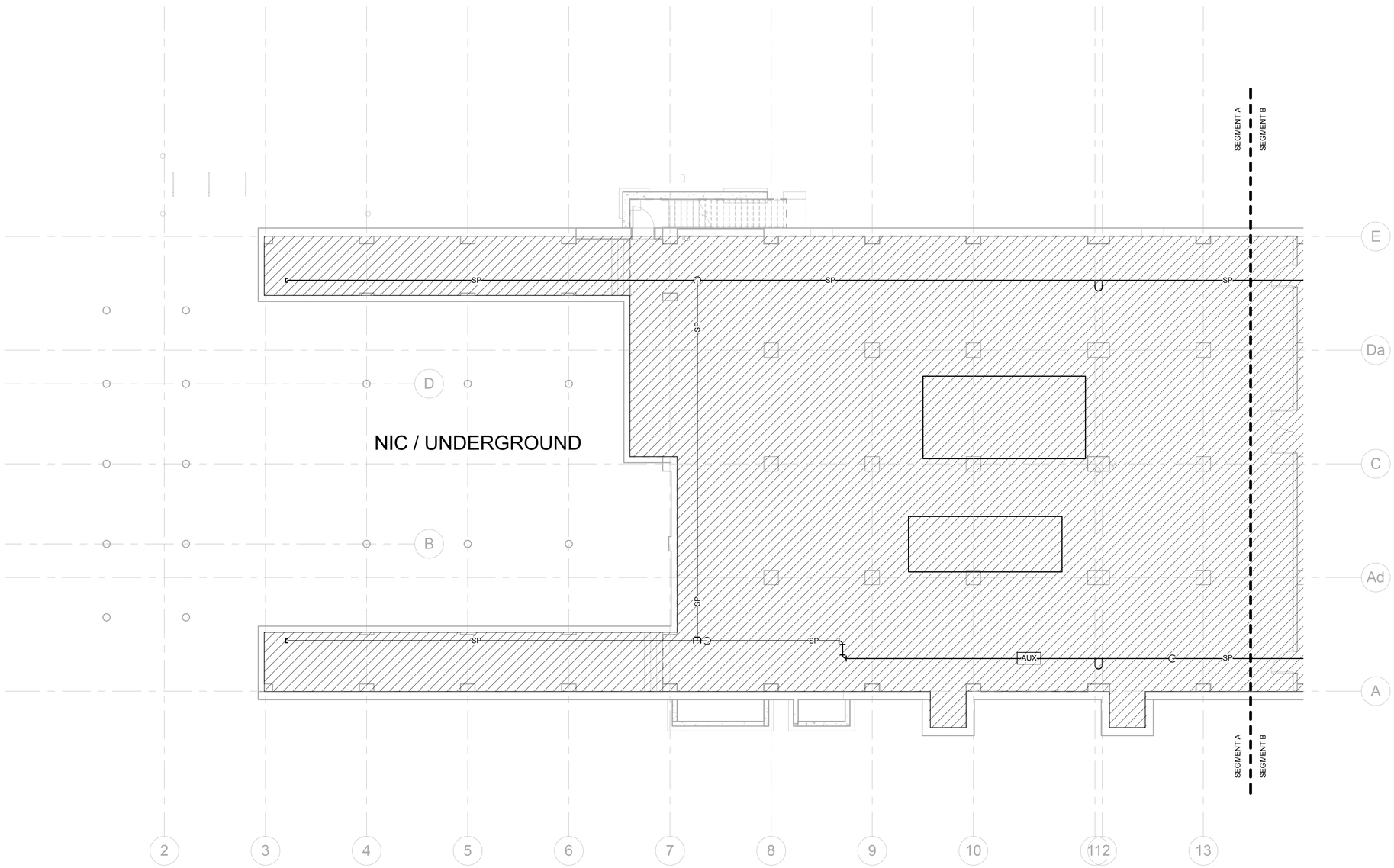
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

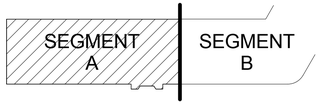
DRAWING TITLE: FIRE PROTECTION LEGEND, ABBREVIATIONS, & CODE SUMMARY

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293585 | LATEST REV.

SHEET NO. FP-001

12/16/2013 9:14:08 AM





KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

REVISIONS					REVISIONS				
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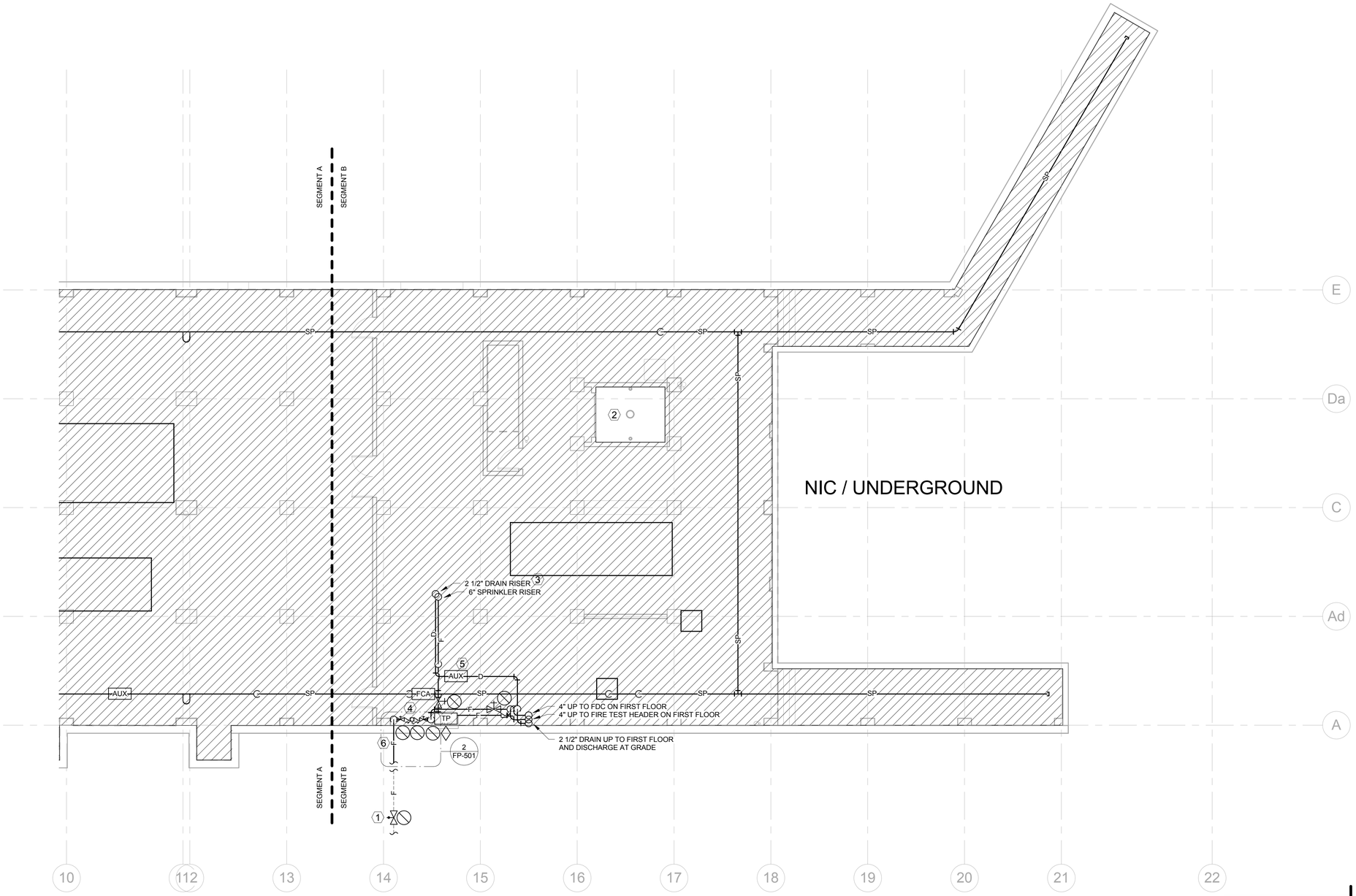
DRAWING TITLE: BASEMENT SEGMENT A - FIRE PROTECTION FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293586 | LATEST REV.

SHEET NO. FP-100A

12/16/2013 9:14:15 AM



KEYNOTES:

1. 6" POST INDICATING VALVE TO BE PROVIDED BY CIVIL CONTRACTOR ON DEDICATED 6" FIRE WATER SERVICE LINE, AS CLOSE TO TEE OFF EXISTING MAIN AS POSSIBLE. FIRE SUPPRESSION CONTRACTOR SHALL PROVIDE TAMPER SWITCH ON PIV. FIRE ALARM CONTRACTOR SHALL PROVIDE MONITOR MODULE FOR TAMPER SWITCH. LOCATION SHOWN ON DRAWING IS DIAGRAMMATIC ONLY. SEE CIVIL PLAN CS-101 FOR PIV LOCATION.

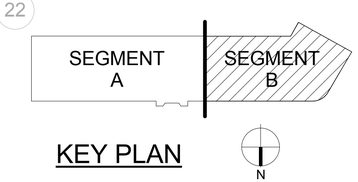
2. SPRINKLER COVERAGE NOT REQUIRED IN ELEVATOR SHAFT.

3. DISCHARGE EXPRESS DRAIN TO OUTSIDE AT GRADE LEVEL. PROVIDE SPLASH BLOCK. PROVIDE AUXILIARY DRAIN INSIDE WHERE DRAIN PIPE IS BELOW DISCHARGE POINT.

4. DISCHARGE BACKFLOW PREVENTER RELIEF VALVE INTO DRAIN PIPE WITH AIR GAP. DRAIN PIPE SHALL DIRECT FLOW TOWARDS NEARBY 4" FLOOR DRAIN. DRAIN PIPE SHALL NOT EXTEND PAST THE FOOTPRINT OF THE BACKFLOW PREVENTER TO AVOID A TRIPPING HAZARD.

5. AUX DRAIN SERVES AS LOW PRESSURE DRAINAGE FOR BASEMENT SPRINKLER SYSTEM. PRESSURIZED FLOW FROM TEST CONNECTIONS DISCHARGES AT GRADE. PIPE AUX DRAIN TO DISCHARGE INTO NEAREST FLOOR DRAIN.

