

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE	PAGE OF PAGES 1 15	
2. AMENDMENT/MODIFICATION NO. 1	3. EFFECTIVE DATE 01/31/2012	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)	
6. ISSUED BY CODE	PS32-B	7. ADMINISTERED BY (If other than Item 6) CODE	PS32-B	
Procurement Office George C. Marshall Space Flight Center National Aeronautics and Space Administration Marshall Space Flight Center, AL 35812		John Busbey/256.544.0896 FAX 256.544.9162 Email: john.a.busbey@nasa.gov		
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State, and Zip Code)		AUTOMATED INVOICE PAYMENT INFORMATION: (256) 544-5566		
		(x)	9A. AMENDMENT OF SOLICITATION NO. NNM12ZPS003E	
		X	9B. DATED (SEE ITEM 11) 01/05/2012	
			10A. MODIFICATION OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

X The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, X is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

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

12. ACCOUNTING AND APPROPRIATION DATA (If required)

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

(x)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

**E. IMPORTANT:** Contractor is not, X is required to sign this document and return \_\_\_\_\_ copies to the issuing office.

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

**PROJECT:** Reliability, Safety, and Energy Upgrades to Building Systems for Site Critical Building 4708.

The purpose of this amendment is to answer questions and make clarifications to the Plans and Specifications.

All terms and conditions of the solicitation remain the same.

The bid date, time and location remains un-changed: bids to be opened on 02/08/2012 at 1:30 p.m. local time at the Huntsville Madison County Chamber of Commerce, located at 225 Church ST, Huntsville, AL 35810.

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

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
		John Busbey	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		BY Original signed by	01/31/2012
		(Signature of Contracting Officer)	

Amendment 1, Reliability, Safety, and Energy Upgrades to Building Systems for Site Critical Building 4708

1. In the electrical specs for components and materials it refers to “qualified testing agency” for field quality control. I do not see a section in the spec’s table of contents that defines a “qualified testing agency”. Does it have to be third party?

**Response:** Yes.

2. Reference drawing # FAC-JS-4708-M62, in the Air Handler Valve Schedule: 4708-VLV0004 is shown to serve 4708B-SAF0018 Chilled Water Coil. Should it show to serve 4708B-AH0018 Chilled Water Coil or is there a piece of equipment named 4708B-SAF0018?

**Response:** 4708B-SAF0018 is an existing air handler that will have its control valve replaced.

3. Reference drawing # FAC-JS-4708-M62, in the Air Handler Valve Schedule: 4708-VLV0005 is shown to serve 4708B-SAF0019 Chilled Water Coil. Should it show to serve 4708B-AH0019 Chilled Water Coil or is there a piece of equipment named 4708B-SAF0019?

**Response:** 4708B-SAF0019 is an existing air handler that will have its control valve replaced.

4. Reference drawing # FAC-JS-4708-M62, in the Air Handler Valve Schedule: 4708-VLV0012 is shown to serve 4708B-SAF0018 Hot Water Coil. Should it show to serve 4708B-AH0018 Hot Water Coil or is there a piece of equipment named 4708B-SAF0018?

**Response:** 4708B-SAF0018 is an existing air handler that will have its control valve replaced.

5. Reference drawing # FAC-JS-4708-UCS23, there is a point named 4708B-SAF1-HWV. I cannot locate this valve in the Air Handler Valve Schedule on M62?

**Response:** Remove point 4708B-SAF-HWV, unit has a cooling coil only. See contract drawing FAC-JS-4708-M86 (section B-5).

6. Reference drawing # FAC-JS-4708-M60, in the Air Handler Schedule: 4708A-AH0011 is shown as Bidding Alternate #2B. UCS Sheet 15 shows this equipment and its associated VAV units to be Base Bid? Are the controls for 4708A-AH0011 to be bid as Base or Alternate 2B?

**Response:** Controls should be bid as Alternate 2B.

7. Reference drawing # FAC-JS-4708-M60, in the Air Handler Schedule: 4708A-AH0015 is shown as Bidding Alternate #2B. UCS Sheet 16 shows this equipment and its associated VAV units to be Base Bid? Are the controls for 4708A-AH0015 to be bid as Base or Alternate 2B?

**Response:** Controls should be bid in Alternate 2B.

8. Reference drawing # FAC-JS-4708-M60, in the Air Handler Schedule: 4708A-AH0026 is shown as Bidding Alternate #3. UCS Sheet 21 shows this equipment to be Bidding Alternate #2A? Are the controls for 4708A-AH0026 to be bid as Alternate 2A or Alternate 3? Air

**Response:** Controls should be bid in Alternate 3.

9. Reference drawing # FAC-JS-4708-M60, in the Air Handler Schedule: 4708-AH00B5 is shown as Bidding Alternate #1B. UCS Sheet 8 shows this equipment and the controller to be Base Bid? Are the controls for 4708-AH00B5 to be bid as Base or Alternate 1B? Air Handling Unit

**Response:** Controls should be bid in Alternate 1B.

10. Reference drawing # FAC-JS-4708-M60, in the Air Handler Schedule: 4708B-AH0001 is shown as Bidding Alternate #1A. There are no UCS points listed on UCS sheets but there is a control valve listed for a Hot Water Control Valve (4708-VLV0063) for this unit on sheet M64 and UCS points shown on the equipment schematic M85. Provide information on what UCS equipment will be required for 4708B-AH0001.

**Response :**

Add the following I/O points for 4708B-AH1 to panel 4708B-UCS0001, Card 4 (ref. contract drawing FAC-JS-4708-UCS14):

Point Name	Point Type	Channel #	SK #
4708B-AH1-SAF	DI	UI13	ISW2
4708B-AH1-SAF	DO	DO7	RELY1
4708B-AH1-SAT	AI	UI14	TRTD1
4708B-AH1-SPT	AI	UI15	TRTD2
4708B-AH1-FILTER	AI	UI16	AIR8/SPP1
4708B-AH1-HWV	AO	AO3	ACT_AO
4708B-AH1-SA_VFD	AO	AO4	N/A

11. There are references throughout the Commissioning requirements on pages 017100-3 and 171000-3 for section 23 09 00 HVAC Instrumentation and Controls specifications. Cannot locate 23 09 00 HVAC Instrumentation and Controls on the bid disc.

**Response:** Commissioning Specification should reference 255014 Direct Digital Control/Utility Control System.

12. Reference drawing # FAC-JS-4708-UCS17, the text ALT 1A is shown the middle of the page. What parts of this page should be this ALT 1A be applied?

**Response:** ALT1A applies to SP4 on 4708C UCS0001 Card 1: Control points for ceiling fans 1 & 2.

13. Reference drawing # FAC-JS-4708-M63, in the VAV Schedule: 4708-VAV0080 shows NOT USED. However, on floor plan sheet M35 and UCS sheet UCS22 shows this VAV0080 being utilized. If it exists, please provide VAV Schedule information including VAV control valve flow.

**Response:** Not used. Remove reference to 4708-VAV0080 from contract drawings FAC-JS-4708-M35 and -UCS22.

14. Reference drawing # FAC-JS-4708-UCS2, note 29 states to provide touch screen for 4708-CF1 & CF2. CF1 & CF2 on are shown as Base Bid in Fan Schedule on sheet M61; however, on sheet M35, CF1 & CF2 are shown as Bidding Alternate #1A. Are there 2 touch screen controllers on Base Bid and 2 additional required for Bidding Alternate #1A?

**Response:** No, 4708-CF0001 and 4708-Cf0002 and all associated controls shall be a part of ALT-1A only.

15. Reference drawing # FAC-JS-4708-M62, in the Louver/Damper Schedule: 4708-DM0003 shows a size of 52 inches wide by 22 inches high. This contradicts sheet M46, Detail #3 that depicts 4708-DM0003 to be 28 inches wide by 28 inches high. Which dimension is correct for 4708-DM0003?

