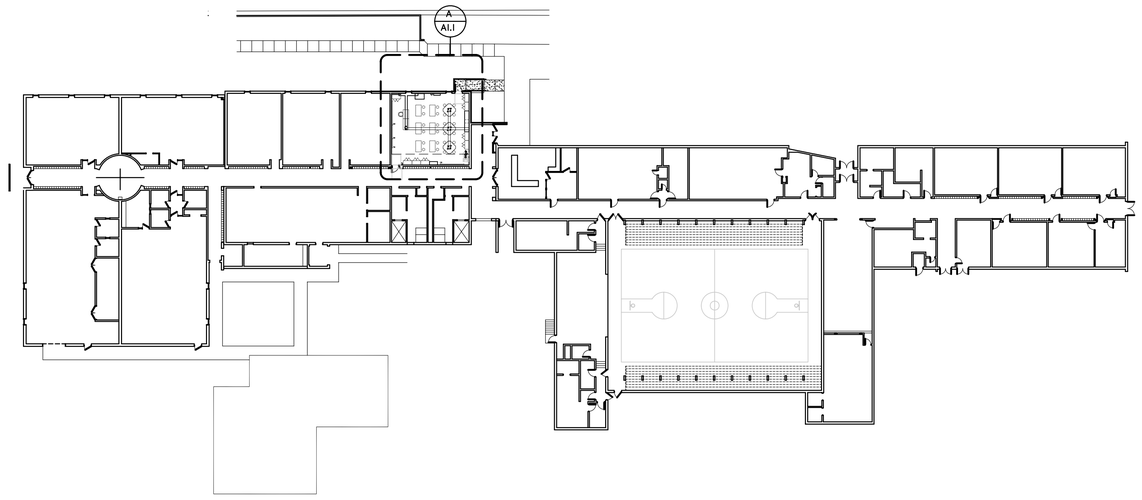
UDALL HIGH SCHOOL

UNIFIED SCHOOL DISTRICT #463 - UDALL, KANSAS



A OVERALL FLOOR PLAN
SCALE: 1/32" = 1'-0"
NORTH

SYMBOLS INDEX

NAME / 148	ROOM NUMBER	A	COLUMN GRID INDICATOR
148a	DOOR NUMBER		ELEVATION TARGET
1	WALL TYPE, REFER TO SHEET A1.0	1	EQUIPMENT DESIGNATION
1	WINDOW FRAME TYPE.		
1 / A4.1	WALL SECTION NUMBER / SHEET NUMBER		METAL STUD, SIZE AS NOTED.
1 / A4.1	BUILDING SECTION NUMBER / SHEET NUMBER		WOOD STUD, SIZE AS NOTED.
1 / A3.1	DETAIL NUMBER / SHEET NUMBER		WOOD STUD BLOCKING, SIZE AS NOTED.
1 / A6.1 / B	INTERIOR ELEVATION NUMBER / SHEET NUMBER	1 / A4.1	ELEVATION VIEW, NUMBER / SHEET NUMBER
	PLYWOOD, THICKNESS AS NOTED		COMPACT FILL
	CONCRETE, SECTION		WOOD, DETAIL
	BRICK		STEEL
	CONCRETE MASONRY UNIT		ALUMINUM
	METAL STUD WALL		GYPSUM WALLBOARD
	BATT INSULATION, THICKNESS VARIES		RIGID INSULATION

ABBREVIATIONS

A.D.A.	AMERICAN DISABILITIES ACT	H.M.	HOLLOW-METAL
A.F.F.	ABOVE FINISHED FLOOR	MTL.	METAL
ALT.	ALTERNATE	N.T.S.	NOT TO SCALE
B.U.R.	BUILT UP ROOF(ING)	P. LAM.	PLASTIC LAMINATES
C.B.	CHALKBOARD	PTD	PAINTED
CMU	CONCRETE MASONRY UNIT	REINF	REINFORCED
CONC.	CONCRETE	RM.	ROOM
C.R.	CLASSROOM	S.A.C.	SUSPENDED ACOUSTICAL CEILING
DEMO	DEMOLITION, DEMOLISH	S.C. DOOR	SOLID-CORE DOOR
DN	DOWN	SMACNA	
DS	DOWNSPOUT	S.S.	STAINLESS STEEL
ELEV.	ELEVATION	W	WITH
EXG., EXIST.	EXISTING	MB	MARKER BOARD
E.J.	EXPANSION JOINT	TB	TACK BOARD
F.E.	FIRE EXTINGUISHER	TW	TALL WARDROBE CABINET
G.W.B.	GYPSUM WALLBOARD	TS	TALL STORAGE

THE COMPLETE SET OF PLANS AND SPECIFICATIONS ARE BEING ISSUED FOR BIDS. AS SUCH, EACH BIDDER IS REQUIRED TO REVIEW THE ENTIRE SET OF DOCUMENTS FOR WORK THAT MAY BE REQUIRED/DESCRIBED OUTSIDE THE EXPECTED AREA.

INDEX TO DRAWINGS

PROJECT DIRECTORY

FUNCTION	FIRM/ADDRESS	CONTACT	PHONE / FAX
OWNER	UNIFIED SCHOOL DISTRICT #463 303 South Seymour Udall, Kansas 67146	DALE ADAMS daleadams@usd463.org	(620) 782-3623
USD 463 - FACILITIES	UNIFIED SCHOOL DISTRICT #463 303 South Seymour Udall, Kansas 67146	MARK WILSON markwilson@usd463.org	(620) 782-3623 #305
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MECHANICAL / PLUMBING ENGINEER	MECHANICAL CONCEPTS 14801 E. Timberlake Rd. Wichita, Kansas	RICHARD BOWMAN rb@richardbowman.us	(316) 733-2718
ELECTRICAL ENGINEER	INTEGRATED CONSULTING ENGINEERS 349 S. Hydraulic St., Wichita, KS	DREW ROSE drose@iconengineers.net	(316) 264-3588 (316) 264-3948 Fax

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2017
UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
UNIFIED SCHOOL DISTRICT #463

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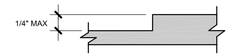
MH, GH, EE	MRH

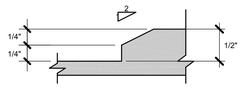
SHEET

TITLE

OF 1 SHEETS



VERTICAL CHANGES IN LEVEL



BEVELED CHANGES IN LEVELS

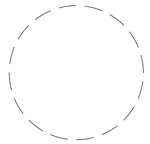
CHANGES IN LEVEL GREATER THAN 1/2" HIGH SHALL BE RAMPED, AND SHALL COMPLY WITH ADA SECTION 405 OR 406

RAMPS

2010 ADA FIGURE 303.2 & 303.3

A THRESHOLD

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

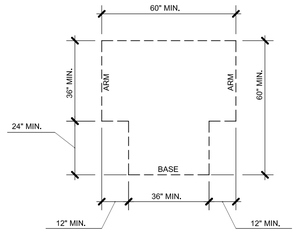


THE TURNING SPACE SHALL BE A SPACE OF 60 INCHES DIAMETER MINIMUM. THE SPACE SHALL BE PERMITTED TO INCLUDE KNEE AND TOE CLEARANCE COMPLYING WITH 306.

2010 ADA FIGURE 304.3.1

B CIRCULAR SPACE

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



2010 ADA FIGURE 304.3.2

C T-SHAPED TURNING SPACE

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

FIRE DOORS SHALL HAVE A MINIMUM OPENING FORCE ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY. THE FORCE FOR PUSHING OR PULLING OPEN A DOOR OR GATE OTHER THAN FIRE DOORS SHALL BE AS FOLLOWS.

1. INTERIOR HINGED DOORS AND GATES: 5 POUNDS (22.N) MAXIMUM
2. SLIDING OR FOLDING DOORS: 5 POUNDS (22.2 N) MAXIMUM

2010 ADA FIGURE 404.2.9

D DOOR AND GATE OPENING FORCE

SCALE: N/A

THRESHOLDS, IF PROVIDED AT DOORWAYS, SHALL BE 1/2 INCH HIGH MAXIMUM. RAISED THRESHOLDS AND CHANGES IN LEVEL AT DOORWAYS SHALL COMPLY WITH 302 AND 303.

EXCEPTION: EXISTING OR ALTERED THRESHOLDS 3/4 INCH HIGH MAXIMUM THAT HAVE A BEVELED EDGE ON EACH SIDE WITH A SLOPE NOT STEEPER THAN 1:2 SHALL NOT BE REQUIRED TO COMPLY WITH 404.2.5

2010 ADA FIGURE 404.2.5

E THRESHOLDS

SCALE: N/A

1008.1.4 FLOOR ELEVATION. THERE SHALL BE A FLOOR OR LANDING ON EACH SIDE OF A DOOR. SUCH FLOOR OR LANDING SHALL BE AT THE SAME ELEVATION ON EACH SIDE OF THE DOOR. LANDINGS SHALL BE LEVEL EXCEPT FOR EXTERIOR LANDINGS, WHICH ARE PERMITTED TO HAVE A SLOPE NOT TO EXCEED 0.25 UNIT VERTICAL IN 12 UNITS HORIZONTAL (2-PERCENT SLOPE).

IBC SECTION 1008.1.5

F FLOOR ELEVATION

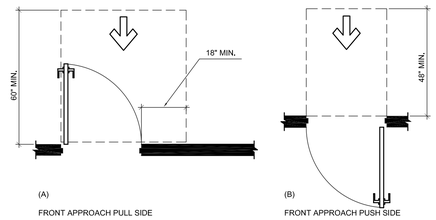
SCALE: 3/8" = 1'-0"

1008.1.5 LANDINGS AT DOORS. LANDINGS SHALL HAVE A WIDTH NOT LESS THAN THE WIDTH OF THE STAIRWAY OR THE DOOR, WHICHEVER IS GREATER. DOORS IN THE FULLY OPEN POSITION SHALL NOT REDUCE A REQUIRED DIMENSION BY MORE THAN 7 INCHES. WHEN A LANDING SERVES AN OCCUPANT LOAD OF 50 OR MORE, DOORS IN ANY POSITION SHALL NOT REDUCE THE LANDING TO LESS THAN ONE-HALF ITS REQUIRED WIDTH. LANDINGS SHALL HAVE A LENGTH MEASURED IN THE DIRECTION OF TRAVEL OF NOT LESS THAN 44 INCHES.

IBC SECTION 1008.1.6

G LANDINGS AT DOORS

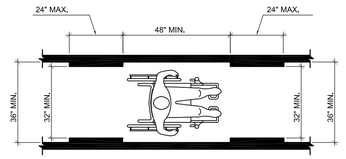
SCALE: 3/8" = 1'-0"



2010 ADA FIGURE 404.2.4.1

H MANEUVERING CLEARANCES AT MANAUAL SWINGING DOORS AND GATES

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

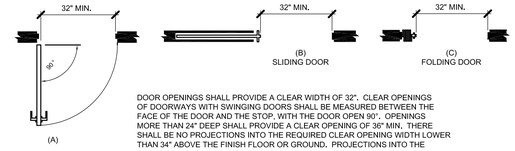


WHERE THE ACCESSIBLE ROUTE MAKES A 180 DEGREE TURN AROUND AN ELEMENT WHICH IS LESS THAN 48" WIDE, CLEAR WIDTH SHALL BE 42" MIN APPROACHING THE TURN, 48" MIN AT THE TURN AND 42" MIN LEAVING THE TURN.

2010 ADA TABLE 403.5.1

I CLEAR WIDTH OF AN ACCESSIBLE ROUTE

SCALE: N.T.S.



DOOR OPENINGS SHALL PROVIDE A CLEAR WIDTH OF 32". CLEAR OPENINGS OF DOORWAYS WITH SWINGING DOORS SHALL BE MEASURED BETWEEN THE FACE OF THE DOOR AND THE STOP, WITH THE DOOR OPEN 90°. OPENINGS MORE THAN 24" DEEP SHALL PROVIDE A CLEAR OPENING OF 36" MIN. THERE SHALL BE NO PROJECTIONS INTO THE REQUIRED CLEAR OPENING WIDTH LOWER THAN 34" ABOVE THE FINISH FLOOR OR GROUND. PROJECTIONS INTO THE CLEAR OPENING WIDTH LOWER THAN 34" AND 80" ABOVE THE FINISH FLOOR OR GROUND SHALL NOT EXCEED 4".

2010 ADA TABLE 404.2.3

J CLEAR WIDTH OF DOORWAYS

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

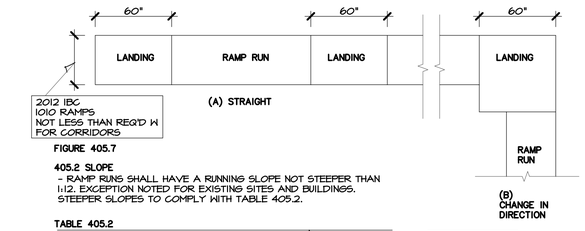


FIGURE 405.7

405.2 SLOPE
- RAMP RUNS SHALL HAVE A RUNNING SLOPE NOT STEEPER THAN 1:12. EXCEPTION NOTED FOR EXISTING SITES AND BUILDINGS. STEEPER SLOPES TO COMPLY WITH TABLE 405.2.

TABLE 405.2

SLOPE	MAXIUM RISE
STEEPER THAN 1:10 BUT NOT STEEPER THAN 1:8	3 INCHES
STEEPER THAN 1:12 BUT NOT STEEPER THAN 1:10	6 INCHES

2012 IBC
1010 RAMPS
1:12 SLOPE MAX

405.5/6 RAMP RUN
WIDTH: WHERE HANDRAILS ARE PROVIDED, BETWEEN HANDRAILS SHALL BE 36" MINIMUM.
RISE: RISE FOR ANY RAMP RUN SHALL BE 30" MAXIMUM

405.7 RAMP LANDING
WIDTH: SHALL BE AT LEAST AS WIDE AS THE WIDEST RAMP RUN LEADING TO THE LANDING
HANDRAILS: RAMP RUNS WITH A RISE GREATER THAN 6"

2010 ADA TABLE 405

K RAMP REQUIREMENTS

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

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2017 UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
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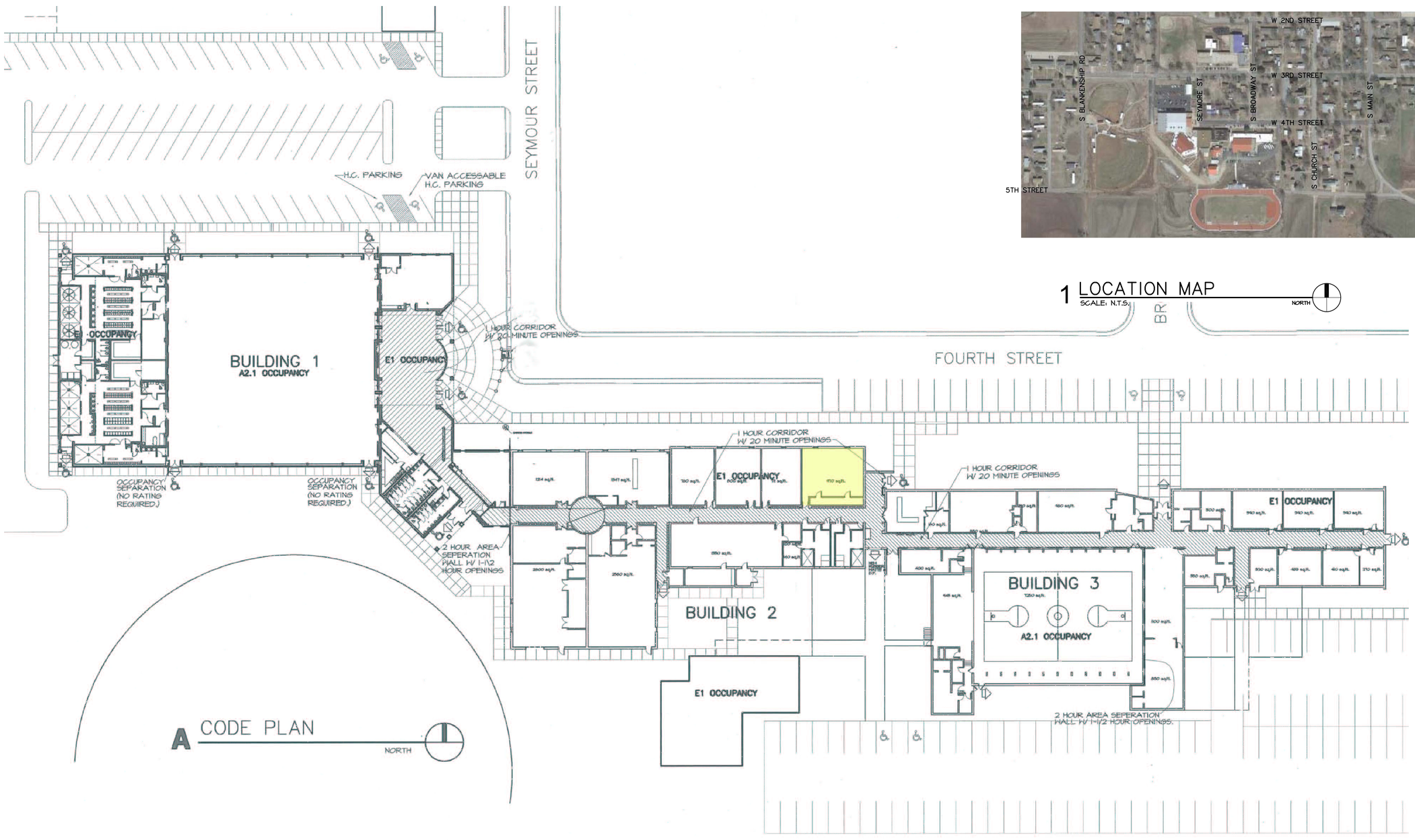

A CODE PLAN
NORTH

1 LOCATION MAP
SCALE: N.T.S.
NORTH

Project Information:
Type of construction - New Addition To And To REMODEL of The High School
Location - The site is bounded by Second Street to the North, Third Street to the South, and Broadway Street to the East.
Owner - Udall Unified School District #463
City - Udall, Kansas
County - Cowley

Project Certification:
Architect:
Hanney Steele Architects
1726 South Hillside
Wichita, Kansas 67211
316/683-8965
316/684-1441 Fax
The Plans Shall Comply With The Following:
1991 Uniform Building Code (UCBO)
1991 Uniform Mechanical Code (UCBO)
1991 Uniform Plumbing Code (UCBO)
1992 National Electrical Code (NFPA-70)
1988 Life Safety Code
1986 A.N.S.I.A117.1 (American National Standards Institute)
1992 Americans with Disabilities Act Guidelines

Design Consultants:
Hartwell Jantz Engineers, Structural Consultant
322 S. Laura, Wichita, Kansas 67211 316/262-0125
Contact: Jim Jantz, P.E.

Shrum Engineering, Mechanical Consultant
254 Laura, Wichita, Kansas 67211 316/262-1281
Contact: Bob Shrum, P.E.

Shrum Engineering, Electrical Consultant
254 Laura, Wichita, Kansas 67211 316/262-1281
Contact: Bob Shrum, P.E.

BUILDING 1 — New High School Gymnasium Addition
Mixed Occupancy A2.1 & E1 — Type II-One Hour Construction
Basic Allowable Area A2.1 — 13,500 S.F. per floor
Basic Allowable Area E1 — 20,200 S.F. per floor
Open 3 sides, 100 percent increase
Allowable Area Increase A3 — 27,000 S.F. per floor
Allowable Area Increase E1 — 40,400 S.F. per floor
Actual S.F.
New Addition A2.1 — 14,520 S.F.
New Addition E1 — 14,737 S.F.
Total New Addition — 29,257 S.F.
14,520 S.F. A2.1 / 27,000 S.F. = 54%
14,737S.F. E1 / 40,400 S.F. = 36%
Allowable Stories — 2
Allowable Height — 65'-0"
Actual Stories — 1
Actual Height — 28'-0" (top of roof)

Structural Fire Protection
F/R Remarks Reference: UBC Table No. 17-A
Exterior Bearing Walls — 1 Hour
Interior Bearing Walls — 1 Hour
Exterior Non-brg Walls — 1 Hour 1903 (a)
Structural Frame — 1 Hour
Permanent Partitions — 1 Hour
Shaft Enclosures — 1 hour
Ceilings/Floors — 1 Hour
Ceilings/Roofs — 1 Hour 1906
Exterior Doors and Windows — Sec. 1903 (b)
Stairway Construction — Sec. 1905
Fire Safety: Fire Alarm System, Smoke Detectors, Fire Extinguishers, Exit Lights, and Emergency Lights.
HVAC System: Combination gas fired heating / electric cooling roof top unit
Fuel: Natural Gas
Food Handling: None
Handicapped provisions: Parking, walks, egress, signage, toilets, and drinking fountains

BUILDING 2 — Existing High School Academic
E1 Occupancy — Type II-One Hour Construction
Basic Allowable Area — 20,200 S.F. per floor
Open 3 sides, 100 percent increase
Allowable Area Increase E1 — 40,400 S.F. per floor
Actual S.F. — 32,223 S.F.
Allowable Stories — 2
Allowable Height — 65'-0"
Actual Stories — 1
Actual Height — 21'-4" (top of roof)
Structural Fire Protection
F/R Remarks Reference: UBC Table No. 17-A
Exterior Bearing Walls — 1 Hour
Interior Bearing Walls — 1 Hour
Exterior Non-brg Walls — 1 Hour 1903 (a)
Structural Frame — 1 Hour
Permanent Partitions — 1 Hour
Shaft Enclosures — 1 Hour
Ceilings/Floors — 1 Hour
Ceilings/Roofs — 1 Hour 1906
Exterior Doors and Windows — Sec. 1903 (b)
Stairway Construction — Sec. 1905
Fire Safety: Fire Alarm System, Smoke Detectors, Fire Extinguishers, Exit Lights, and Emergency Lights.
HVAC System: Central boiler, cabinet unit heaters with hot water heat
Combination gas fired heating and electric cooling roof top unit, and also gas furnace heating with DX cooling
Fuel: Natural Gas

BUILDING 3 — Existing High School Gymnasium
A2.1 Occupancy — Type II-One Hour Construction
Basic Allowable Area — 13,500 S.F. per floor
Actual S.F. — 10,047 S.F.
Allowable Stories — 2
Allowable Height — 65'-0"
Actual Stories — 1
Actual Height — 21'-4" (top of roof)
Structural Fire Protection
F/R Remarks Reference: UBC Table No. 17-A
Exterior Bearing Walls — 1 Hour
Interior Bearing Walls — 1 Hour
Exterior Non-brg Walls — 1 Hour 1903 (a)
Structural Frame — 1 Hour
Permanent Partitions — 1 Hour
Shaft Enclosures — 1 Hour
Ceilings/Floors — 1 Hour
Ceilings/Roofs — 1 Hour 1906
Exterior Doors and Windows — Sec. 1903 (b)
Stairway Construction — Sec. 1905
Fire Safety: Fire Alarm System, Smoke Detectors, Fire Extinguishers, Exit Lights, and Emergency Lights.
HVAC System: Central boiler, cabinet unit heaters with hot water heat
Combination gas fired heating and electric cooling roof top unit, and also gas furnace heating with DX cooling
Fuel: Natural Gas

A OVERALL FLOOR PLAN
SCALE: N.T.S.
NORTH

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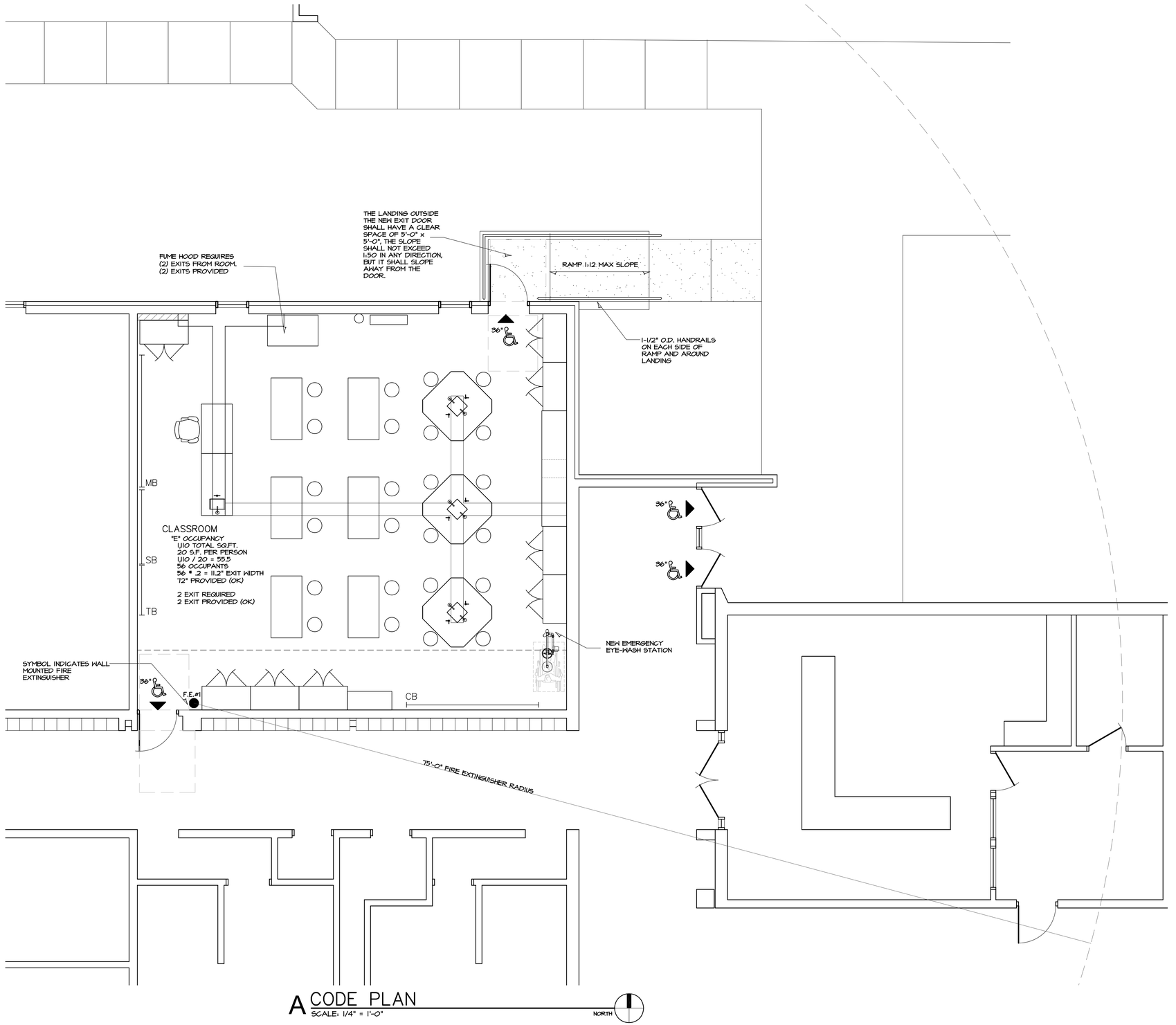

A CODE PLAN
SCALE: 1/4" = 1'-0"

ARCHITECTS

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CODE 2

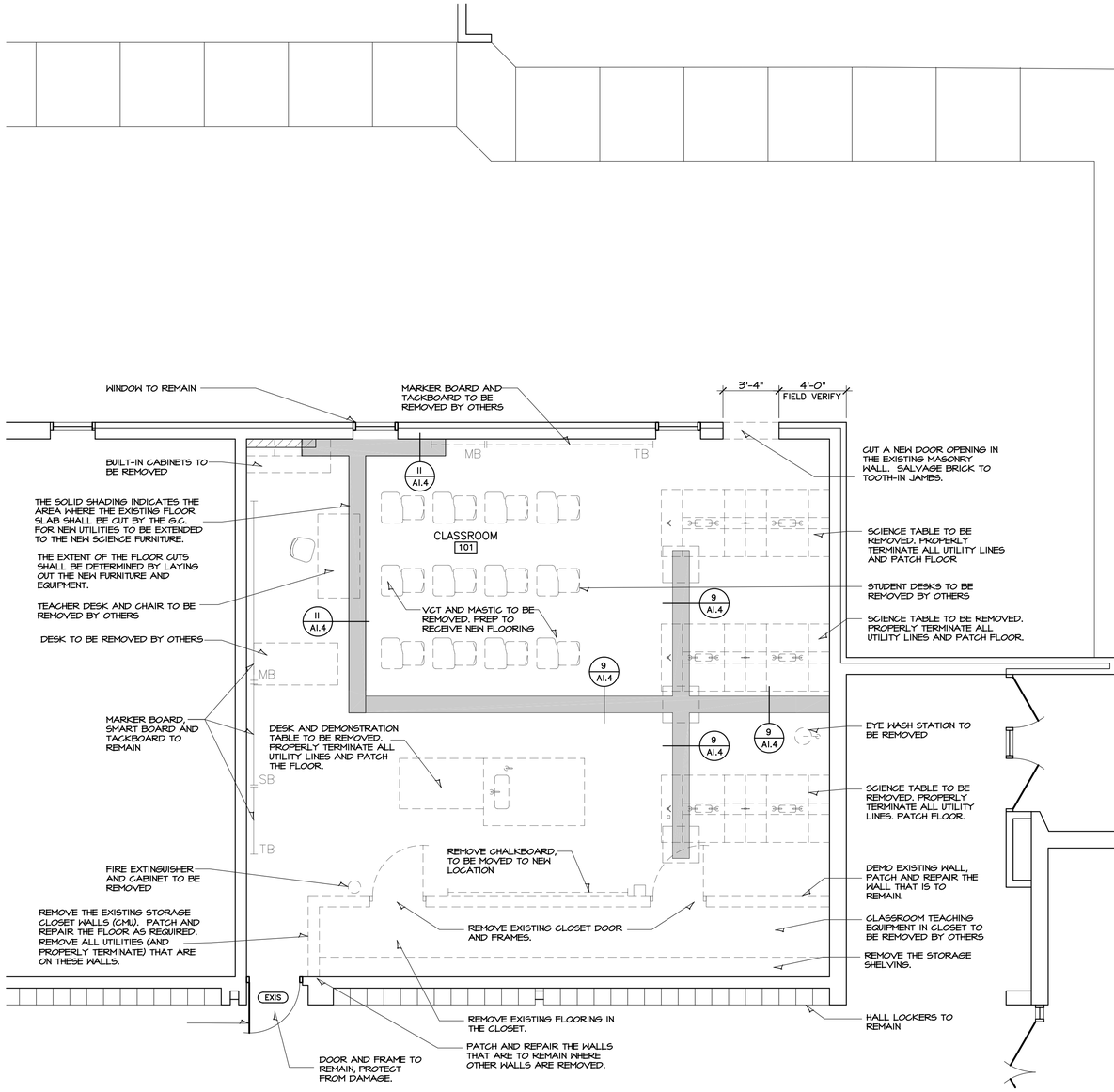
OF 1 SHEETS

THE FLOOR TILE APPEARS TO BE 12" SQUARE VCT. NOTIFY THE ARCHITECT IF A SMALLER TILE (8"x8") IS DISCOVERED ONCE THE DEMOLITION BEGINS.