6. NEW 6" MAIN ENTERS BUILDING AT 4' ABOVE FINISHED FLOOR, THEN ELBOWS DOWN TO ELEVATION OF BACKFLOW PREVENTER.



KEY PLAN

1/8"=1'-0"

GRAPHIC SCALE

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED Designer	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED Checker	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED Approver	
DOUGLAS M. SMITH JR.	NASA COD	12/08/2013	TECH. PROJ. ENG.	
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X.XX (2 DECIMAL PLACES) ±.02
X.XXX (3 DECIMAL PLACES) ±.005
SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT A - FIRE PROTECTION FLOOR PLAN

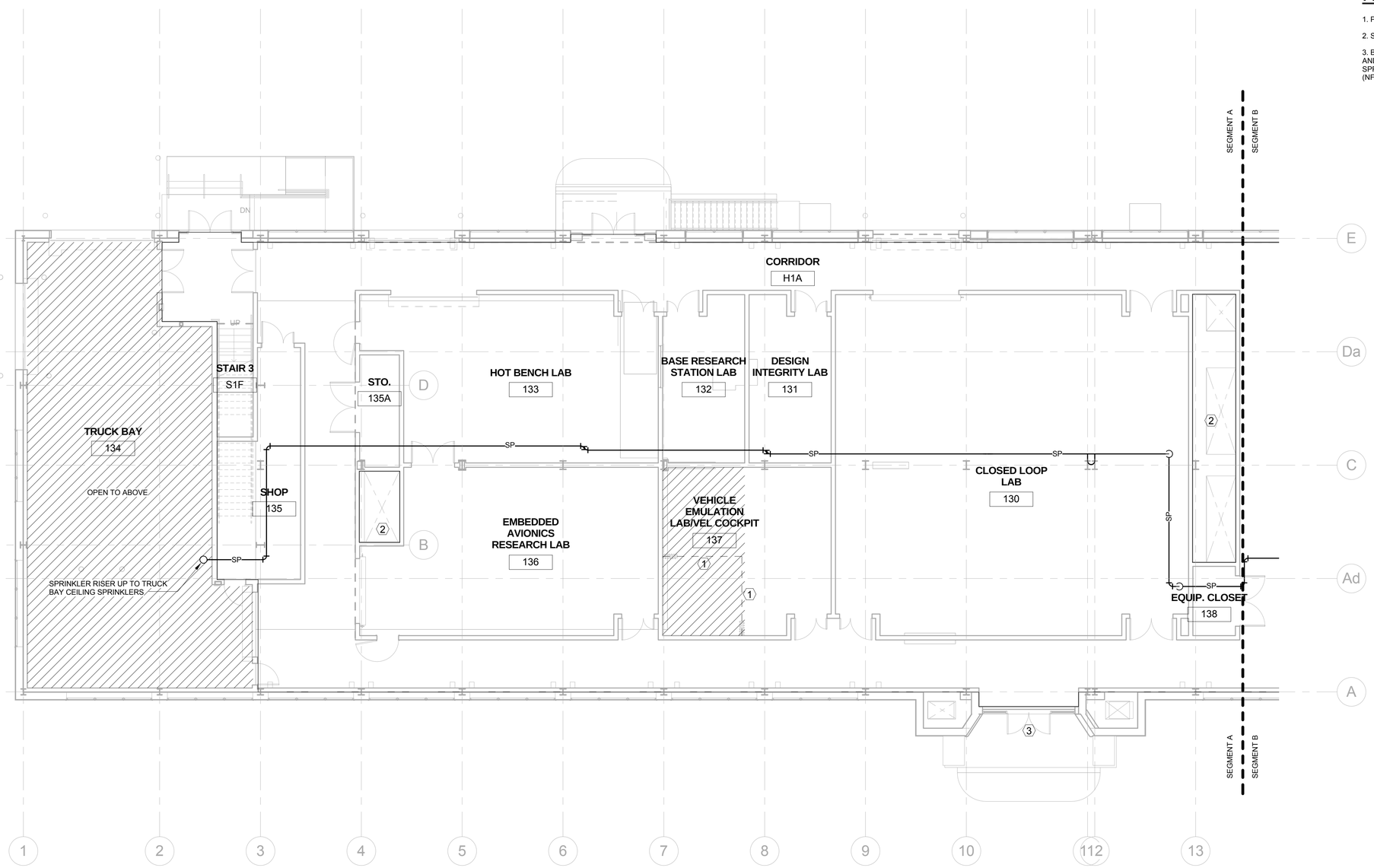
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293587 | LATEST REV.

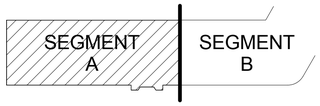
SHEET NO. FP-100B

12/16/2013 9:14:43 AM

KEYNOTES:

1. PROVIDE SPRINKLER COVERAGE ON BOTH SIDES OF BLACKOUT CURTAIN.
2. SPRINKLER COVERAGE NOT REQUIRED IN SHAFT.
3. BUILDING ENTRANCE IS CONSTRUCTED OF NON-COMBUSTIBLE MATERIAL, AND COMBUSTIBLE OBJECTS WILL NOT BE STORED UNDERNEATH CANOPY. NO SPRINKLER COVERAGE IS REQUIRED UNDER BUILDING ENTRANCE CANOPY (NFPA 13 8.15.7.2).





KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT A - FIRE PROTECTION FLOOR PLAN

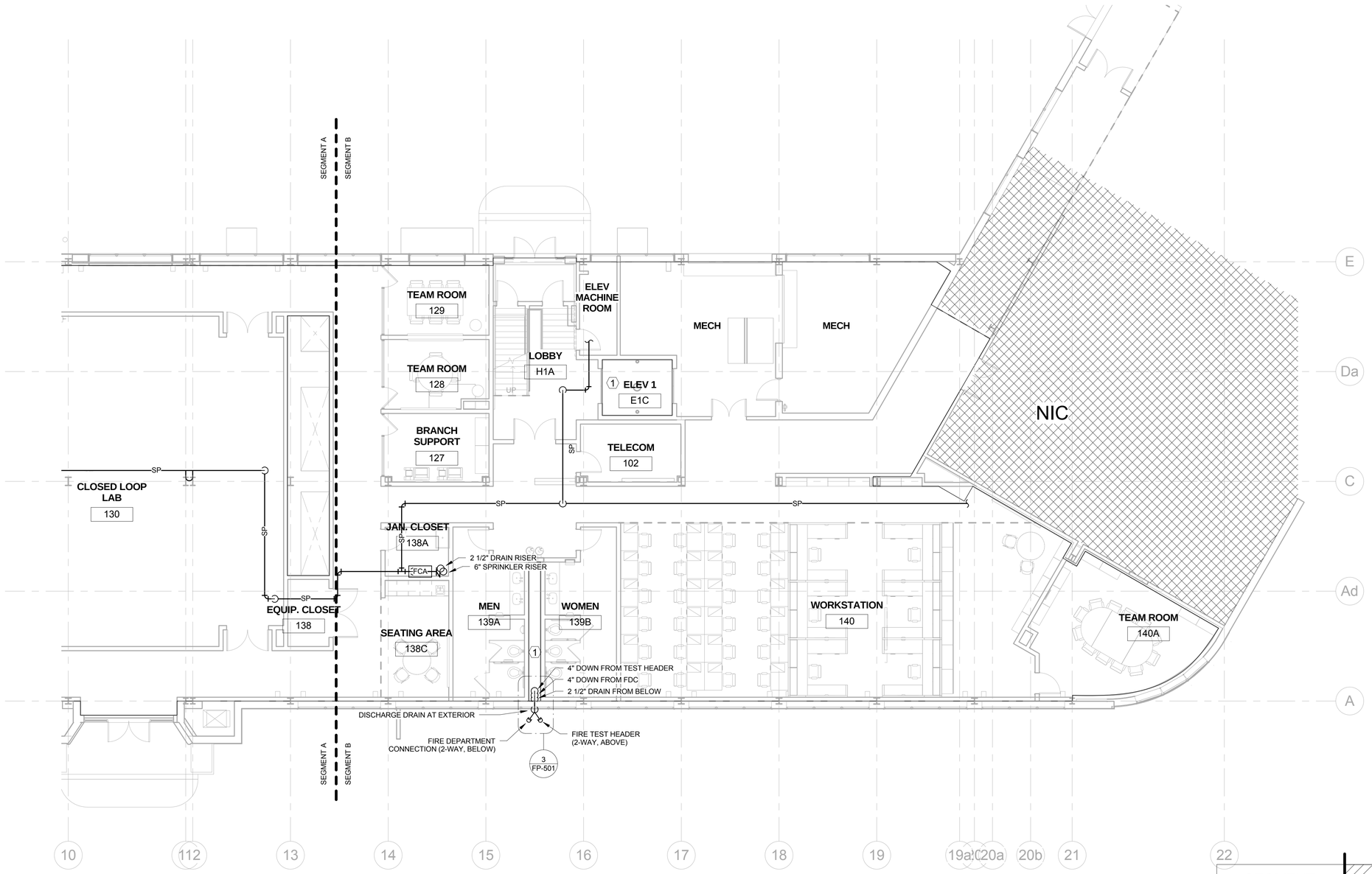
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293588 | LATEST REV.

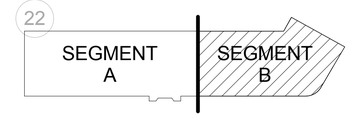
SHEET NO. FP-101A

12/16/2013 9:14:50 AM

KEYNOTES:

1. SPRINKLER COVERAGE NOT REQUIRED IN ELEVATOR SHAFT.
2. SPRINKLER COVERAGE NOT REQUIRED IN NON-COMBUSTIBLE CONCEALED SPACE.





KEY PLAN

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT B - FIRE PROTECTION FLOOR PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293589 | LATEST REV.