**Response:** 52"x22" is an approximate size. Coordinate exact damper size with mechanical contractor and air handler supplier.

16. Reference drawing # FAC-JS-4708-UCS8, the outside air damper control point for 4708-AH00B5 shows to be 2-position; however, sheet M46, Detail #2 shows only manual dampers. Is there to be an outside air control damper for 4708-AH00B5 or is a manual damper desired? If a control damper is desired, please add it to the Louver/Damper Schedule on sheet M62.

**Response:** See the Schematic on M82, the damper shall be the same as DM0022, with the exception of being two position and shall use the TAG 4708-DM0024

17. Reference drawing # FAC-JS-4708-UCS9, there are control points named: 4708-AHB12-DM03, -DM04, -AHB13-DM05, -DM06. Aren't these duplicate points for already points named -AHB12-OAD, -RAD, -AHB13-OAD, -RAD?

**Response:** Yes.

18. Reference drawing # FAC-JS-4708-UCS19, there are hot water and reheat water valve points shown for 4708A-AH0004, -AH0005, & -AH0006 but these valves show as currently pneumatic and are not shown to be replaced by any valves in the Control Valve Schedule on sheet M62 or M64. Should new valves be added to the Control Valve Schedule?

**Response:** Valves are to remain; existing pneumatic actuators should be replaced with electronic DDC actuators.

19. Reference drawing # FAC-JS-4708-UCS19, there are damper operator points shown for 4708A-AH0004, -AH0005, & -AH0006 but these operators show as currently pneumatic

and are not shown to be replaced by any operators in the Louver/Damper Schedule on sheet M62. Should new dampers & operators be added to the Louver/Damper Schedule?

**Response:** Dampers are to remain, existing pneumatic actuators should be replaced with electronic DDC actuators.

20. Reference drawing # FAC-JS-4708-UCS21, there are damper operator points shown for 4708A-AH0025 for outside air, return air and exhaust air. However, sheet M48, Detail #1 only shows an operator for outside air referenced in the Louver/Damper Schedule on sheet M62. Are there to be dampers and operators for return air and exhaust air for 4708A-AH0025? If so, please add them to the Louver/Damper Schedule on sheet M62.

**Response:** Provide return air damper DM-0037. There should be a return air damper. This should be DM-0037 and be sized for the unit opening, opposed blade, with 24v 4-20mA proportional actuator control. Remove point 4708A-AH25-EAD from UCS Panel 4708A-UCS0007-Card1-AO5.

21. Reference drawings # FAC-JS-4708-UCS, there are damper operator points shown for exhaust air on several units. However, none of the AHU detail sheets show an damper reference DM-xxxxx for any exhaust air for the Louver/Damper Schedule on sheet M62. Are there to be dampers and operators for exhaust air for these units? If so, please add them to the Louver/Damper Schedule on sheet M62.

**Response:** Revise note #3 as follows: “DO NOT FURNISH FACTORY RETURN AND OUTSIDE AIR DAMPERS WITH MIXING BOX. FURNISH FACTORY MIXING DAMPERS WITH ACTUATORS AND EXHAUST DAMPERS WITH ACTUATORS FOR THE FOLLOWING UNITS: 4708-AHB011, 4708-AHB013, 4708-AH00B3, 4708B-AH004, 4708A-AH0015, 4708A-AH0028, 4708B-AH006, & 4708B-AH0022”.

22. Reference drawing # FAC-JS-4708-M62, in the Louver/Damper Schedule: 4708-DM0033 shows a size of 69 inches wide by 26 inches high. This contradicts sheet M47, Detail #9 that depicts 4708-DM0033 to be 48 inches wide by 24 inches high. Which dimension is correct for 4708-DM0033? Will this be the same dimension for the outside air CFM location?

**Response:** 69”x26” is an approximate size. Coordinate exact damper size with mechanical contractor and air handler supplier.

23. Reference: Drawings and Light Fixture Schedule  
Drawing E44 uses Fixture Tag S1, S1E, and S5  
Drawing E45 uses Fixture Tag S1, S1E, and R5E  
Drawing E46 uses Fixture Tag S1, S1E, and S5  
Drawing E49 uses Fixture Tag S1, S1E, and Y1  
Drawing E52 uses Fixture Tag S1 and S3E  
Drawing E54 uses Fixture Tag R4  
Drawing E55 uses Fixture Tag S1, S1E, and R4  
These Fixture Tags are not on the Light Fixtures Schedule.

Could you provide the right Fixture Tag or provide the fixture information as it would be shown on the Light Fixture Schedule?

Note: This is a total of 82 Fixtures.

**Response:** Bid per revised contract drawings FAC-JS-4708-E1, -E44, -E45, -E46, -E49, -E52, and -E55 included herein.

**The following changes shall be made to the contract documents:**

24. Connect 4708B-AH1-SAF VFD serial connection to Card 4, serial port" SP4". Label SP4 as "B-AH1-SA\_VFD"
25. On sheet UCS13, replace the field device "SK DP2/SPP1" with "SK ISW2" for "DI" point 4708C-AH1-SAF on existing panel 4708B-UCS0001, card 1, channel UI2.
26. Change all field devices listed as "SK ISW1" to "SK ISW2" on all applicable UCS wiring details. See SK ISW2 (attached).

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
	PANELBOARD (SURFACE MOUNTED)
	TRANSFORMER
	NON - FUSED DISCONNECT SWITCH
	SEPARATELY ENCLOSED CIRCUIT BREAKER
	FUSED DISCONNECT SWITCH, UPPER NUMBER INDICATES SWITCH SIZE, LOWER NUMBER INDICATES FUSE SIZE, CENTER NUMBER INDICATES NUMBER OF POLES
	MOTOR (SUBSCRIPT INDICATES HORSEPOWER)
	MAGNETIC MOTOR STARTER
	COMBINATION MAGNETIC MOTOR STARTER CB-CIRCUIT BREAKER, F-FUSED, NF-NON FUSED
	VARIABLE FREQUENCY DRIVE
	JUNCTION BOX
	PUSHBUTTON CONTROL STATION
	SLASHES INDICATES NUMBER OF WIRES, LONGER SLASH INDICATES GROUND CONDUCTOR, INDICATES ISOLATED GROUND CONDUCTOR, ALL WIRE #12, UNLESS OTHERWISE NOTED OR SPECIFIED
	BRANCH CIRCUIT HOME RUN TO PANEL BOARD, NUMBER OF ARROWS INDICATES NUMBER OF CIRCUITS, NUMERAL AT EACH ARROW IDENTIFIES CIRCUIT NUMBER
	CONDUIT TURNED UP
	CONDUIT TURNED DOWN
	CONDUIT CONCEALED IN CEILING OR WALL
	CONDUIT CONCEALED IN FLOOR
	CONDUIT EXPOSED
	CONTROL CONDUIT
	LIGHTING FIXTURE DESIGNATION, A CAPITAL LETTER IN SYMBOL INDICATES FIXTURE TYPE
	BARE LAMP FLUORESCENT STRIP OR INDUSTRIAL TYPE FLUORESCENT FIXTURE
	BARE LAMP FLUORESCENT STRIP OR INDUSTRIAL TYPE FLUORESCENT FIXTURE, SHADED LIGHT INDICATES EMERGENCY CIRCUIT
	WALL MOUNTED LIGHTING FIXTURE
	DUCT SMOKE DETECTOR, SEE NOTE 3

ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
	RECESS MOUNTED FLUORESCENT LIGHT FIXTURE
	SURFACE MOUNTED FLUORESCENT LIGHT FIXTURE
	EMERGENCY LIGHT FIXTURE PROVIDED WITH BATTERY BACKED BALLAST
	RECESSED DOWN LIGHT FIXTURE
	CEILING MOUNTED OCCUPANCY SENSOR
	CEILING MOUNTED HALLWAY OCCUPANCY SENSOR
	WALL SWITCH OCCUPANCY SENSOR
	DIGITAL TIMER WALL SWITCH
	MOTOR RATED TOGGLE SWITCH WITH AUXILIARY CONTACT
	SINGLE POLE TOGGLE SWITCH, SUBSCRIPT INDICATES FIXTURES CONTROLLED BY SWITCH, MOUNT 48 INCHES A.F.F. UNLESS NOTED OTHERWISE.
	PHOTO ELECTRIC CELL, MOUNTING AS NOTED
	INDICATES NOTE, NUMERAL IN SYMBOL INDICATES NOTE ORDER
	DETAIL REFERENCE, UPPER NUMBER INDICATES DETAIL NUMBER, LOWER LEFT INDICATES REFERENCE PLAN DRAWING NUMBER, LOWER RIGHT INDICATES DRAWING NUMBER ON WHICH DETAIL APPEARS
	EXISTING SMOKE DETECTOR
	EXISTING SPEAKER
	EXISTING MOTION SENSING DOOR SWITCH

ELECTRICAL LEGEND	
ABBREVIATIONS	
SYMBOL	DESCRIPTION
A_AMP	AMPERE
AFF	ABOVE FINISHED FLOOR
BLDG	BUILDING
C	CONDUIT
COTR	CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE
CU	COPPER
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
ELEV	ELEVATOR
ENGR	ENGINEER
EX	EXISTING
FAR	FUSE AS REQUIRED
FBO	FURNISH BY OTHERS
JB	JUNCTION BOX
KVA	KILOVOLT AMPERE
KW	KILOWATT
LTG	LIGHTING
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUG ONLY
MTD	MOUNTED
MTG	MOUNTING
MTG HT	MOUNTING HEIGHT
MTR	MOTOR
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NIC	NOT IN CONTRACT
NEC	NATIONAL ELECTRICAL CODE
NTS	NOT TO SCALE
OC	ON CENTER
PB	PUSHBUTTON
PH	PHASE
PNL	PANEL
SW	SWITCH
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLT
WP	WEATHERPROOF

**LEGEND GENERAL NOTES:**

- ALL MOUNTING HEIGHTS INDICATED IN THE LEGEND AND ELSEWHERE ON THE ELECTRICAL DRAWINGS SHALL BE MEASURED TO THE BOTTOM OF THE DEVICE, EQUIPMENT, ETC., UNLESS OTHERWISE NOTED.
- SYSTEMS CONDUITS SHALL FOLLOW THE SAME SYMBOLOGY AS BRANCH CIRCUIT CONDUITS WITH RESPECT TO INSTALLATION METHODS.
- PROVIDE DUCT SMOKE DETECTOR AND CONNECT TO NEAREST EXISTING INITIATING DEVICE LOOP, PROVIDE FOR REPROGRAMMING CONTROL PANEL FOR NEW DEVICES, SMOKE DETECTORS PROVIDED BY ELECTRICAL AND INSTALLED BY MECHANICAL, INTERLOCK DETECTOR WITH AHU TO SHUT DOWN UNIT IN THE EVENT OF ALARM.

**GENERAL PROJECT ELECTRICAL NOTES:**

- INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF NFPA 70-2011 AND APPLICABLE STATE AND LOCAL CODES.
- ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE. CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ACTUAL ARRANGEMENT WITH OTHER TRADES. WHERE SPECIFICALLY DIMENSIONED CONTRACTOR SHALL ATTEMPT TO MAINTAIN THE DIMENSIONS NOTED EXCEPT WHERE CONFLICTS MAY EXIST BETWEEN THE STRUCTURAL AND OTHER UTILITIES. ADJUST LOCATION TO COORDINATE WITH OTHER TRADES.
- WHERE MANUFACTURER'S AND MODELS ARE INDICATED ON PLANS, THESE PROVIDE ONLY A MINIMUM LEVEL OF QUALITY AND ARE NOT NECESSARILY INTENDED AS PROPRIETARY SPECIFICATIONS. REFER TO DIVISION 26-28 SPECIFICATIONS FOR SUBSTITUTION PROVISIONS AND PROCEDURES. THE ITEMS NOTED ARE USED AS A DESIGN BASIS THROUGHOUT THE DOCUMENTS AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONFLICTS WITH OTHER TRADES AND WIRING CHANGES RESULTING FROM SUBSTITUTIONS.
- CONTRACTOR SHALL FIELD VERIFY AND COORDINATE CIRCUIT ROUTING AS REQUIRED TO MEET SCHEMATIC INTENT OF THE PLANS.
- PROVIDE ADDITIONAL SUPPORTS FOR SWITCHES, STARTERS, RACEWAYS AND OTHER ELECTRICAL EQUIPMENT WHERE BUILDING STRUCTURE IS NOT SUITABLE FOR DIRECT MOUNTING.
- ALL EXISTING EXIT SIGNS TO REMAIN UNLESS OTHERWISE NOTED.

**GENERAL ELECTRICAL DEMOLITION NOTES:**

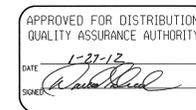
- GENERAL: DEMOLITION DRAWINGS ARE BASED UPON CASUAL FIELD OBSERVATION AND EXISTING RECORD DRAWINGS. THE CONTRACTOR SHALL VERIFY ACTUAL FIELD CONDITIONS PRIOR TO BEGINNING ANY DEMOLITION WORK. ANY DISCREPANCIES SHALL BE REPORTED TO AND RESOLVED WITH THE COTR. BEGINNING OF WORK MEANS THAT THE CONTRACT ACCEPTS EXISTING CONDITIONS.
- INTERRUPTIONS OF SERVICES: COORDINATE AND SCHEDULE INTERRUPTIONS OF SERVICES AND SYSTEMS WITH COTR. MINIMIZE OUTAGES AND DISRUPTIONS OF SERVICES TO ADJACENT AREAS. MAKE PROVISIONS FOR TEMPORARY SERVICES AND CONNECTIONS TO KEEP CIRCUITS AND SYSTEMS IN AREAS ADJACENT TO DEMOLITION OPERATIONAL.
- DISPOSITION OF MATERIALS OF DEMOLITION: WHERE NOTED ON PLANS TO RETURN ITEMS TO THE GOVERNMENT, TAKE CARE TO PROTECT, LABEL AND REMOVE EQUIPMENT TO AVOID DAMAGE SUCH THAT IT IS SUITABLE FOR REUSE. PALLETIZE ITEMS TO BE TURNED OVER TO GOVERNMENT AND LOCATE FOR STORAGE AS DIRECTED BY THE COTR. ALL OTHER MATERIALS OF DEMOLITION SHALL BE REMOVED AND DISPOSED OF PROPERLY OFF SITE BY THE CONTRACTOR IN ACCORDANCE WITH ALL LAWS AND ORDINANCES. THE CONTRACTOR SHALL INCLUDE ALL FEES, PERMITS AND COSTS OF DISPOSITION OF DEMOLISHED MATERIALS IN HIS PRICE, INCLUDING FLUORESCENT AND HID LAMPS CONTAINING MERCURY.
- EXTENT OF DEMOLITION:
  - REMOVE EXISTING INSTALLATIONS TO ACCOMMODATE REQUIREMENTS FOR NEW CONSTRUCTION. COMPLETELY REMOVE ALL ACCESSORIES, BRACKETS, SUPPORTS, HANGERS, WIRE, CONDUIT, DEVICES, ETC., UNLESS OTHERWISE INDICATED TO REMAIN.
  - REMOVE ABANDONED WIRING TO SOURCE OF SUPPLY. REMOVE EXPOSED ABANDONED CONDUIT, INCLUDING ABANDONED CONDUIT ABOVE ACCESSIBLE CEILING FINISHES. CUT CONDUIT FLUSH WITH WALLS AND FLOORS, AND PATCH SURFACES.
  - WHERE JUNCTIONS, BOXES, OUTLETS, ETC. REMAIN TO SERVE "THROUGH" CIRCUITS, PROVIDE BLANK COVER AND IDENTIFY.
  - DISCONNECT AND REMOVE ELECTRICAL DEVICES AND EQUIPMENT SERVING UTILIZATION EQUIPMENT THAT HAS BEEN REMOVED.
- CLEANING AND REPAIR:
  - REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION WORK.
  - CLEAN AND REPAIR EXISTING MATERIAL AND EQUIPMENT WHICH REMAIN OR ARE TO BE REUSED.
  - PROVIDE TYPED CIRCUIT DIRECTORY SHOWING REVISED CIRCUITING ARRANGEMENT.