THE FLOOR TILE MASTIC SHALL BE REMOVED AND THE SLAB PREPARED FOR A NEW FLOORING (PATCH AND LEVELING AS REQUIRED)

DEMOLITION MATERIALS SHALL BE REMOVED FOR THE CLASSROOM VIA THE NEW DOOR OPENING TO MINIMIZE DUST AND DEBRIS BEING SPREAD TO THE INTERIOR OF THE SCHOOL.

THE GENERAL CONTRACTOR IS RESPONSIBLE FOR THE DUST CONTROL AND CLEANING UP AFTER THE CONSTRUCTION.



A ENLARGED DEMO PLAN

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

NORTH

0 1 5 10

ARCHITECTS

ALBERT N. R. HANNEY LICENSED 3005 KANSAS PROFESSIONAL ARCHITECT

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2017 UDALL HIGH SCHOOL SCIENCE CLASSROOM REMODEL UNIFIED SCHOOL DISTRICT #463

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SHEET

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OF 1 SHEETS

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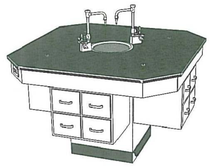

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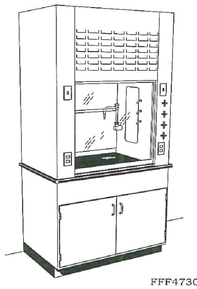

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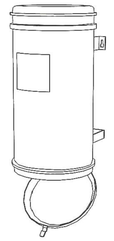

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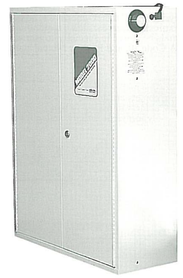

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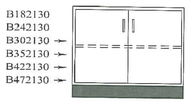
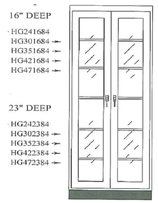


33

34



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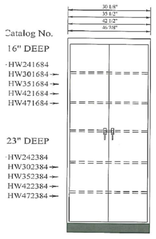
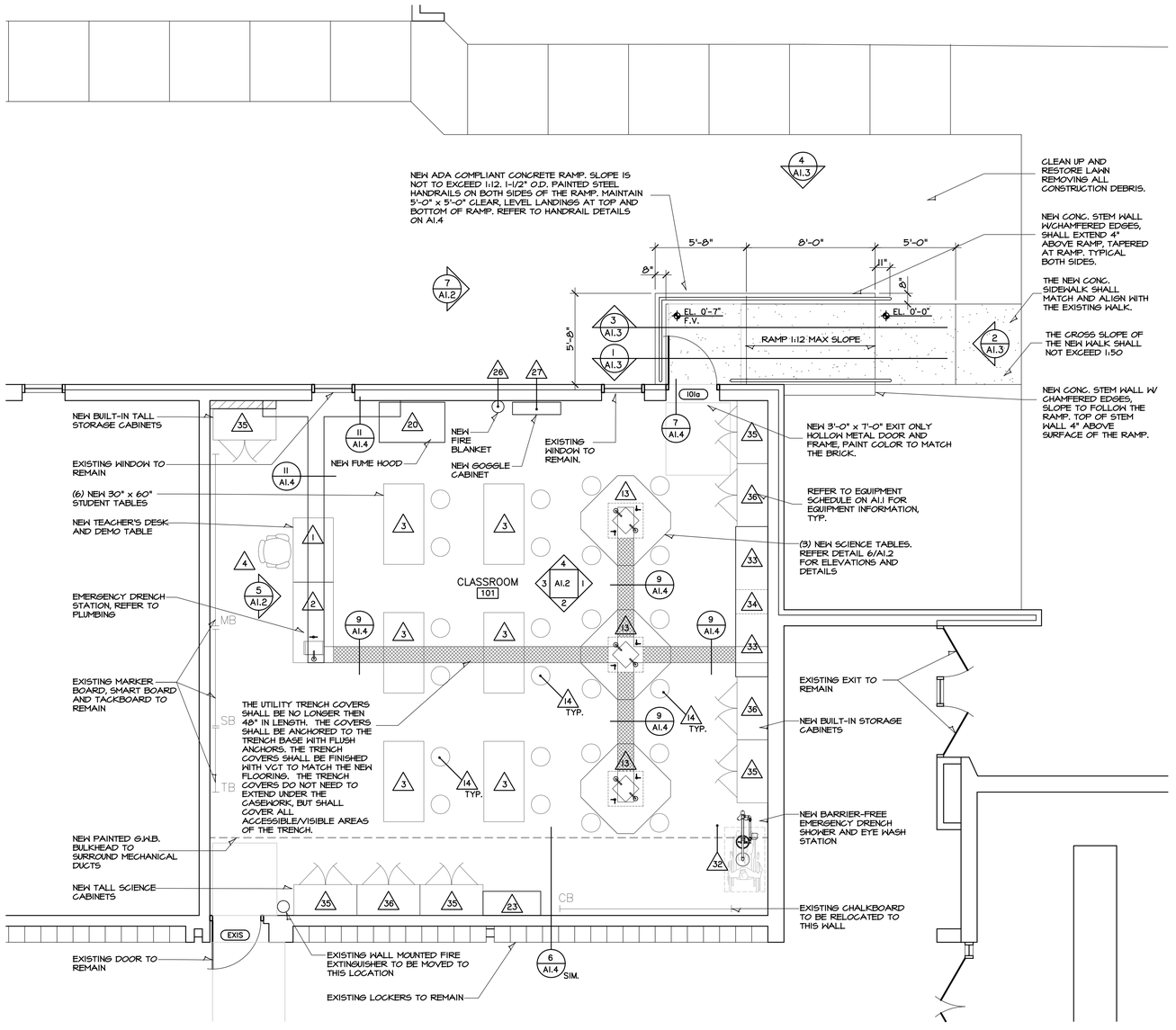


36

EQUIPMENT SCHEDULE

MARK	MODEL	DESCRIPTION	DIMENSIONS	MANUFACTURER	REMARKS
1	B1001	DEMONSTRATION TABLE	60"L X 30"W X 36"H	LEONARD PETERSON & CO	GREENLAW APPARATUS
2	B1030	INSTRUCTORS DESK	48"L X 30"W X 30"H	LEONARD PETERSON & CO	
3	B907	STUDENTS PHYSICS TABLE	72"L X 24"W X 30"H	LEONARD PETERSON & CO	GREENLAW APPARATUS;M-812-700 AIR
4		TEACHER CHAIR			BY OWNER
13	B747	FOUR-STUDENT SCIENCE TABLE		LEONARD PETERSON & CO	OCTAGONAL W/ CENTER SINK
14	B1641	STUDENTS STOOL	24"H (for 36"H tables)	LEONARD PETERSON & CO	ALTERNATE ONE
20	FAF473092	FUME HOOD	4'-1"L X 2'-10"W X 7'-5"H	LEONARD PETERSON & CO	W/ TOP & BASE #808/70
23	B1232	FREE STANDING ACID STORAGE	43" L X 44" H X 18" D	LEONARD PETERSON & CO	W/ LOCK
26	B1248	FIRE BLANKET AND CASE	9"DIA X 19 1/2" HIGH	LEONARD PETERSON & CO	
27	B1255	SAFETY GOGGLE CASE W/ GOGGLES	24"W X 9 1/4"D X 28"H	LEONARD PETERSON & CO	
32	B-1244-HC	SHOWER & EYEWASH UNIT (ADA)		LEONARD PETERSON & CO	
33	B472130	TWO DOOR BASE UNIT	47"L X 21"W X 30"H	LEONARD PETERSON & CO	W/ LOCK;FURNISH 1 1/4" COUNTER
34	DD182130	EIGHT DRAWER BASE UNIT	18"L X 21"W X 30"H	LEONARD PETERSON & CO	W/ LOCK;FURNISH 1 1/4" COUNTER
35	HG472384	EXHIBIT CASE W/ GLAZED DOORS	47"L X 23"W X 84"H	LEONARD PETERSON & CO	W/ LOCK
36	HW472384	EXHIBIT CASE W/ HINGED DOORS	47"L X 23"W X 84"H	LEONARD PETERSON & CO	W/ LOCK



A ENLARGED FLOOR PLAN

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

ARCHITECTS

MARK IN R. HANNEY
LICENSED
3005
KANSAS
PROFESSIONAL ARCHITECT

11/22/17

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2017
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SCIENCE CLASSROOM REMODEL
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2	10/23	REVIEW
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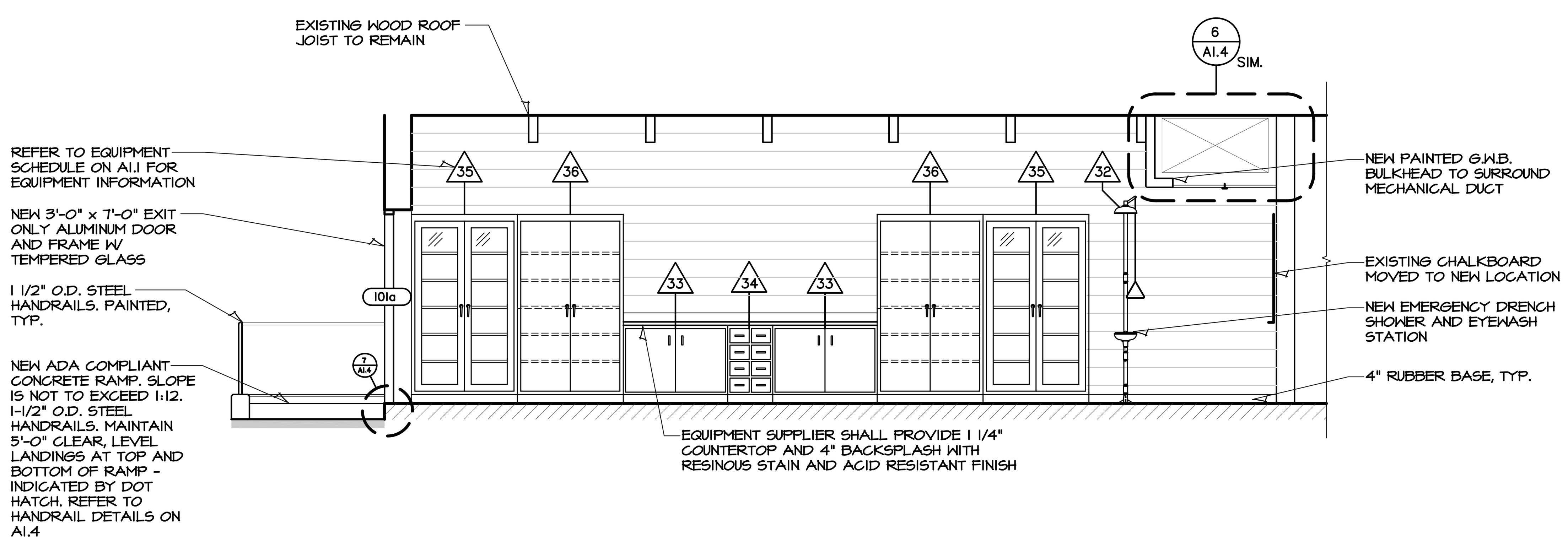
MH, CH, EE	MRH

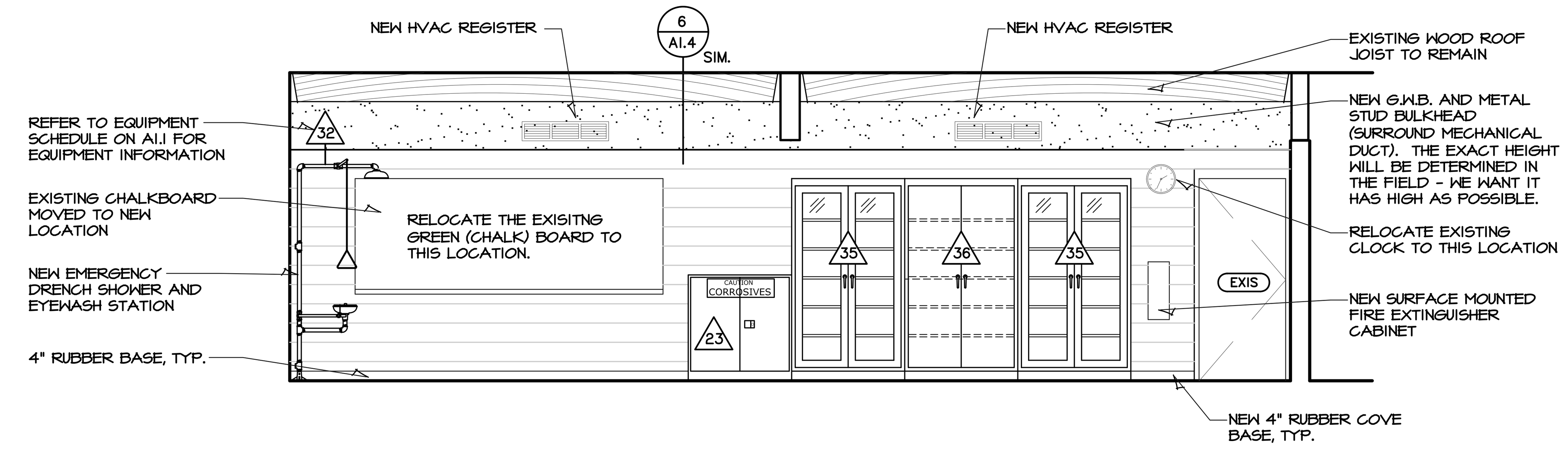
SHEET

A1.1

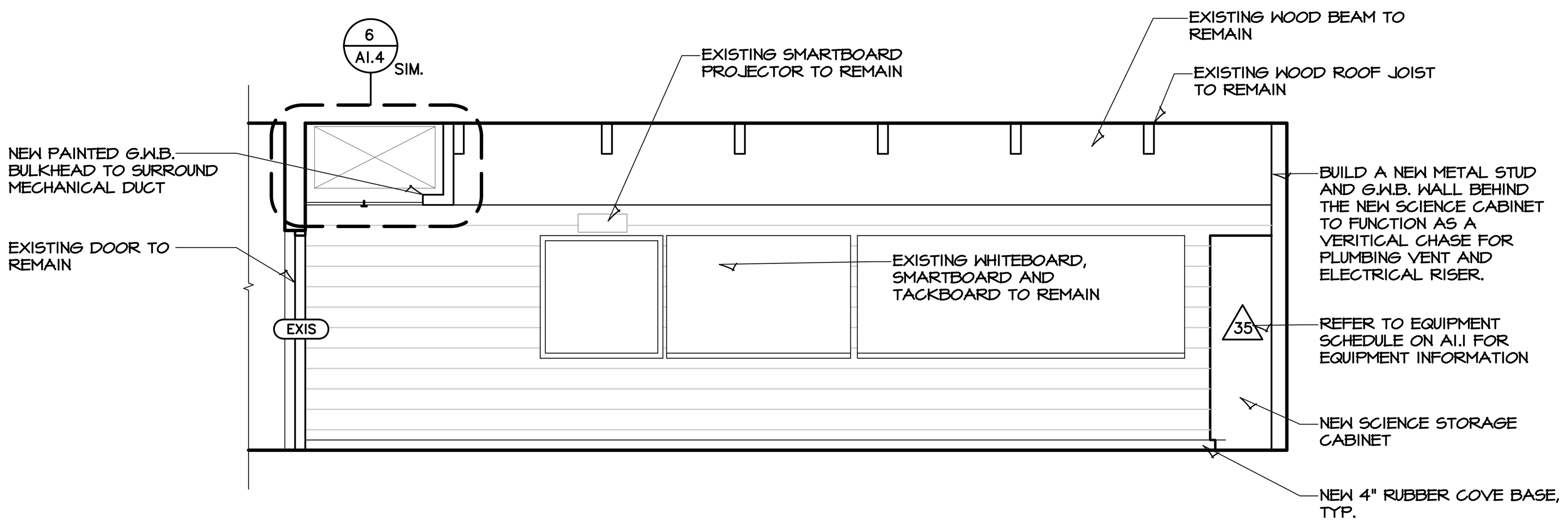
OF 1 SHEETS



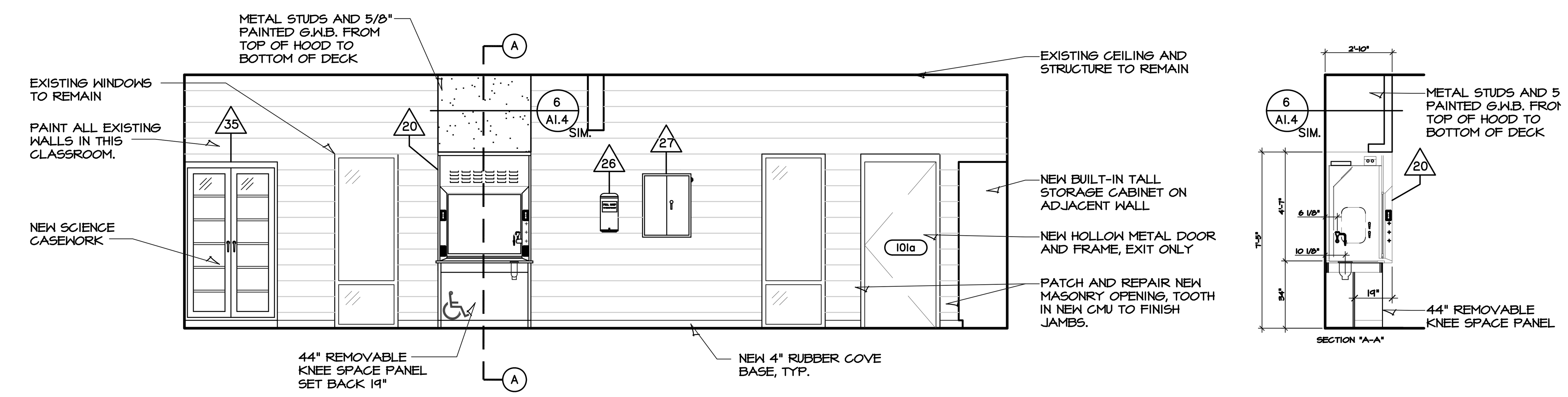
1 EAST ELEVATION
SCALE: 1/4" = 1'-0"



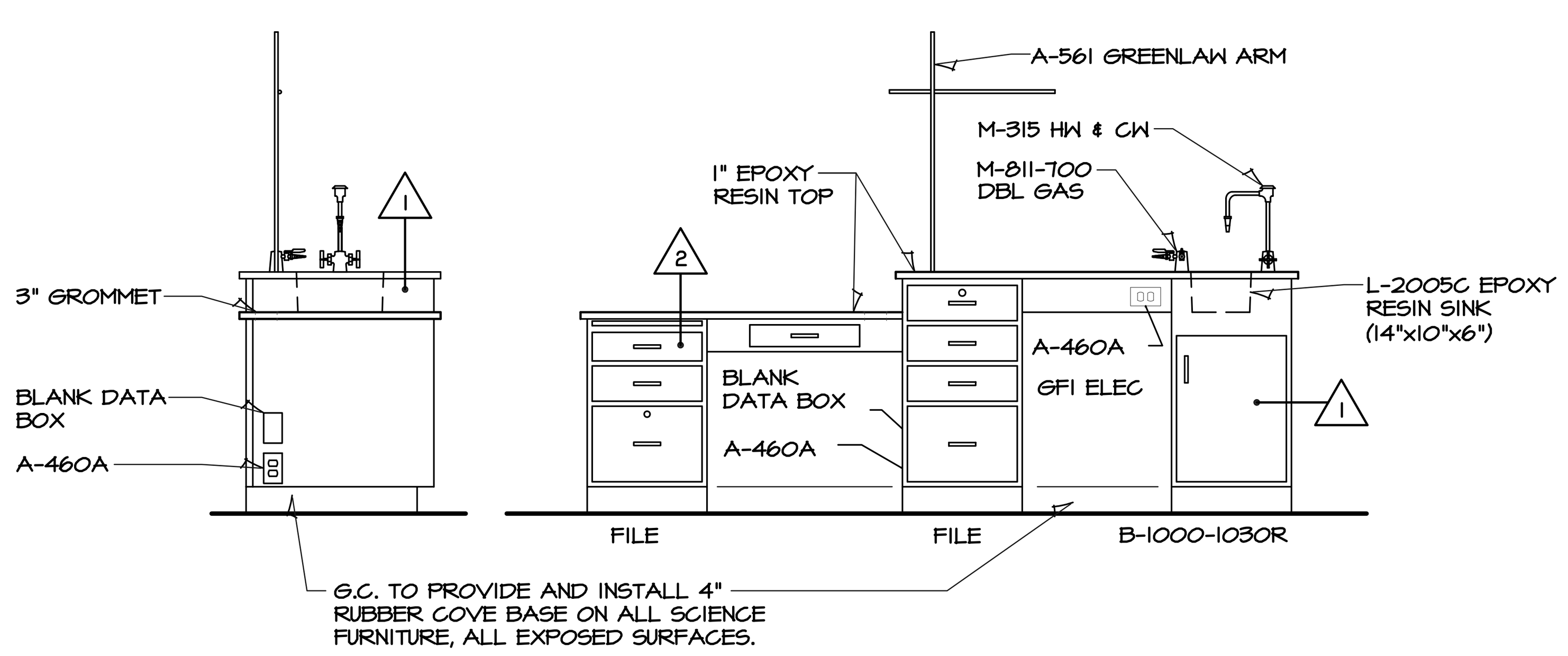
2 SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



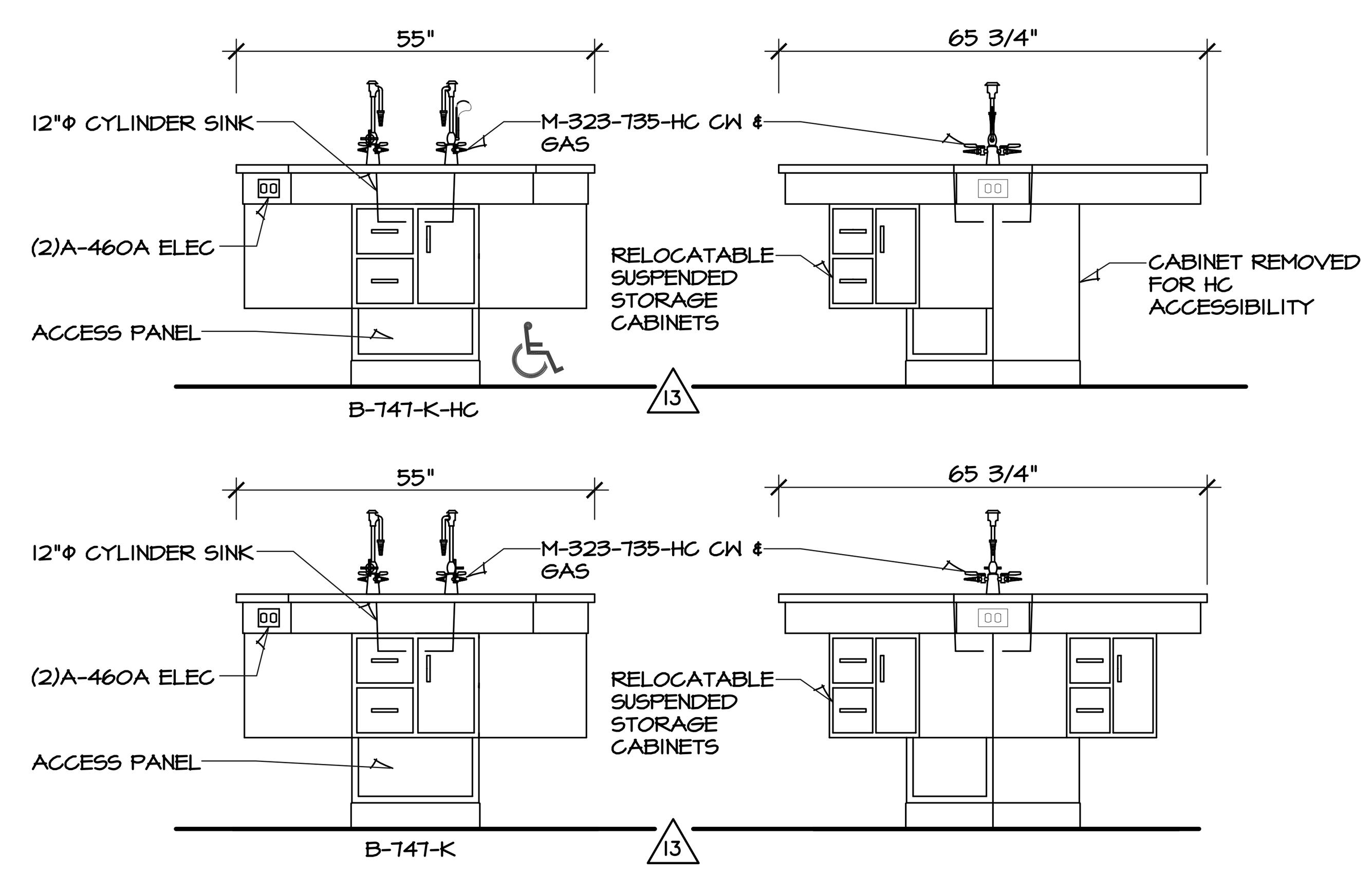
3 WEST ELEVATION
SCALE: 1/4" = 1'-0"