SHEET NO. FP-101B

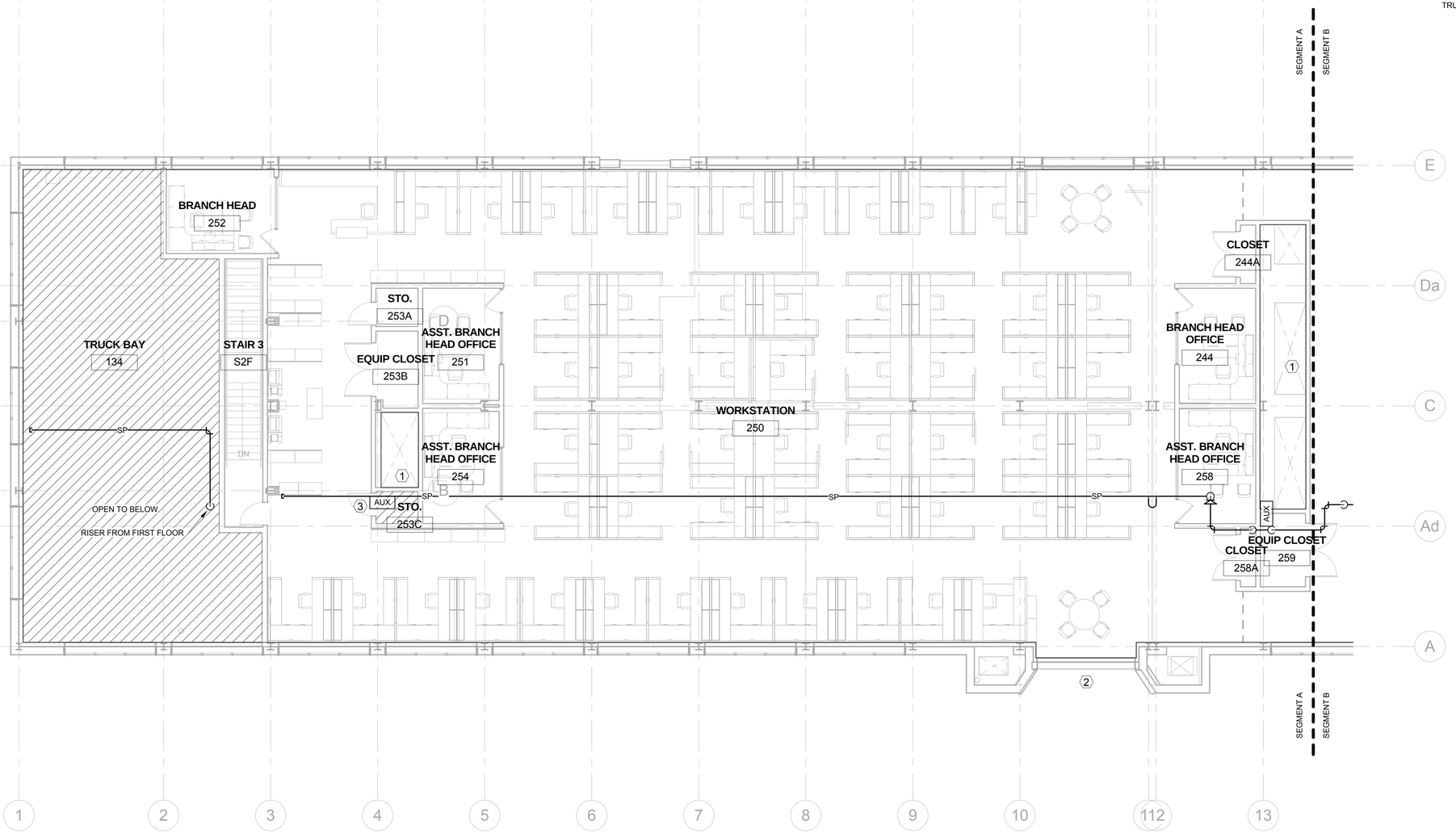
12/16/2013 9:14:58 AM

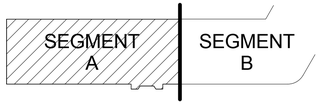
KEYNOTES:

1. SPRINKLER COVERAGE NOT REQUIRED IN SHAFT.

2. BUILDING ENTRANCE IS CONSTRUCTED OF NON-COMBUSTIBLE MATERIAL, AND COMBUSTIBLE OBJECTS WILL NOT BE STORED UNDERNEATH CANOPY. NO SPRINKLER COVERAGE IS REQUIRED UNDER BUILDING ENTRANCE CANOPY (NFPA 13 8.15.7.2).

3. AUXILIARY DRAIN DISCHARGE TO BE PIPED DOWN TO FIRST FLOOR LEVEL OF TRUCK BAY.





KEY PLAN

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8' 4' 0 8' 16'

GRAPHIC SCALE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT B - FIRE PROTECTION FLOOR PLAN

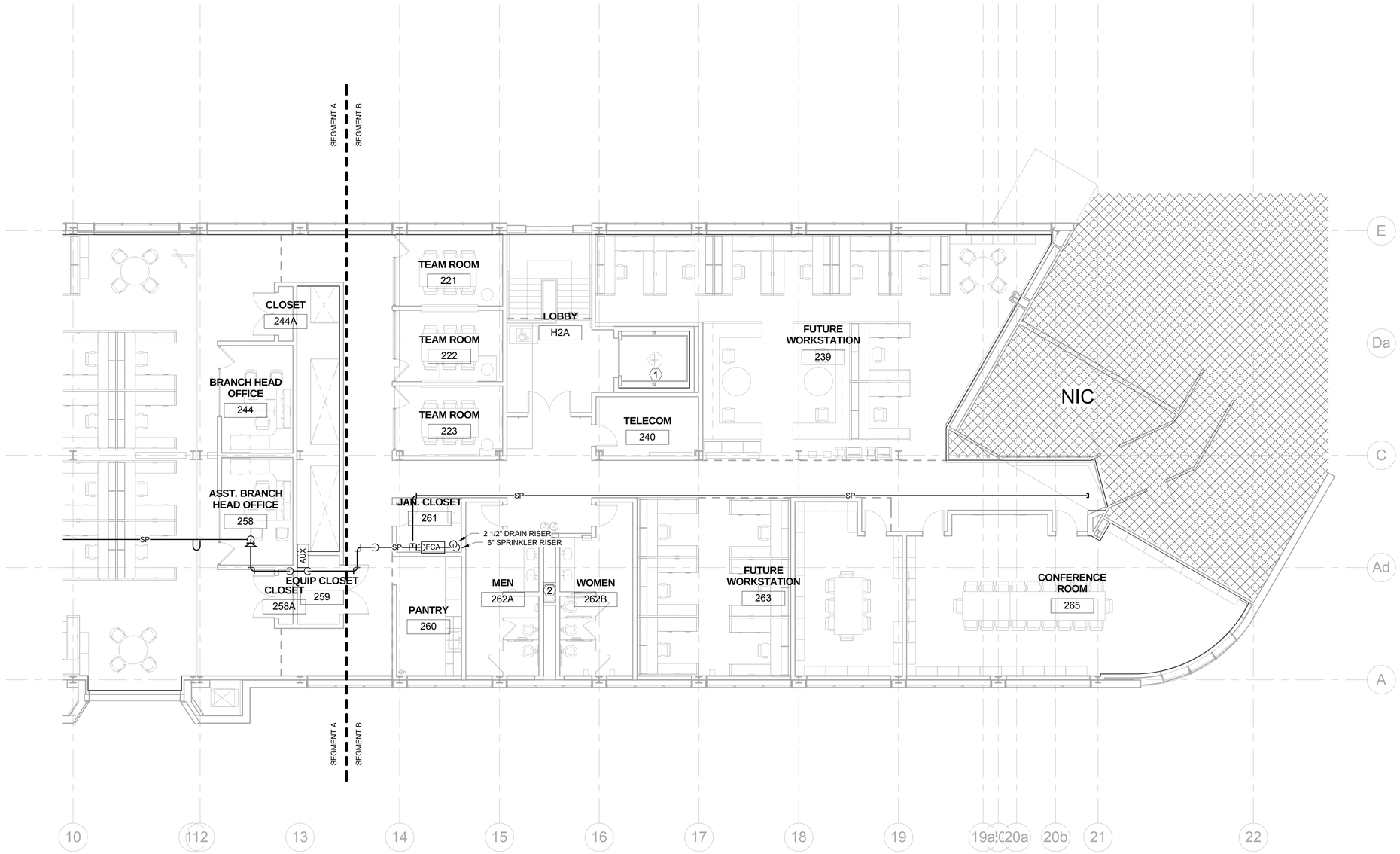
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293590 | LATEST REV.

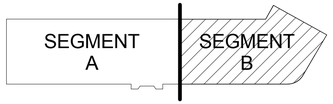
SHEET NO. FP-102A

12/16/2013 9:15:20 AM

KEYNOTES:

1. SPRINKLER COVERAGE NOT REQUIRED IN ELEVATOR SHAFT.
2. SPRINKLER COVERAGE NOT REQUIRED IN NON-COMBUSTIBLE CONCEALED SPACE.





KEY PLAN

N

1/8"=1'-0" 8' 4' 0 8' 16'

GRAPHIC SCALE

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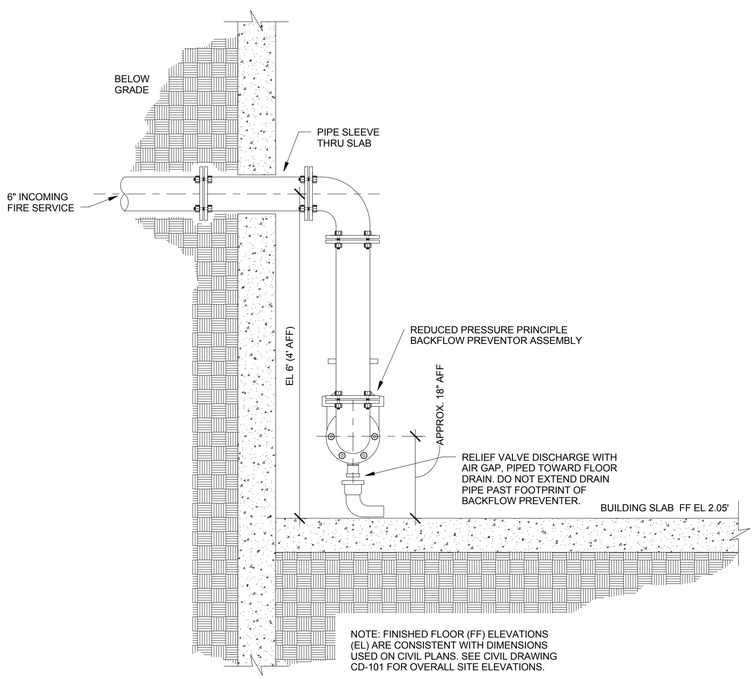
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT B - FIRE PROTECTION FLOOR PLAN

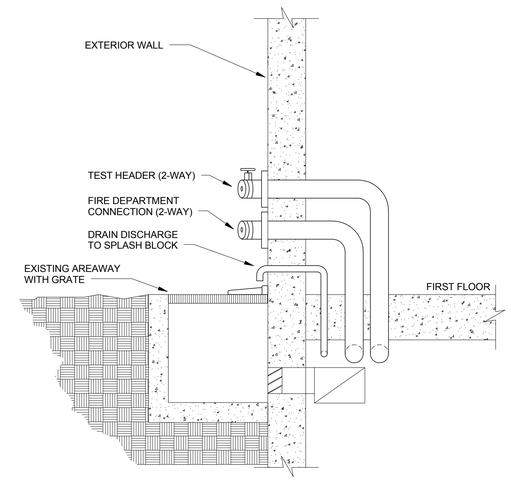
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293591 | LATEST REV.