**LIGHT FIXTURE SCHEDULE**

FIXTURE TAG	LAMP TYPE/NUMBER				LAMP	VOLTAGE		MANUFACTURER	BASIS OF DESIGN	LENS	MOUNTING			NOTES	
	HALOGEN	HID	INCAND.	FLUOR.		277	120				RECESSED	SUSPENDED	SURFACE		
C1				2	F32T8	1		LITHONIA #AF 2 32 MVOLT		NONE		X			2 LAMP INDUSTRIAL
C1E				2	F32T8	1		LITHONIA #AF 2 32 MVOLT		NONE		X			C1 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
D1				2	28TRT	1		LITHONIA #LFBN 2/26-42TRT F803A MVOLT		NONE		X			8" OPEN DOWNLIGHT
R1				2	F32T8	1		LITHONIA #2SP G 2 32 A12 MVOLT		ACRYLIC		X			2 LAMP RECESSED LENSED
R1E				2	F32T8	1		LITHONIA #2SP G 2 32 A12 MVOLT		ACRYLIC		X			R1 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
R2				3	F32T8	1		LITHONIA #2SP G 3 32 A12 MVOLT		ACRYLIC		X			3 LAMP RECESSED LENSED
R2E				3	F32T8	1		LITHONIA #2SP G 3 32 A12 MVOLT		ACRYLIC		X			R2 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
R3				4	F32T8	1		LITHONIA #2SP G 4 32 A12 MVOLT		ACRYLIC		X			4 LAMP RECESSED LENSED
R5				3	F32T8	1		LITHONIA #2PM4 G 3 32 18LD MVOLT		PARABOLIC		X			3 LAMP 18 CELL PARABOLIC
R7				3	F32T8	1		LITHONIA #2WRT G 3 T8 A12125 MVOLT		ACRYLIC		X			3 LAMP RECESSED LENSED FIXTURE - PROVIDE TRIPLE GASKETING.
R7E				3	F32T8	1		LITHONIA #2WRT G 3 T8 A12125 MVOLT		ACRYLIC		X			R7 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
R8				2	F32T8	1		LITHONIA #2PM4 G 2 32 18LD MVOLT		ACRYLIC		X			2 LAMP RECESSED LENSED WITH DIMMABLE BALLAST
R8E				2	F32T8	1		LITHONIA #2PM4 G 2 32 18LD MVOLT		ACRYLIC		X			R8 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
S2				3	F32T8	1		LITHONIA #2M 3 32 A12 MVOLT		ACRYLIC			X		3 LAMP SURFACE LENSED
S2E				3	F32T8	1		LITHONIA #2M 3 32 A12 MVOLT		ACRYLIC			X		S2 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
S3				4	F32T8	1		LITHONIA #2M 4 32 A12 MVOLT		ACRYLIC			X		4 LAMP SURFACE LENSED
S4				2	F32T8	1		LITHONIA #AW 2 32 MVOLT		ACRYLIC			X		2 LAMP WRAPAROUND
S4E				2	F32T8	1		LITHONIA #AW 2 32 MVOLT		ACRYLIC			X		S4 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
W1				2	F32T8	1		LITHONIA #UNS 2 32 MVOLT		NONE		X	X		2 LAMP STRIP
W1E				2	F32T8	1		LITHONIA #UNS 2 32 MVOLT		NONE		X	X		W1 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
W2				2	F32T8	1		LITHONIA #WP 2 32 MVOLT		ACRYLIC			X		2 LAMP STAIRWELL
W2E				2	F32T8	1		LITHONIA #WP 2 32 MVOLT		ACRYLIC			X		W2 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
W3				1	42WTRT	1		LITHONIA #TWAC 42TRT		POLYCARBONITE			X		EGRESS WALL PACK
S5				2	42W	1		LITHONIA #VR4 42TRT MVOLT		POLYCARBONATE			X		EGRESS CEILING
R4				2	F32T8	1		LITHONIA #2PM4 G 2 32 12LD MVOLT		PARABOLIC		X			2 LAMP 12 CELL PARABOLIC
R5E				3	F32T8	1		LITHONIA #2PM4 G 3 32 18LD MVOLT		PARABOLIC		X			R5 EMERGENCY FIXTURE - PROVIDE WITH EMERGENCY BALLAST
Y1	2				20W	1		LITHONIA #ELM654 H2006 TD SD					X		UNIT EMERGENCY LIGHT
A				2	F32T8	1		COLUMBIA #ST824-232G-FSA19-EU		ACRYLIC		X			EXISTING FIXTURE TO BE RELOCATED
AE				2	F32T8	1		COLUMBIA #ST824-232G-FSA19-EU		ACRYLIC		X			A EMERGENCY FIXTURE - PROVIDE WITH NEW EMERGENCY BALLAST
D				2	F32T8	1		COLUMBIA #LS4-232-EU		NONE			X		EXISTING FIXTURE TO BE RELOCATED
E				3	F32T8	1		COLUMBIA #ST824-332G-FSA19-3EU		ACRYLIC		X			EXISTING FIXTURE TO BE RELOCATED
EE				3	F32T8	1		COLUMBIA #ST824-332G-FSA19-3EU		ACRYLIC		X			E EMERGENCY FIXTURE - PROVIDE WITH NEW EMERGENCY BALLAST
G				2	F17T8	1		COLUMBIA #ST822-217G-FSA19-EU-FO735		ACRYLIC		X			EXISTING FIXTURE TO BE RELOCATED

**KEYED NOTES:**

- INSTALL FIXTURES REMOVED FROM ROOM B27 FOR THIS TYPE.
- PROVIDE ELECTRONIC DIMMING BALLAST EQUIVALENT TO ADVANCE MARK 10 POWERLINE.