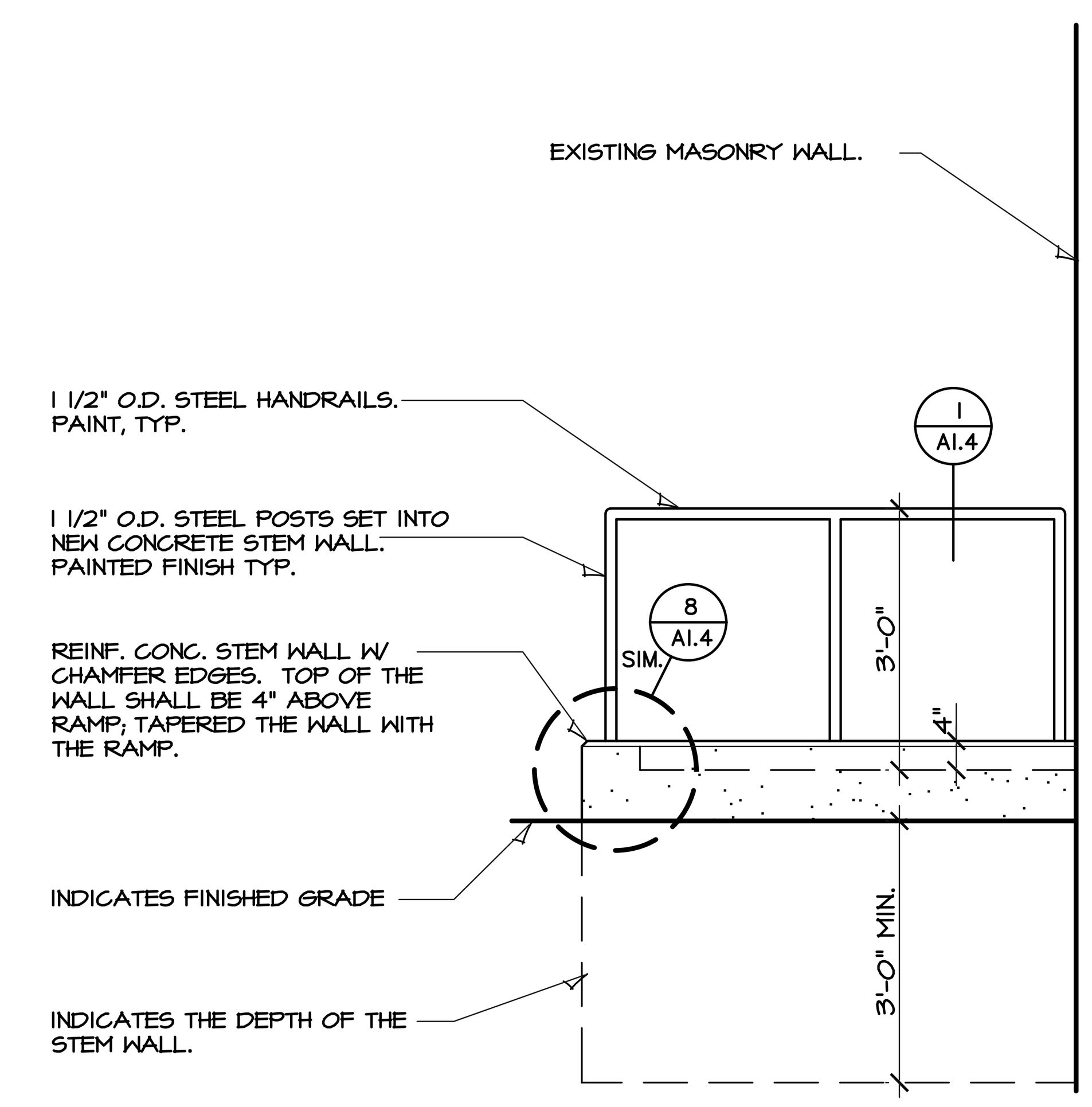
4 NORTH ELEVATION
SCALE: 1/4" = 1'-0"



5 DEMO TABLE ELEVATION
SCALE: 1/2" = 1'-0"



6 PEDESTAL TABLE DETAILS
SCALE: 1/2" = 1'-0"



7 WEST RAMP ELEVATION
SCALE: 1/2" = 1'-0"

ARCHITECTS
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DATE: NOVEMBER 2017	
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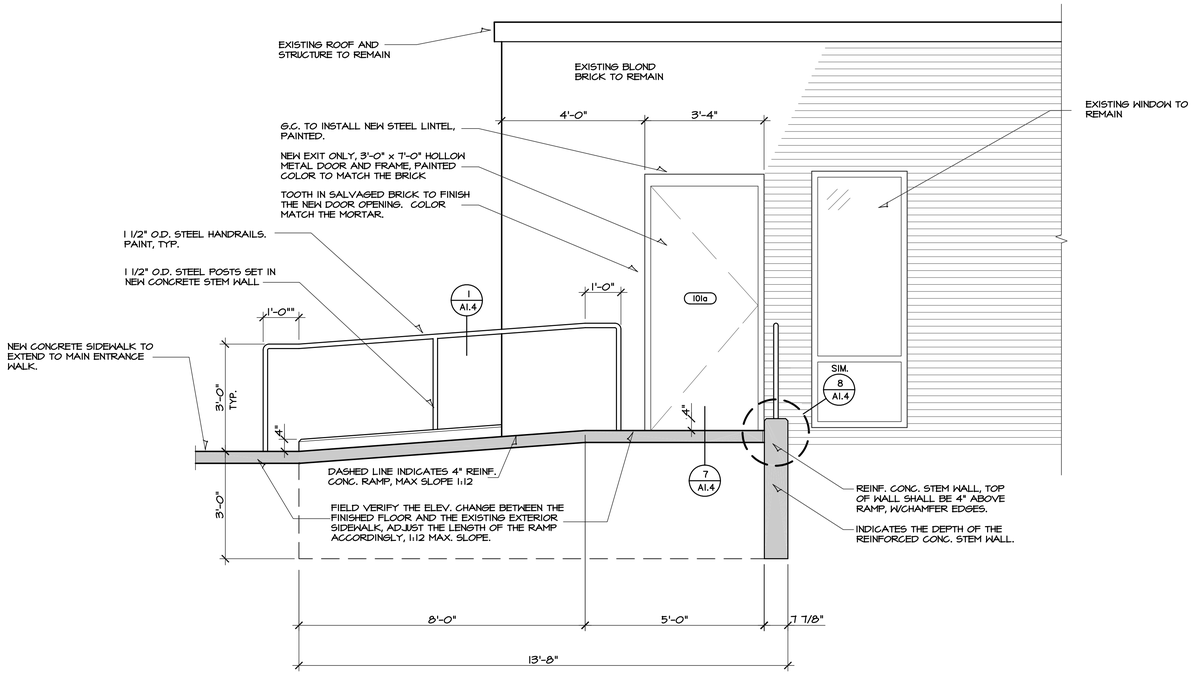
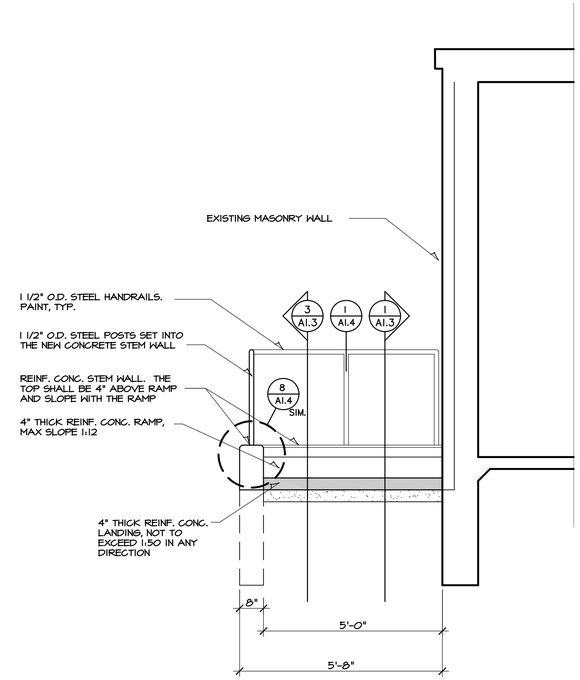
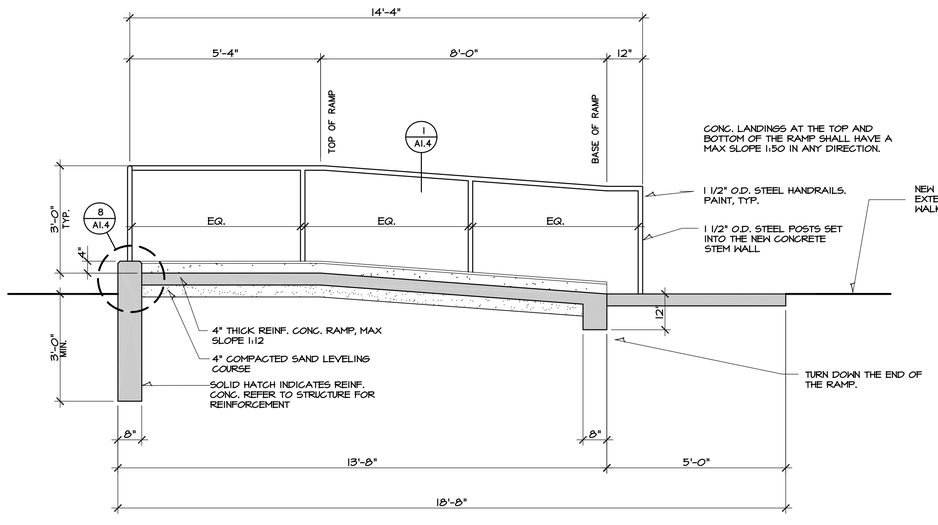
SHEET
A1.2
OF 1 SHEETS



1 SOUTH RAMP SECTION
SCALE: 1/2" = 1'-0"



2 NORTH RAMP SECTION
SCALE: 1/2" = 1'-0"



3 EAST RAMP SECTION
SCALE: 1/2" = 1'-0"

ARCHITECTS

MARK H. R. HANNEY LICENSED 3005 KANSAS PROFESSIONAL ARCHITECT

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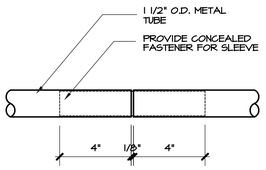
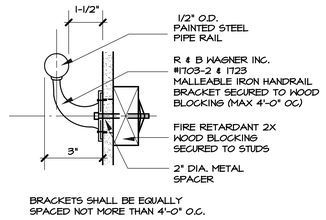
SHEET
A1.3
OF 1 SHEETS

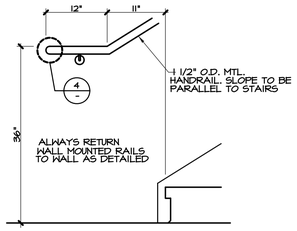


1 HANDRAIL SPLICE
SCALE: N.T.S.



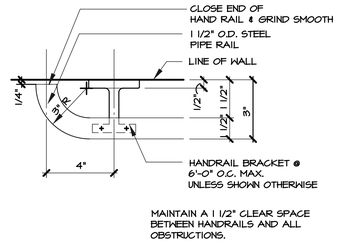
BRACKETS SHALL BE EQUALLY SPACED NOT MORE THAN 4'-0" O.C.

2 HANDRAIL WALL MOUNT DETAIL
SCALE: N.T.S.



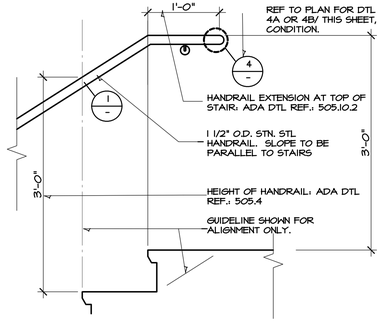
BOTTOM OF STAIR/ RAMP

3 HANDRAIL EXTENSION DETAIL
SCALE: N.T.S.



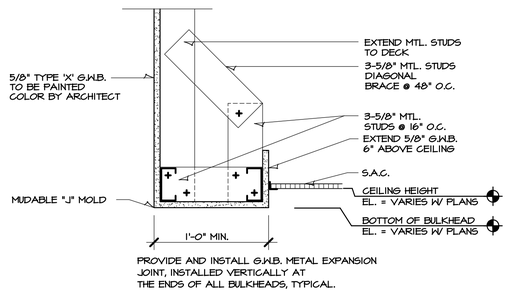
MAINTAIN A 1 1/2" CLEAR SPACE BETWEEN HANDRAILS AND ALL OBSTRUCTIONS.

4 HANDRAIL WALL RETURN DETAIL
SCALE: N.T.S.



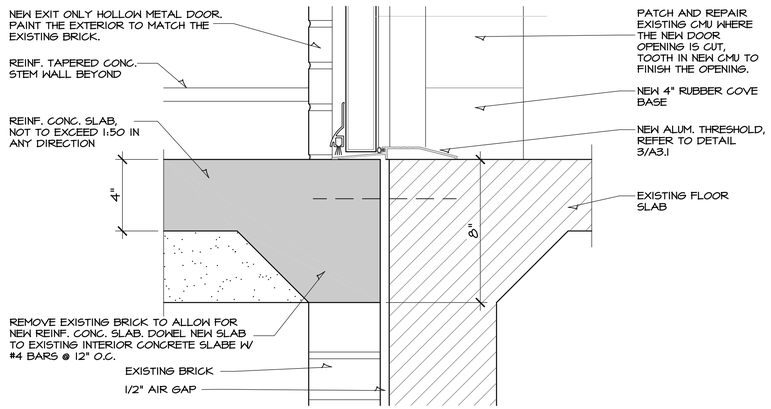
TOP OF STAIR/ RAMP

5 HANDRAIL EXTENSION DETAIL
SCALE: N.T.S.

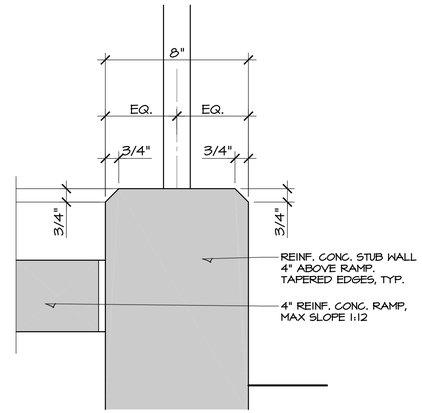


PROVIDE AND INSTALL G.W.B. METAL EXPANSION JOINT, INSTALLED VERTICALLY AT THE ENDS OF ALL BULKHEADS, TYPICAL.

6 BULKHEAD DETAIL
SCALE: N.T.S.

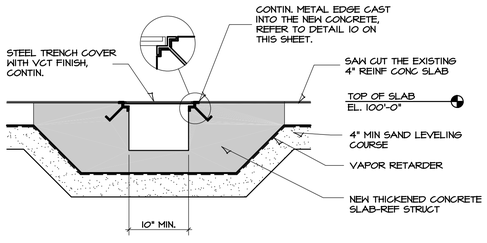


7 DETAIL
SCALE: 3" = 1'-0"



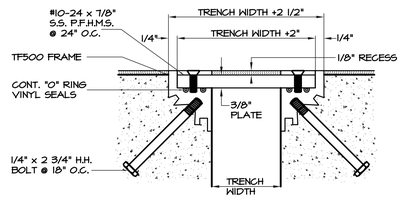
8 CHAMFER & POST DETAIL
SCALE: 3" = 1'-0"

G.C. TO PROVIDE AND INSTALL ACCESSIBLE TRENCH COVER UNIT THAT HAS RECESSES FOR VCT FINISH.



G.C. SHALL COORDINATE THE SIZE OF THE TRENCH AND COVER WITH THE SUB-CONTRACTORS TO INSURE THE TRENCH IS THE PROPER SIZE TO HOUSE ALL THE UTILITIES (SEWER, WATER, GAS, AND ELECTRICAL)

9 UTILITY TRENCH
SCALE: 1" = 1'-0"



*CAST IN PLACE MOUNT - STANDARD

ALUMINUM: 6063-T5 EXTRUSION, 6061-T6

EXPOSED FINISH: MILL

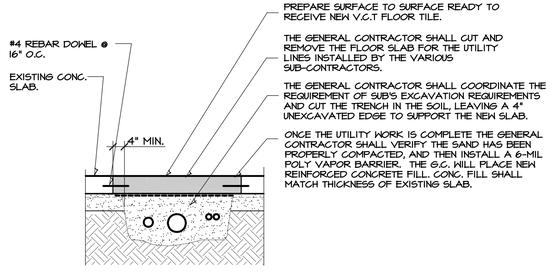
ZINC CHROMATE AREAS IN CONTACT W/CONCRETE

SEALS: 70 DURO. VINYL

ARCHITECTURAL ART MANUFACTURING OR APPROVED EQUAL.

M00-13-13
REV. 06/09

10 TRENCH DETAIL
SCALE: 1" = 1'-0"



11 UTILITY EXTENSION DETAIL
SCALE: 1" = 1'-0"

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DATE: NOVEMBER 2017	
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SHEET

A1.4

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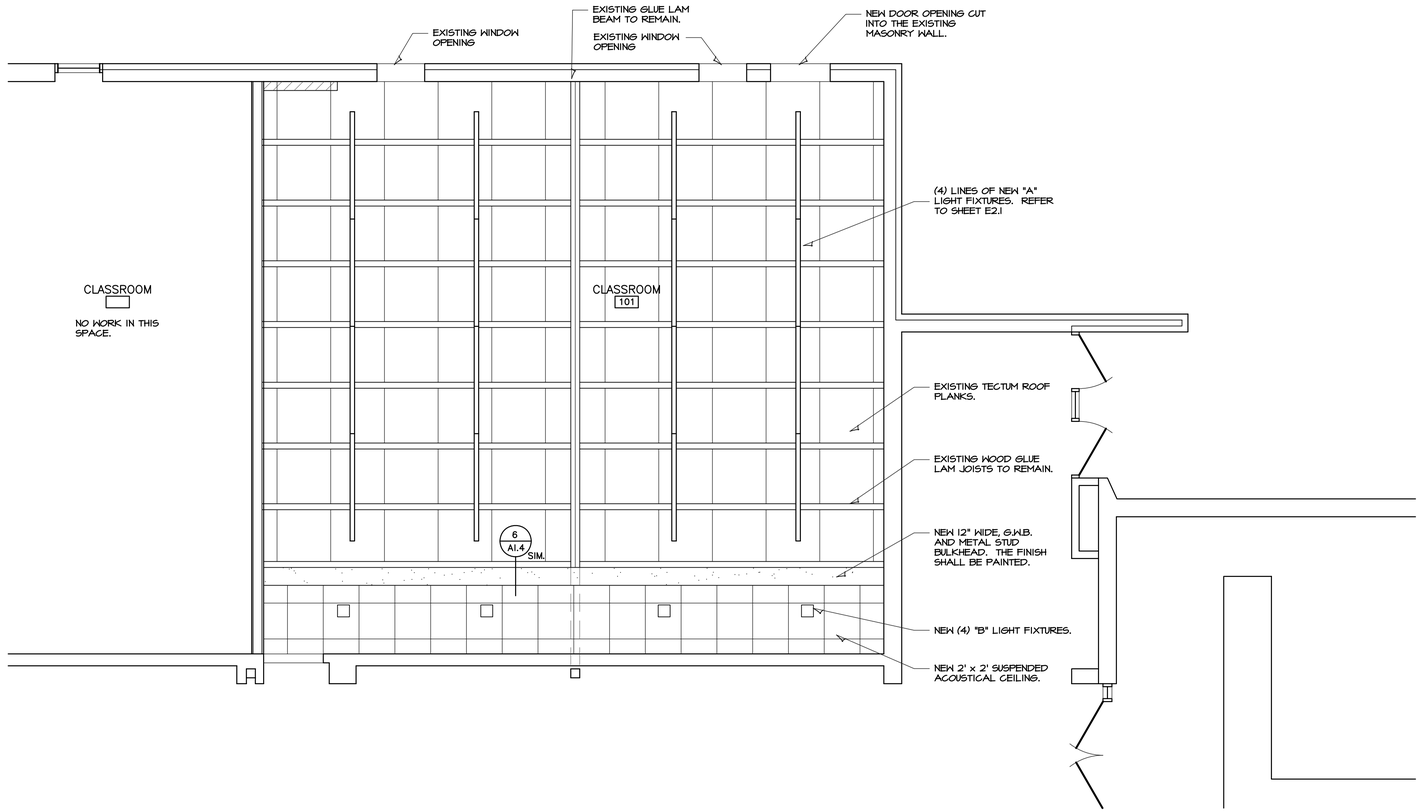

A REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"

NORTH

0 1 5 10

ARCHITECTS

MARTIN R. HANNEY LICENSED 3005 KANSAS PROFESSIONAL ARCHITECT

11/21/17

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2017
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DATE: NOVEMBER 2017	
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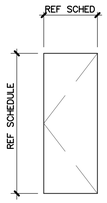
SHEET

A2.1

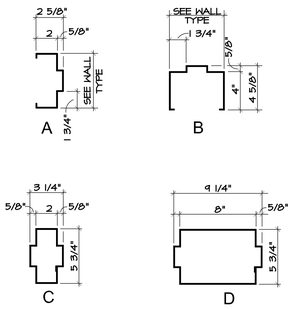
OF 1 SHEETS

DOOR TYPES



HM1
HOLLOW METAL
1-3/4" THICK
INSULATED

H.M. - FRAME PROFILES



DOOR SCHEDULE

DOOR						FRAME							
								DETAILS					✳ WEATHER STRIPPING BY ALUM. DOOR SUPPLIER
DOOR NO.	MAT'L	TYPE	THK.	WIDTH	HEIGHT	MAT'L	TYPE	HEAD	JAMB	SILL	DOOR SILL	FIRE RATING (F.P.S.C.)	HDW. SET NO.	REMARKS
101a	HM	HM1	1-3/4"	3'-0"	7'-0"	HM	1F	2/A3.1	4/A3.1	1/A3.1	3/A3.1	-	-	1	CLASSROOM

GENERAL NOTES

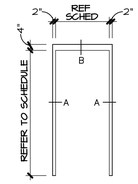
- INSTALL WEATHER STRIPPING, THRESHOLD & DRIP CAP AT ALL EXTERIOR DOORS. REFER TO DETAILS ON THIS SHEET. TYP.
- DOOR 101a TO HAVE ADA COMPLAINT PANIC HARDWARE INSTALLED.
- DOOR 101a IS AN EXIT ONLY DOOR, NO ACCESS HARDWARE ON THE EXTERIOR FACE OF THE DOOR SLAB.

HARDWARE SET 1

1 CONTINUOUS HINGE	CFMHDI x DOOR HEIGHT		PE (PEMKO)
1 EXIT DEVICE	7100-36"	626	YA (YALE)
1 DOOR CLOSER	CPS1500T SN-134	689	NO (NORTON)
1 THRESHOLD	2001AT x OPENING WIDTH		PE
1 GASKETING	ST13D (HEAD & JAMBS)		PE
1 RAIN GUARD	68_R x OVERALL FRAME WIDTH		PE (DOOR WIDTH +4")
1 GASKETING	2891AS (HEAD & JAMBS)		PE
1 DOOR BOTTOM	2221APK x DOOR WIDTH		PE
1 DOOR STOP	462 HEAVY DUTY STOPS		RO (ROCKWOOD)

NOTE: INSTALL WEATHERSTRIP BEFORE INSTALLING DOOR CLOSERS.

ALUM. FRAME TYPE

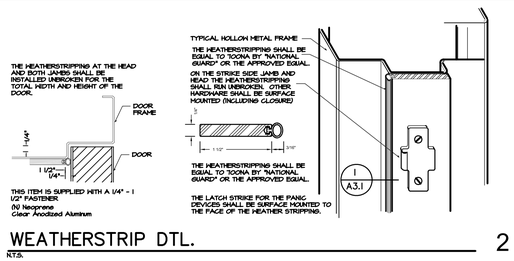


1F

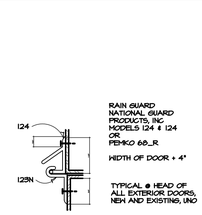
GALVANIZED, HOLLOW METAL FRAME. PAINT THE EXTERIOR, COLOR TO MATCH THE BRICK.

FIELD VERIFY THE HEIGHT, THE HEAD OF THE DOOR SHALL MATCH THE ADJACENT WINDOWS.

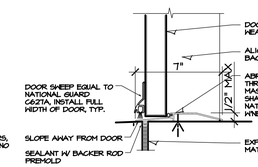
DOOR DETAILS



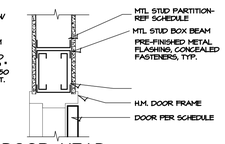
1 WEATHERSTRIP DTL.
N.T.S.



2 DRIP CAP
N.T.S.



3 THRESHOLD
N.T.S.



4 DOOR HEAD
N.T.S.

ROOM FINISH SCHEDULE

Room Name	RM. #	FLOOR	BASE	WALLS				NOTES
				NORTH	SOUTH	WEST	EAST	
CLASSROOM	101	VCT	RUBBER	PAINT	PAINT	PAINT	PAINT	-

GENERAL NOTES

- EXISTING FLOOR SLAB IS TO BE CLEANED AND PREPARED TO RECEIVE NEW FLOOR FINISH. OWNER TO SELECT FLOOR FINISH.
- NEW PAINT ON ALL EXISTING CMU BLOCK WALLS AND NEW BULKHEAD
- NEW 2x2 SUSPENDED ACOUSTICAL CEILING ALONG CORRIDOR WALL, REFER TO THE REFLECTED CEILING PLAN.
- NEW BASE, 4" TALL RUBBER COVE BASE, COLOR SELECTED BY THE OWNER

ARCHITECTS

MARTIN R. HANNEY LICENSED 3005 KANSAS PROFESSIONAL ARCHITECT

11/21/17

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DATE: NOVEMBER 2017	
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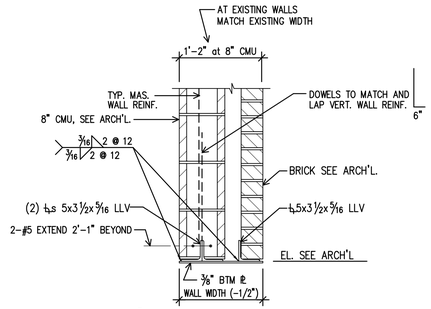
MH, CH, EE	MRH

SHEET

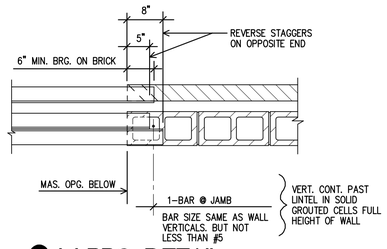
A3.1

OF 1 SHEETS

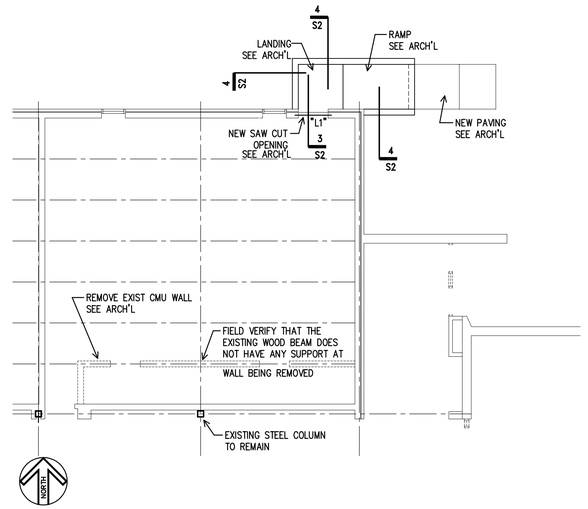
BEAR ON UNDISTURBED SOIL WITH 2000 PSF MIN BEARING CAPACITY
REBAR TO BE 60 KSI, LAP 30", PROVIDE CORNER BARS
CONCRETE TO BE 4000 PSI W/ 6% ENTRAINED AIR
CONCRETE TO HAVE MINIMUM 50% ROCK
STEEL TO BE A36
WELD WITH E70xx ELECTRODES



1 L1 SECTION
NO SCALE



2 L1 BRG. DETAIL
NO SCALE



A EXISTING PLAN
1/8" = 1'-0"

PLAN NOTES:
1. VERIFY ALL DIMENSIONS.

MASONRY:

M 1 MASONRY REINFORCING FABRICATOR AND GENERAL CONTRACTOR SHALL CERTIFY THAT THEY HAVE REVIEWED ALL SHOP DRAWING SHEETS BEFORE SUBMITTING FOR REVIEW, BY STAMPING EACH SHEET, OR BY COMPANY LETTERHEAD STATING THE SAME, FOR EACH SUBMITTAL. ALL DEVIATIONS FROM THE CONTRACT DRAWINGS SHALL BE HIGHLIGHTED BY THE FABRICATOR AND/OR GENERAL CONTRACTOR. SHOP DRAWINGS SUBMITTED FOR ENGINEER'S REVIEW ARE ONLY CHECKED FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS. NO RESPONSIBILITY IS ASSUMED BY THE ENGINEER FOR THE CORRECTNESS OF DIMENSIONS, DETAILS, QUANTITIES OR PROCEDURES SHOWN ON THE SHOP DRAWINGS.