SHEET NO. FP-102B

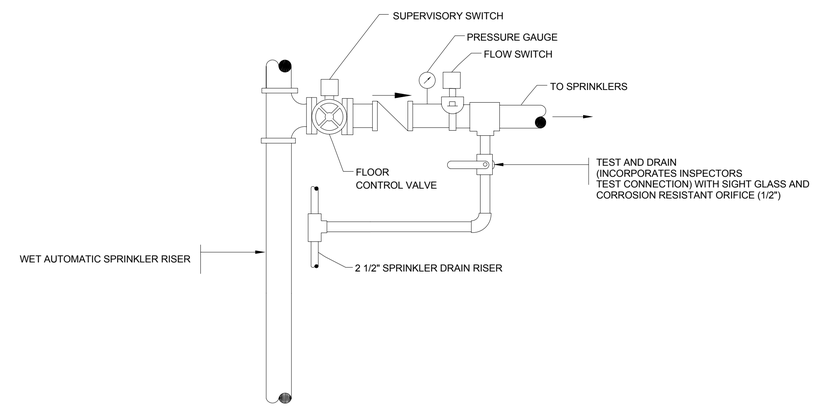
12/16/2013 9:15:37 AM



2 FIRE SERVICE DETAIL
FP-501 REF: FP-100A SCALE:NTS



3 FDC & TEST HEADER DETAIL
FP-501 REF: FP-101A SCALE:NTS



1 TYPICAL FLOOR CONTROL ASSEMBLY DETAIL
FP-501 REF: SCALE:NTS

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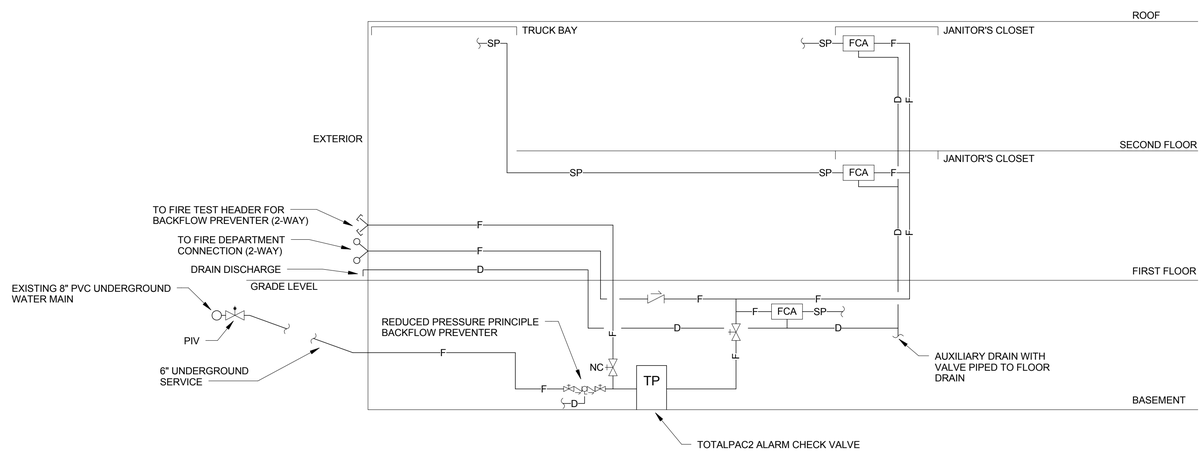
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRE PROTECTION DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293592 | LATEST REV.
SHEET NO. FP-501

12/16/2013 9:15:45 AM



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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
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DRAWING TITLE: FIRE PROTECTION RISER DIAGRAM

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293593 | LATEST REV.

SHEET NO. FP-601

12/16/2013 9:15:52 AM

LEGEND:

- CM — CONTROL MODULE
  - SD - CLOSES SMOKE DAMPER
- MM — MONITOR MODULE
- P — MANUAL PULL STATION
- S AHU-# RET — DUCT SMOKE DETECTOR
  - AHU - SERVES AHU
  - RET - ON RETURN AIR DUCT
  - SUP - ON SUPPLY AIR DUCT
- ? E — CEILING SMOKE DETECTOR
  - E - DETECTOR FOR ELEVATOR RECALL
- E — HEAT DETECTOR
  - E - DETECTOR FOR ELEVATOR SHUNT TRIP
- 15 — WALL MOUNTED STROBE
  - SUBSCRIPT INDICATES CANDELA RATING
  - WP INDICATES WEATHERPROOF DEVICE
- 15 — WALL MOUNTED COMBINATION HORN/STROBE
  - SUBSCRIPT INDICATES CANDELA RATING
- FACP — FIRE ALARM CONTROL PANEL
- BPS — STROBE BOOSTER POWER SUPPLY
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- 120 VAC POWER SUPPLY
- AREA NOT IN CONTRACT
- 1 — KEYNOTE
- RTS — REMOTE TEST SWITCH

APPLICABLE CODES AND STANDARDS:

GSA P-100, FACILITIES STANDARDS FOR THE PUBLIC BUILDING SERVICE, 2010
FIRE PROTECTION FPE REVIEW COMMENT RECORD, 15 AUGUST 2012
INTERNATIONAL BUILDING CODE (IBC), 2009
INTERNATIONAL MECHANICAL CODE (IMC), 2009
ACCESSABLE AND USABLE BUILDINGS AND FACILITIES ICC A117.1, 2009
NASA STD 8719.11A, SAFETY STANDARD FOR FIRE PROTECTION, NOVEMBER, 2008
NASA LARC FIRE PROTECTION PROGRAM LPR 1710.11
NFPA 1, FIRE PREVENTION CODE, 2009
NFPA 70, NATIONAL ELECTRICAL CODE, 2011
NFPA 72, NATIONAL FIRE ALARM CODE, 2010
NFPA 90A, STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS, 2009
NFPA 101, LIFE SAFETY CODE, 2009
NFPA 110, STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS, 2010
NFPA 111, STANDARD ON STORED ELECTRICAL ENERGY EMERGENCY AND STANDBY POWER SYSTEMS, 2010
SAFETY CODE FOR ELEVATORS AND ESCALATORS, ASME A17.1, 2010

ABBREVIATIONS:

AED	AUTOMATED EXTERNAL DEFIBRILLATOR
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLER UNIT
ANN	ANNUNCIATOR
BAS	BUILDING AUTOMATION SYSTEM
BCU	BLOWER COIL UNIT
BPS	BOOSTER POWER SUPPLY
CO	CARBON MONOXIDE
CM	CONTROL MODULE
DACT	DIGITAL ALARM COMMUNICATOR TRANSMITTER
FACP	FIRE ALARM CONTROL PANEL
FPE	FIRE PROTECTION ENGINEER
GSA	GENERAL SERVICES ADMINISTRATION
MM	MONITOR MODULE
NAC	NOTIFICATION APPLIANCE CIRCUIT
NIC	NOT IN CONTRACT
SD	SMOKE DAMPER
SLC	SIGNALING LINE CIRCUIT
SP	SPEAKER
SUP	SUPERVISORY
TS	TAMPER SWITCH
TBD	TO BE DETERMINED
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
UON	UNLESS OTHERWISE NOTED
WF	WATER FLOW
WP	WEATHERPROOF

FIRE DETECTION AND ALARM SYSTEM REQUIREMENTS - GENERAL SCOPE OF WORK:

A COMPLETE, ANALOG-ADDRESSABLE FIRE ALARM SYSTEM SHALL BE PROVIDED THROUGHOUT ALL LEVELS OF THE RENOVATION OF THE EAST WING.

THE FIRE ALARM SYSTEM SHALL CONSIST OF HORN/STROBE NOTIFICATION APPLIANCES ARRANGED FOR AUDIBILITY THROUGHOUT ALL OCCUPIED AREAS, AND STROBE COVERAGE THROUGHOUT ALL COMMON AREAS.

THE FIRE ALARM SYSTEM SHALL BE AN INTELLIGENT NOTIFIER BRAND SYSTEM WITH NOTIFIER 320 FACP.

THE FIRE ALARM SYSTEM SHALL CONNECT TO THE EXISTING FACP LOCATED IN THE WEST WING AS DIAGRAMMED IN THESE DRAWINGS, AND SHALL REPORT TO THE SITE CENTRAL STATION VIA THE EXISTING REPORTING SYSTEM. ALARM SIGNALS FROM EITHER WING SHALL REPORT ON BOTH PANELS.

FULL AUTOMATIC DETECTION SHALL BE PROVIDED THROUGHOUT THE EAST WING AS REQUESTED BY THE FPE REVIEW COMMENT RECORD DATED AUGUST 15, 2012. THE ELEVATOR MACHINE ROOM SHALL BE PROVIDED WITH A HEAT DETECTOR FOR ELEVATOR POWER SHUNT TRIP.

A REMOTE FLUSH MOUNTED ANNUNCIATOR SHALL BE PROVIDED AT THE MAIN ENTRANCE TO THE BUILDING.

MANUAL PULL STATIONS SHALL BE PROVIDED AT EACH LEVEL OF THE EXIT STAIRS.

AED DEVICES SHALL BE INSTALLED ON BOTH THE 1ST AND 2ND FLOORS AND MONITORED BY THE FIRE ALARM SYSTEM FOR THE CONDITIONS OF AN OPEN CABINET DOOR AND THE DEVICE REMOVED FROM THE CABINET.

THE SYSTEM SHALL INTERCONNECT WITH HVAC SYSTEMS, SHUNT TRIP, ELEVATOR SHAFT LEAK MONITOR, AND CO MONITORING SYSTEM.

A MASS NOTIFICATION SYSTEM IS NOT TO BE PROVIDED PER DISCUSSION WITH THE AHJ.

FIRE ALARM GENERAL NOTES:

1. THE FIRE ALARM PLANS ARE DIAGRAMMATIC ONLY. DEVICES MAY REQUIRE ADJUSTMENT IN THE FIELD.

2. THE CONTRACTOR SHALL ROUTE WIRING AND CONDUIT ALONG THE SHORTEST AND MOST COST EFFECTIVE ROUTE WHERE POSSIBLE. DO NOT MIX POWER LIMITED AND NON-POWER LIMITED WIRING WITHIN THE SAME CONDUIT. CONTRACTOR SHALL NOT EXCEED 40% CONDUIT FILL. KEEP SLC AND AUDIO CIRCUITS SEPARATED.

3. COORDINATE ALL FIRE ALARM EQUIPMENT WITH ALL OTHER TRADES TO AVOID CONFLICTS. PROVIDE ALL NECESSARY FITTINGS, EQUIPMENT, HANGERS, OFFSETS, ROUTING, ETC. TO AVOID ALL CONFLICTS AT NO ADDITIONAL COST.

4. COORDINATE JUNCTION BOX MOUNTING HEIGHTS FOR EQUIPMENT FURNISHED BY OTHER TRADES, ADJUST AS NECESSARY TO ACCOMMODATE THE EQUIPMENT SELECTED. PROVIDE ALL FINAL CONNECTIONS TO NEW EQUIPMENT.

5. CONTRACTOR SHALL PROVIDE ALL END OF LINE DEVICES AS REQUIRED TO MATCH THE CONTROL EQUIPMENT REQUIREMENTS AND TO SUPERVISE ALL CIRCUITS.