BWS&C FILE NO. 33865-36

REV.	BY	DATE	REVISION	C.I. NO.	APPROVED
1	DMS	1-27-12	FIXTURE TYPE REVISIONS		
2	DMS	1-27-12	ORIGINAL ISSUE		

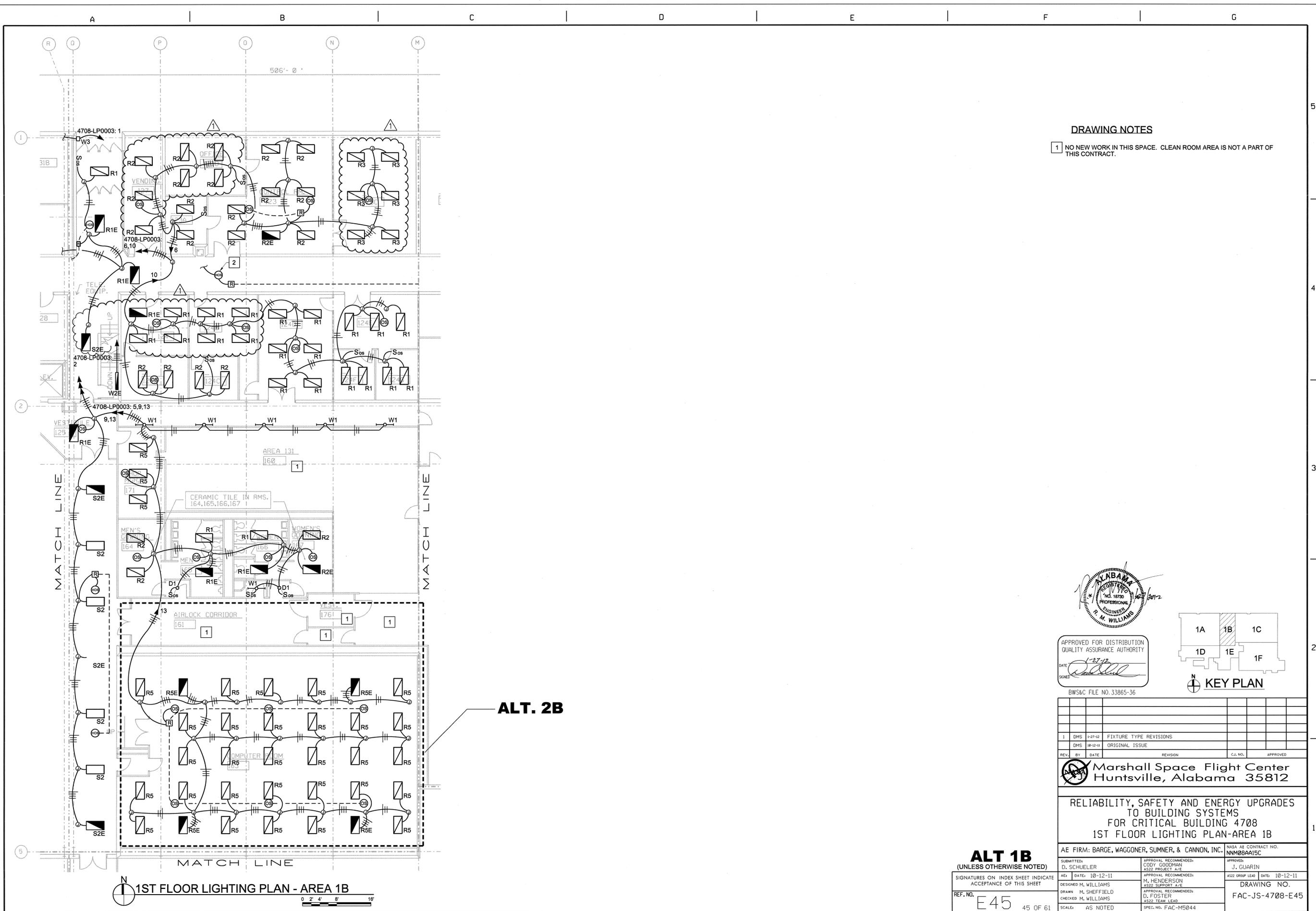
**RELIABILITY, SAFETY AND ENERGY UPGRADES TO BUILDING SYSTEMS FOR CRITICAL BUILDING 4708 ELECTRICAL GENERAL NOTES AND LEGEND**

AE FIRM: BARGE, WAGGONER, SUMNER, & CANNON, INC.		NASA AE CONTRACT NO. NNM08AA15C	
SUBMITTED BY: D. SCHUELER	APPROVAL RECOMMENDED: CODY GOODMAN AS22 PROJECT A/E	APPROVED: J. GUARIN	AS22 GROUP LEAD DATE: 10-12-11
DESIGNED BY: M. WILLIAMS	APPROVAL RECOMMENDED: M. HENDERSON AS22 SUPPORT A/E	DRAWING NO. FAC-JS-4708-E1	
CHECKED BY: M. SHEFFIELD	APPROVAL RECOMMENDED: D. FOSTER AS22 TEAM LEAD		
SCALE: AS NOTED	SPEC. NO. FAC-MS044		

SIGNATURES ON INDEX SHEET INDICATE ACCEPTANCE OF THIS SHEET

REF. NO. E1 1 OF 61





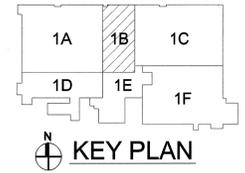
**ALT. 2B**

**DRAWING NOTES**

- 1 NO NEW WORK IN THIS SPACE. CLEAN ROOM AREA IS NOT A PART OF THIS CONTRACT.



APPROVED FOR DISTRIBUTION  
QUALITY ASSURANCE AUTHORITY  
DATE 1-27-12  
SIGNED [Signature]



BWS&C FILE NO. 33865-36

REV.	BY	DATE	REVISION	C.L. NO.	APPROVED
1	DMS	11-27-12	FIXTURE TYPE REVISIONS		
	DMS	10-12-11	ORIGINAL ISSUE		

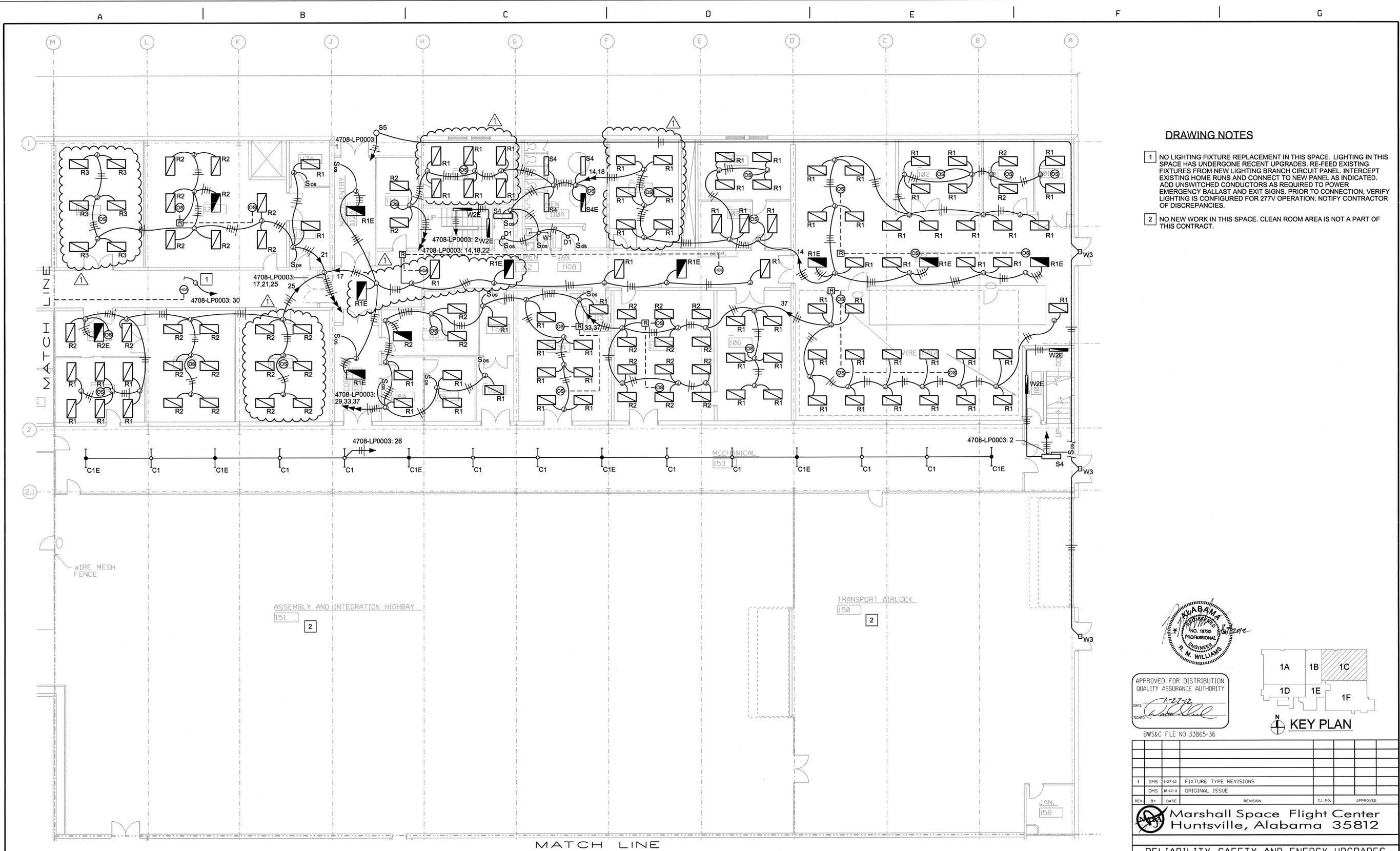
**Marshall Space Flight Center**  
Huntsville, Alabama 35812