M 2 SHOP DRAWINGS SHALL BE PREPARED IN KEEPING WITH THE CURRENT NATIONAL STANDARDS: N.C.M.A.

M 3 HOLLOW CONCRETE BLOCK (MASONRY) UNITS SHALL MEET ASTM C90, LIGHT WEIGHT, TYPE 1 WITH A MINIMUM COMPRESSIVE STRENGTH OF 2670 PSI ON THE NET AREA f'm = 2000 PSI).

M 4 NO "U" TYPE LINTEL BLOCKS SHALL BE USED FOR BOND BEAMS, U.N.O. USE OPEN BOTTOM STANDARD BOND BEAM BLOCK WITH NOTCHED KNOCK-OUT WEBS AND EXPANDED METAL LATH GROUT STOPS.

M 5 MASONRY DESIGN STRENGTH (f'm) SHALL BE DETERMINED BY PRISM TESTS CONFORMING TO ASTM E447, METHOD B, IN ADVANCE OF BEGINNING MASONRY WORK. STANDARD AGE OF TEST SPECIMENS SHALL BE 28 DAYS.

M 6 MASONRY WORK SHALL HAVE SPECIAL INSPECTION AS DEFINED BY THE GOVERNING BUILDING CODE.

M 7 NO STACKED BOND MASONRY CONSTRUCTION SHALL BE ALLOWED.

M 8 MORTAR FOR USE IN MASONRY SHALL MEET ASTM C270, TYPE M OR S.

M 9 GROUT FOR USE IN MASONRY SHALL MEET ASTM C476; COMPRESSIVE STRENGTH = 2500 PSI AT 28 DAYS WITH NOT LESS THAN 6 1/2 SACKS OF CEMENT PER YARD, COURSE SAND OR PEA GRAVEL (3/8" MAX. AGGREGATE), AND A SLUMP OF NOT GREATER THAN 8".

M 10 LOW-LIFT GROUTING:
GROUT LIFTS SHALL NOT EXCEED 4'-0" MAX. THE TOP OF EACH GROUT LIFT SHALL BE 2" BELOW THE TOP OF THE MASONRY UNIT. ALL AIR POCKETS SHALL BE REMOVED BY RODDING OR VIBRATING THE GROUT.

M 11 MASONRY BEARING WALLS SHALL BE LAID WITH ALL FACE SHELLS SOLIDLY IN MORTAR.

M 12 REINFORCING BARS SHALL MEET ASTM A615 GR. 60 (FY=60,000 PSI). ALL CELLS CONTAINING REINFORCEMENT SHALL BE SOLID GROUTED.

M 13 PROVIDE A MINIMUM OF 1/2" GROUT BETWEEN MAIN REINFORCING AND MASONRY UNITS.

M 14 HOLD VERTICAL BARS STRAIGHT AND TRUE AND CENTERED IN WALL.

M 15 PROVIDE DOWELS FROM FOUNDATIONS AT ALL VERTICAL MASONRY WALL REINFORCEMENT. DOWELS SHALL MATCH VERTICAL REINFORCEMENT IN SIZE AND SPACING, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS. PROVIDE ONE DOWEL FOR EACH VERTICAL WALL BAR AT EACH LOCATION.

M 16 HORIZONTAL AND VERTICAL REINFORCEMENT SHALL BE CONTINUOUS AND LAPPED A MINIMUM NUMBER OF BAR DIAMETERS AS SCHEDULED:

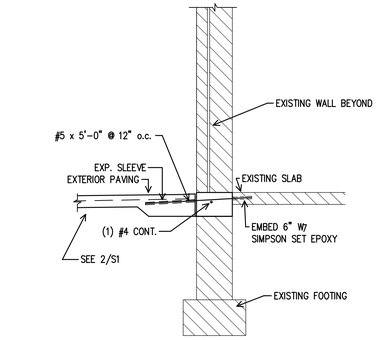
	SINGLE REINFORCING	DOUBLE REINFORCING AND BOND BEAMS
#5'S	43 BAR DIA.	65 BAR DIA.

M 17 EXCEPT AS NOTED ON PLANS AND DETAILS, REINFORCE ALL MASONRY WALLS TYPICALLY AS FOLLOWS:
VERTICAL: 1-#5 AT 32" O.C. @ 8" CMU UNO
HORIZONTAL: #9 GAGE WIRE LADDER TYPE JOINT REINFORCEMENT AT 16" O.C. AND 2-#5 CONTINUOUS IN 8" DEEP BOND BEAM AT FLOOR LINES, AT 8'-0" ABOVE FINISHED FLOOR, ROOF LINES AND AT THE TOP OF PARAPET.

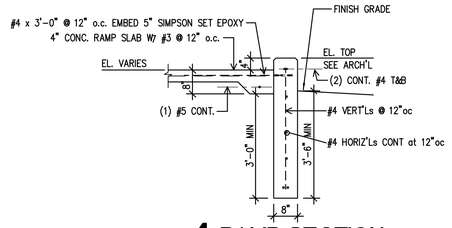
M 18 PROVIDE 1-#5 VERTICAL MIN. AT ALL WALL ENDS, CORNERS, AND CONTROL JOINTS AND AT THE INTERSECTION OF ALL WALLS, SEE DETAIL.

M 19 PROVIDE 2-#5 MIN. IN 8" DEEP BOND BEAM AT HEAD AND SILL OF ALL OPENINGS IN MASONRY WALLS. EXTEND 48 BAR DIAMETERS PAST EDGE OF OPENING.

M 20 ALL OPENINGS IN MASONRY SHALL HAVE 1-#5 MIN. EACH JAMB EXTENDING THE FULL HEIGHT OF THE WALL SPAN.



3 NEW DOOR and LANDING at EXTG.
1/2" = 1'-0"



4 RAMP SECTION
1/2" = 1'-0"

ARCHITECTS

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2017
UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
UNIFIED SCHOOL DISTRICT #463

DRAWINGS ISSUED		
NO.	DATE	ITEM ISSUED
3	11/22	REVISIONS
2	11/13	FOR PERMIT
1	10/11	CONSTRUCT DOCS

COMPUTER DRAWING

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EMAIL paul.kspe@gmail.com
DR: PDS

JOB NO. 19-9113 ENGR: PDS

DATE: OCTOBER 2017

DRAWN BY:	CHECKED BY:
pds	pds

SHEET

S1

OF 1 SHEETS

EQUIPMENT CONNECTION SCHEDULE

SCH. CODE
SW=DISC. SW.
CB=CIR.BKR.
T=TOGGLE SW.

ICE

	UNIT DESIG	120/60/1	208/60/1	208/60/3	LOAD H.P.	LOAD FLA	LOAD MCA	PANEL DEVICE RATING (AMPS/POLE) 20/1	30/1	30/2	30/3	40/1	40/2	40/3	50/1	50/2	50/3	DISCONNECTING DEVICE AT UNIT (AMPS/POLE) FUSTAT	30/1	30/2	30/3	60/1	60/2	60/3	STARTER (SIZE/POLE) SIZE FUSE	NEMA/3R	0/3	1/3	2/3	IN MCC	AT UNIT	NEMA/3R	CIRCUIT NUMBER	FEEDER IDENT.
◇2	EF-1	●			1/8			●										SW							X								◇1	20.2

EQUIPMENT CONNECTION SCHEDULE NOTES

ICE

GENERAL NOTES:

a. ALL CONNECTIONS AND ELECTRICAL EQUIPMENT LISTED IN THIS SCHEDULE SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR

b. REFER TO THE MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE REQUIREMENTS ASSOCIATED WITH WIRING AND CONNECTIONS OF INTERLOCKING, THERMOSTAT LOCATIONS, EXHAUST FAN CONTROL SWITCHES AND OTHER CONTROLS OF MECHANICAL EQUIPMENT.

SCHEDULE NOTES:

◇1 CONNECT NEW EXHAUST FAN 'EF-1' TO EXISTING PANEL '13' CIRCUIT #14. PROVIDE NEW 20A/1P CIRCUIT BREAKER AS REQUIRED.

◇2 EXHAUST FAN TO BE CONTROLLED BY NEW HOOD. CONTRACTOR SHALL WIRE FAN SO THAT IT TURNS ON WHEN THE HOOD TURNS ON. PROVIDE RELAYS, WIRING, AND CONTACTORS AS REQUIRED TO PERFORM THIS OPERATION. HOOD SHALL ALSO BE INTERLOCKED WITH NEW MOTORIZED DAMPER LOCATED WITHIN EXISTING ROOF-TOP UNIT LOCATED ON ROOF. WHEN HOOD COMES ON, IT SHALL OPERATE THE MOTORIZED DAMPER AS REQUIRED. PROVIDE 120V POWER CONNECTION TO MOTORIZED DAMPER AS REQUIRED. COORDINATE EXACT REQUIREMENTS WITH MECHANICAL CONTRACTOR.

LIGHT FIXTURE SCHEDULE

ICE

FIXT LTR	MANUFACTURER	CATALOG NUMBER	LAMPS NO	LAMPS TYPE	FIXT. VOLT.	FINISH	MOUNTING	REMARKS
A	HE WILLIAMS	7SS-4-L50/840-DIM-UNV	1	5,500 LUMEN LED	120V	STD	SURFACE	◇1 ◇2
B	HALO LIGHTING	SMD6S-6-940-WH	1	600 LUMEN LED	120V	STD	SURFACE	◇3
C	HE WILLIAMS	VWPH-L30/740-T3-DBZ-EM/4W-DIM-UNV	1	3,000 LUMEN LED	120V	STD	SURFACE	◇4
XA	MULE LIGHTING	SQC-LED-1-R-WW-HL	1	LED	120V	STD	SURFACE	◇5

LIGHT FIXTURE SCHEDULE NOTES

ICE

GENERAL NOTES:

a. GENERAL CONTRACTOR SHALL PROVIDE FIREPROOFING AROUND RECESSED FIXTURES INSTALLED IN FIRE RATED CEILING PER U.L. REQUIREMENTS. ELECTRICAL CONTRACTOR SHALL COORDINATE.

b. SEE SPECIFICATIONS FOR LAMP AND BALLAST TYPE. VERIFY LAMP COLOR WITH ARCHITECT PRIOR TO ORDERING.

c. PROVIDE ARROWS AND FACES AS INDICATED BY THE DRAWINGS.

d. MANUFACTURERS LISTED IN THIS SCHEDULE OR BY WRITTEN ADDENDUM WILL BE THE ONLY APPROVED MANUFACTURERS TO BID THE LIGHTING FIXTURES FOR THIS PROJECT. CONTRACTORS AND SUPPLIERS USING PRICING FROM MANUFACTURERS NOT LISTED ON SCHEDULE OR BY ADDENDUM DO SO AT THEIR OWN RISK.

e. FIXTURES BY WILLIAMS EQUAL TO THOSE SPECIFIED AND APPROVED BY THE ENGINEER WILL BE ACCEPTABLE: FIXTURE EQUALS SHALL BE MANUFACTURED THE SAME AS SPECIFIED UNITS, I.E., ENCLOSED SPRING LOADED LATCHES, ALUMINUM DOORS, POST PAINTED FINISH.

LIGHT FIXTURE SCHEDULE NOTES:

◇1 FIXTURES TO BE SURFACE MOUNTED TO WOOD BEAMS IN CLASSROOMS. PROVIDE MOUNTING BRACKETS AS REQUIRED.

◇2 FIXTURES TO BE INSTALLED 'END TO END'. HOWEVER THE CONTRACTOR SHALL LEAVE IN BETWEEN EACH FIXTURE A 4" GAP. BETWEEN THE FIXTURES. THIS GAP SHALL BE SHALL HAVE EMT CONDUIT THAT WILL ALLOW THE WIRING TO GO BETWEEN EACH FIXTURE. THE CONDUIT SHALL HAVE SET SCREW ENDS SO THAT THE FIXTURES CAN BE TAKEN APART. THE INTENT OF THE GAPS IS TO ALLOW THE DISTRICT STAFF TO TAKE DOWN ONE OF THE FIXTURES AS REQUIRED WITHOUT HAVING TO TAKE DOWN SEVERAL FIXTURES.

◇3 PROVIDE BACK-BOX AS REQUIRED FOR SURFACE MOUNT FIXTURES.

◇4 COORDINATE MOUNTING HEIGHT OF WALL PACK WITH ARCHITECT PRIOR TO ROUGH IN.

◇5 PROVIDE 90-MINUTE BATTERY WITH FIXTURE AS REQUIRED.

CU FEEDER SCHEDULE

ICE

FEEDER IDENT.	CONDUCTORS SETS	CONDUCTORS QUANT. PER SET	CONDUCTORS SIZE	GROUND SIZE PER SET	ISOLATED GRD. SIZE PER SET	CONDUIT SIZE PER SET
20.X	1	SEE NOTE 'b'	#12	#12	-----	1/2"
30.X	1	SEE NOTE 'b'	#10	#10	-----	1/2"
40.X	1	SEE NOTE 'b'	#8	#10	-----	3/4"
50.X	1	SEE NOTE 'b'	#6	#10	-----	1"
60.X	1	SEE NOTE 'b'	#4	#8	-----	1 1/4"
70.X	1	SEE NOTE 'b'	#4	#8	-----	1 1/4"
80.X	1	SEE NOTE 'b'	#3	#8	-----	1 1/4"
90.X	1	SEE NOTE 'b'	#2	#6	-----	1 1/4"
100.X	1	SEE NOTE 'b'	#1	#6	-----	1 1/2"
150.X	1	SEE NOTE 'b'	#1/0	#6	-----	2"
200.X	1	SEE NOTE 'b'	#3/0	#6	-----	2"
225.X	1	SEE NOTE 'b'	#4/0	#4	-----	2-1/2"
250.X	1	SEE NOTE 'b'	#250 KCMIL	#4	-----	2-1/2"
300.X	1	SEE NOTE 'b'	#350 KCMIL	#4	-----	3"
400.X	1	SEE NOTE 'b'	#500 KCMIL	#3	-----	3-1/2"
450.X	2	SEE NOTE 'b'	#4/0	#2	-----	2-1/2"
500.X	2	SEE NOTE 'b'	#250 KCMIL	#2	-----	2-1/2"
600.X	2	SEE NOTE 'b'	#350 KCMIL	#1	-----	3"
800.X	2	SEE NOTE 'b'	#500 KCMIL	#1/0	-----	3-1/2"
1200.X	4	SEE NOTE 'b'	#350 KCMIL	#3/0	-----	3"
1600.X	5	SEE NOTE 'b'	#400 KCMIL	#4/0	-----	3-1/2"

FEEDER SCHEDULE NOTES:

a. THIS PROJECT MAY NOT REQUIRE ALL FEEDER TYPES LISTED IN THIS SCHEDULE.

b. THE NUMBER OF CONDUCTORS WILL BE BASED ON THE FOLLOWING NOTATION AT THE END OF EACH FEEDER TAG:

EXAMPLE: XXXX.X
AMPACITY

XXXX.XS: INDICATES THE SERVICE FEEDER SIZE, AND NUMBER OF CONDUCTORS. NO GROUND SHALL BE REQUIRED FOR SERVICE FEEDERS.

XXXX.2: INDICATES (2) HOT CONDUCTORS (OR 1 HOT + 1 NEUTRAL) FOR SINGLE PHASE CONNECTIONS

XXXX.3: INDICATES (3) HOT CONDUCTORS FOR THREE PHASE CONNECTIONS,(OR 2 HOT +1 NEUTRAL) FOR SINGLE PHASE CONNECTIONS

XXXX.4: INDICATES (3) HOT CONDUCTORS & (1) NEUTRAL CONDUCTOR. FOR THREE PHASE CONNECTIONS

SYMBOL LIST

ICE

SYMBOL	DESCRIPTION	MOUNTING
A	FLUORESCENT FIXTURE & FIXTURE LETTER	CEILING
A	FLUORESCENT FIXTURE & FIXTURE LETTER	CEILING
A A	INCAND. OR H.I.D. FIXTURE & FIXT. LETTER	SURF./RECESSED
A	INCAND. OR H.I.D. FIXTURE & FIXT. LETTER	WALLBRACKET
	EXIT FIXT. - SHADING DENOTES FACE(S)	CEIL./WALL
E	EMERGENCY LIGHT	CEIL./WALL
	GFCI DUPLEX GROUNDED RECEPTACLE	1'-3" AFF
	DUPLEX GROUNDED RECEPTACLE	1'-3" AFF
	EXTERIOR GFCI RECEPT. WEATHERPROOF	1'-3" AFF
	DOUBLE DUPLEX RECEPTACLE	1'-3" AFF
	SPECIAL OUTLET, SEE SCHEDULE OR AS NOTED	
	OCCUPANCY SENSOR, SEE SCHEDULE OR AS NOTED	
	PHONE/DATA OUTLET	1'-3" AFF
	DATA OUTLET	1'-3" AFF
	CATV OUTLET	1'-3" AFF
	SWITCHED RECEPTACLE	1'-3" AFF
	TELEPHONE OUTLET (P=PAY, 44")(W= 44")	1'-3" AFF
$ $3 $4 $PK	SWITCHES (1-POLE,3-WAY,4-WAY,PILOT,KEY)	4'-0" TO TOP
	PUSH BUTTON	
J	JUNCTION BOX	
F	FUSTAT	
	SPECIAL DEVICE AS NOTED ON PLAN	
A	BRANCH CIRCUIT PANEL & PANEL DESIG.	6'-6"TO TOP
30/3/240	H.D. SAFETY SWITCH (AMPS,POLE,VOLTAGE)	6'-6"TO TOP
0/3/240	STARTER (SIZE,POLE,VOLTAGE)	6'-6"TO TOP
X	PLAN NOTE	
	MOTOR	
	CONDUIT RUN W/ CONDUCTORS SEE NOTE #7	CEIL./WALL
	CONDUIT RUN 2 CIRCUIT, SEE NOTE #7	EARTH/FLOOR
	PARTIAL HOMERUN (MULTIPLE LOAD LOCATIONS)	
30.3 3#10	FEEDER 30.3 30A CIRCUIT SEE NOTE #7	
	CIRCUIT SUPPLIED FROM EMERGENCY SYSTEM	
XXX.X	FEEDER IDENTIFICATION, SEE SCHEDULE	
CT	SEE NOTE #9	
WP	WEATHERPROOF	
EM	ITEM SUPPLIED FROM EMERGENCY SYSTEM	
a,b,c	INDICATES SWITCHING SCHEME	
TP	TAMPER PROOF	
	FIRE ALARM MANUAL STATION	4'-0" TO TOP
	COMB. F.A. HORN & VISUAL SIGNAL	WALL 80"AFF
	FIRE ALARM VISUAL SIGNAL	WALL 80"AFF
	AREA SMOKE DETECTOR, SEE GEN. NOTE #11	CEIL./WALL
	HEAT DETECTOR	CEIL./WALL

GENERAL NOTES

ICE

1. VERIFY ALL OUTLET LOCATIONS ON THE JOB PRIOR TO ROUGH-IN.
2. REFER TO RELATED ARCHITECTURAL, MECHANICAL, AND STRUCTURAL DRAWINGS FOR RELATED INFORMATION.
3. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
4. COORDINATE OUTLET BOX LOCATIONS WITH MASONRY TO MINIMIZE CUTTING OF BRICK OR BLOCK.
5. ALL MOUNTING HEIGHTS TO BOTTOM OF ITEM UNLESS OTHERWISE NOTED.
6. E.C. SHALL REFER TO MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE REQUIREMENTS ASSOCIATED WITH WIRING AND CONNECTION OF INTERLOCKING AND CONTROLS OF MECHANICAL UNITS AND THERMOSTAT LOCATIONS.
7. CONDUIT RUN W/CONDUCTORS AS INDICATED, CONDUIT SIZE AS REQUIRED. CONDUIT RUN TO PANEL DEVICE SIZE AS INDICATED (AMP/ POLE). CIRCUIT WITHOUT INDICATION IS ROUTED TO 20A.,1P. BREAKER. CONDUCTOR COUNT IS NOT SHOWN ON THE DRAWINGS FOR #12 SIZE CONDUCTORS. ELECTRICAL CONTRACTOR SHALL PROVIDE NUMBER OF CONDUCTORS AS REQUIRED FOR CIRCUITING, SWITCHING AND/OR CONTROL AS REQUIRED. ALL REQUIREMENTS OF THE CURRENT NATIONAL ELECTRICAL CODE SHALL BE FOLLOWED FOR CONDUIT FILL AND CONDUCTOR DE-RATING IF APPLICABLE.
8. EXIT LIGHTS AND EMERGENCY LIGHT FIXTURES WITH BATTERY BACKUP SHALL BE CIRCUITED WITH UNSWITCHED HOT CONDUCTOR FROM AREA LIGHTING CIRCUIT FOR POWER SENSING AND CHARGING. IN ADDITION, PROVIDE SWITCHED CIRCUITS TO ANY REQUIRED EMERGENCY LIGHT FIXTURES REQUIRING SAME FOR LOCAL AREA CONTROL.
9. "CT" INDICATED ADJACENT TO DEVICE INDICATES DEVICE IS MOUNTED ABOVE BACKSPLASH OF COUNTER TOP. VERIFY EXACT HEIGHT WITH ARCHITECTURAL PLANS AND ELEVATIONS.
10. A GROUND CONDUCTOR SIZED PER N. E. C. ARTICLE 250 IS REQUIRED IN ALL POWER, RECEPTACLE, AND LIGHTING CIRCUITS. GROUND CONDUCTORS ARE NOT SHOWN ON DRAWINGS.
11. WHERE AREA SMOKE DETECTORS ARE SHOWN ON THE DRAWINGS ELECTRICAL CONTRACTOR SHALL NOT LOCATE SMOKE DETECTORS CLOSER THAN 4 FEET FROM ANY MECHANICAL AIR SUPPLY OR RETURN DIFFUSER, GRILLE, OR REGISTER PER NFPA. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR LOCATION OF DETECTOR.
12. AT EVERY SMOKE OR FIRE/SMOKE DAMPER ELECTRICAL CONTRACTOR SHALL INSTALL A DUCT SMOKE DETECTOR AND RELAY TO CLOSE DAMPER AND SHUT DOWN ASSOCIATED MECH UNIT ON ACTIVATION OF DETECTOR. REFER TO MECHANICAL PLANS AND SPECIFICATIONS AND/OR MECHANICAL CONTRACTOR FOR LOCATIONS AND CONTROL REQUIREMENTS. PROVIDE 120V. CONTROL POWER AT DAMPER IF REQUIRED. IF REQUIRED BY THE FIRE ALARM SYSTEM SUPPLIER, MECHANICAL CONTRACTOR SHALL MODIFY DUCTWORK WHERE FIRE/SMOKE DAMPERS ARE LOCATED AS REQUIRED TO INSTALL DUCT SMOKE DETECTORS IN THE DUCTWORK AT THE FIRE/SMOKE DAMPER LOCATIONS. NOT ALL SMOKE OR FIRE/SMOKE DAMPERS MAY BE SHOWN ON THE DRAWINGS, HOWEVER, ALL SMOKE OR FIRE/SMOKE DAMPERS SHALL BE PROVIDED WITH ABOVE REQUIREMENTS.

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2017
UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
UNIFIED SCHOOL DISTRICT #463

DRAWINGS ISSUED		
NO.	DATE	ITEM ISSUED
4	11/21	ISSUED FOR BIDS
3	11/13	BOE MEETING
2	10/23	REVIEW
1	10/11	CONSTRUCT DOCS

COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV
CHECKED BY: DR

ELECTRICAL SCHEDULES

E1.1

17316.00-107

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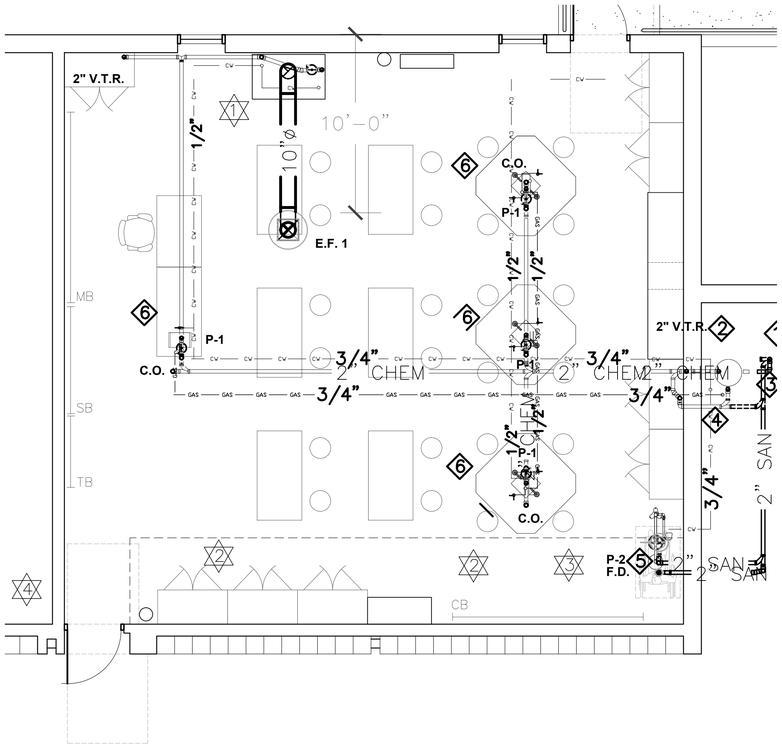
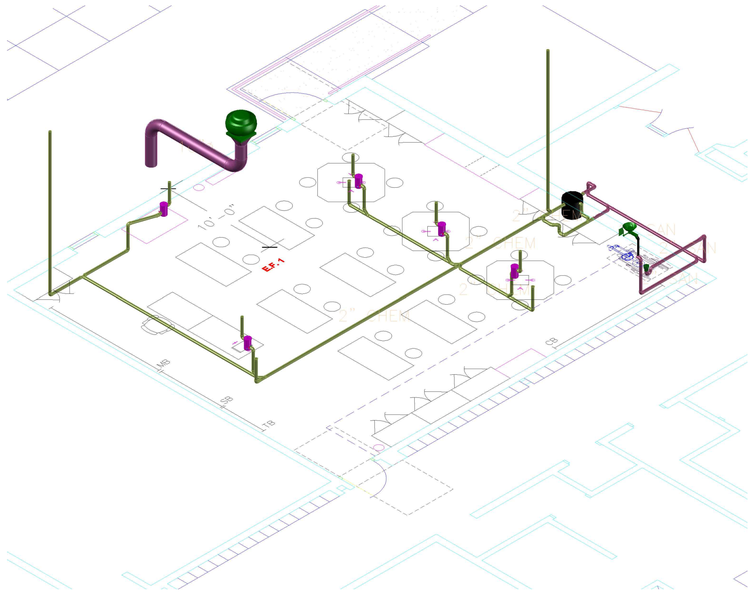


MECHANICAL PLUMBING FLOOR PLAN

SCALE 1/4"=1'0"

NORTH



ISOMETRIC

NO SCALE

PLUMBING PLAN NOTES:

PLUMBING CONTRACTOR TO MAKE A SITE VISIT BEFORE BIDDING THE PROJECT
REMOVE AND CAP ALL UNUSED EXISTING PIPING

1. **TIE INTO EXISTING SANITARY SEWER FIELD VERIFY EXACT LOCATION**
2. **PROVIDE SPEARS 5 GALLON CPVC ACID WASTE TANK WITH LIMESTONE CHIPS**
3. **TIE INTO EXISTING COLD WATER WITH WATTS BACKFLOW PREVENTOR AND SHUT OFF BALL VALVE FIELD VERIFY EXACT LOCATION**
4. **TIE INTO EXISTING NATURAL GAS PROVIDE GAS VALVE FIELD VERIFY EXACT LOCATION**
5. **MOVE EXISTING EYE WASH & SHOWER FIELD VERIFY EXACT LOCATION**
6. **PROVIDE EACH LAB SINK WITH SHUT OFF VALVES FOR DOMESTIC WATER AND GAS**

H.V.A.C. PLAN NOTES:

1. 10ø" 316 STAINLESS DUCT UP TO EF1 GROUND AND POLISH ALL JOINTS. HOOD BY OWNER
2. REMOVE AND REINSTALL SUPPLY GRILLES TO NEW SOFFIT
3. PROVIDE NEW 42"X16" TRANSFER GRILLE EQUAL TO TITUS 24 RL.
4. PROVIDE NEW MOTORIZED FRESH AIR HOOD FOR EXISTING ROOF TOP UNIT. E.C. TO WIRE MOTOR TO COME ON WITH EXHAUST FAN. SET DAMPER TO 500 CFM.