6. CONTRACTOR SHALL VERIFY ALL WIRE SIZES BASED ON ACTUAL CIRCUIT LENGTH INSTALLED IN THE FIELD TO STAY WITHIN THE MANUFACTURER'S ACCEPTABLE VOLTAGE DROP. SUBMIT WIRE SIZE SUBSTITUTIONS FOR APPROVAL. CHANGES IN WIRE SIZE SHALL BE AT NO ADDITIONAL COST.

7.PROVIDE THE MANUFACTURER'S RECOMMENDED SIZE AND TYPE OF CABLING BETWEEN ALL FIRE ALARM EQUIPMENT REQUIRING CONNECTIONS TO FUNCTION PROPERLY.

8. EXPOSED BOXES AND CONDUIT SHALL BE PAINTED TO MATCH THE EXISTING FINISHES.

9. ALL WIRING OUTSIDE OF CABINETS AND BOXES SHALL BE ROUTED IN CONDUIT IN ACCORDANCE WITH DIVISION 26 RACEWAY REQUIREMENTS.

10. ALL EXTERIOR APPLIANCES SHALL BE WEATHERPROOF.

11. ALL PENETRATIONS OF FIRE RATED PARTITIONS AND FLOORS SHALL BE FIRE STOPPED PER THE SPECIFICATIONS. CONTRACTOR SHALL PROVIDE FIRE STOPPING SUBMISSIONS FOR EACH ASSEMBLY FOR APPROVAL PRIOR TO INSTALLATION. REFER TO FIRESTOP SPECIFICATION SECTION FOR MORE INFORMATION. FLOOR PENETRATIONS NOT LOCATED WITHIN A FIRE RATED SHAFT SHALL BE FIRESTOPPED WITH SYSTEMS LISTED FOR 1 HOUR FIRE RESISTANCE.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE NECESSARY NUMBER OF STROBE BOOSTER POWER SUPPLIES. THE NUMBER OF PANELS SHOWN ON DRAWINGS (TOTAL OF 5) IS AN APPROXIMATION. FIELD CONDITIONS MAY NECESSITATE MORE PANELS.

13. AUDIBILITY SHALL BE ACHIEVED IN ALL AREAS WITH A SOUND LEVEL AT LEAST 15 DB ABOVE THE AVERAGE AMBIENT SOUND LEVEL, EVEN WITH DOORS CLOSED.

14. MOUNTING OF FIELD DEVICES SHALL BE COORDINATED IN THE FIELD. DEVICES IN FINISHED AREAS SHALL BE RECESSED IN GYPSUM BOARD PARTITIONS AND GYPSUM BOARD AND LAY IN CEILINGS. IN ALL OTHER LOCATIONS, DEVICES SHALL BE SURFACE MOUNTED AND BE PROVIDED WITH THE MANUFACTURER'S SURFACE MOUNTED BACK BOXES, U.O.N.

15. PULL STATIONS SHALL BE SEMI-FLUSH MOUNTED, DOUBLE-ACTION TYPE, WITH MANUAL RESET. A KEY IS REQUIRED AND IT SHALL BE THE SAME KEY AS REQUIRED FOR THE FIRE ALARM PANEL.

16. REMOTE INDICATING SWITCHES SHALL BE PROVIDED FOR DUCT DETECTORS NOT CLEARLY VISIBLE FROM THE FLOOR.

17. ROUTE ALL FIRE ALARM CABLE WITHIN FACTORY FINISHED RED METAL CONDUIT.

20. "T" TAPPING OF NOTIFICATION CIRCUITS SHALL NOT BE ALLOWED.

21. SIGNALING LINE CIRCUITS (SLC) SHALL BE CLASS B. NOTIFICATION APPLIANCE CIRCUITS (NAC) SHALL BE CLASS B.

22. A MINIMUM OF TWO DISTINCT FIRE ALARM AUDIBLE AND VISUAL NAC CIRCUITS MUST BE PROVIDED ON EACH FLOOR (GSA P100 SECTION 7.6).

23. INDIVIDUAL MONITOR AND CONTROL MODULES ARE SHOWN FOR FUNCTIONS SUCH AS ELEVATOR CONTROL, WATER-FLOW AND TAMPER, ETC. FOR CLARITY. IF THE REQUIRED CONTROL OR MONITORING CAN BE ACHIEVED WITH COMBINATION MODULES, THIS IS THE CONTRACTOR'S OPTION.

24. CANDELA RATINGS SHOWN ARE APPROXIMATE BASED ON NFPA 72, AND MAY REQUIRE ADJUSTMENTS IN FIELD TO ACHIEVE REQUIRED CANDELA LEVELS.

25. ALL VISIBLE STROBES SHALL BE SYNCHRONIZED IN ACCORDANCE WITH NFPA 72 REQUIREMENTS.

26. USE "LIQUID TITE" CONDUIT IN WET LOCATIONS.

27. DUCT SMOKE DETECTORS SHALL BE MOUNTED IN READILY ACCESSIBLE LOCATIONS TO FACILITATE MAINTENANCE.

28. SMOKE DETECTORS FOR DOOR RELEASING SERVICE SHALL BE LISTED FOR RELEASING SERVICE.

29. A DUCT ACCESS DOOR SHALL BE INSTALLED ADJACENT TO EACH FIRE DAMPER, SMOKE DAMPER, AND DUCT SMOKE DETECTOR FOR MAINTENANCE AND INSPECTION. SIZE SHALL BE LARGE ENOUGH FOR INTENDED PURPOSE AND SHALL BE APPROVED BY THE GOVERNMENT. SEE MECHANICAL DRAWINGS THAT SHOW ACCESS PANELS.

30. GENERAL SMOKE DETECTOR SPACING IS AT A NOMINAL 30 FT, WITH A MAXIMUM 15 FT FROM ANY END WALL. ALL POINTS OF THE CEILING SHALL HAVE A DETECTOR WITHIN A FACTOR OF 0.7 OF THIS SPACING (21 FT). SMOKE DETECTOR SPACING IS ADJUSTED FOR AREAS WITH EXPOSED BEAMED CEILINGS. BEAMS RUNNING EAST-WEST ARE APPROXIMATELY 14 INCHES DEEP. SPOT SMOKE DETECTORS SPACED PERPENDICULAR TO THESE BEAMS SHALL NOT EXCEED 2/3 THEIR LISTED SPACING. BEAMS RUNNING NORTH-SOUTH ARE APPROXIMATELY 29 INCHES DEEP AND ARE SPACED MORE THAN 96" ON CENTER. EACH BAY FORMED BY THESE BEAMS SHALL BE TREATED AS A SEPARATE AREA PER NFPA 72 SECTION 17.6.3.3. HEAT DETECTOR SPACING IN THE TRUCK BAY IS REDUCED BY 60% BASED ON 27' FOOT CEILING HEIGHT, PER NFPA 72 TABLE 17.6.3.5.1.

31. SMOKE DETECTORS SHALL NOT BE LOCATED WITHIN 3 FEET OF HVAC REGISTERS.

32. AN ALARM CONDITION IN EITHER WING OF BUILDING 1230 SHALL PRODUCE AN ALARM THROUGHOUT THE ENTIRE BUILDING. COMMUNICATION BETWEEN THE EXISTING WEST WING NFS 320 PANEL AND THE NEW EAST WING NFS 320 PANEL SHALL BE DONE THROUGH CONTROL MODULES AND MONITOR MODULES AS SHOWN ON FA-101B. CONTROL MODULES ON EACH PANEL'S SLC SHALL SIGNAL MONITOR MODULES ON THE OTHER PANEL'S SLC WHEN THAT PANEL IS IN ALARM, SUPERVISORY, OR TROUBLE CONDITION.

33. PROVIDE DUCT SMOKE DETECTORS ON SUPPLY AIR DUCTS SERVED BY AIR HANDLER UNITS HAVING A CAPACITY GREATER THAN 2000 CFM, IN ACCORDANCE WITH NFPA 90A. RETURN AIR DUCT SMOKE DETECTORS ARE NOT REQUIRED, AS THIS BUILDING IS PROTECTED BY A SYSTEM OF AREA SMOKE DETECTORS. PROVIDE CONTROL MODULES AT EACH AHU/BCU FOR SHUTDOWN UPON ACTIVATION OF ANY AREA SMOKE DETECTOR OR THE AIR HANDLER UNIT'S RESPECTIVE DUCT SMOKE DETECTOR. PROVIDE A CONTROL MODULE AT EACH SMOKE DAMPER OR FIRE/SMOKE DAMPER TO SHUT THE DAMPER UPON ACTIVATION OF ANY AREA OR DUCT SMOKE DETECTOR.

34. PROVIDE A MONITOR MODULE AT THE BAS CONTROL PANEL TO PRODUCE A SUPERVISORY SIGNAL AT THE FACP WHEN CARBON MONOXIDE LEVELS IN THE TRUCK BAY ARE AT OR GREATER THAN 25 PARTS PER MILLION.

35. PROVIDE WIRE-TO-FIBER PANEL FOR FIRE ALARM SYSTEM REPORTING IN BUILDING 1230 ROOM 124 (IN WEST WING). CONNECT TO SLC LOOP AT THAT LOCATION. NASA TO PROVIDE 4 STRAND FIBER CONNECTION FROM BUILDING 1230 TO MONITORING STATION.