RELIABILITY, SAFETY AND ENERGY UPGRADES  
TO BUILDING SYSTEMS  
FOR CRITICAL BUILDING 4708  
1ST FLOOR LIGHTING PLAN-AREA 1B

AE FIRM: BARGE, WAGGONER, SUMNER, & CANNON, INC.	NASA AE CONTRACT NO. NN02BAA15C
SUBMITTED: D. SCHUELER	APPROVED: J. GUARIN
DESIGNED: M. WILLIAMS	DATE: 10-12-11
CHECKED: M. WILLIAMS	DRAWING NO. FAC-JS-4708-E45
SCALE: AS NOTED	SPEC. NO. FAC-M5044

**ALT 1B**  
(UNLESS OTHERWISE NOTED)  
SIGNATURES ON INDEX SHEET INDICATE ACCEPTANCE OF THIS SHEET  
REF. NO. **E45** 45 OF 61

**1ST FLOOR LIGHTING PLAN - AREA 1B**

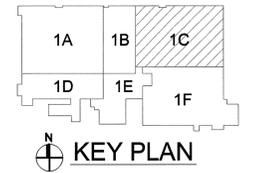


**DRAWING NOTES**

- 1 NO LIGHTING FIXTURE REPLACEMENT IN THIS SPACE. LIGHTING IN THIS SPACE HAS UNDERGONE RECENT UPGRADES. RE-FEED EXISTING FIXTURES FROM NEW LIGHTING BRANCH CIRCUIT PANEL. INTERCEPT EXISTING HOME RUNS AND CONNECT TO NEW PANEL AS INDICATED. ADD UNSWITCHED CONDUCTORS AS REQUIRED TO POWER EMERGENCY BALLAST AND EXIT SIGNS. PRIOR TO CONNECTION, VERIFY LIGHTING IS CONFIGURED FOR 277V OPERATION. NOTIFY CONTRACTOR OF DISCREPANCIES.
- 2 NO NEW WORK IN THIS SPACE. CLEAN ROOM AREA IS NOT A PART OF THIS CONTRACT.



APPROVED FOR DISTRIBUTION  
 QUALITY ASSURANCE AUTHORITY  
 DATE: 1-27-12  
 SIGNED: [Signature]



BWS&C FILE NO. 33865-36

REV.	BY	DATE	REVISION	C.I. NO.	APPROVED
1	DMS	1-27-12	FIXTURE TYPE REVISIONS		
	DMS	10-12-11	ORIGINAL ISSUE		

**Marshall Space Flight Center**  
 Huntsville, Alabama 35812

RELIABILITY, SAFETY AND ENERGY UPGRADES  
 TO BUILDING SYSTEMS  
 FOR CRITICAL BUILDING 4708  
 1ST FLOOR LIGHTING PLAN-AREA 1C

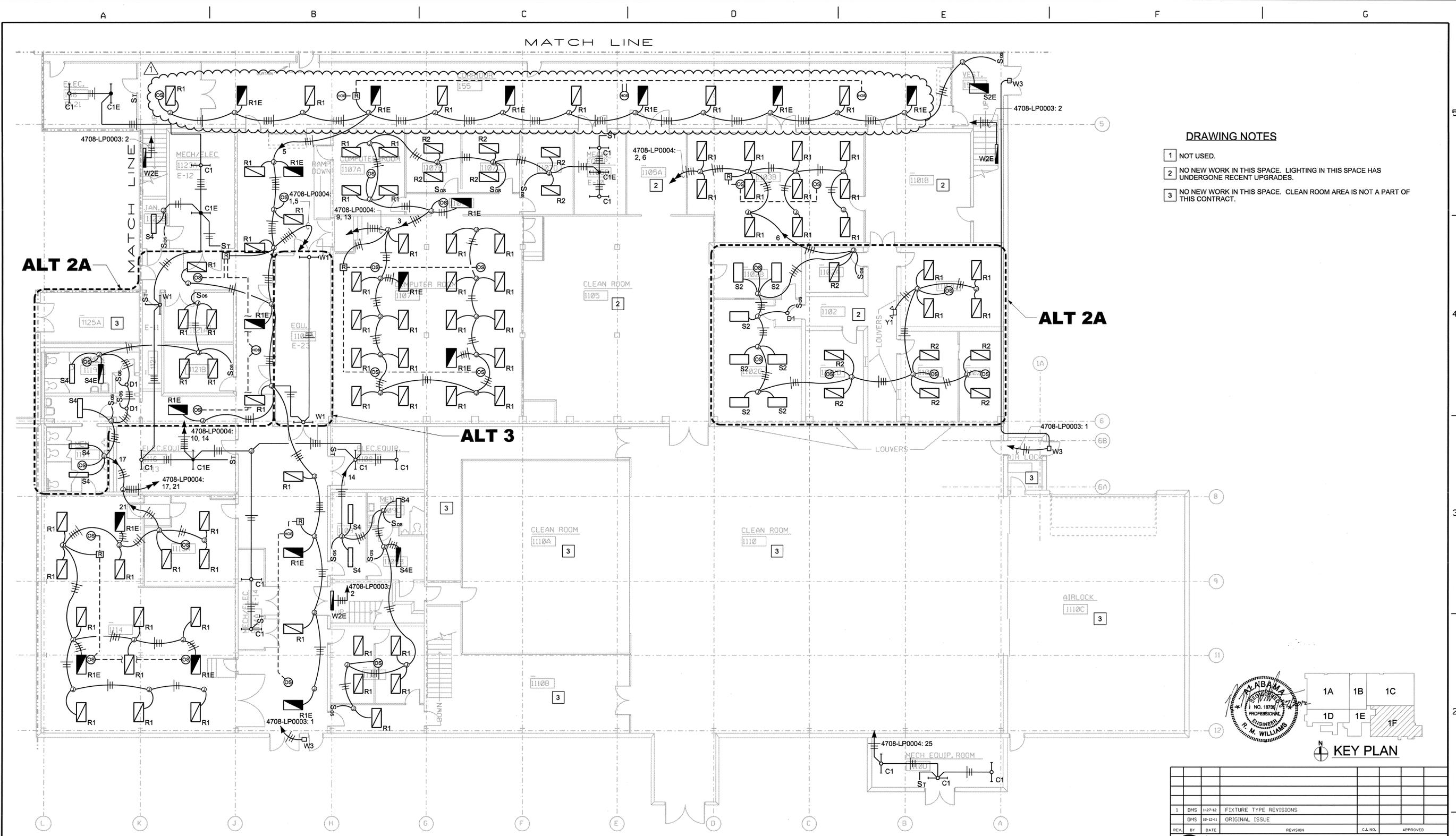
AE FIRM: BARGE, WAGGONER, SUMNER, & CANNON, INC.		NASA AE CONTRACT NO. NNM08AA15C	
SUBMITTED: D. SCHUELER	APPROVAL RECOMMENDED: CODY GOODMAN AS22 PROJECT A/E	APPROVED: J. GUARIN	
DESIGNED M. WILLIAMS	APPROVAL RECOMMENDED: M. HENDERSON AS22 SUPPORT A/E	AS22 GRMP LEAD DATE: 10-12-11	
DRAWN M. SHEFFIELD	APPROVAL RECOMMENDED: D. FOSTER AS22 TEAM LEAD	DRAWING NO. FAC-JS-4708-E46	
CHECKED M. WILLIAMS	SCALE: AS NOTED	SPEC. NO. FAC-M5044	