Plumbing Fixtures

Sink, faucets, gas cocks and vacuum breakers are provided by the owner.

P.C. to provide all chemical piping including a Lab Waste 15 gallon HDPE Round Neutralization tank with limestone and vent connection. Provide Watts SI-742 at all sinks and chemical drains.

P.C. to provide ball valves for water to each fixture and gas cocks for each fixture. The hood requires water and drain but no gas connection.

Floor Drain Zurn ZN415-6S floor drain w/round strainer and Sure Seal SS3509 Trap Guard

Cleanout- (Interior) Zurn ZN-1400 C.I. Floor Cleanout with adjustable N.B. top.

Wall Cleanout (Interior) Zurn Z-1468 access cover and c/o plug

WORK BY G.C.

1. PROVIDE ALL FRAMED OPENINGS FOR MECHANICAL WORK.
2. MOP IN ALL MECHANICAL CURBS AND VENTS FURNISHED BY M.C.
3. PROVIDE STRUCTURAL SUPPORT FOR MECH EQUIP AS REQUIRED.
4. CUT, PATCH ALL FLOORS, WALLS, CEILING AND ROOF AS REQUIRED FOR M.C., P.C.

WORK BY E.C.

1. PROVIDE ALL POWER AND CONTROL WIRING.
2. PROVIDE ALL SMOKE DETECTORS AS REQUIRED.
3. PROVIDE 115V UTILITY OUTLETS AS REQUIRED BY CODE.

PLUMBING GENERAL NOTES:

1. THE PLUMBING CONTRACTOR SHALL FIELD VERIFY ALL EXISTING JOB CONDITIONS PRIOR TO STARTING WORK, ORDERING EQUIPMENT, FABRICATION OF MATERIALS, ETC.
2. THE PLUMBING CONTRACTOR SHALL COMPLY AND INSTALL ALL WORK IN ACCORDANCE TO UNIFORM PLUMBING CODE, AND ALL CITY, COUNTY AND STATE CODES.
3. THE PLUMBING DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW APPROXIMATE LOCATION OF EQUIPMENT AND PIPING. EXACT LOCATION OF FIXTURES, EQUIPMENT, ETC. SHALL BE COORDINATED WITH WORK OF OTHER TRADES.
5. DO NOT ROUTE PIPING ABOVE ELECTRICAL PANELS, COORDINATE WITH ELECTRICAL CONTRACTOR.
6. FIELD VERIFY ALL EXISTING UTILITIES BEFORE STARTING WORK.
7. PROVIDE ALL EQUIPMENT AND FIXTURES WITH ISOLATING VALVES LOCATED CONVENIENTLY, USE ONLY FULL FLOW BALL VALVES.
8. ALL WASTE PIPING SHALL MAINTAIN A SLOPE OF 1/4" PER FOOT.
9. SUBMIT SHOP DRAWINGS ON EACH PIECE OF EQUIPMENT, PLUMBING FIXTURES, PIPE INSULATION, ETC. FOR REVIEW AND APPROVAL.
10. SUPPORT ALL PIPING AND ANCHOR TO BUILDING STRUCTURE PER CODE.
11. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF HIS MATERIAL AND TRASH.
12. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS FOR HIS WORK.
13. PLUMBING CONTRACTOR SHALL COORDINATE GAS,SEWER AND WATER SERVICE WITH UTILITIES AND PAY FOR ASSOCIATED FEES AND METER CHARGES.
14. PLUMBING CONTRACTOR SHALL COORDINATE HIS WORK WITH OWNER TO AVOID SHUTDOWNS.
15. ALL MATERIAL SHALL BE NEW AND OF BEST QUALITY.
16. PROVIDE 12" AIR CHAMBER AT EACH FIXTURE FOR THE HOT AND COLD WATER.
17. ALL PIPING SHALL BE TESTED AND INSPECTED BEFORE COVERING UP.
18. PLUMBING CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, MATERIAL AND WORKMANSHIP FURNISHED BY HIM AND SHALL BE FREE FROM DEFECT. SHOULD ANY SUCH DEFECT APPEAR WITHIN ONE (1) YEAR FROM DATE OF ACCEPTANCE OF THE INSTALLATION SAME SHALL BE REPAIRED OR REPLACED AT NO COST TO THE OWNER.
19. PLUMBING CONTRACTOR SHALL PROVIDE OWNER WITH ONE (3) RING BINDER WITH PLUMBING FIXTURES, OPERATION AND MAINTENANCE MANUALS.

MATERIAL SPECIFICATIONS:

1. ALL WASTE & VENT PIPING SHALL BE SPEARS LAB WASTE SCH 80 WITH DWV FITTINGS.
2. ALL UNBURIED DOMESTIC WATER PIPING SHALL BE TYPE "L" HARD COPPER. AT CONTRACTOR'S OPTION VIEGA PROPRESS FITTINGS MAY BE USED.
3. ALL BURIED DOMESTIC WATER PIPING SHALL BE TYPE "K" SOFT COPPER. BURIED LINES SHALL HAVE NO JOINTS OR BE SILVER SOLDERED.
4. ALL GAS PIPING SHALL BE STEEL SCH. 40 BLACK PIPE. AT CONTRACTOR'S OPTION VIEGA MEGA PRESS FITTINGS MAY BE USED, WELD PIPE LARGER THAN 2". PROVIDE COATED STEEL PIPE WITH WRAPPED JOINTS IF BURIED.
6. INSULATE ALL HOT AND COLD WATER WITH 1" THICK ARMAFLEX OR FIBERGLASS INSULATION. UP TO 2" AND 1-1/2" ABOVE 2". RUNOUTS MAY BE 1/2". PROVIDE HEAT TRAPS ON HOT WATER HEATERS THAT DO NOT CIRCULATE. WHERE WATER PIPING IS RUN ABOVE FLOOR IT SHALL BE RUN ON WARM SIDE OF INSULATION.
7. HOT WATER FLUE SHALL BE TYPE "B" VENT
8. VERIFY GAS EQUIPMENT SIZING WITH HVAC CONTRACTOR
9. DOMESTIC WATER SERVICE MAY BE SCH. 40 PVC.
10. USE METALLIC PIPE IN FIRE RATED WALLS.
11. ALL NON METALLIC PIPE IN R.A. PLENUM MUST BE ONE OF THREE METHODS. C-P.V.C. SCH 80 OR CAST IRON OR WRAPPED BY A CERTIFIED INSTALLER OF THERMAL CERAMIC'S PLENUM WRAP +. OR APPROVED EQUAL. PROVIDE GAS SHUT OFF VALVES, UNIONS AND DRIP LEGS TO ALL GAS EQUIPMENT.

EXHAUST FAN SCHEDULE

				FAN					ELECTRICAL				
MARK	MANUF.	MODEL NUMBER	C.F.M	EXT. S.P.	BHP	MHP	ZONES	T.S.	DRIVE	RPM	VOLTAGE	TEMPERATURE	NOTES
E.F. 1	COOK	ACRUD 101R15D	567	.5	N/A	1/8	6.5	3858	DIRECT	1512	115/1/60	70	1,2,3,4,5

NOTES:
1. FURNISH EXHAUST FANS WITH BACKDRAFT DAMPER, ALUMINUM BIRD SCREEN, DISCONNECT, SPEED CONTROLLER.
2. ALL FANS ARE SELECTED AT 1339 FT ELEVATION.
3. GREENHECK, CARNES, JENN-AIR, PENN, TWIN CITY ARE APPROVED EQUALS.
4. PROVIDE WITH COOK 12" HIGH ROOF CURB OR EQUAL.
5. E.C. TO SWITCH FAN WITH HOOD.
6. PROVIDE FACTORY EPOXY COATING FOR FAN.

FIXTURE SCHEDULE

		WATER					
MARK	FIXTURE	COLD CONN.	HOT CONN.	WASTE CONN.	VENT	GAS	FURNISHED BY
P-1	LAB SINK	1/2"	0	2"	2"	1/2"	OWNER
P-2	EYE WASH	1/2"	0	2"	1-1/2"		OWNER

PLUMBING SYMBOL SCHEDULE

MARK	DESCRIPTION	MARK	DESCRIPTION
SAN	SANITARY SEWER	F.D.	FLOOR DRAIN
SANV	PLUMBING VENT LINE	C.O.	CLEANOUT
CW CW	DOMESTIC COLD WATER LINE		GAS VALVE
HW HW	DOMESTIC HOT WATER LINE		BALL VALVE
HWR HWR	DOMESTIC HOT WATER RECIRCULATING		UNION
GAS GAS	NATURAL GAS LINE	V.T.R.	VENT THROUGH ROOF
2" CHEM	CHEMICAL DRAIN	CW FV	WALL HYDRANT (FREEZE PROOF)
		D D	CONDENSATE DRAIN

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NANCY E. HANNEY LICENSED 16026 11-20-17 KANSAS PROFESSIONAL ENGINEER

2017 UDALL HIGH SCHOOL SCIENCE CLASSROOM REMODEL UNIFIED SCHOOL DISTRICT #463

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COMPUTER DRAWING

DATE: NOVEMBER 2017	
DRAWN BY:	CHECKED BY:
RJB	NH

SHEET

MP1.1

OF 1 SHEETS

MECHANICAL CONCEPTS L.L.C.
14801 TIMBERLAKE RD.
WICHITA, KANSAS 67230
PHONE 316-733-2718
FAX 877-839-4680
EMAIL
RB@RICHARDBOWMAN.US

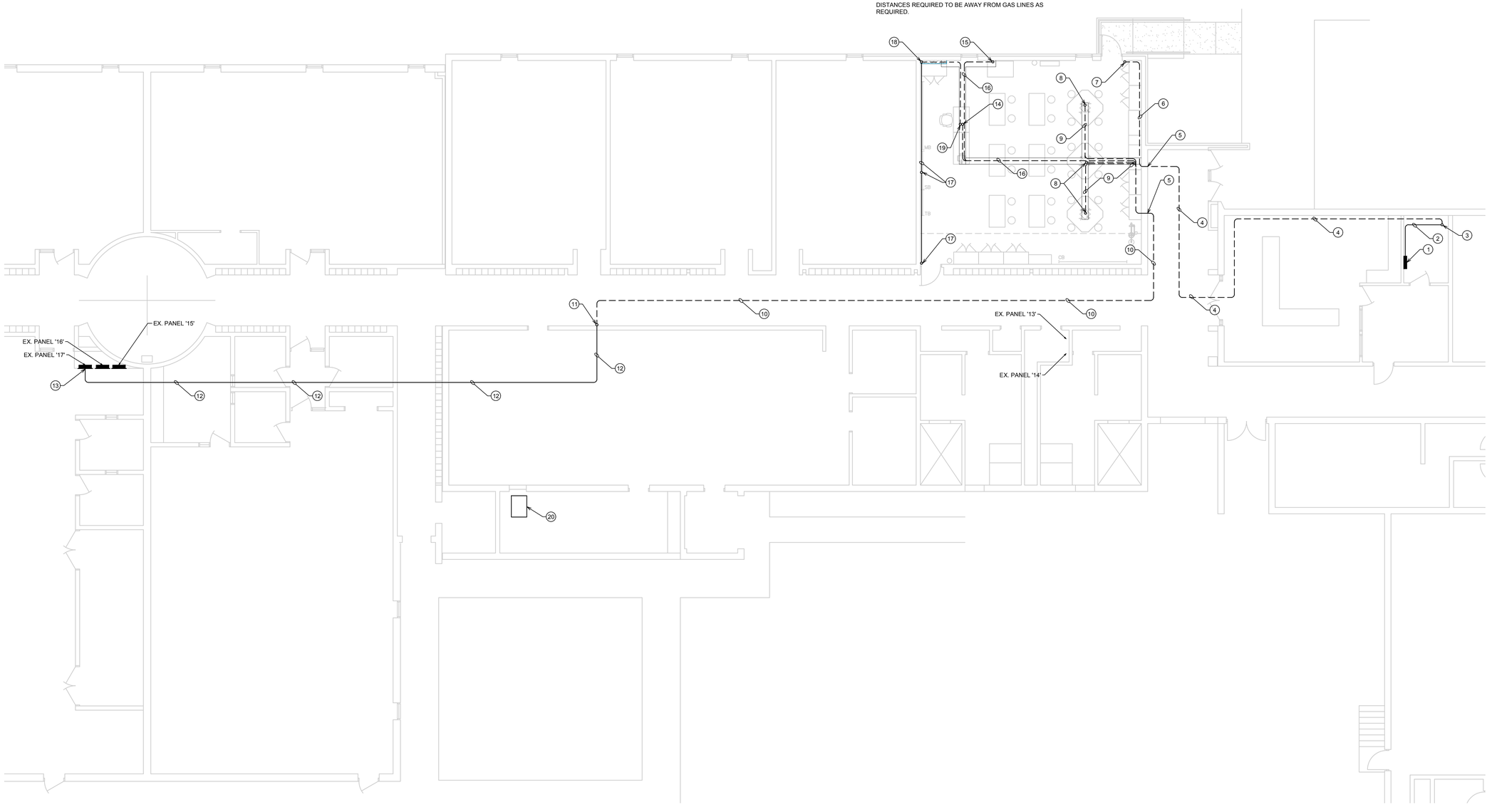
GENERAL NOTES:

1. ALL CIRCUITS INDICATED ON DRAWINGS SHALL BE 20A, 120V CIRCUITS WITH (2)-#12'S AND (1)-#12 G. IN 0.5" CONDUIT U.O.N.
2. LABEL ALL SNAP SWITCH COVERPLATES WITH THE PANEL AND CIRCUIT NUMBER.
3. REFER TO RELATED ARCHITECTURAL DRAWINGS FOR RELATED INFORMATION.
4. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
5. WALL MOUNTING HEIGHTS TO CENTERLINE OF DEVICE UNLESS OTHERWISE NOTED.
6. A GROUND CONDUCTOR SIZED PER N.E.C. ARTICLE 250 IS REQUIRED IN ALL POWER, RECEPTACLE, AND LIGHTING CIRCUITS. GROUND CONDUCTORS ARE NOT SHOWN ON DRAWINGS.

PLAN NOTES:

1. EXISTING FIRE ALARM CONTROL PANEL. EXISTING SYSTEM IS SILENT KNIGHT #SK-5208. CONTRACTOR SHALL MODIFY AND EXPAND AS REQUIRED TO ADD NEW DEVICES SHOWN ON DOCUMENTS.
2. FIRE ALARM CABLING TO BE ROUTED OVERHEAD TO TUNNEL ENTRY LOCATED WITHIN OFFICE STORAGE ROOM.
3. ROUTE FIRE ALARM CABLING DOWN INTO TUNNEL AT THIS LOCATION.
4. ROUTE FIRE ALARM CABLING THRU EXISTING TUNNEL SYSTEMS. PROVIDE CABLING SUPPORTS AS REQUIRED.
5. CONTRACTOR SHALL DRILL THRU EXISTING TUNNEL WALL AS REQUIRED TO GET INTO NEW UTILITY TRENCH LOCATED WITHIN EAST WALL OF CLASSROOM. ALL CABLING OR POWER CONDUCTORS THAT ARE LOCATED WITHIN UTILITY TRENCH SHALL BE LOCATED WITHIN EMT CONDUIT AND HAVE COMPRESSION FITTINGS.
6. ROUTE FIRE ALARM CABLING THRU UTILITY TRENCH AS REQUIRED TO GET TO NEW DEVICES. ALL CABLING TO BE INSTALLED IN CONDUIT WITH COMPRESSION FITTINGS AS REQUIRED.
7. FIRE ALARM CABLING TO BE ROUTED OUT OF UTILITY TRENCH AND UP TO NEW SURFACE MOUNTED FIRE ALARM DEVICES. CONTRACTOR SHALL PROVIDE SURFACE MOUNTED WIRE MOLD AS REQUIRED. WIRE MOLD COLOR TO MATCH PAINT COLOR.
8. POWER CONDUCTORS TO BE ROUTED DOWN FROM LAB TABLE INTO UTILITY CHASE. ALL CONDUCTORS TO BE ROUTED IN EMT CONDUIT WITH COMPRESSION FITTINGS. CONTRACTOR TO MAINTAIN MINIMUM DISTANCES REQUIRED TO BE AWAY FROM GAS LINES AS REQUIRED.
9. POWER CONDUCTORS TO BE ROUTED IN UTILITY CHASE. ALL POWER CONDUCTORS TO BE ROUTED IN EMT CONDUIT WITH COMPRESSION FITTINGS AND BE IN INSTALLED ABOVE ANY PLUMBING, WASTE, AND GAS LINES.
10. POWER CONDUCTORS TO BE ROUTED IN TUNNELS. ALL POWER CONDUCTORS TO BE ROUTED IN EMT CONDUIT WITH COMPRESSION FITTINGS.
11. CONTRACTOR TO CONVERT FROM EMT CONDUIT TO MC CABLING TO ROUTE CIRCUITS UP THRU NEW ARCH CHASE. CONTRACTOR SHALL ROUTE MC CABLING UP THRU NEW ARCHITECTURAL CHASE LOCATED WITHIN CORRIDOR UP TO BLOCK WALL (CONTRACTOR TO CONVERT TO EMT CONDUIT ONCE ABOVE THE PLYWOOD CHASE) AND PUNCH THRU THE WALL TO GET ABOVE AN ACCESSIBLE CEILING AREA.
12. CONTRACTOR TO ROUTE CIRCUITS (LOCATED WITHIN EMT CONDUIT) ABOVE ACCESSIBLE CEILING.
13. CIRCUITS TO BE ROUTED TO EXISTING PANEL "17.
14. POWER CONDUCTORS TO BE ROUTED DOWN FROM TEACHERS LAB TABLE INTO UTILITY CHASE. ALL CONDUCTORS TO BE ROUTED IN EMT CONDUIT WITH COMPRESSION FITTINGS.
15. APPROXIMATE LOCATION OF SURFACE MOUNTED RECEPTACLE ASSOCIATED WITH NEW HOOD. ROUTE CONDUCTORS IN SURFACE MOUNTED RACEWAY FROM OUTLET INTO UTILITY CHASE. ALL POWER CONDUCTORS SHALL BE INSTALLED ABOVE ALL PLUMBING LINES IN UTILITY CHASE. CONTRACTOR TO MAINTAIN MINIMUM DISTANCES REQUIRED TO BE AWAY FROM GAS LINES AS REQUIRED.
16. ROUTE CIRCUITS THRU NEW UTILITY CHASE. ALL POWER CONDUCTORS SHALL BE INSTALLED ABOVE ALL PLUMBING LINES IN UTILITY CHASE AND BE LOCATED WITHIN EMT CONDUIT WITH COMPRESSION FITTINGS. CONTRACTOR TO MAINTAIN MINIMUM DISTANCES REQUIRED TO BE AWAY FROM GAS LINES AS REQUIRED.
17. CONTRACTOR TO ROUTE A/V CABLES ASSOCIATED WITH SMARTBOARD AND NEW DATA CABLING THRU NEW SURFACE MOUNTED RACEWAY MOUNTED ABOVE EXISTING WHITE BOARD. RACEWAY COLOR TO MATCH PAINT. PROVIDE NEW A/V CABLES AS REQUIRED, COORDINATE A/V CABLE TYPE WITH EXISTING SMART BOARD.
18. A/V LINES AND DATA CABLING TO BE ROUTED IN ARCHITECTURAL CHASE DOWN TO BELOW FLOOR LEVEL IN FLOOR CUT AS REQUIRED. ROUTE A/V CABLES TO TEACHERS DESK AS REQUIRED. PROVIDE NEW A/V AND DATA CABLES AS REQUIRED. COORDINATE EXACT TYPE WITH OWNER PRIOR TO INSTALL.
19. ROUTE A/V AND DATA CABLES UP INTO TEACHER LAB TABLE. COORDINATE EXACT STUB-UP POINT WITH DISTRICT PRIOR TO INSTALL.
20. EXISTING I.T. PATCH PANEL RACK. CONTRACTOR SHALL ROUTE NEW CAT 6 CABLING THRU EXISTING ROUTE THAT ALL OTHER CAT6 CABLING IS TAKING BACK TO CLASSROOM. PROVIDE ADDITIONAL SURFACE MOUNTED RACEWAYS AS REQUIRED.

CONDUIT AND CIRCUIT ROUTING SHOWN ON THIS DRAWING IS INTENDED TO GIVE THE CONTRACTOR AN IDEA OF HOW THESE ITEMS SHALL BE ROUTED. THIS IS NOT INTENDED TO BE AN AS-BUILT OF HOW IT SHOULD BE DONE. THE CONTRACTOR SHALL VERIFY THE EXISTING ROUTING WITH ALL THE EXISTING CONDITIONS IN THE FIELD AS REQUIRED.



A PARTIAL OVERALL FLOOR PLAN - ELECTRICAL
SCALE: 1/8" = 1'-0"

NORTH

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2017
UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
UNIFIED SCHOOL DISTRICT #463

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1	10/11	CONSTRUCT DOCS

COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV
CHECKED BY: DR

PARTIAL OVERALL FLOOR PLAN - ELECTRICAL

E2.0

17316.00-107

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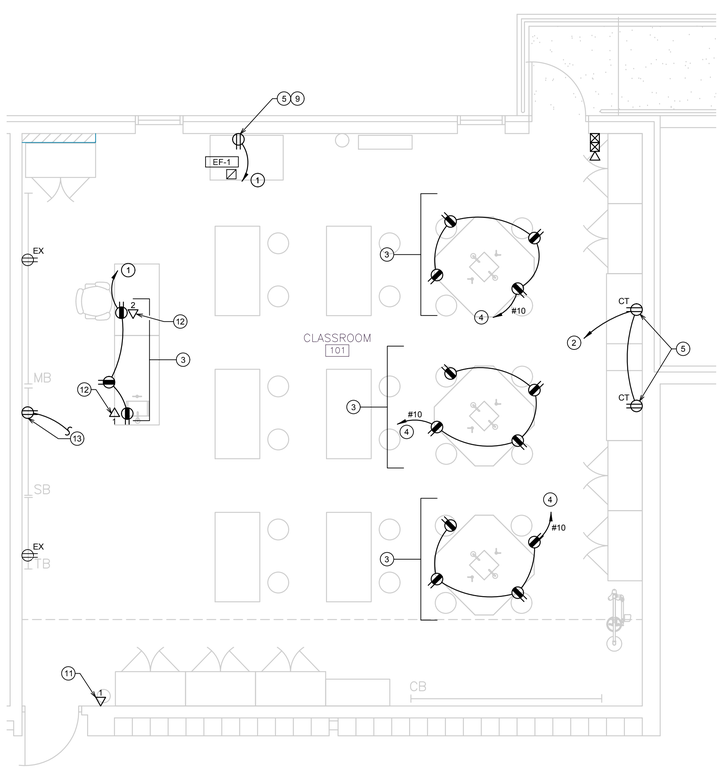
ALL NEW ELECTRICAL DEVICES LOCATED ON EXISTING WALLS (THAT ARE NOT BEING FURRED OUT) SHALL BE SURFACE MOUNTED. CONTRACTOR SHALL MAKE BEST EFFORT TO FEED ALL NEW SURFACE MOUNTED DEVICES FROM BEHIND TO MINIMIZE SURFACE MOUNTED RACEWAYS. CONTRACTOR SHALL COORDINATE WALL TYPES WITH ARCHITECTURAL DRAWINGS. CONTRACTOR TO VERIFY LOCATION OF ANY SURFACE MOUNTED RACEWAYS WITH ARCHITECT/ENGINEER PRIOR IN INSTALL. THE COLOR OF NEW SURFACE MOUNTED RACEWAY SHALL MATCH THE WALLS.



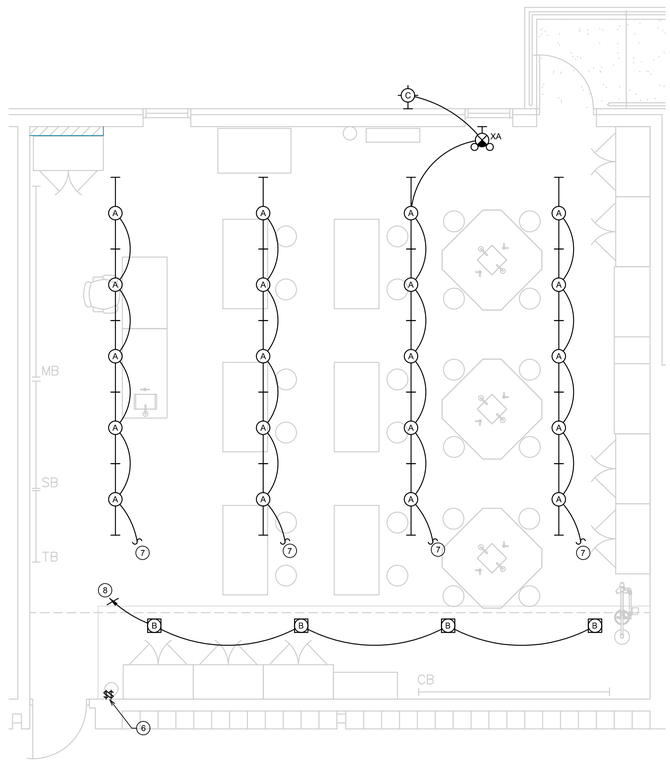
A ENLARGED FLOOR PLAN - POWER

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

NORTH

0 2' 4' 8'

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



B ENLARGED FLOOR PLAN - LIGHTING

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

NORTH

0 2' 4' 8'

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

GENERAL NOTES:

1. ALL CIRCUITS INDICATED ON DRAWINGS SHALL BE 20A, 120V CIRCUITS WITH (2)-#12'S AND (1)-#12 G. IN 0.5" CONDUIT U.O.N.
2. LABEL ALL SNAP SWITCH COVERPLATES WITH THE PANEL AND CIRCUIT NUMBER.
3. REFER TO RELATED ARCHITECTURAL DRAWINGS FOR RELATED INFORMATION.
4. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
5. WALL MOUNTING HEIGHTS TO CENTERLINE OF DEVICE UNLESS OTHERWISE NOTED.
6. A GROUND CONDUCTOR SIZED PER N.E.C. ARTICLE 250 IS REQUIRED IN ALL POWER, RECEPTACLE, AND LIGHTING CIRCUITS. GROUND CONDUCTORS ARE NOT SHOWN ON DRAWINGS.