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SEAL AREA

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BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	JC	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	JG	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	EW	
DOUGLAS M. SMITH JR.	NASA COD	12/08/2013	TECH. PROJ. ENG.		
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HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRE ALARM LEGEND, ABBREVIATIONS, & CODE SUMMARY

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293594 | LATEST REV.
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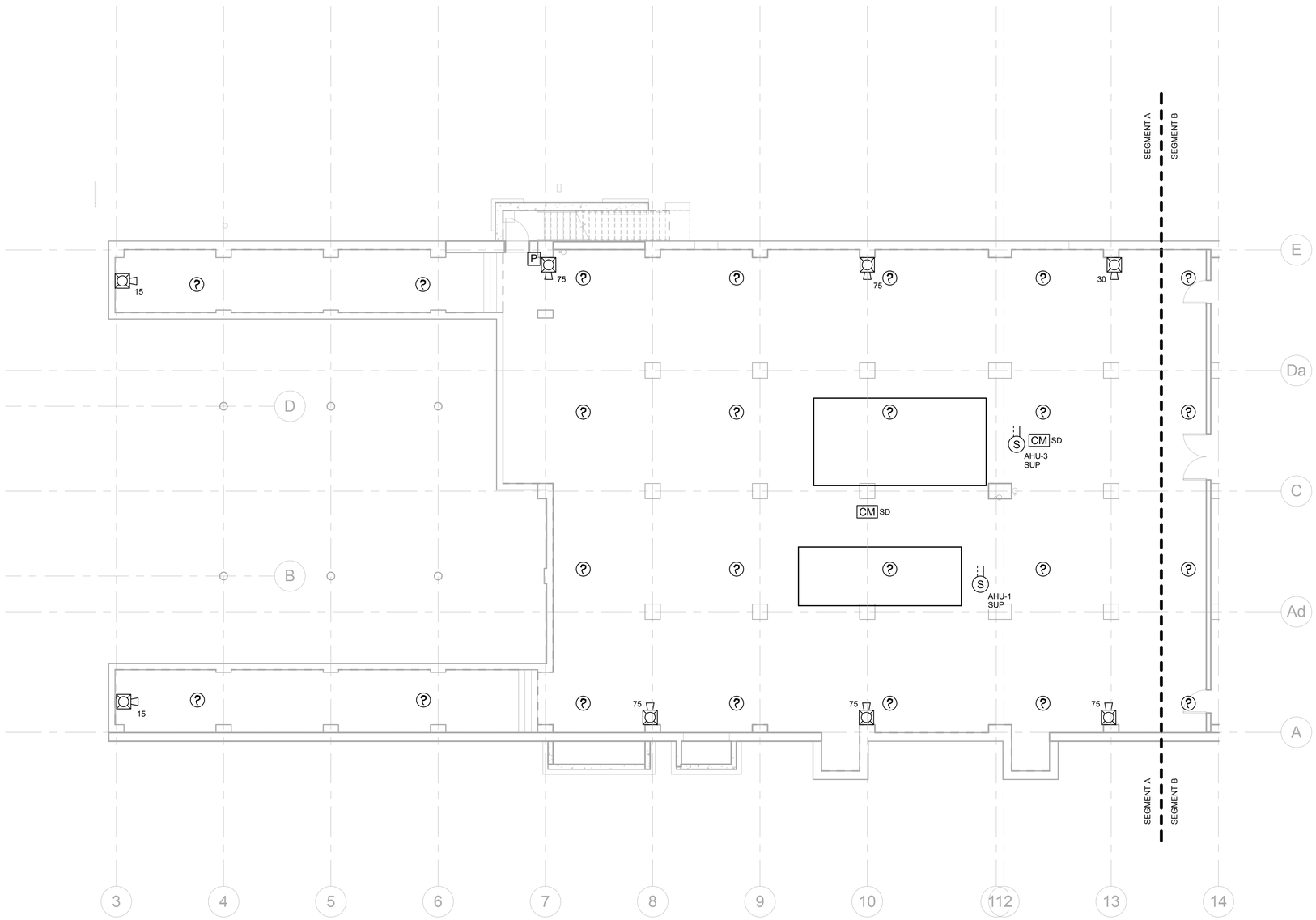
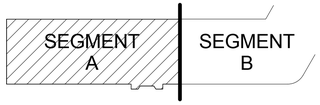
12/16/2013 9:11:42 AM





KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

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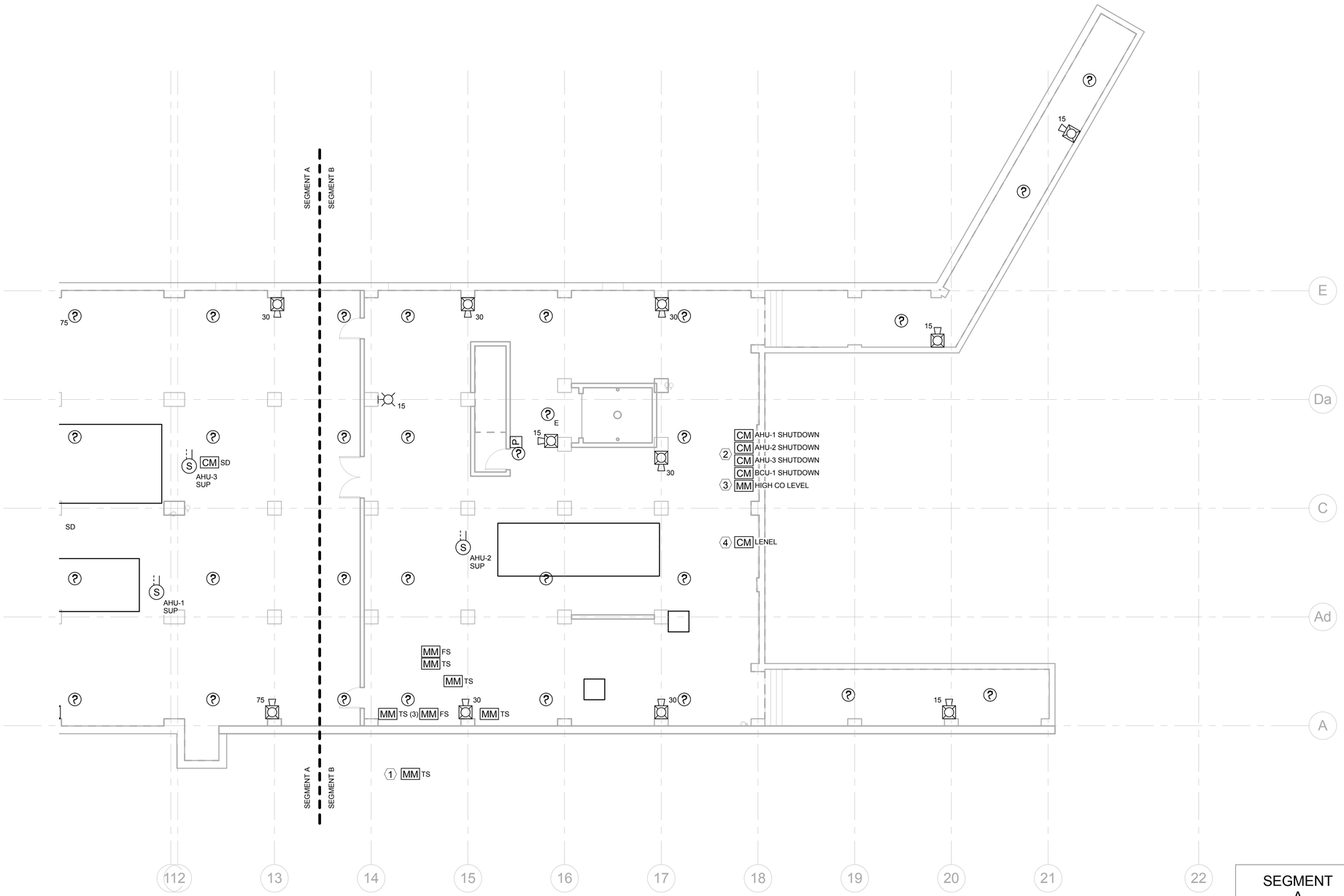
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT A - FIRE ALARM PLAN

BUILDING NO. 1230
SIZE D
DRAWING NO. 1293595
LATEST REV.
SHEET NO. FA-100A

12/16/2013 9:11:59 AM



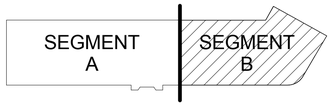
KEYNOTES:

1. PROVIDE MONITOR MODULE FOR POST INDICATOR VALVE OUTSIDE BUILDING. FIRE SUPPRESSION CONTRACTOR TO PROVIDE TAMPER SWITCH ON VALVE. LOCATION SHOWN ON DRAWING IS DIAGRAMMATIC ONLY. SEE CIVIL PLAN CS-101 FOR PIV LOCATION.

2. CONTROL MODULES WIRED TO BAS PANEL FOR AHU SHUTDOWN.

3. PROVIDE MONITOR MODULE AT BAS CONTROL PANEL TO OUTPUT SUPERVISORY SIGNAL AT FACP WHEN TRUCK BAY CO LEVELS ARE GREATER THAN 25 PARTS PER MILLION.

4. CONTROL MODULE TO SIGNAL LENEL PANEL TO RELEASE DOOR LOCKS UPON ALARM SIGNAL FROM FIRE ALARM SYSTEM.



KEY PLAN

N

1/8"=1'-0"

8' 4' 0 8' 16'

GRAPHIC SCALE

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: BASEMENT SEGMENT B - FIRE ALARM PLAN

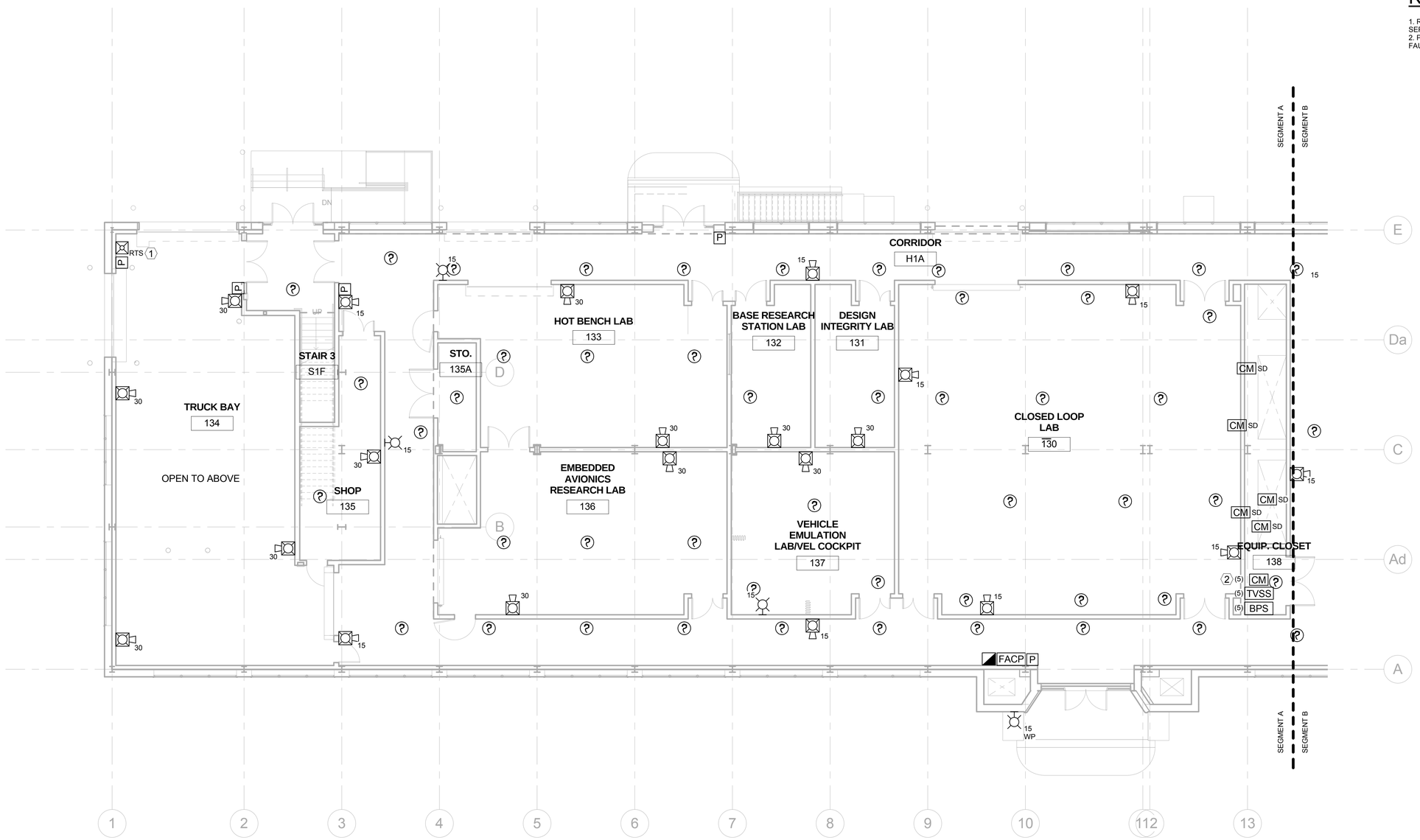
BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293596 | LATEST REV.