**1ST FLOOR LIGHTING PLAN - AREA 1C**  
 0' 2' 4' 8' 16'

**ALT 1B**  
 (UNLESS OTHERWISE NOTED)

SIGNATURES ON INDEX SHEET INDICATE ACCEPTANCE OF THIS SHEET

REF. NO. **E46** 46 OF 61



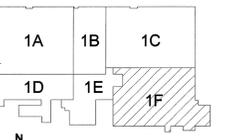
**DRAWING NOTES**

- 1 NOT USED.
- 2 NO NEW WORK IN THIS SPACE. LIGHTING IN THIS SPACE HAS UNDERGONE RECENT UPGRADES.
- 3 NO NEW WORK IN THIS SPACE. CLEAN ROOM AREA IS NOT A PART OF THIS CONTRACT.

**ALT 2A**

**ALT 2A**

**ALT 3**



**KEY PLAN**

**1ST FLOOR LIGHTING PLAN - AREA 1F**



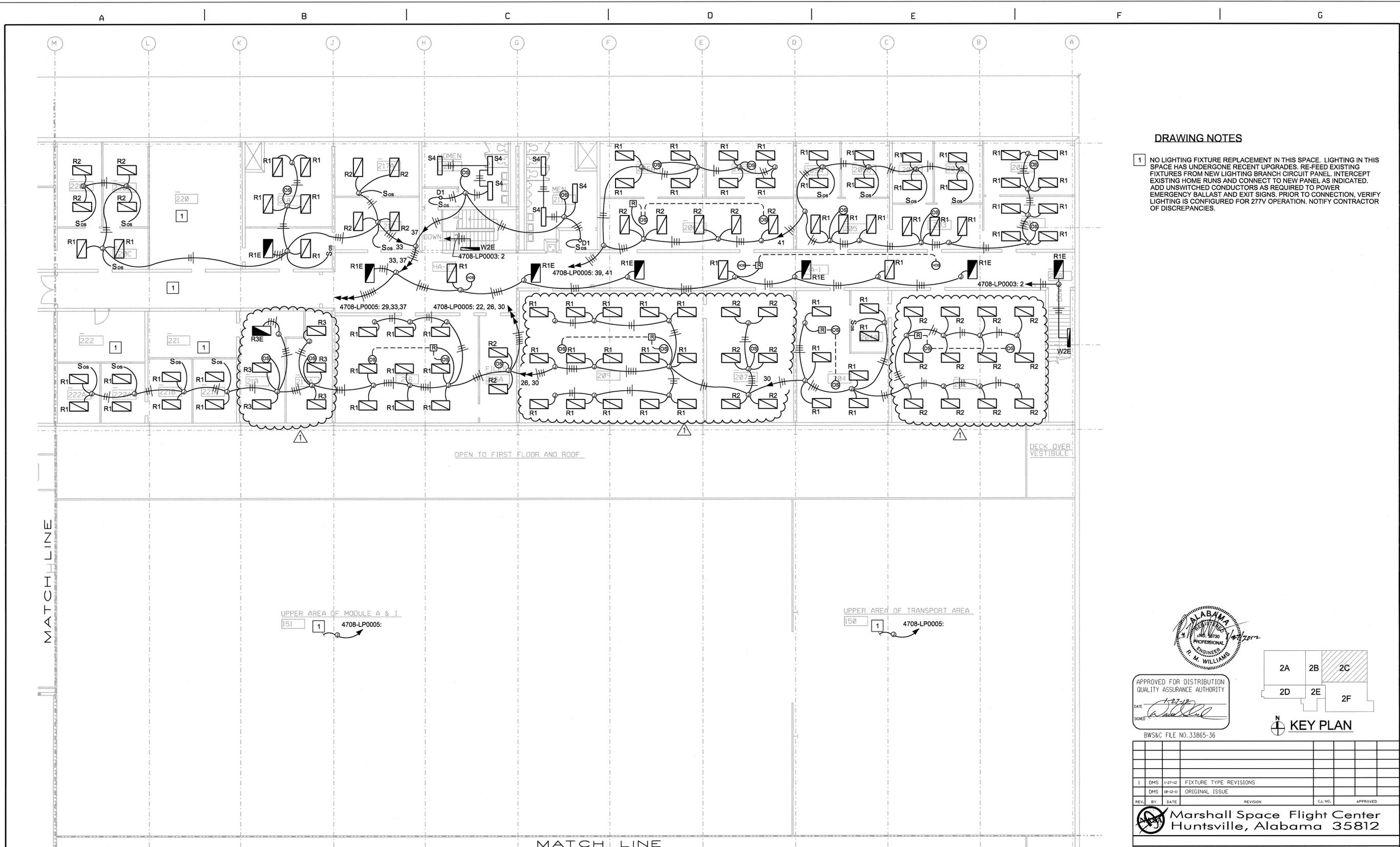
**ALT 2B**  
(UNLESS OTHERWISE NOTED)  
APPROVED FOR DISTRIBUTION  
QUALITY ASSURANCE AUTHORITY  
DATE: 1-27-12  
SIGNATURE: [Signature]

BWS&C FILE NO. 33865-36  
SIGNATURES ON INDEX SHEET INDICATE ACCEPTANCE OF THIS SHEET  
REF. NO. **E49** 49 OF 61

REV.	BY	DATE	REVISION	C.I. NO.	APPROVED
1	DMS	1-27-12	FIXTURE TYPE REVISIONS		
	DMS	10-12-11	ORIGINAL ISSUE		

 <b>Marshall Space Flight Center</b> Huntsville, Alabama 35812	
<b>RELIABILITY, SAFETY AND ENERGY UPGRADES TO BUILDING SYSTEMS FOR CRITICAL BUILDING 4708 1ST FLOOR LIGHTING PLAN-AREA 1F</b>	
AE FIRM: BARGE, WAGGONER, SUMNER, & CANNON, INC.	NASA AE CONTRACT NO. NNM06AA15C
SUBMITTED: D. SCHUELER	APPROVED: J. GUARIN
DESIGNED: M. WILLIAMS	DATE: 10-12-11
DRAWN: M. SHEFFIELD	ASST GROUP LEAD
CHECKED: M. WILLIAMS	DRAWING NO. FAC-JS-4708-E49
SCALE: AS NOTED	SPEC. NO. FAC-M5044



**DRAWING NOTES**

1 NO LIGHTING FIXTURE REPLACEMENT IN THIS SPACE. LIGHTING IN THIS SPACE HAS UNDERGONE RECENT UPGRADES. RE-FEED EXISTING FIXTURES FROM NEW LIGHTING BRANCH CIRCUIT PANEL. INTERCEPT EXISTING HOME RUNS AND CONNECT TO NEW PANEL AS INDICATED. ADD UNSWITCHED CONDUCTORS AS REQUIRED TO POWER EMERGENCY BALLAST AND EXIT SIGNS. PRIOR TO CONNECTION, VERIFY LIGHTING IS CONFIGURED FOR 277V OPERATION. NOTIFY CONTRACTOR OF DISCREPANCIES.