PLAN NOTES:

1. CONNECT TO EXISTING 120V CIRCUIT MADE POSSIBLE BY DEMOLITION OF CIRCUITS FROM EXISTING PANEL '13'. PROVIDE NEW 20A/1P CIRCUIT BREAKER AS REQUIRED. REFER TO E2.0 FOR PROPOSED CIRCUIT ROUTING.
2. CONNECT TO SAME SPARE CIRCUIT AT TEACHERS LAB TABLE IN FRONT OF CLASSROOM. CIRCUIT TO BE CONNECTED TO 120V CIRCUIT MADE POSSIBLE BY DEMOLITION OF CIRCUITS IN EXISTING PANEL '13'.
3. ELECTRICAL DEVICES LOCATED WITHIN LAB TABLE. COORDINATE EXACT ROUGH IN LOCATIONS WITH LAB TABLE MANUFACTURE PRIOR TO ROUGH IN.
4. CONNECT TO AVAILABLE 120V CIRCUIT IN EXISTING PANEL '17'. PROVIDE NEW 20A/1P CIRCUIT BREAKER AS REQUIRED. REFER TO E2.0 FOR PROPOSED CIRCUIT ROUTING.
5. PROVIDE SURFACE MOUNT BOX FOR DUPLEX RECEPTACLE AS REQUIRED. COLOR TO BE SELECTED BY ARCHITECT. ALL SURFACE MOUNTED RACEWAY TO BE FEED FROM UTILITY TRENCH. RACEWAY COLOR TO MATCH PAINT.
6. PROVIDE SURFACE MOUNT BOX FOR NEW TOGGLE SWITCHES. SWITCHES SHALL CONTROL EXISTING LIGHT CIRCUITS. CONTRACTOR TO COORDINATE COLOR OF BOX WITH ARCHITECT. ALL SURFACE MOUNT WIRE MOLD RACEWAYS TO MATCH COLOR OF WALL.
7. CONNECT NEW LIGHT FIXTURES TO EXISTING LIGHTING CIRCUIT AND CONTROL THAT SERVED PREVIOUS FIXTURES.
8. CONNECT TO EXISTING 120V LIGHTING CIRCUIT IN SPACE.
9. COORDINATE POWER REQUIREMENTS ASSOCIATED WITH HOOD WITH HOOD MANUFACTURE. MAKE REVISIONS TO MOUNTING LOCATION AND WIRING AS REQUIRED TO COORDINATE WITH HOOD. HOOD POWER SHALL BE INTERLOCKED WITH EXHAUST FAN 'EF-1'. WHEN HOOD TURNS ON, THEN EF-1 SHALL TURN ON. COORDINATE EXACT WIRING WITH HOOD MANUFACTURE AND MECHANICAL CONTRACTOR.
10. NEW FIRE ALARM DEVICES SHALL BE SURFACE MOUNTED TO BLOCK WALL. ALL SURFACE MOUNTED RACEWAYS TO MATCH COLOR OF WALLS. ALL WIRING TO GO INTO UTILITY TRENCH.
11. NEW DATA DROP LOCATED HIGH ON WALL FOR CONNECTION TO WIRELESS AP DEVICE. PROVIDE SURFACE MOUNTED RACEWAYS AS REQUIRED. COORDINATE EXACT LOCATION WITH DISTRICT I.T. STAFF PRIOR TO ROUGH IN.
12. LOCATION OF NEW DATA DROP. CONTRACTOR TO PROVIDE NEW CAT 6 CABLING AS REQUIRED BACK TO PATCH PANEL LOCATED OFF LIBRARY (REFER TO E2.0 FOR LOCATION.) CONTRACTOR SHALL FOLLOW EXISTING PATHWAY FROM CLASSROOM TO EXISTING PATCH PANEL. PROVIDE SURFACE MOUNTED RACEWAY WHEN ROUTING CABLING THRU CLASSROOM TO ARCH. CHASE LOCATED IN NORTHWEST CORNER OF ROOM. REFER TO E2.0 FOR ADDITIONAL INFORMATION.
13. RECEPTACLE TO BE MOUNTED HIGH ON WALL FOR POWER TO SMART BOARD. PROVIDE SURFACE MOUNTED WIRE MOLD RACEWAY AS REQUIRED. CONNECT TO NEAREST 120V RECEPTACLE CIRCUIT AVAILABLE.

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COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV
CHECKED BY: DR

ENLARGED FLOOR PLAN - POWER & LIGHTING

E2.1

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GENERAL NOTES:

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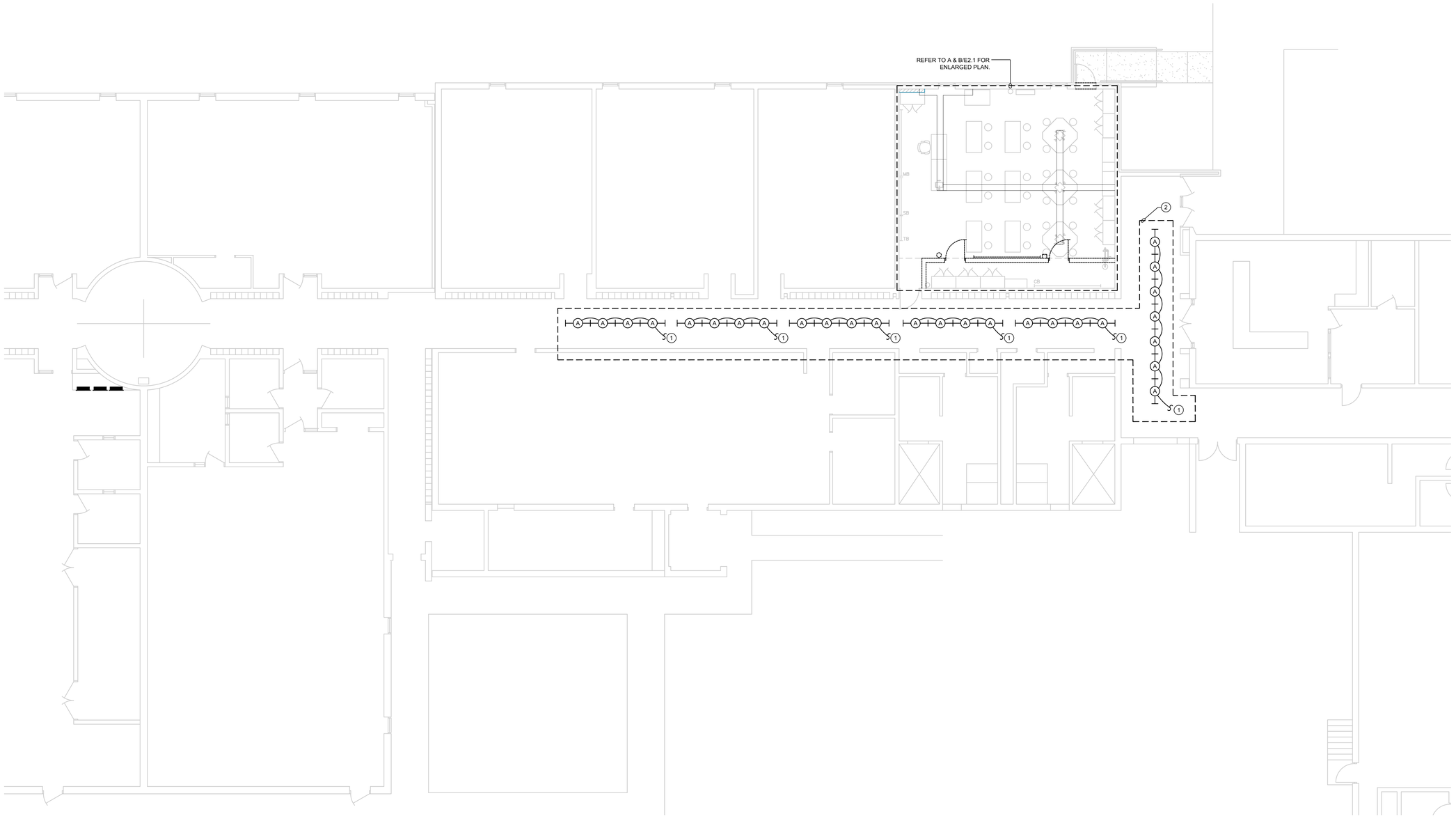
2. LABEL ALL SNAP SWITCH COVERPLATES WITH THE PANEL AND CIRCUIT NUMBER.
3. REFER TO RELATED ARCHITECTURAL DRAWINGS FOR RELATED INFORMATION.
4. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
5. WALL MOUNTING HEIGHTS TO CENTERLINE OF DEVICE UNLESS OTHERWISE NOTED.
6. A GROUND CONDUCTOR SIZED PER N.E.C. ARTICLE 250 IS REQUIRED IN ALL POWER, RECEPTACLE, AND LIGHTING CIRCUITS. GROUND CONDUCTORS ARE NOT SHOWN ON DRAWINGS.

PLAN NOTES:

1. CONNECT NEW LIGHT FIXTURES TO EXISTING LIGHTING CIRCUIT AND CONTROL THAT SERVED PREVIOUS FIXTURES.
2. ALL NEW LIGHT FIXTURES IN CORRIDOR TO BE PRICED AS ADD-ALTERNATE. REFER TO ARCHITECTURAL BID FORM FOR MORE INFORMATION.



A PARTIAL OVERALL FLOOR PLAN - LIGHTING

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

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E3.0

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DIVISION 16 ELECTRICAL

SECTION 16010

GENERAL REQUIREMENTS

PART 1 - GENERAL EXTENT OF WORK

1.01 The General Conditions, General Requirements, and Special Conditions shall be and are hereby made a part of this section. The Electrical Contractor shall furnish all labor, materials, tools, transportation, equipment, services and facilities required for the complete, proper and substantial installation of all electrical work shown on the drawings and/or outlined in these specifications. The installation shall include all materials, appliances and apparatus not specifically mentioned herein or noted on the drawings, but which are necessary to make a complete working installation of all electrical systems.

1.02 The Contractor shall consult and be guided by the General Conditions and all other divisions referred to herein and relative thereto in performing the work covered under this division of the specification.

1.03 All of the electrical related work required for this project (unless specified otherwise) is a part of the electrical contract price and is not necessarily specified under this division of the specifications or shown on the drawings. Therefore, all divisions of the specifications and all drawings shall be consulted.

1.04 The drawings showing the layout of the work indicate the approximate locations of outlets, apparatus and equipment. The drawings are schematic only and are not intended to show the exact routing of conduits, etc. The final determination as to the routing shall be governed by structural conditions and other obstructions. This shall not be construed to mean the design of the system may be changed, it merely refers to the exact run of a raceway between given points. The Contractor shall consult all contract drawings which may affect the location of any outlet, apparatus or equipment to avoid possible interference and permit full coordination of all work. The right to make any reasonable change in the location of apparatus, outlets and equipment up to the time of roughing-in is reserved by the Architect without involving any additional expense to the Owner.

1.05 The approval by the Architect or his representative of any materials, drawings, etc., submitted by the Contractor will be considered as general only and to aid the Contractor in carrying out his work. Such approval as may be given does not relieve the Contractor from the necessity of furnishing the materials and performing all the work as required by the drawings and the specifications.

1.06 The work specified under this division of the specifications shall include the furnishing of all labor, materials, apparatus and tools necessary for the complete installation of all conduit and wiring; devices for lighting, power and control systems, and such other work and equipment as are indicated on the drawings or as noted herein.

1.07 The entire installation shall be made in a workman like manner, left completely connected, and ready to give proper and continuous service.

1.08 All materials and work in connection with the foregoing items shall be as specified herein, or called for on the drawings.

1.09 The complete installation shall be in accordance with the latest rules and regulations of the National Fire Protection Association and all other Boards and Departments having jurisdiction. Any items or requirements noted herein or shown on the drawings in excess of code requirements, but permitted under the code, shall take preference unless special permission is obtained from the Architect to the contrary.

1.10 The light and power installation shall operate with the electrical energy obtained from outside sources. Such part of the system as may be regulated by rules of the local utility company shall, insofar as method of construction, workmanship and materials are concerned, be in full accordance with the standard practice and rules and regulations of the local utility company.

1.11 This Contractor shall coordinate his work under this division of the specifications with the work of other trades wherein it may be interrelated. His work shall be done in such an order that there will be no interference in installing, nor delay in completion, of any part or parts of each respective trade, thereby permitting all construction work to proceed in its natural sequence without unnecessary delay.

1.12 Before submitting his bid, the Contractor shall familiarize himself with the rules of all governing bodies having jurisdiction and shall notify the Architect in submitting his bid, if in his opinion, any work or material specified is contrary to such rules. Otherwise, the Contractor shall be responsible for the approval of all work and materials and, in case the use of any material specified is not permitted, a substitute shall be approved by the Architect and shall be provided at no increase in cost.

1.13 Unless noted otherwise on the Drawings, or elsewhere in these Specifications, the singular words 'Provide', 'Furnish', or 'Install' noted on the drawings or in these Specifications shall mean to completely furnish, install, and connect each item, and if such is a part or component of a system the entire system shall be functional with all items and components provided.

PART 2 - RULES AND REGULATIONS

2.01 All work under this heading shall comply with the latest rules and regulations of the National Electrical Code Standard of the National Fire Protection Association and with all laws, regulations and ordinances of the utility company, City, County and State.

2.02 Drawings and specifications indicate the minimum standards of construction. Should any work indicated be substandard to any ordinance, law, code, rule or regulation bearing on work, the Contractor shall execute work accordingly, without increased cost to the Owner, but not until he has referred such variances to the Architect for his approval.

2.03 This Contractor shall provide and install only the brands of materials and equipment specified herein, or equipment approved by the Architect-Engineer as equal. All material and equipment shall be listed and labeled by Underwriters Laboratories, Inc., indicating compliance with nationally recognized standards and/or tests.

PART 3 - PERMITS, FEES AND INSPECTIONS

3.01 Secure and pay for all necessary and usual permits, fees, inspections and certificates required for this work and deliver permits and certificates to the Architect for transmittal to the Owner before final acceptance of the project.

PART 4 - SERVICES

4.01 This Contractor shall pay for all expenses, deposits, reimbursements, etc., required by the local rules and codes for the service to the building, complete and ready for use.

4.02 This Contractor shall bear all expenses involved for the complete installation of the electrical service (both temporary and permanent) to the building ready for operation, except as specifically excluded on the drawings. All temporary wiring shall be installed per the National Electrical Code. This shall include guard posts around transformers and pedestals per utility company standards. Verify complete installation and locations of pad mount or pole mount transformers with the local electric utility company and bid installation to comply with their requirements.

4.03 This Contractor shall consult all local departments to verify requirements and bid installation of service in accordance with local codes and utility company standards.

4.04 This Contractor shall bear all expenses involved for the complete telephone service conduit installation and steel or nylon pull wire ready for cable installation. Verify complete installation with the local telephone company and bid installation to comply with their requirements.

PART 5 - TEMPORARY ELECTRICAL

5.01 Electrical Contractor/Subcontractor shall:

A. Make arrangements with electric utility for temporary service.

B. Provide materials, equipment, labor to install, modify, maintain (and upon completion of project, remove) safe temporary electrical power and lighting systems per OSHA standards.

C. Provide sufficient capacity for construction tools, equipment, temporary ventilation and lighting.

D. Distribute systems throughout building and construction area of site such that an extension cord no longer than 100' will reach any work area. Open branch systems permitted where permitted by the National Electrical Code and OSHA. Provide temporary services to all construction offices as required.

E. Employ permanent systems as they are completed and available.

F. Provide metering of temporary service. All temporary utility costs will be paid by the General Contractor.

PART 6 - MATERIALS OF APPROVED EQUAL

6.01 Where items of equipment and/or materials are specifically identified herein by a manufacturer's name, model or catalog number, only such specific items may be used in the base bid, except as hereinafter provided.

6.02 Unless requests for changes in base bid specifications are received and approved and noted by written addendum prior to the opening of bids, the successful contractor will be held to furnish specified items.

6.03 After contract is awarded, changes in specifications shall be made only as defined under "Substitution of Equipment."

PART 7 - SUBSTITUTION OF EQUIPMENT

7.01 After execution of the contract, substitution of equipment of makes other than those specifically named in the contract documents may be approved by the Engineer only if the equipment named in the specifications cannot be delivered to the job in time to completethe work in proper sequence to work of other contractors, due to conditions beyond control of the contractor.

7.02 Requests for substitutions must be accompanied by documentary proof of equality of difference in price and delivery, if any, in form of certified quotations from suppliers of both specified and proposed equipment.

7.03 The Owner shall receive all benefits of the difference in cost involved in any substitution, and the contract altered by change order to credit Owner with any savings so obtained.

PART 8 - SUBMITTALS

8.01 Contractor shall, within 15 days after award of contracts begin sending to the General Contractor for review submittals containing the following:

8.02 Shop Drawings:

A. Submit three master sets of "Shop Drawings" in the form of bond paper 8 1/2" x 11" or 11" x 17" size. Data shall be reduced on drawings as required to leave 5" x 3" clear on each drawing for Engineer's stamp.

B. Architect and consultants will retain copies of the master set for their records and return one reviewed master set to the contractor.

C. Contractor(s) shall, upon receipt of reviewed shop drawings, obtain and distribute copies of reviewed master set as necessary to coordinate work. (Contractor's file, job site file, record document file, other prime contractors, subcontractors and suppliers.)

D. Shop Drawings are custom prepared data and shall show and identify item(s) to be furnished and give location, arrangement, scale, details, sizes, dimensions, performance characteristics, capacities, wiring diagrams, finish and other pertinent information. Each individual item shall have its own separate sheet provided for approval. (Example: Separate sheets for each panelboard.)

E. All shop drawings shall be checked and signed by this contractor and General Contractor prior to submittal to the Architect/Engineer. SHOP DRAWINGS SUBMITTED WITHOUT THE CONTRACTOR'S STAMP OF APPROVAL AND VERIFICATION WILL BE RETURNED BEFORE THE ENGINEER WILL REVIEW SAME. Equipment, materials, etc., not meeting specifications and/or drawing requirements shall be returned to the supplier for corrections before they are submitted to the Architect-Engineer. This Contractor is reminded that only those materials specified, approved or otherwise indicated by the project specifications, drawings, or addenda will be permitted to be used in constructing the electrical work for this project. The first review of submittals (shop drawings) will be provided as indicated at no charge to the Contractor. However, subsequent review(s) of resubmittals required by "Rejected" status from the original review will necessitate the Electrical Contractor being charged by the electrical consultant a fee of $65 per man-hour, with a minimum charge of $100 for each item resubmitted. It is intended that all electrical submittals be made in a complete and timely fashion such as to permit a comprehensive and thorough review of same.

F. Each shop drawing sheet shall indicate job name.

G. Shop drawings submitted without contractor's signatures or approval and verification will not be reviewed.

H. Shop drawings shall be submitted on wire, devices, fixtures (including distribution curves), gear, systems, conduit, etc.

8.03 Product Data: Product Data includes manufacturer's printed specifications, instructions, recommendations, pertinent catalog pages and similar information. Such data shall be marked to identify the data applicable to the Project. Submit three copies. Architect and consultants will review, note and record action and make copies for their files. One submitted copy then will be returned to the Contractor who shall reproduce and distribute copies needed for Project Work.

8.04 Quantities of materials will not be verified by the Architect or Engineer. Submittal Review stamp on shop drawings does not constitute review of quantities listed on shop drawings.

8.05 Engineer's review of Compliance Submittals will not relieve Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless Contractor, has in writing, called Engineer's attention to such deviation at the time of submission and Engineer has given written approval to the specific deviation, nor shall any review by Engineer relieve Contractor from responsibility for errors and/or omissions in Compliance Submittals. No work shall be fabricated until the Architect's review has been obtained. Any time delay caused by correcting and resubmitting shop drawings will be the responsibility of the Contractor.

PART 9 - OPERATING INSTRUCTIONS:

9.01 The Contractor shall submit along with the shop drawings of the equipment, three (3) copies of operating instructions for all items. Instructions shall be prepared by the manufacturer of the equipment.

9.02 After the operating instructions have been approved by the Engineer, the Contractor shall frame one (1) set under plastic and mount near the equipment described.

9.03 The Contractor shall also obtain all manufacturer's instruction manuals and provide one complete set of "as built" drawings and turn these over to the Architect upon completion of the project.

9.04 The Contractor shall keep in a safe place all keys and special wrenches furnished with equipment under this contract and shall give same to the Architect at the completion of the project.

9.05 The Contractor shall prepare (5) complete brochures covering all systems and equipment furnished and installed under his contract. Brochures shall be submitted to the Architect-Engineer for review prior to delivery to the Owner. The Engineer will retain (1) copy. The cost of these brochures shall be included in the contract cost. Brochures shall contain the following:

A. Certified equipment drawings and/or catalog data clearly marked for equipment furnished as required for approval submission under previously detailed section of these specifications.

B. Complete operating and maintenance instructions for each item of equipment.

C. Complete parts list for each equipment item.

D. Any special emergency operating instructions and a list of service organizations (including addresses and telephone numbers) capable of rendering emergency service to the various parts of the system.

E. Riser diagrams on special systems.

9.06 Brochures shall be bound in hard fiberboard covers or loose-leaf binders. If loose-leaf binding is used, each sheet shall be reinforced to prevent tearing from continued usage. Each brochure shall have the following information clearly printed on its front cover:

A. Project name and address.

B. Section of work covered: "Electrical Work".

C. Name and address of Architect.

D. Name and address of Engineer.

E. Name and address of Contractor.

F. Telephone number of Contractor, including night or emergency number.

9.07 In addition to these written instructions, each respective Contractor shall fully and carefully instruct the Owner, or his representatives, as to the proper operation, care and maintenance of each system and its equipment.

PART 10 - COORDINATION AND BUILDING CONDITIONS

10.01 The Contractor shall visit the site and determine all existing local conditions affecting work in his contract. He shall examine architectural drawings and specifications to familiarize himself with the type of construction to be used for all work and how it will affect the installation of work in his contract.

10.02 Failure to determine existing conditions or the nature of existing or new construction will not be considered as a basis for the granting of additional compensation.

10.03 The drawings have been prepared to cover all electrical work under this contract. The Contractor is referred to all other contract drawings to guide him in the proper installation of his work.

10.04 The Contractor shall fully familiarize himself with the floor drawings, elevations, details of construction, feeders, fixtures, conduit, wiring, service, etc., insofar as it may affect the installation of the work under this specification in order that all necessary materials and labor may be provided even though not specifically referred to on the drawings or called for in the specifications.

10.05 As the drawings are generally diagrammatic, the final layout of the work shall be subject to the approval of the Architect but the Contractor shall be responsible without increase in contract price for the coordination of all work under various divisions of the specifications.

10.06 This Contractor shall confer with other Contractors installing work which may affect his work and must arrange his conduit, etc., in proper relation to such work. Any damage resulting from his neglect to do so must be paid for by the Contractor.

10.07 Where necessary to fit and center with paneling of ceilings and wall spaces, the Contractor must, at his own expense, shift the lighting outlets or other outlets as required by the Architect.

10.08 All outlets shall be set in such a manner as to finish flush with wall and ceiling lines unless marked to be exposed or surface mounted on the drawings. The height of brackets, switches, outlets, etc., are to be as directed.

10.09 The Contractor shall obtain from the Architectural and Structural drawings the exact location and size of spaces available for his apparatus and material and shall install them accordingly. In case the space allowed is not sufficient, or an obstruction interferes with placing them as shown or specified, the Contractor shall obtain instructions from the Architect and shall install them as directed without extra charge.

10.10 The above provisions refer only to the exactness of positions that cannot be determined from the drawings and do not permit placing apparatus distinctly different from that shown on the drawings.

10.11 This Contractor shall do all cutting and patching of building materials required for the installation of work herein specified. No structural member shall be cut without the approval of the Architect and all such cutting shall be done in a manner directed by him.

10.12 All patching shall be done in a neat and workman-like manner, meeting with the approval of the Architect, by mechanics of the particular trade involved. Any penetrations through roof shall be made with "Stoneman" flashing connections as manufactured by Stoneman Engineering and Manufacturing Co., Inglewood, Calif., and any penetrations made in exterior or basement foundation walls shall be sealed with Thunderline "Link-Seal" connections, as manufactured by Thunderline Corporation, Wayne, Michigan.

10.13 Any holes or voids created in floors, ceilings and walls, including any spaces or gaps around conduit or equipment passing through such areas, which compromise the applicable rating of the floors, ceilings or walls, shall be sealed with an intumescent material equal to "3M Fire Barrier Caulk, Putty or Strip Sheet", "Carborundum Fiberfrax Fyre Putty", "Tremco X-ferno Fire Products", or "Rectorseal Metacalk". Material equal to the above and meeting U.L. 1479 may be used. All installations shall be per manufacturer's exact instructions.

10.14 All drilling of holes through concrete shall be accurately and carefully done by using a "Concrete Termite" drill. The use of a star drill or air hammer for this work shall not be permitted.

10.15 This Contractor shall do all painting and finishing of all electrical equipment installed in finished areas. All work shall be performed in accordance with the Architectural specification section on "Painting and Finishing". All colors and finish applications shall be as directed by the Architect. (Painting is not required of receptacles, switches, circuit breakers, etc., unless specifically so noted on the drawings.)

10.16 The Electrical Contractor shall confirm the exact electrical requirements for all equipment supplied by others and installed or connected by the Electrical Contractor. The specific work performed for the installation of any equipment shall be in conformance with the requirements established by the shop drawings of the equipment supplied. In the event the shop drawings establish requirements distinctly different than the requirements shown in the contract documents, the Contractor shall be entitled only to an adjustment of the difference between the work shown and the work required with full credit for labor and materials shown on the original drawings.

10.17 The Electrical Contractor shall provide all trenching and backfilling for underground conduits. Unless noted otherwise in other divisions of these specifications, all trenches shall be backfilled and compacted with material defined by the United Soil Classification as ML or CL (silt and clay of low to medium plasticity). Compaction shall be to 90% of ASTM D698.

PART 11 - PERFORMANCE

11.01 Provide as part of the work of this contract, in addition to the first year guarantee on equipment and materials, the following described routine maintenance and inspection. (The one year time period will not start until each and every item is complete in accordance with drawings and specifications and accepted by the Owner). Check all emergency systems, control, fire alarm, transformers, etc., correct and adjust same. This service to be provided during the guarantee period.

PART 12 - SYSTEM

12.01 System: Distribution characteristics shall be as indicated on drawings.

PART 13 - GROUNDING

13.01 All conductors, motor frames, etc., that require grounding shall be grounded in accordance with the requirements of the National Electrical Code, local power company and local electrical codes. All ground connections to ground rods shall be with U.L. approved ground clamps. Provide additional ground rods as required to achieve a resistance of 25 ohms or less per N.E.C. 250-84; at the request of the Engineer provide a copy of the ground test results. Multiple ground rods (when required) shall not be less than 6 feet apart.

PART 14 - ADJUSTING, ALIGNING AND TESTING

14.01 All equipment shall be checked for proper adjustment and balance. All panelboards, distribution panels, switchboards, and transformers shall be balanced to provide a balanced load on each phase. A complete record of all such adjustments shall be made. Final readings shall be submitted to the Architect-Engineer for records. The Contractor shall provide all equipment, instruments, gauges, meters, etc., as required for the complete checking of these systems.

14.02 Mechanisms of all electrical equipment shall be checked, adjusted, and tested for proper operation. Adjustable parts of all lighting fixtures and other electrical equipment shall be checked, adjusted, and tested as required to produce the intended performance.

14.03 Completed wiring system shall be free from open or shorted circuits. After completion, this Contractor shall perform tests for insulation resistance in accordance with the requirements of the National Electrical Code.

14.04 The Contractor shall maintain service and equipment for the testing of electrical equipment and apparatus until all work is approved and accepted by the Owner. A first class voltmeter and ammeter shall be kept available at all times and this Contractor shall provide service for test readings when and as required. All test readings shall be recorded on an approved form and submitted to the Architect.

14.05 Before final acceptance is made, this Contractor shall, at his own expense, frame under plastic the sequence of operations of the sound system, controls, fire alarm, etc., for each and every item requiring instructions. These instructions shall be mounted as directed. He shall cover same with Architect and/or his selected parties, and shall adjust all apparatus and place same in satisfactory operating service as approved by the Architect.

14.06 Final observation will be made upon written request from the Contractor after the project is complete. At the time of final observation, the Contractor shall be present or shall be represented by a person of authority. The Contractor shall demonstrate, as directed by the Architect-Engineer, that his work fully complies with the purpose and intent of the drawings and specifications. All labor, services, and all instruments or tools necessary for such demonstration and tests shall be provided by the Contractor.

PART 15 - MOTOR CONTROL AND SPECIAL CONNECTIONS

15.01 The Electrical Contractor shall furnish, install and connect all wiring, conduit, boxes, toggle switches, thermal switches, disconnect switches, remote push-button stations not included in magnetic starters, etc., for all equipment requiring electrical power that is furnished by other contractors and/or the Owner, as required for a complete and operatable system. The Electrical Contractor shall receive, install and connect all magnetic starters and controllers, capacitors, power factor correction devices, transformers, alarms, bells, horns, relays, remote switches, etc., for equipment supplied by others, (i.e. starters, capacitors or power factor correction devices for mechanical equipment, etc.). In general all major equipment will be specified to be factory prewired with only service and interlocking required at the site by the Electrical Contractor; however he shall check all divisions of the specifications to verify if the equipment is specified factory prewired and if not, then it shall be the responsibility of the Electrical Contractor to provide the complete wiring of the equipment in accordance with wiring diagrams, and temperature control drawings provided by the other contractors and/or the Owner, to the Electrical Contractor. All interlocking of equipment shall be by the Electrical Contractor.

15.02 All control equipment requiring piping connections to air, water, steam, etc., lines such as pneumatic electrical relays, remote bulb temperature controls, solenoid valves, aquastats, pressure control, etc., will be furnished and installed under "Mechanical Work".

15.03 All line and low voltage wiring, conduit and connections required to control equipment and/or dampers are a part of this section. Provide and install line or low voltage wiring to all dampers as required for system operation. All low voltage wiring, conduit, connections and/or terminations are by the Electrical Contractor unless specifically noted otherwise within the bidding documents.