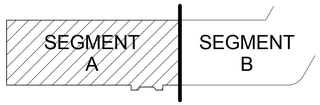
SHEET NO. FA-100B

12/16/2013 9:12:08 AM

KEYNOTES:

1. REMOTE TEST SWITCH WITH KEY AND LED FOR DUCT SMOKE DETECTOR SERVING BCU AT CEILING.
2. PROVIDE MONITORING OF BPS POWER FAULT, CIRCUIT FAULT, AND GROUND FAULT.





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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT A - FIRE ALARM PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293597 | LATEST REV.

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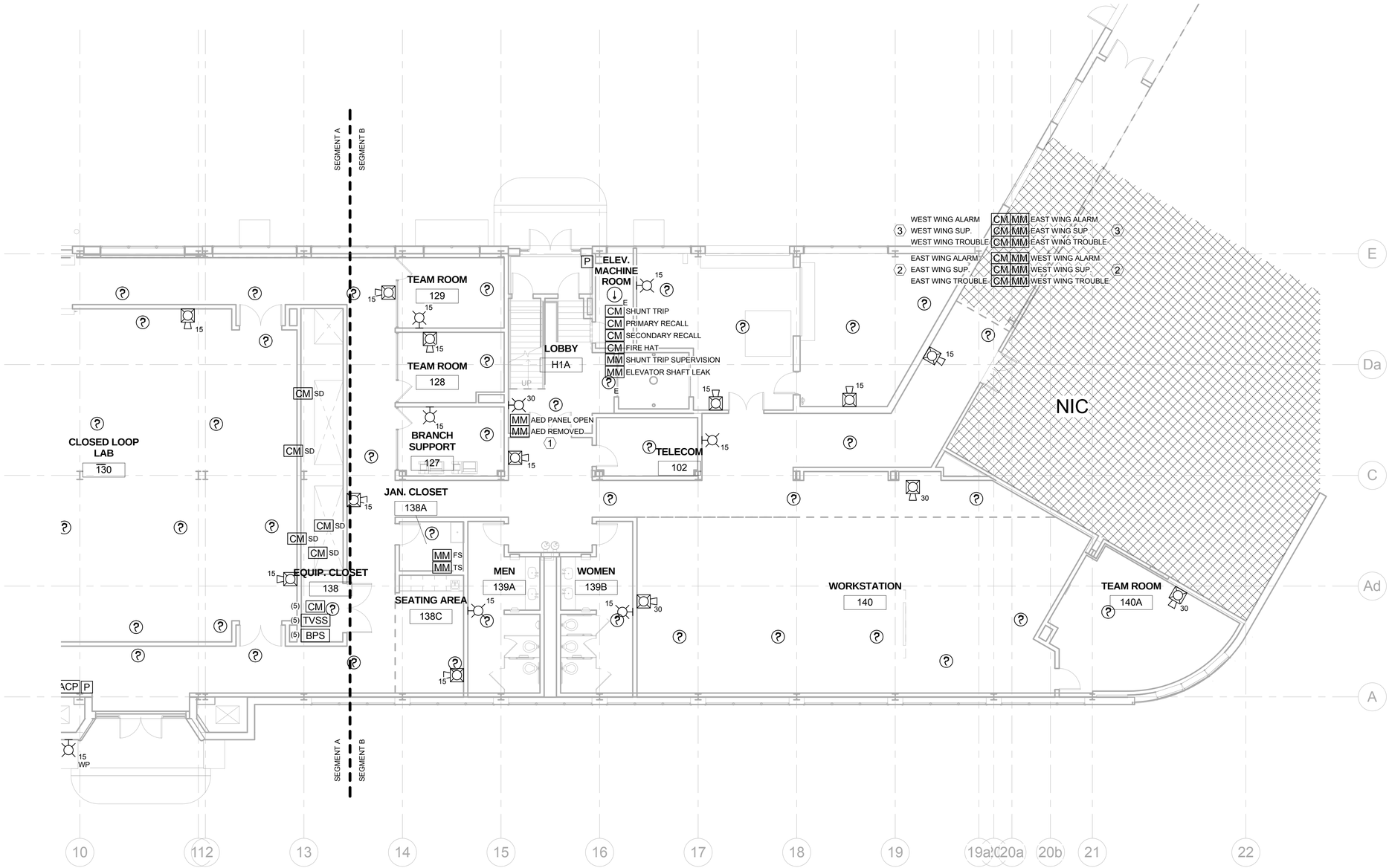
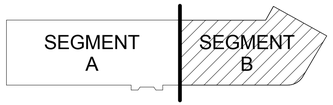


KEYNOTES:

1. PRELIMINARY LOCATION OF AED CABINET. FINAL LOCATION TO BE DETERMINED AT TIME OF CONSTRUCTION BY FIRE CHIEF.
2. INSTALL CONTROL MODULES ON EAST WING FIRE ALARM SLC TO TRANSMIT SIGNALS TO MONITOR MODULES FROM WEST WING SLC. INSTALL MONITOR MODULES ON EAST WING FIRE ALARM SLC TO MONITOR SIGNALS TRANSMITTED FROM CONTROL MODULES ON WEST WING SLC.
3. INSTALL NEW CONTROL MODULES ON EXISTING WEST WING FIRE ALARM SLC TO TRANSMIT SIGNALS TO MONITOR MODULES ON EAST WING SLC. INSTALL NEW MONITOR MODULES ON EXISTING WEST WING SLC TO MONITOR SIGNALS TRANSMITTED FROM CONTROL MODULES ON EAST WING SLC.



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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRST FLOOR SEGMENT B - FIRE ALARM PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293598 | LATEST REV.

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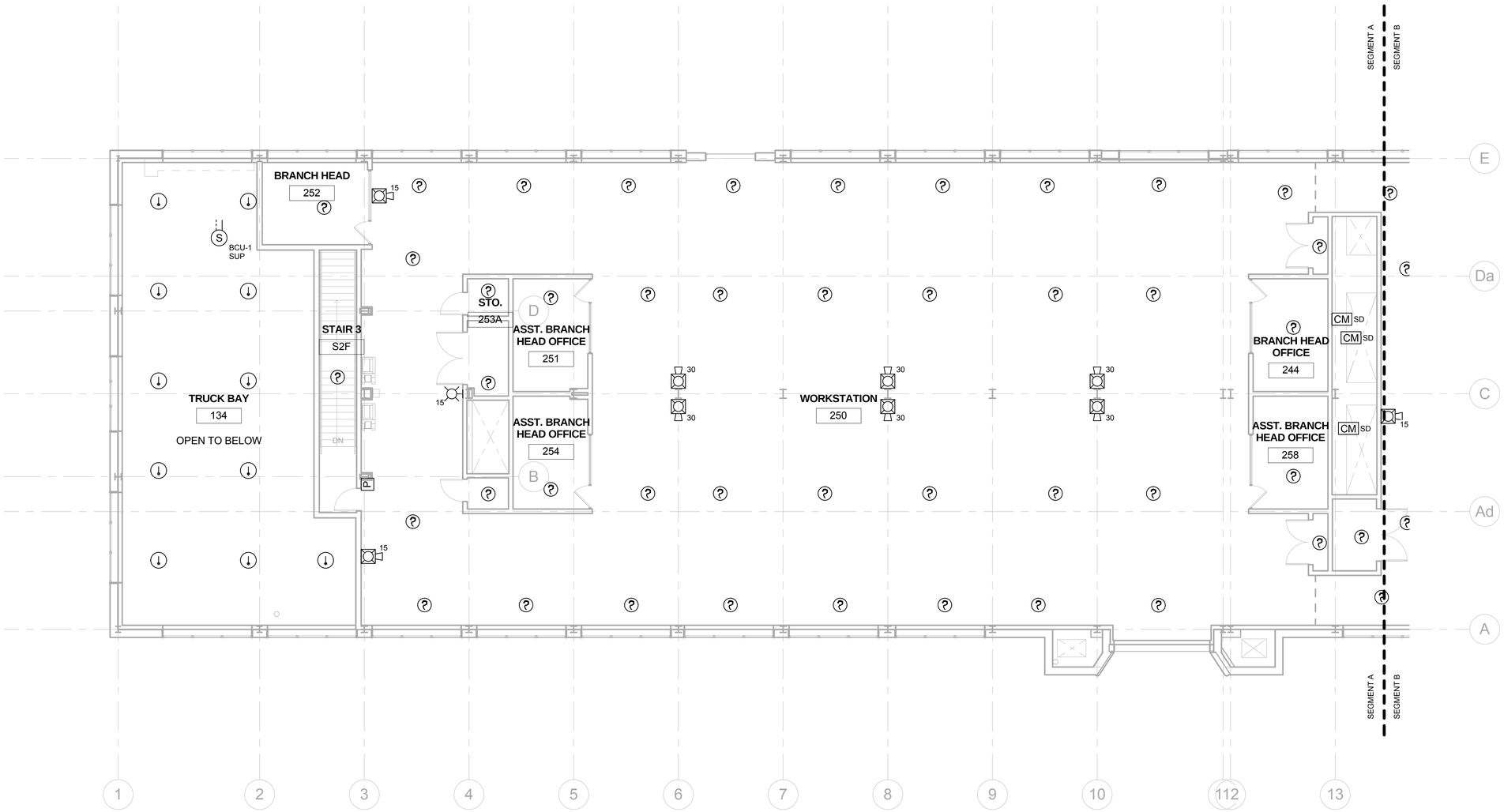

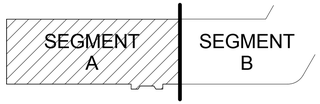

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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT A - FIRE ALARM PLAN

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293599 | LATEST REV.