MATCH LINE

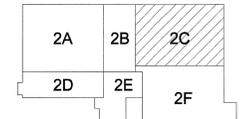
**2ND FLOOR LIGHTING PLAN - AREA 2C**

0 2' 4' 8' 16'



APPROVED FOR DISTRIBUTION  
QUALITY ASSURANCE AUTHORITY

DATE: 10-12-11  
SIGNED: [Signature]



**KEY PLAN**

BWS&C FILE NO. 33865-36

REV.	BY	DATE	REVISION	C.I. NO.	APPROVED
1	DMS	11-27-11	FIXTURE TYPE REVISIONS		
	DMS	10-12-11	ORIGINAL ISSUE		

**Marshall Space Flight Center**  
Huntsville, Alabama 35812

**RELIABILITY, SAFETY AND ENERGY UPGRADES TO BUILDING SYSTEMS FOR CRITICAL BUILDING 4708 2ND FLOOR LIGHTING PLAN-AREA 2C**

AE FIRM: BARGE, WAGGONER, SUMNER, & CANNON, INC.		NASA AE CONTRACT NO. NNM28A015C
SUBMITTED: D. SCHUELER	APPROVAL RECOMMENDED: CODY GOODMAN	APPROVED: J. GUARIN
AG: DATE: 10-12-11	APPROVAL RECOMMENDED: M. HENDERSON	4708 GROUP LEAD DATE: 10-12-11
DRAWN: M. WILLIAMS	APPROVAL RECOMMENDED: D. FOSTER	DRAWING NO. FAC-JS-4708-E52
CHECKED: M. WILLIAMS	APPROVAL RECOMMENDED: AS22 TEAM LEAD	
SCALE: AS NOTED	SPEC. NO. FAC-M5044	

**ALT 1A**  
(UNLESS OTHERWISE NOTED)

SIGNATURES ON INDEX SHEET INDICATE ACCEPTANCE OF THIS SHEET

REF. NO. **E52** 52 OF 61

MATCH LINE

DECK OVER CORRIDOR  
HA-13

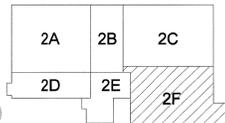
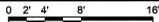
OPEN TO  
1ST FLOOR

MATCH LINE

OPEN TO 1ST FLOOR  
MECH/EQU

HIGH BAY AREA

2ND FLOOR LIGHTING PLAN - AREA 2F



KEY PLAN

1	DMS	11-27-12	FIXTURE TYPE REVISIONS		
	DMS	10-12-11	ORIGINAL ISSUE		
REV.	BY	DATE	REVISION	C.I. NO.	APPROVED

Marshall Space Flight Center  
Huntsville, Alabama 35812

RELIABILITY, SAFETY AND ENERGY UPGRADES  
TO BUILDING SYSTEMS  
FOR CRITICAL BUILDING 4708  
2ND FLOOR LIGHTING PLAN-AREA 2F

AE FIRM: BARGE, WAGGONER, SUMNER, & CANNON, INC. NASA AE CONTRACT NO. NNM08AA15C

SUBMITTED: D. SCHUELER	APPROVAL RECOMMENDED: CODY GOODMAN AS22 PROJECT A/E	APPROVED: J. GUARIN
DESIGNED M. WILLIAMS	APPROVAL RECOMMENDED: M. HENDERSON AS22 SUPPORT A/E	AS22 GROUP LEAD DATE: 10-12-11
DRAWN M. SHEFFIELD	APPROVAL RECOMMENDED: D. FOSTER AS22 TEAM LEAD	DRAWING NO. FAC-JS-4708-E55
CHECKED M. WILLIAMS	SPEC. NO. FAC-M5044	

**ALT 2A**  
(UNLESS OTHERWISE NOTED)  
APPROVED FOR DISTRIBUTION  
QUALITY ASSURANCE AUTHORITY  
DATE: 10-12-11  
SIGNED: [Signature]

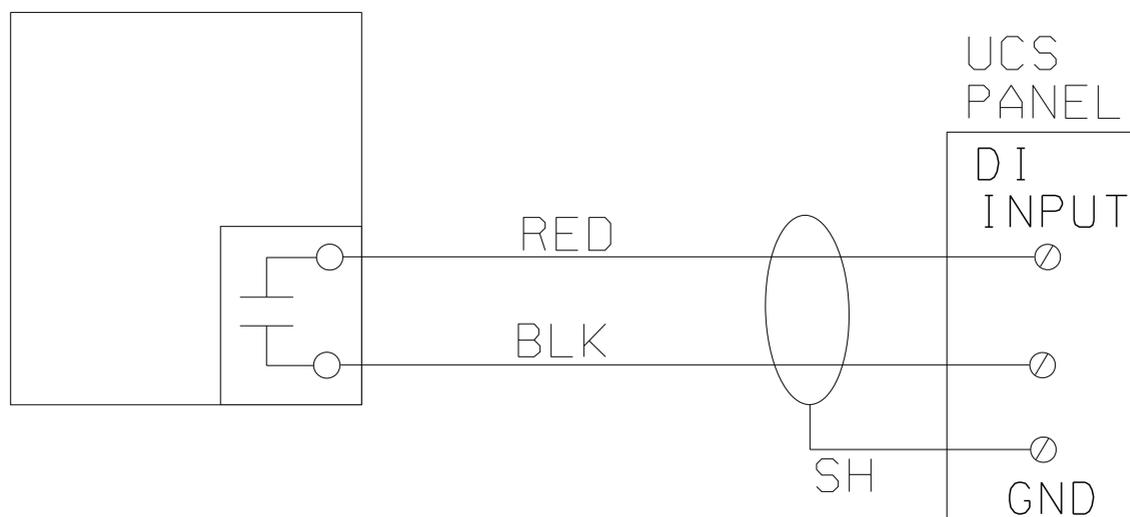
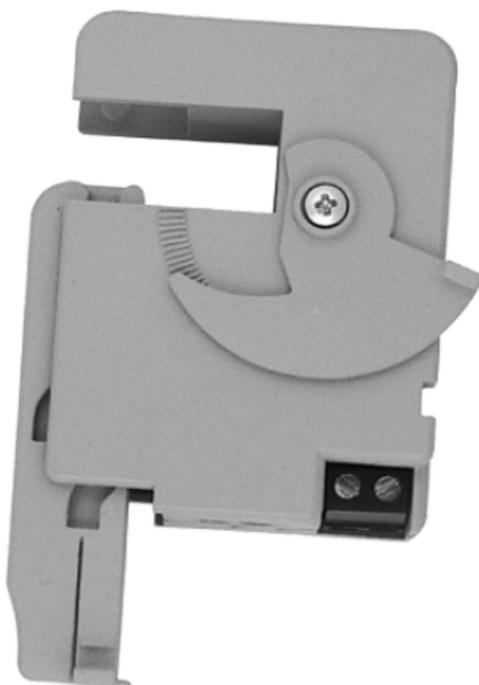
BWS&C FILE NO. 33865-36  
SIGNATURES ON INDEX SHEET INDICATE ACCEPTANCE OF THIS SHEET  
REF. NO. E55 55 OF 61

# CURRENT OPERATED SWITCH

## TECHNICAL DATA

CURRENT RANGE: .75-150 AMPS  
 TYPE: SPLIT CORE  
 THRESHOLD: FIXED, .75 AMPS  
 MAX SENSE VOLTAGE: 600 VAC  
 SWITCH: SOLID STATE, SPST; 30 VAC/DC  
 OUTPUT: 0.4 AMPS MAX  
 OPERATING TEMPERATURE: -30 TO 140°F  
 LED: OVER TRIP POINT

NOTE: THIS DEVICE SHALL BE A FUNCTIONAL DEVICES INC. P/N RIBXGTFL  
 PH# 800-888-5538 OR sales@FunctionalDevices.com



## WIRING DIAGRAM



NAME: \_\_\_\_\_