15.04 It shall be assumed the Contractor has familiarized himself with the equipment to be furnished by the other contractors and/or the Owner in connection with this work and that provisions for such connections and work have been included in the Contractor's price. In no case will extra remuneration be allowed for such work.

15.05 Connections to all equipment have been designed for units as specified on the drawings or in the specifications. In the event equipment or controls differ on approved mechanical shop drawings, it shall be the responsibility of the supplying contractor to coordinate electrical connections to the units and reimburse Electrical Contractor for any changes in system design. These changes shall not involve additional cost to the Owner.

PART 16 - GUARANTEE

16.01 This Contractor, by the acceptance of this specification and the signing of his contract, acknowledges his acquaintance with the requirements and guarantees that every part used in constructing the system as herein described will be of the best of its respective kind that can be obtained and will be erected in a most thorough and substantial manner by none but experienced workmen.

16.02 He guarantees that all conduit as provided within and by this specification will be free from all obstructions of every description and will be free from holes or broken places and be well bonded together. He guarantees that all wiring and conduit to be used in construction of this project will be new and unused.

16.03He further guarantees to hold himself responsible for any defects which may develop in any part of the entire system, including apparatus and appliances provided under this section of the specification, and to replace and make good without cost to the Owner any such faulty parts of construction which develop defects at any time within one year from date of final certification of completion and acceptance. Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to the

Page 16010-

Owner's satisfaction, advise Architect in writing, describe efforts to rectify situation, and provide analysis of cause of problem. Architect will then suggest course of action. The Electrical Contractor shall replace material and equipment that requires excessive service during guarantee period as defined and as directed by the Architect. This guarantee does not include ordinary lamp failure.

16.04 Use of systems provided under the Specification for temporary services and facilities shall not constitute Final Acceptance of the work nor beneficial use by the Owner, and shall not institute guarantee period.

PART 17 - SUPPLEMENTARY CONDITIONS

17.01 Supplementary to all other terms of the contract, this work shall be performed subject to the following conditions.

17.02 Materials and equipment installed on this project shall be first class in quality and shall be new and unused.

17.03 Workmanship on this project shall be first class work performed by the experienced licensed mechanics of the proper trade.

17.04 Work under this contract shall be adequately protected at all times. Temporary raceways shall be kept closed and all raceways shall be installed clean and free from dirt and grease.

17.05 Storage, parking, signs, advertisement, fires and smoking shall conform to all applicable regulations and/or directions of the Architect.

17.06 Measurements on job and shop layouts required for installation of work shall be the responsibility of the contractor and acceptance of work is subject to approval of shop drawings by the Architect.

17.07 Contractor shall furnish all hoists, scaffolds, staging, runways and equipment necessary for the completion of this work.

17.08 Obtain and pay for all required electrical permits and licenses.

17.09 Maintain lights and guards required for safety.

17.10 Remove temporary service after use.

PART 18 - CONTRACT CHANGES

18.01 All changes or deviations from the contract, including those for extra or additional work, must be submitted in writing for the approval of the Architect/Engineer. No verbal orders will be recognized.

PART 19 - RUBBISH/CLEANUP

19.01 All rubbish resulting from the work herein specified shall be periodically removed by this Contractor.

19.02 Clean all electrical equipment and materials of all foreign matter (both inside and out). Clean all light fixtures using only methods and materials as recommended by the manufacturer.

PART 20 - PROPOSALS

20.01 The Contractor shall consult the General Conditions and the Proposal Form for proposals and subdivisions of the work required.

PART 21 - EXTENT OF WORK

21.01 The extent of the work under this heading of the contract shall be the furnishing of all plant, labor, materials, and equipment as required to complete work as shown on the drawings and as specified under this heading, and all plant, labor, materials and equipment not shown on the drawings or specified, but necessary to make installation complete in accordance with the intent of the contract, to provide first class, complete, and operative installation throughout.

PART 22 - TAXES

22.01 Contractor shall include all applicable local, state and federal taxes in his bid. Consult the Supplementary Conditions of these specifications relative to any and all tax exemptions permitted for this project.

PART 23 - "AS-BUILT DRAWINGS"

23.01 E.C. shall prepare and submit to the Engineer, upon completion of the project, one complete set of reproducible "As Built" drawings for the electrical portion of the project.

23.02 Drawings shall clearly indicate any and all approved deviations (i.e. addendum items, change order data, etc.) from the Project Bid Documents.

23.03 These drawings will become the property of the Owner and will be for his future reference file, record document.

DIVISION 16 ELECTRICAL

SECTION 16020

BASIC MATERIALS AND METHODS

PART 1 - CONDUIT

1.01 Materials:

A. All conduits and raceways shall be as listed below. No other wiring or raceway systems will be allowed.

B. Rigid conduit (G.R.S.) and intermediate metal conduits (IMC) shall be standard size, hot dip galvanized steel conduit, minimum 1/2" trade size, as manufactured by Triangle PWC, Inc., Allied, or equal. Rigid conduit and IMC shall be provided with threaded fittings and couplings. In trade sizes 2-1/2" to 4", contractor may use Allied 'KwikCouple' fittings in lieu of individual steel couplings. Where 'Kwik-Couple' fittings are used exterior for vertical risers, install fitting with taper end up. A "green" ground wire, sized per NEC 250-95, shall be installed in all conduits containing phase conductors.

C. E.M.T. (thinwall conduit) shall be minimum 1/2" trade size, as manufactured by Triangle PWC, Inc., Allied, or equal. Provide EMT with Thomas and Betts, or equal, U.L. listed steel or die-cast type fittings. Indenter type fittings shall not be used. Contractor may use Allied 'Kwik-Fit' fittings in lieu of individual fittings. A "green" ground wire, sized per NEC 250-95, shall be installed in all conduits containing phase conductors. E.M.T. conduit shall not be installed in earth or below grade.

D. All conduit installed in wet locations, exposed exterior to the building, or subjected to physical abuse (i.e. industrial locations), shall be rigid steel conduit (G.R.S.) or intermediate metal conduit (I.M.C.). All conduit installed in earth or below grade shall be rigid steel conduit (G.R.S.), intermediate metal conduit (I.M.C.), or U.L. approved schedule 40 P.V.C. conduit.

E. Thin wall conduit (E.M.T.) may be used where code permits except as outlined above.

F. Short runs of galvanized or liquid tight steel flexible conduit may be used when approved by the Engineer. (Minimum 1/2" trade size.) A separate "green" ground conductor (sized per N.E.C.) shall be installed in all flexible conduits. Type AC "Armored Cable", Type MC "Metal-clad Cable", or "BX" cable shall not be used in any manor unless supplied as part of a manufactured flexible wiring system for lighting and approved by the Engineer.

G. U.L. approved schedule 40 P.V.C. conduit may only be used where conduits are to be run in earth or below slabs. P.V.C. conduits shall not be used above grade inside or outside of the building, unless specifically noted otherwise on the drawings. Use G.R.S. ells and risers, both horizontal and vertical. Use conduit adapters when converting from P.V.C. to steel conduit. Branch circuit and feeder P.V.C. conduit to be 3/4" min. Concrete encase all conduit installed below grade where so noted on the drawings, (U.L. approved schedule 40 P.V.C. with plastic spacers). All P.V.C. conduit shall be provided with a separate "green" ground conductor, sized per N.E.C.

1.02 Bushings and Locknuts:

A. Where conduits enter boxes, they shall be rigidly clamped to the box by double locknuts and bushings. Conduit shall enter the box squarely. Bushings and locknuts shall be made of malleable iron and shall have sharp clean-cut threads.

1.03 Conduit Installation:

A. Where conduit sizes are not specifically indicated, provide sizes in accordance with the requirements of the N.E.C.

B. Conduit work in general shall be installed concealed in walls, floor and roof construction or concealed within furred spaces. Exposed work shall include only feeders and short connections to equipment in equipment room unless noted otherwise. All exposed conduits (where approved by the Engineer) shall be routed parallel and/or perpendicular to building elements.

C. Conduit to be installed to the requirements of structure and to the requirements of all other work on the project. Conduit shall be installed to clear all openings, depressions, pipes, ducts, reinforcing steel, etc. Conduit set in forms for concrete structure shall be installed in such a manner that installation will not affect the strength of the structure. Coordinate installation with Structural Engineer for conduits rising up from floor slabs into bottom of panelboards. Minimum distance between conduits shall be 6". Maximum size of conduit permitted in concrete slabs, if so approved by the Architect, is 1" trade size.

D. Conduit shall be installed continuous between connections to outlets, boxes and cabinets with a minimum possible number of bends and not more than the equivalent of 4-90 degree bends between J-box connections. Bends shall be smooth and even and shall be made without flattening conduit or flaking enamel. Radius of bends shall be as long as possible and never shorter than the corresponding trade elbow. Long radius elbows shall be used where necessary.

E. Conduits shall be securely fastened in place with approved straps, hangers, and steel supports as required by the National Electrical Code. All surface mounted conduits on walls below eight foot above grade shall be secured with conduit straps, no clamps. The use of wire, plumbers straps, etc, will not be permitted.

F. Junction and pull boxes shall be installed where shown on drawings and additional boxes shall be installed if required for pulling of wire, provided location and installation is approved by the Architect. All boxes shall be code gauge construction with screw type covers and shall be installed in accessible locations.

G. Conduit shall be reamed and thoroughly cleaned before installation and kept clean after installation. Openings shall be plugged and boxes shall be covered as required to keep conduit clean during construction. All conduit shall be fished clear of obstructions before the pulling of wires. All conduit shall be as sized above and shall not be smaller than N.E.C. listed minimum requirements.

H. All work shall be protected against damage during construction and any work damaged or moved out of line after roughing-in shall be repaired and reset to the approval of the Architect without additional cost to the Owner.

I. Conduit terminations at panelboards, switchboards, motor control equipment, junction boxes, etc., shall be aligned and installed true and plumb. Wood or steel bucks or templates shall be used where required. This work shall also include all steel supports as required for mounting of electrical equipment excepting only where steel supports are specified to be furnished under another specification heading.

J. Where conduits cross construction expansion joints, Contractor shall provide Appleton XJ or equal expansion couplings with copper bonding jumpers.

K. Where conduits are installed in concrete, all connectors and couplings shall be water tight or rated for direct burial in concrete.

L. Mechanical equipment service clearances and electrical apparatus service clearances as specified in their respective manufacturer's product data shall be maintained free from conduit obstructions.

M. All conduits routed below grade shall be minimum 30" below grade unless noted otherwise on the drawings. All conduits routed below floor slabs shall be installed a minimum of 4" below the slab.

PART 2 - WIRES AND WIRING

2.01 American, Southwire, Essex, or equal code gauge wire, rated 600V, finished with fadeless color coding and bearing Underwriter's label. Wires shall be soft annealed copper with properties conforming to the National Electrical Code requirements. No. 8 gauge and larger shall be stranded and No. 10 gauge and smaller may be solid or stranded, unless noted otherwise on the drawings. Stranded conductors shall only be used on devices and lugs that are U.L. listed for use with stranded conductors.

2.02 Wire smaller than No. 12 gauge shall not be used unless specifically called for on the drawings.

2.03 Unless noted otherwise on the Electrical drawings or herein, all wiring for all systems shall be routed within conduit, shall be of the same insulation type and shall be continuous between outlets and boxes (with no splices or taps into conduit). Splices and taps in outlet boxes shall be twisted joints. U.L. approved pre-insulated spring pressure connectors shall be used for branch circuit connections. Connectors shall be installed so that all conductors are properly insulated.

2.04 All control wiring shall be copper, solid or stranded, #14 Ga. or larger depending upon current requirements, with insulation type for 90 C. rating. Where stranded conductors are used, provide with spade type insulated copper terminals. Unless noted otherwise on the Mechanical drawings or herein, all mechanical control wiring for all systems shall be routed within conduit, shall be of the same insulation type and shall be continuous between outlets and boxes (with no splices or taps into conduit).

2.05 See riser diagrams and/or other sections of the Specifications for types and ratings for sound, fire alarm, control and other special cables.

2.06 Wires for general use within the building shall be type THHN or type THWN, 90 degree rated except where called for otherwise on the drawings. Type THHN or type THWN shall be used at the temperature rating of equipment termination lugs, environmental conditions, and as Code allows. Wires for other than general use shall be as hereinafter specified for specific services.

2.07 A "green" insulated ground conductor, sized per N.E.C. 250-95 and/or as shown on the drawings, shall be installed in each conduit containing phase conductors.

2.08 Where quantities of conductors in a raceway system are not specifically indicated, provide the number as required to maintain function, control and number of circuits as indicated.

2.09 All conductors shall be identified at all termination points and in all pull and junction boxes by the following method of color coding:

208Y/120 Volt System	480Y/277 Volt System	240/120 Volt System
Phase A Black	Phase A Black	Phase A Brown
Phase B Red	Phase B Red	Phase B Orange
Phase C Blue	*Phase C Blue	Phase C Yellow
Neutral White	Neutral White	Neutral Gray
Ground Green	Ground Green	Ground Green

*(Note: identify "high leg" per N.E.C.)

2.10 All conductors size #6 AWG and smaller shall have colored insulation. Where conductors with black insulation are used for the larger wire sizes (#4 AWG and larger), color coding shall be provided with two (2) layers, one-half lapped, of No.35 colored Scotch Vinyl electrical tape. Where any conductor is or can be supplied from an emergency system the Contractor shall mark each conductor with an additional two layers, one-half lapped, of Purple colored Scotch Vinyl Electrical tape.

2.11 Isolated Ground conductors shall be green with one yellow stripe. All isolated ground circuits shall be provided with separate phase, neutral, and ground conductors (no shared neutrals or grounds).

2.12 Provide a listing of the above described conductor color code identification scheme at all branch circuit panelboards per Article 210-4(d), National Electrical Code.

2.13 Splices and taps for #6 and larger conductors shall be made with block type terminations (with insulating jacket) or with split bolt connectors, covered and completely insulated with a minimum of three half-lapped layers of Scotch No. 33+ (105 degree C) plastic electrical tape or by approved insulated fastener. All splices and taps having irregular surfaces shall be properly padded with Scotchfil putty before application of insulating plastic tape. Scotchlok electrical pre-insulated spring pressure connectors or equal may be used for up to #8 conductors.

PART 3 - OUTLET BOXES

3.01 All electrical service outlets, including plug receptacles, lamp receptacles, lighting fixtures and switches shall be provided with 4" square, code gauge steel knockout boxes, galvanized or sherardized and of required depth for service and appliances. Single gang 'handy boxes' will not be allowed. All outlet boxes shall be flush mounted unless noted otherwise on the drawings or herein. Boxes installed in gyp board or plaster finish shall have code gauge galvanized raised covers set to not more than 1/4" behind final finish. Covers shall be selected with proper openings for devices installed in box. Manufacturers shall be Steel City, Appleton, RACO or equals approved by the Engineer.

3.02 Boxes mounted to metal wall studs shall be mounted with Caddy #MSF metal stud clip, or equal as approved by the Engineer. Boxes mounted to either metal or wood studs shall be mounted with Caddy #766 farside box support, or equal as approved by the Engineer. Single metal stud box clips without box supports are not acceptable for mounting boxes.

3.03 Sectional boxes shall not be used except where directed and approved by the Architect for installation in unplastered tile walls and provided conduit connections are installed concealed in walls.

3.04 Where lighting fixtures and appliance outlets are to be mounted on concrete or on plaster finish on concrete, outlet boxes shall be installed in forms of exact dimensions from bench marks, columns, walls or floors. Where lighting fixtures and appliance outlet are to be mounted on masonry walls and/or plastered furring or other finish, outlet boxes shall be roughed in to general location before installation of walls and furring and shall be reset to exact dimensions before walls and furring are constructed. All outlet boxes shall be set true to horizontal and vertical lines parallel to walls, floors, and ceilings and be true to finish lines.

3.05 Install all outlets in a secure and substantial manner and locate so as to be compatible with space, construction and equipment requirements and with the work of the other trades.

3.06 Furnish and install plaster rings for all boxes installed in plastered (or gyp board) ceilings and walls. Verify construction with general construction drawings.

3.07 Boxes for exterior or wet location work (where permitted or approved) shall be Appleton or Crouse-Hinds Type FS or FSC for shallow devices and Type FD or FDC for deep devices. Boxes for ceiling mounted light fixtures shall have approved no-bolt fixture studs. Boxes used as junction boxes shall have beveled edge flat steel blank covers.

3.08 Location of outlets on small drawings is approximate and exact dimensions for location of outlets shall be as taken from large scale drawings and details on drawings or as directed by the Architect. Outlets shall be located generally from column centers and finished wall lines or to center of joints of wall panels. Ceiling outlets shall be installed at elevation of suspended ceilings and connected to outlets in ceiling or slab above.

3.09 Clock outlets shall be mounted 8'-0" above floor unless otherwise noted on the drawings. All other outlets shall be mounted at heights above floor as called for on the drawings or as directed. Bracket lights over mirrors shall be centered on mirror with 2" clearance above mirror.

3.10 Boxes for switches and receptacles installed in columns shall be located off center to allow for future partitions.

3.11 Boxes for switches at or near doors shall be installed on the side opposite the hinge and within 6" of the door. Verify door swing direction prior to rough-in.

3.12 Rough-in outlets for electric water coolers so as to be concealed behind coolers, but remain accessible, in accordance with recommendation of equipment supplier.

3.13 To prevent sound from traveling through walls, electrical devices serving different rooms shall not be mounted in the same stud space. Through-wall boxes shall not be used. In fire rated walls or partitions, outlet boxes on opposite sides of walls or partitions shall be separated by a horizontal distance of not less than 24 inches. Installation shall be per UBC with fire stopping pads manufactured by International Protective Coating Corp. Outlet boxes larger than 4" square shall not be installed in fire rated walls or partitions. Verify location of fire rated walls or partitions with Architectural drawings prior to rough-in.

3.14 Provide blank cover plates for all outlet boxes not used. Plates in finished areas shall match those specified for switch and receptacle devices. Blank cover plates for junction boxes supplied from the emergency system or fire alarm system shall be painted red.

PART 4 - INSTALLATION OF SWITCH PLATES, ESCUTCHEONS, ETC.

4.01 It shall be the duty of this Contractor to examine the plaster, painting, and other finishes before making his installation to make sure that these accessories, when installed, will fit and cover properly and leave no open or unfinished surface showing. He shall refuse to complete his installation where faulty work on the part of others is found, and he shall promptly report the trouble to the Architect.

PART 5 - SUPPORTS AND HANGERS

5.01 Provide supports and hangers as necessary and as required to insure a good and substantial installation. Support raceways, fixtures, cabinets, boxes, etc., on approved type of trapeze hangers or wall brackets, as manufactured by Unistrut, American Electric, B-Line, Globe, or approved equal. Provide steel hanger rods securely fastened to or through the building structure for all trapezes, etc. Do not suspend from mechanical piping or ductwork. Perforated plumber's straps or wire will not be permitted.

PART 6 - JUNCTION, PULL AND SUPPORT BOXES

6.01 Pull and junction boxes shall be code gauge galvanized steel boxes with bolted, hinged or screwed covers. Boxes shall be flush or surface mounted as shown or required by N.E.C. and job conditions. Install in accessible locations.

6.02 Conductors shall not be spliced within pull boxes.

6.03 Boxes shall be rated as shown on the drawings or as required by applicable codes, ie: raintight, weatherproof, explosionproof, etc.

PART 7 - PAINTING AND FINISHES

7.01 Preparation of the material and the materials used for priming and finish painting shall be in accordance with the "Painting" section. Finish painting shall be performed under "Painting " section. Priming shall be performed under this section. Equipment specified to be factory-primed or finish-coated shall be the work of this section and materials and workmanship shall be as specified in "Painting" section.

PART 8 - NAMEPLATES AND IDENTIFICATION

8.01 General: The following shall be equipped with nameplates:

A. All distribution equipment (disconnect switches (fused or nonfused), switchboards, panelboards, transformers, motor control centers, separately mounted circuit breakers, contactors, motor starters and relays etc.).

8.02 Inscription: Nameplates shall adequately describe the function or use of the particular equipment involved. Nameplates for panelboards and switchboards shall include the panel designation, voltage, phase and A.I.C. rating required (See Schedules). For example, "Panel - A, 120/208 V, 3-Phase, 4-wire, 10,000 A.I.C" The name used for a machine nameplate shall be the same as the one used on the machine's motor starter, disconnect and P.B. station nameplates. Nameplates for fused switches and panels shall also indicate fuse type and size.

8.03 Construction: Nameplates shall be laminated phenolic plastic, black front and black with white core. Nameplates for emergency system panelboards and transfer switches shall be red front and back with white core letters. Lettering shall be engraved through front layer to form 1/4" white characters (1/2" white letters for distribution panels and switchboards). Branch switch label shall be 1/4" letters. Nameplates shall be securely fastened to the equipment to be identified, with double sided adhesive backed tape. Motor nameplates may be non-ferrous metal not less than 0.03" thick, die stamped. All nameplates and their installation are part of this work. Free hand lettering or adhesive tape type label markers will not be accepted.

8.04 Special Electrical Systems (fire alarm, sound system, emergency systems, etc.) shall be so identified at junction and pull boxes, terminal cabinets and equipment racks with a permanent, waterproof means of identification. (Example - FIRE ALARM). Free hand lettering or adhesive tape type label markers will not be accepted.

8.05 Wall switches or other control devices controlling equipment or special lighting control configurations shall have either engraved wall plates or shall be provided with engraved nameplates.

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2017
UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
UNIFIED SCHOOL DISTRICT #463

DRAWINGS ISSUED		
NO.	DATE	ITEM ISSUED
4	11/21	ISSUED FOR BIDS
3	11/13	BOE MEETING
2	10/23	REVIEW
1	10/11	CONSTRUCT DOCS

COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV
CHECKED BY: DR

ELECTRICAL SPECIFICATIONS

E4.1

17316.00-107

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PART 9 - WALL SWITCHES

9.01 Wall switches in general, used to control lighting, shall be quiet operating, listed by U.L. and conform to NEMA standards as well as the latest Federal Specification W-S-896e. Certification that switch meets this specification shall be submitted to the Engineer for approval.

9.02 Switches shall be single pole, two-pole, three-way, or four-way, as called for on the drawings. Groups of switches shall be under one cover plate. Where switches are in fire rated walls groups of switches shall be maximum of 2 gangs under one cover plate.

9.03 All Switches shall be rated 20 A. at 125 V. - 277 V. unless specified otherwise.

9.04 Switches: (Verify colors)

Manuf: (Series #)		Toggle	KeyPilot
P & S	20AC1	20AC1-L	20AC1-CPL
Hubbell	1221	HBL1220L	HBL1220PL
Leviton	1221-2	1221-2L	1221-PLR
Arrow-Hart	1221	1991L	1991PL

Once device manufacturer has been selected, all switches, receptacles and plates in the project shall be by the same manufacturer, unless noted otherwise on the Drawings or in the Specifications.

9.05 Pilot light switches shall be illuminated toggle switch lighted red in the "on" position. Key switches shall be master keyed.

9.06 All switches shall have High-Impact Thermoplastic or Nylon (not Thermoset), smooth surface, wall plates. Where plates are noted to be engraved or labeled, provide stainless steel wall plates in color to match other plates and provide engraved filled letters. If approved by the Engineer, high-impact thermoplastic plates with filled letters may be used for engraving provided that a sample plate is submitted for approval. Plates shall be set plumb and parallel with the wall. Stainless steel plates where used or specified shall be .032" nominal thickness, non-magnetic.

9.07 Color of switches and plates shall be as selected by the Architect. Verify colors prior to ordering.

9.08 Provide barriers between 277V. switches and between 277V. and 120V. switches installed in a common outlet box.

9.09 Incandescent wall box dimmers shall be linear slide type with smooth face plates, no exposed cooling fins, equal to Lutron NT-600, NT-1000, or NT-1500 for loads to 1500W. For Loads 1500W to 2000W, Lutron N-2000. Verify color of face plate and dimmer with Architect prior to ordering. Dimmer switches for fluorescent and compact fluorescent light fixtures shall be slide type, equal to Lutron. Fluorescent and compact fluorescent dimmer switches shall be compatible with the ballast used with the light fixture. Coordinate with ballast manufacturer.

PART 10 - RECEPTACLES

10.01 Convenience duplex receptacles shall be grounded twin outlet receptacles rated 20 amperes at 125 volts.

10.02 Where receptacles are indicated on the drawings as "WP" (weatherproof) or required by applicable codes to be weatherproof, they shall be G.F.C.I. duplex receptacles, with a industrial grade raintight single or double lift metal coverplate.

10.03 See drawings for special outlet schedule.

10.04 Receptacle body shall be formed of high-impact thermoplastic or urea and receptacle contacts shall be Bronze. Receptacles shall be listed by U.L. and conform to NEMA standards as well as the latest Federal Specification W-C-596. Certification that receptacle meets or exceeds N.E.M.A. Standards shall be submitted to the Engineer for approval.

10.05 Surge suppression (TVSS) duplex receptacles shall be 20A., 125V., NEMA 5-20R devices. Receptacles shall have a red, device verification light which is illuminated when the suppression circuit is functional. The receptacle shall meet or exceed UL Standards 1449 and 498 and be capable of suppressing 70 joules of transient energy. Receptacles shall be P & S #IG6362-ISP, Hubbell IG8362 or Wiremold #83TB2-V.

10.06 Receptacles: (Verify colors)

Manuf:	DUPLEX (20A. 125V)	DUPLEX GFCI (15A.125V)	DUPLEX ISOLATED GRD. (20A. 125V)	CLOCK (20A. 125V)
P & S	5362A	2091S	IG6300	S3733-SS
Hubbell	HBL5235	HBL5362	GF5352	IG5362
Leviton	5362A-5261-CH	6899	5362-IG	
Arrow-Hart	5362	GF5342	IG5362	5708

Once device manufacturer has been selected, all receptacles, switches, and plates in the project shall be by the same manufacturer, unless noted otherwise on the Drawings or in the Specifications.

10.07 Where tamperproof receptacles are indicated on the drawings to be provided, receptacles shall be equal to Hubbell #HBLSG63H, 20 amp, 125 volt.

10.08 Install receptacles to clear all cabinets, equipment, etc.

10.09 All receptacles shall have High-Impact Thermoplastic or Nylon (not Thermoset), smooth surface, wall plates. Where plates are noted to be engraved or labeled, provide stainless steel wall plates in color to match other plates and provide engraved filled letters. If approved by the Engineer, high-impact thermoplastic plates with filled letters may be used for engraving provided that a sample plate is submitted for approval. Plates shall be set plumb and parallel with the wall. Stainless steel plates where used or specified shall be .032" nominal thickness, non-magnetic.

10.10 Color of receptacles and plates as selected by the Architect. Verify color prior to ordering.

10.11 Provide duplex receptacle on separate circuit beside each telephone terminal board location and other communications equipment requiring 120 volt power.

PART 11 - FLOOR BOXES

11.01 Unless noted otherwise on the drawings, flush floor boxes shall be equal to Steel City #68 Series floor box with P-60-DS cover plate for power and P-60-1/2-2 cover plate for telephone and data outlets. Provide with carpet flange for floors with carpet. Verify exact location with Architect prior to rough-in.

11.02 All floor boxes shall be cleaned of all construction debris and dirt.

11.03 Where fire rated 'poke-through' devices are specified, Contractor shall install devices after concrete pour and after final verification of location with Owner. Fire rated 'poke-through' devices shall be spaced apart from each other as required by the manufacturer and U.L.

11.04 PVC floor boxes may be used in lieu of floor boxes indicated above. PVC floor boxes shall be equal to Walker, Wiremold, Hubbell, Carlon, with metal covers. Receptacle covers shall be double flap, telephone and data covers shall be combination 2"1/2" inserts. Unless noted otherwise on the drawings, all floor boxes for similar devices shall be either metal or PVC, no intermixing of same types of floor boxes will be allowed.

PART 12 - CONTACTORS AND RELAYS

12.01 Shall be as manufactured by Cutler-Hammer, General Electric, Siemens, Allen Bradley, or Square "D". They shall be as sized on the drawings.

12.02 All contactors and relays shall be "T" (Tungsten) rated.

PART 13 - TIME SWITCHES

13.01 Time switches by Tork, Intermatic, or Paragon equal to those shown on the drawings or specified below, and approved by the Engineer, will be acceptable.