SHEET NO. FA-102A

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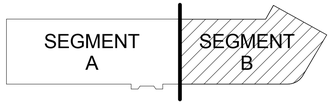

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B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: SECOND FLOOR SEGMENT B - FIRE ALARM PLAN

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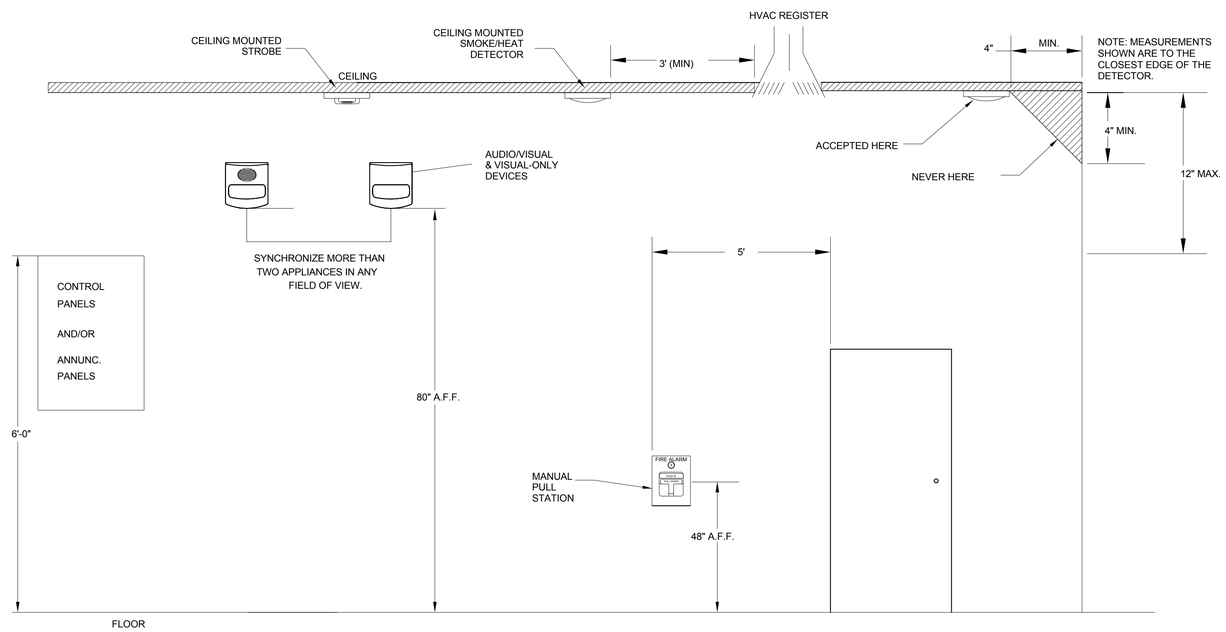

2 TYPICAL DEVICE MOUNTING HEIGHT

FA-501 REF: SCALE:NTS

SYSTEM INPUTS \ SYSTEM OUTPUTS	ALARM SIGNAL TO FACP	SUPERVISORY SIGNAL TO FACP	TROUBLE SIGNAL TO FACP	BUILDING EVACUATION A/V'S ACTIVATE	SHUT DOWN ASSOCIATED AHU OR BCU	SHUT DOWN ALL AHUS	CLOSE ASSOCIATED SMOKE DAMPER	CLOSE ALL SMOKE DAMPERS	INITIATE SHUNT TRIP OF MAIN POWER TO ELEVATOR	INITIATE PRIMARY ELEVATOR RECALL	INITIATE SECONDARY ELEVATOR RECALL	DEACTIVATE BUILDING AUDIBLE AND VISUAL NOTIFICATION APPLIANCES	DEACTIVATE BUILDING AUDIBLE NOTIFICATION APPLIANCES ONLY	TRANSMIT SIGNAL TO EXISTING NFS 320 PANEL IN WEST WING VIA CONTROL MODULES	SIGNAL LENEL TO RELEASE DOOR LOCKS
MANUAL PULL STATION	●			●		●								●	●
GENERAL AREA SPOT SMOKE OR HEAT DETECTOR	●			●		●		●						●	●
BUILDING AHU OR BCU DUCT SMOKE DETECTOR		●			●									●	
HIGH CARBON MONOXIDE LEVEL IN TRUCK BAY		●												●	
ELEVATOR SHAFT LEAK DETECTED		●												●	
IN-DUCT SMOKE DETECTOR		●			●		●							●	
MAIN WATER FLOW SWITCH	●			●		●								●	●
FLOOR AREA WATER FLOW SWITCH	●			●		●								●	●
TAMPER SWITCH		●												●	
OPEN WIRE OR GROUND IN ANY SUPERVISED CIRCUIT			●											●	
POWER SUPPLY PROBLEMS (PRIMARY, TROUBLE, AND SECONDARY)			●											●	
ELEVATOR LOBBY SMOKE DETECTOR OTHER THAN 1ST LEVEL	●			●		●		●		●				●	●
1ST LEVEL ELEVATOR LOBBY SMOKE DETECTOR	●			●		●		●			●			●	●
ELEVATOR MACHINE ROOM HEAT DETECTOR	●			●		●		●	●					●	●
SHUNT TRIP POWER SUPERVISION			●											●	
WALK TEST		●		●										●	
PANEL RESET												●		●	
ALARM SILENCE		●											●	●	
AED DEVICE REMOVED FROM CABINET WITH BYPASS KEY NOT ACTIVATED		●												●	
AED DEVICE REMOVED FROM CABINET WITH BYPASS KEY ACTIVATED (NO OUTPUT)															
AED CABINET SUPERVISORY BYPASS SWITCH ACTIVATED			●											●	
ALARM SIGNAL FROM WEST WING PANEL	●			●		●									●
SUPERVISORY SIGNAL FROM WEST WING PANEL		●													
TROUBLE SIGNAL FROM WEST WING PANEL			●												

1 FIRE ALARM SEQUENCE OF OPERATIONS

FA-501 REF: SCALE:NTS

REVISIONS

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SEAL AREA

STATE OF MARYLAND JACK D. CAMPBELL No. 41279 PROFESSIONAL ENGINEER

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NASA

LANGLEY RESEARCH CENTER

ISSUE DATE

2013.11.06 100% FINAL SUBMISSION

APPROVALS

NAME	ORGANIZATION	DATE			DATE
WILLIAM ABRAMS	NASA COD	12/02/2013	DRAWN	Author	
BRYAN HAAS	NASA COD	12/02/2013	DESIGNED	Designer	
MARK WHITAKER	NASA FSH, FC	12/06/2013	CHECKED	Checker	
ROGER BAILEY	NASA, D320	12/09/2013	APPROVED	Approver	
DOUGLAS M. SMITH JR.	NASA COD	12/08/2013	TECH. PROJ. ENG.		
			RES. PROJ. ENG.		

TOLERANCE ON DIMENSIONS UNLESS SHOWN OTHERWISE: ANGULAR ± ; X.XX (2 DECIMAL PLACES) ±.02 ; X.XXX (3 DECIMAL PLACES) ±.005

SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

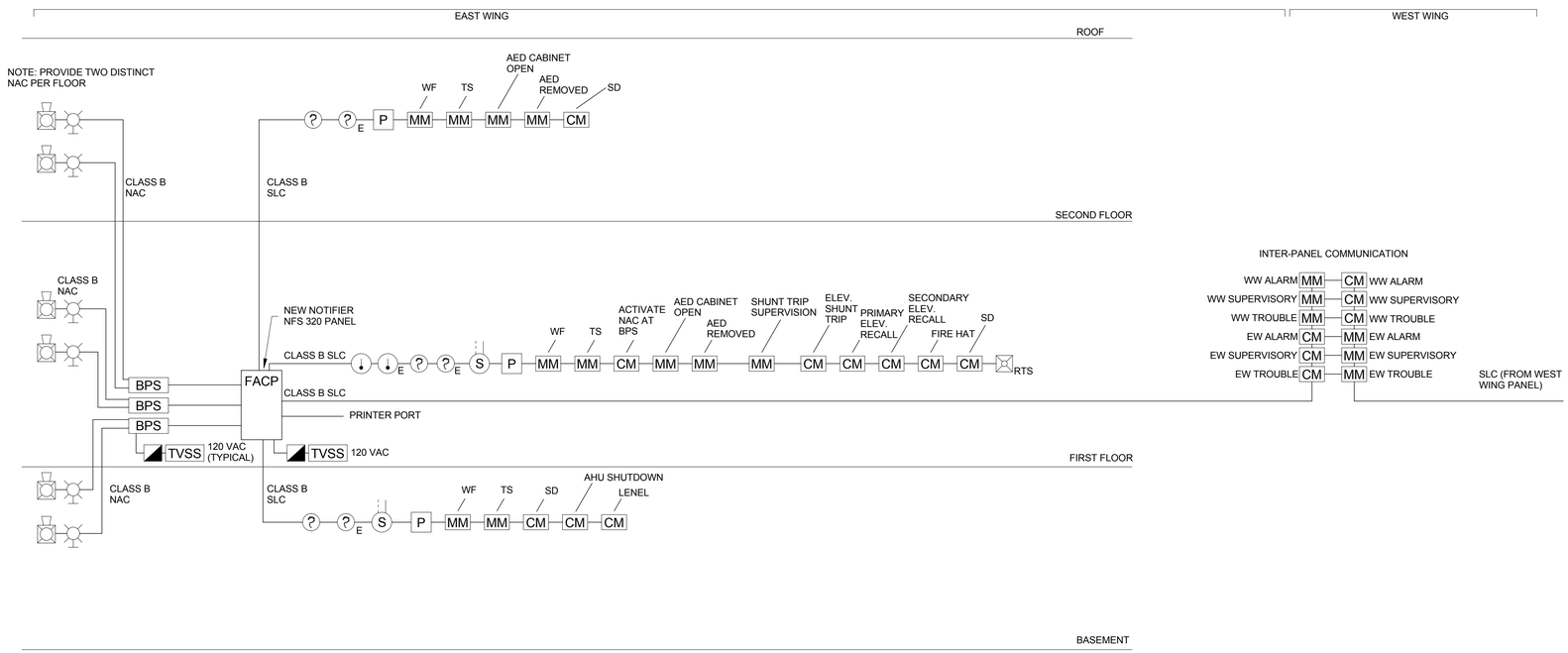
PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
B1230 East Wing - (D320) Safety-Critical Avionics Lab

DRAWING TITLE: FIRE ALARM DETAILS

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293601 | LATEST REV.

SHEET NO. FA-501

12/18/2013 9:13:36 AM



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ISSUE DATE
2013.11.06 100% FINAL SUBMISSION

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SURFACE FINISH IN MICROINCHES RMS UNLESS SHOWN OTHERWISE

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
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PROJECT TITLE: FY'14 Minor CoF Project - Repair by Renovation
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DRAWING TITLE: FIRE ALARM RISER DIAGRAM

BUILDING NO. 1230 | SIZE D | DRAWING NO. 1293602 | LATEST REV.

SHEET NO. FA-601

12/16/2013 9:14:02 AM