13.02 Exterior lighting or interior time switches shall be Intermatic ET70115C Series, 7 day with carry-over, unless specified otherwise. Set time switch per Owners Requirements.

13.03 All time switches shall be provided with momentary contacts if required.

13.04 All time switches shall be provided with manual bypass switches and standby battery systems.

PART 14 - PHOTO ELECTRIC CONTROLS

14.01 Photo Electric Controls by Tork, Intermatic, or Paragon equal to those indicated below and approved by the Engineer will be acceptable.

14.02 Photo Electric Controls (Photo Switches-Photo Cells) shall be Intermatic #K4133 rated at 3000W, 277 Volts, or #K4121 rated at 1800W, 120 volts, weatherproof. Mount on roof and orient photo electric controls to the north. Photo-electric controls supplied as a part of a fixture assembly shall be as provided by Fixture Manufacturer.

14.03 All photocell housings supplied as part of the light fixture assembly or mounted on the light fixture shall be painted to match the light fixture finish.

PART 15 - STARTERS (SEPARATELY MOUNTED)

15.01 Starters for all devices shown on all drawings shall be supplied by the Electrical Contractor unless specifically noted otherwise on the drawings.

15.02 Starters shall have melting alloy relays or bimetallic overload relays (as required for load served). Starter housing shall have NEMA rating for the location (general purpose, weatherproof, etc.). Each starter shall have an H-O-A switch in cover and control transformer (if required) for controls. See drawings for multispeed starter requirements.

15.03 Coil voltage shall be as required for controls as shown on all drawings and control power transformer size shall be adequate to provide control functions as shown.

15.04 Provide each starter with a spare set of auxiliary contacts. One closed when the starter is deactivated and one closed when the starter is activated.

15.05 Overload thermal units shall be sized on the basis of actual motor nameplate current. Overloads shall be non-adjustable NEMA standard trip and shall be available in sizes covering the complete NEMA horsepower. Starters shall be Class 20 (Class 10 not acceptable).

15.06 Starters shall be fully NEMA rated; I.E.C. design starters will not be acceptable.

15.07 Separately mounted starters shall be by the same manufacturer as the distribution equipment, or Allen Bradley or Furnas.

PART 16 - DISCONNECT SWITCHES

16.01 The Contractor shall furnish and install externally operated, non fused and/or fused (with Class R rejection features), heavy duty, horsepower rated, disconnect switches at all points indicated on the drawings or required by code. These switches shall be by the same manufacturer as the distribution equipment.

16.02 All disconnect switches shall be fused except for disconnect switches that have individual fuse protection at point circuit receives its supply.

16.03 Provide dead front type for all exterior disconnects on grade level when so required by local code.

16.04 All fused disconnect switches shall have a minimum rating of 100,000 A.I.C. with fuses installed unless noted otherwise on the drawings.

16.05 All disconnect switches shall be provided with grounding kits.

PART 17 - FUSES

17.01 Cartridge type fuses of proper size as required shall be furnished and installed for all switches and panelboards throughout, and an additional supply of three (3) spare fuses of each size shall be furnished in original packages to the Owner. Furnish a NEMA enclosure with hinged cover equal to Bussmann type SFC for storing all spare fuses and locate adjacent to main service equipment. Fuses for motor and mechanical equipment shall be sized from the nameplate data per N.E.C. requirements.

17.02 Fuses shall be manufactured by Bussmann Mfg. Co., Gould-Shawmut Co., Littelfuse or approved equal by Engineer. Fuse types shall be installed as follows:

Main Service and Distribution Feeder Protection:

	Bussman	Littelfuse	Gould Shawmut
601 amps and larger	KRP-C/KTNKLPC		A4BQ Gould
	Bussman	Littelfuse	Shawmut
600 volts and less (Class L) 600 amps and less	LPN-RK	LLN-RK	A2D-R
250 volts and less (Class RK1) 600 amps and less	LPS-RK	LLS-RK	A6D-R
600 volts and less (Class RK1)			

Motors and Primary Feeders for Transformers:

250 volts and less (Class RK5)	FRN-R	FLN-R	TR-R
600 volts and less (Class RK5)	FRS-R	FLS-R	TRS-R

17.03 Class T fuses will not be accepted, unless they are a part of a manufacturers assembly or approved by the Engineer. Class J fuses may be used as an alternate to the Class R fuses listed above.

17.04 Fuses installed on project shall be by one manufacturer only. (Do not intermix Manufacturers.)

PART 18 - EQUIPMENT CONNECTIONS

18.01 For 120 volt motors 1/2 HP- and less, 15 amperes and less, Contractor shall provide Bussmann "SSY" box cover unit for indoor application and "SSN" box cover unit for outdoor applications, or equal by Perfect-Line, with fustat plug fuse and integral toggle switch for motors 1/2 HP-120V. and less. Fustats for cord and plug equipment with fuses 15 amperes and less shall be Bussmann "SR" box cover unit, or equal by Perfect-Line, with fustat plug fuse. Mount fustats in housings of equipment served wherever possible. Plug fuses for motors shall be sized based upon 125% of manufacturer's nameplate full load amperage unless otherwise indicated on drawings.

18-02 For 3/4 HP-120V. motors, Contractor shall provide (1) 20 amp 1 pole 120 volt toggle disconnect switch with a Bussmann 'HPD' fuse holder and 'FNQ' fuse at each unit. Switch and fuse holder to be mounted in cover of a 4" square junction box at each unit. For 3/4 HP-120V. motors that are provided with cord and plug, Contractor shall provide 20 amp 120 volt duplex receptacle with (1) 20 amp 1 pole 120 volt toggle disconnect switch on line side of receptacle, and Bussmann 'HPD' fuse holder and 'FNQ' fuse on line side of receptacle. Switch, receptacle, and fuse holder to be mounted in cover of a 4" square junction box at each unit. Fuses for motors shall be sized based upon 125% of manufacturer's nameplate full load amperage unless otherwise indicated on drawings.

18.03 For connections to 277 volt equipment, Contractor shall provide (1) 20 amp 1 pole 277 volt toggle disconnect switch with a Bussmann 'HPD' fuse holder and 'FNQ' fuse at each unit. Switch and fuse holder to be mounted in cover of a 4" square junction box at each unit. Fuses for motors shall be sized based upon 125% of manufacturer's nameplate full load amperage unless otherwise indicated on drawings.

SECTION 16030

SERVICE AND DISTRIBUTION

PART 1 - MAIN SERVICE

1.01 Primary: See the plans.

1.02 Secondary: See the plans. Voltage will be, 277/480-volt, 3-phase, 4-wire, WYE. 120/208-volt, 3-phase, 4-wire, WYE, 240-volt, 3-phase, 3 wire Delta, or 120/240-volt, 1-phase, 3 wire.

1.03 Consult power company for their requirements and for coordinating with their installation. Contractor shall provide any work thus required beyond that indicated by drawings and/or specifications and pay for costs incurred for Utility Company to install both temporary and permanent service to the project. Verify costs with Utility Company prior to bidding. Contractor shall provide guard posts around electrical transformers and electrical pedestals per Utility Company standards.

PART 2 - DISTRIBUTION EQUIPMENT

2.01 Part 2 applies to all distribution equipment supplied on the Project.

2.02 All electrical distribution equipment (switchboards, panelboards, disconnect switches, transformers, starters, etc.) shall be of one manufacturer, unless specifically noted on the drawings, in the specifications, or approved by the Engineer. Intermixing of distribution equipment by different manufacturers will not be permitted.

2.03 If shown on the plans, provide surge arrester for lightning protection on main service entrance. Refer to drawings for voltage and phasing of service. Arrester shall be located within, or adjacent to, the main switch enclosure as indicated on the plans.

2.04 Equipment layouts on the drawings are based upon one manufacturer. Verify all actual equipment sizes with equipment manufacturer prior to bidding.

2.05 If layout changes are required due to other electrical manufacturers equipment size, they must be submitted to and approved by the Engineer prior to bidding. National Electric Code working clearances must be maintained at all times. In no case will extra remuneration be allowed for layout changes that differ from those shown.

2.06 Shop drawings shall be furnished for all distribution equipment indicating the following information:

A. Switchboard voltage/current rating.

B. Overall outline dimensions including weight, available conduit space.

C. Switching and protective device ampere ratings.

D. Bus ratings and material.

E. One line diagram.

F. Integrated short circuit rating.

G. Coordination of any ground fault system settings shall be as per the manufacturers requirements.

Adequate conduit space shall be provided to meet the requirements established on the drawings.

2.07 All items of distribution equipment required to be floor mounted shall be mounted on a minimum 3 1/2" concrete base above floor. Concrete base to be by Electrical Contractor.

2.08 All phase and neutral busing and all ground bars in panelboards and switchboards shall be copper only. All lugs shall be AL/CU rated. All panelboards supplied by 'K' factor transformers shall have 200% rated neutrals.

2.09 Panel schedules are not shown on the drawings, however, copies of these schedules are available to the Contractor after bids are let, upon request to the Engineer.

PART 3 - BRANCH CIRCUIT AND DISTRIBUTION PANELBOARDS

3.01 General:

A. All panels shall be provided with key locking door.

B. Panels shall have hinged covers with concealed trim clamps, doors shall have laser cut trims with concealed hinges, and flush lock, master keyed. Hinged cover shall have continuous piano hinge down one side with door opening by a single latch. Where multi-section panelboards are indicated on the drawings, panel enclosures and covers shall be of the same size for each section.

C. Key all doors alike and furnish two (2) keys for each lock. Doors over 48" high and double doors shall have 3-point latching per U.L. 50. Consult drawings for flush or surface mounting.

D. After wiring, label each circuit and provide under plastic in door of panel a typewritten schedule indicating load description of all circuits in panel. Mark spare breakers and provisions for future breakers in pencil on schedule for future circuit marking.

E. Breakers shall have individual plastic cases sized as scheduled on the plans. Two and three pole breakers shall have common trip (single pole units with tie bars are not acceptable). Main circuit breakers shall be vertically mounted. Back-fed main circuit breakers above 100 amps will not be acceptable. Where spaces are noted in the panel summary, provide all necessary bussing, device support, and connections for future circuit breakers. Provide blank cover for all spaces.

F. All panelboards shall have copper ground buses installed and grounded per the requirements of the N.E.C. All panelboards serving devices having isolated ground circuits shall be provided with an additional insulated copper ground bus for connection of isolated ground conductors. All neutral and ground bars shall have a minimum number of lugs equal to 66% of number of pole spaces in panel. In computer rated or isolated ground panelboards, all neutral, ground and isolated ground bars shall have a minimum number of lugs equal to 100% of number of pole spaces in panel

G. Where flush mounted panels occur on drawings Contractor shall stub into ceiling void for future use, (1) 1" empty conduit for every four spare 20A. breakers or unused panel spaces. On multi-story buildings, Contractor shall stub into ceiling void above panel and into ceiling void of floor below for future use, (1) 1" empty conduit for every four spare 20A. breakers or unused panel spaces Conduits stubbed into ceiling void below panel shall be provided with conduit cap and labeled 'To Panel Above'.

H. All panelboards supplied from an emergency source shall have breakers provided with handle lock-offs for each breaker. Breaker handles to be set in the "ON" position.

I. All phase and neutral busing and all ground bars in branch circuit panelboards and circuit breaker distribution panelboards shall be copper only. All lugs shall be AL/CU rated. All panelboards supplied by 'K' factor transformers shall have 200% rated neutrals.

3.02 Branch Circuit Panelboards:

A. Panelboards rated up to 240V (400A. max) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 10,000 A.I.C. unless noted otherwise. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings. All breakers shall be of either the plug-in type or bolt-on type.

B. Panelboards rated over 240V and up to 480V (400A max) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 14,000 A.I.C. unless noted otherwise. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings. All breakers shall be of the bolt-on type only.

C. Branch Circuit Breaker Panelboards:

Panel Rating	Square D	Siemens	G.E.	Cutler-Hammer
240V (400A max)	NQOD	S1/S3	AL	PRL1
480V (400A max)	NF	S2/S3	AE	PRL2

3.03 Circuit Breaker Distribution Panelboards:

A. Panelboards rated up to 240V (600A. and above) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 10,000 A.I.C. unless noted otherwise on the drawings. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings

B. Panelboards rated over 240V and up to 480V (600A and above) shall have a short circuit current rating tested to U.L. Standards for a minimum rating of 14,000 A.I.C. unless noted otherwise on the drawings. Breaker rating with-in panel shall be equal to or greater than minimum integrated equipment rating. Series ratings will not be accepted, unless specifically noted otherwise on the drawings

C. Circuit Breaker Distribution Panelboards:

Panel Rating	Square D	Siemens	G.E.	Cutler-Hammer
All Raings	I-Line	S4/S5	Spectra	PRL4

D. Distribution panels located in finished rooms (other than mechanical, electrical rooms or janitor rooms) shall be provided with key locking doors.

PART 4 - DRY TYPE TRANSFORMERS (AS INDICATED BY DRAWINGS)

4.01 Dry type transformers up to 10 KVA (115 deg. C. rise), 15 KVA thru 112 1/2 KVA, (150 deg. C. rise), above 112-1/2 KVA, (80 deg. C. rise or higher rating), all in ambient of 40 deg. C, unless noted otherwise on plans.

4.02 Transformers (15 KVA and larger) shall have core isolated from the housing by vibration isolators. The entire housing shall also be isolated from the building by vibration isolators. Connecting conduits shall have flexible steel sections (12" long) to isolate sound transmission. Transformers shall meet NEMA ratings for sound levels and have not less than 4 full-capacity 2 1/2% taps (2 above and 2 below normal). These units may be as manufactured by the manufacturers providing distribution equipment or Hevi-Duty or Jefferson.

4.03 Provide 'K' factor transformers where indicated on the drawings. 'K' factor transformers shall be provided with electrostatic shielding, Class 220 insulation, reduced core flux, and 200% neutral terminal.

DIVISION 16 ELECTRICAL

SECTION 16040

LIGHTING

PART 1 - LIGHTING FIXTURES

1.01 This work shall include all lighting fixtures and lamps as specified on the drawings and herein. Fixtures shall be completely free of defects, dents, rust or chipped surfaces. No cracked, broken, or chipped lenses will be acceptable. Fixtures that are cracked, broken, chipped, rusted, dented or otherwise damaged, shall be replaced without additional cost to the Owner. Fixtures shall be furnished complete including hickeys, suspension nipples, and all other materials and equipment as required for hanging and supporting fixtures in accordance with U.L. UBC, and NEC requirements. This Contractor shall furnish and install lamps for all fixtures and shall wipe fixtures and lamps before and after installation. All recessed mounted fixtures shall be mounted with the trim flush to the finish ceiling or wall surfaces, free of gaps or cracks.

1.02 Electrical Contractor shall verify exact ceiling types in all areas with architectural room finish schedule for exact fixture mounting (i.e., grid or flange type mounting) prior to ordering of fixtures. Electrical Contractor shall verify ceiling construction details in all areas and provide appropriate mounting hardware for installation of lighting fixtures. All surface mounted fixtures shall be supported independent from ceiling system and shall be securely mounted. Lay-in fixtures shall be supported directly from structure, unless ceiling system has been designed for support of such fixtures.

1.03 General Contractor shall provide fireproofing around recessed fixtures installed in fire-rated ceilings per U.L. requirements, Electrical Contractor shall coordinate.

1.04 Provide clear tempered glass shields on all metal halide, and quartz fixtures. Exterior fixtures shall be constructed with gasketed shield and be "bugtight".

1.05 Provide thermal switches on all recessed fixtures as required by N.E.C

1.06 Light fixtures supported by framing members of suspended ceiling systems shall be attached to the framing member by mechanical means. Clips identified for use with the type of ceiling framing member and fixture shall be provided.

1.07 All fluorescent fixture lenses shall be 100% virgin acrylic and be a nominal thickness of 0.125", (Nominal thickness shall be no less than 0.115" thick). Styrene lenses shall not be provided for any light fixtures, unless specifically so noted on the drawings.

1.08 All fluorescent fixtures (housing, door, etc) shall be provided with factory applied powder coat baked enamel finish, applied after final fabrication, unless specifically noted otherwise on the lighting fixture schedule or drawings. Fixtures using pre-painted metal components will not be acceptable.

1.09 All fluorescent fixtures shall be provided with captive spring loaded latches, unless specifically noted otherwise on the lighting fixture schedule or drawings. Fixtures using non captive springs will not be accepted.

1.10 All fluorescent fixtures using F40T12 or FO32T8 type lamps shall be provided with twist-in (not push-in), bi-pin type, lamp holders.

1.11 Connections to all fixtures mounted in lay-in ceilings shall be as follows:

A. Provide J-Box on structure above fixtures for power circuit supply connections. Install U.L. listed 3/8" flexible (min.) steel conduit (whip) down to each fixture. Each whip shall be field cut to length to allow fixture to be relocated up to 4'-0" in any horizontal direction. Whips shall include (2) or (3) #12 AWG Copper, 90 degree rated, conductors (numbers as indicated) and a #12 AWG Copper ground conductor. Fixtures factory supplied with U.L. listed whip assemblies shall also be provided with the conductors as listed above. Tandem fluorescent fixtures shall have a factory supplied U.L. listed whip assembly conductors as required to interconnect fixtures, and be of sufficient length to allow mounting fixtures 12'-0" on center in any horizontal direction.

B. Contractor may use a pre-manufactured flexible wiring system for light fixture connections. System shall be similar to "AFC" systems and shall not be used for switch drops or systems other than lighting.

C. If tandem wired fixtures are used, the maximum whip length between fixtures for electronic ballasts shall be 9 feet.

1.12 Where fluorescent fixtures are mounted in continuous rows, each row shall be supplied with 2 #12 AWG & 1 #12 AWG "green" ground, 90 degree C. rated, Copper conductors, all within 1/2" flexible steel conduit. Feed through wiring shall also be #12 AWG. 90 degree C. copper. Where flexible steel conduit is to be used, all fittings shall be U.L. labeled for the purpose.

1.13 When different lamps in the same fixture are controlled by separate switches (2 or 3 level lighting), the switches shall control the same lamp positions in all fixtures controlled by those switches. Arrangement of switching will generally be that one switch controls middle lamp or lamps, and other switch controls outside lamps unless noted otherwise on the drawings.

1.14 All T8 fluorescent lamp ballasts shall comply with the following requirements unless noted otherwise on the drawings.

A. Electronic integrated circuit, solid-state, full light output, energy efficient type compatible with lamps and lamp combinations to which connected. Ballasts shall be certified by E.T.L., and labeled by C.B.M.. Ballasts shall be Class P, high power factor (minimum 90%), sound rating of 'A' or greater, and have a minimum efficiency of 85% Lamp current crest factor (LCCF) shall be less than 1.7.

B. Ballasts shall be provided in voltages to match connected circuits. Verify circuit voltage prior to ordering light fixtures.

C. Ballasts shall have lamp flicker less than 5% and have total harmonic distortion (THD) of less than 20%.

D. Ballasts shall be provided in one or two lamp configurations. Three and four lamp electronic ballasts will not be allowed unless noted otherwise on the drawings, or as provided in 'Master-Satellite' wiring arrangements.

E. Ballasts shall conform to FCC Regulations Part 15, Subpart J and CFR 47, Part 18 for EMI and RFI limits. Ballasts shall conform to IEEE C62.41, Category A for resistance to voltage surges for normal and common modes.

F. All ballasts shall be secured by a minimum of two bolts.

G. Electronic dimming ballasts shall provide smooth dimming over a minimum range from 100 to 10 percent light output. Ballasts shall be listed for use with the specific fluorescent dimming system provided.

H. Ballasts shall be as manufactured by Sylvania, Motorola, Magnatek, Universal, Jefferson, Howard, or Advance.

1.15 All compact fluorescent and biax lamp ballasts shall be electronic with the same characteristics as listed for T8 lamps except that compact fluorescent or biax ballasts shall be provided with end-of-life sensing and cutoff for disconnecting the lamp on end of life.

1.16 All T12 fluorescent lamp ballasts shall comply with the following requirements unless noted otherwise on the drawings.

A. All ballasts shall be ETL-CBM, U.L. listed, high power factor, Class P, Energy Saver and have a sound rating of A or B.

B. Ballasts shall be provided in voltages to match connected circuits. Verify circuit voltage prior to ordering light fixtures.

C. All ballasts when installed in a fixture shall not exceed 90 degree C. operating case temperature in a 55 degree C. heat box.

D. Ballasts shall be guaranteed not to overheat capacitor insulating media beyond manufacturer's warranty limits.

E. Ballasts shall be as manufactured by Sylvania, Motorola, Magnatek, Universal, Jefferson, Howard, or Advance.

F. All ballasts shall be secured by a minimum of two bolts.

1.17 H.I.D. Fixture Ballasts shall be capable of starting and operating the specified lamps within the limits specified by the lamp manufacturer. The ballast shall limit lamp wattage variation to a maximum of +5 percent from nominal. At rated line voltage the ballast shall have a minimum power factor of 95%. Ballast primary current during lamp starting must not exceed current during normal lamp operation. The ballast must reliably start and operate the lamp in ambient temperatures down to -20 degree F. where installed outdoors and down to +20 degrees F. where installed indoors. The ballast shall be capable of withstanding continuous operation with the ballast secondary in a short-circuit condition without loss of ballast life. Ballasts shall be Jefferson, Sylvania, Universal, Magnetek, Advance, Wide-Lite, Holophane or Westinghouse.

1.18 Lamps shall be as follows. Once a manufacturer has been selected, all lamps on the project shall be by the same manufacturer.

A. Incandescent lamps shall be inside frosted unless otherwise called for in the fixture specifications, (Rated at 130 Volts). Incandescent lamps shall be as manufactured by Philips, G.E., Sylvania, or equal approved by the Engineer.

B. Fluorescent lamps, unless noted otherwise on the drawings, shall be Sylvania F40/D835/SS for T-12 lamps and Sylvania FO32/835 for T-8 lamps ,or equal by Phillips, G.E. or as approved by the Engineer. Verify all lamp colors with Architect prior to ordering.

C. Mercury vapor lamps shall be warm deluxe white unless otherwise noted on the drawings, lamps as manufactured by G.E., Sylvania, Philips, or equal approved by the Engineer.

D. Metal halide lamps shall be Metalarc/C (coated) as manufactured by G.E., Sylvania, Philips, or equal approved by the Engineer. Refer to lighting fixture manufacturer for lamp type.

E. High pressure sodium lamps shall be Lumalux/D (coated) as manufactured by G.E., Sylvania, Philips, or equal approved by the Engineer. Refer to lighting fixture manufacturer for lamp type.

DIVISION 16 ELECTRICAL

SECTION 16050

COMMUNICATIONS SYSTEMS

PART 1 - TELEPHONE SYSTEM

1.01 General: These specifications include the furnishing of all labor and materials necessary for the installation of a complete system of conduits, outlet boxes, and terminal boards for use by the Telephone system supplier. Unless noted otherwise on the drawings, all telephone devices and cables are to be furnished and installed by the telephone system supplier.

1.02 This installation must be done according to the requirements of the local system supplier and the general specifications contained herein. Consult the serving Telephone Co. to verify all requirements.

1.03 Outlets: All telephone outlet boxes shall be installed with 4" square, minimum 2 1/8" deep box and trim, unless noted otherwise on the drawings. Telephone coverplates to be as furnished by telephone system supplier unless noted otherwise on the drawings. All floor outlets shall be adjustable water-tight floor box, per Section 16020. All telephone outlet boxes to be located as directed. Telephone outlet boxes not used shall be provided with blank cover plates to match switch and receptacle plates.

1.04 Provide and install nylon pull wires in all telephone conduits. Provide tags on all pull wires to indicate termination of wire or conduit.

1.05 Provide and install pull boxes at all locations as required by the telephone system supplier.

1.06 Provide and install conduit sleeves thru floors and walls as required by the telephone system supplier.

1.07 The telephone system shall be provided with a 2" minimum main service conduit from the telephone terminal board to the property line unless noted otherwise on the drawings or required by the Telephone Co. Conduit to be routed per the requirements of the serving Telephone Co.. Verify conduit size with Telephone Co. prior to installation and bidding.

1.08 Each telephone outlet box location requires (1) 1" empty conduit with pull wire unless noted otherwise. Telephone conduits shall be stubbed into ceiling void, if ceiling void is accessible and not an air return plenum. Telephone conduit shall be routed to nearest telephone terminal board if ceiling void is not accessible or is an air return plenum. Verify conditions of job prior to rough-in.

1.09 Provide telephone terminal board as shown on the drawings or as required by telephone system supplier. Board shall be 3/4" plywood sized as required by telephone system supplier, minimum 4' x 4'. Telephone terminal board to be mounted on wall and painted to match.

1.10 Provide duplex receptacle on separate circuit beside each telephone terminal board location and other communications equipment requiring 120 volt power

PART 2 - DATA OUTLET SYSTEM

2.01 Part 2 will only apply if there are data outlets shown on the drawings.

2.02 General: These specifications include the furnishing of all labor and materials necessary for the installation of a complete system of conduits, outlet boxes and terminal boards where shown on the drawings for use by the data system supplier. Unless noted otherwise on the drawings, all data system devices and cables are to be furnished and installed by the data system supplier.

2.03 This installation must be done according to the requirements of the system supplier and the general specifications contained herein.

2.04 Outlets: All data outlet boxes shall be installed with 4" square, minimum 2 1/8" deep box and trim, unless noted otherwise on the drawings. Coverplates to be as furnished by data system supplier unless noted otherwise on the drawings. All floor outlets shall be adjustable water-tight floor box, per Section 16020. All data outlet boxes to be located as directed. Data outlet boxes not used shall be provided with blank cover plates to match switch and receptacle plates.

2.05 Provide and install nylon pull wires in all data conduits. Provide tags on all pull wires to indicate termination of wire or conduit.

2.06 Provide and install pull boxes at all locations as required by the data system supplier.

2.07 Provide and install conduit sleeves thru floors and walls as required by the data system supplier.

2.08 Each data outlet box location requires (1) 1" empty conduit with pull wire unless noted otherwise. Data conduits shall be stubbed into ceiling void, if ceiling void is accessible and not an air return plenum. Data conduit shall be routed to data terminal board if ceiling void is not accessible or is an air return plenum. Verify conditions of job prior to rough-in.

2.09 Provide data terminal board as shown on the drawings or as required by data system supplier. Board shall be 3/4" plywood sized as required by data system supplier, minimum 4' x 4'. Unless shown otherwise on the drawings, data terminal board to be mounted on wall adjacent to telephone terminal board and painted to match wall

2.10 Provide duplex receptacle on separate circuit beside each data terminal board location and other communications equipment requiring 120 volt power.

PART 3 - CATV (TELEVISION) OUTLET SYSTEM

3.01 Part 3 will only apply if there are CATV outlets shown on the Drawings.

3.02 General: These specifications include the furnishing of all labor and materials necessary for the installation of a complete system of conduits, outlet boxes and terminal boards where shown on the drawings for use by the CATV system supplier. Unless noted otherwise on the drawings, all CATV devices and cables are to be furnished and installed by the CATV system supplier.

3.03 This installation must be done according to the requirements of the system supplier and the general specifications contained herein.

3.04 Outlets: All CATV outlet boxes shall be installed with 4" square, minimum 2 1/8" deep box and trim, unless noted otherwise on the drawings, with separately mounted 20 amp 125 volt duplex grounded receptacle adjacent to CATV outlet. CATV coverplates to be as furnished by CATV system supplier unless noted otherwise on the drawings. All floor outlets shall be adjustable water-tight floor box, per Section 16020. All CATV outlet boxes to be located as directed. CATV outlet boxes not used shall be provided with blank cover plates to match switch and receptacle plates.

3.05 Provide and install nylon pull wires in all CATV conduits. Provide tags on all pull wires to indicate termination of wire or conduit.

3.06 Provide and install pull boxes at all locations as required by the CATV system supplier.

3.07 Provide and install conduit sleeves thru floors and walls as required by the CATV system supplier.

3.08 Each CATV outlet box location requires (1) 1" empty conduit with pull wire unless noted otherwise. CATV conduits shall be stubbed into ceiling void, if ceiling void is accessible and not an air return plenum. CATV conduit shall be routed to the CATV terminal board if ceiling void is not accessible or is an air return plenum. Verify conditions of job prior to rough-in.

3.09 The CATV system shall be provided with a 1" minimum main service conduit from the CATV terminal board to the property line unless noted otherwise on the drawings or required by the CATV company. Conduit to be routed per the requirements of the serving CATV company. Verify conduit size with CATV company prior to installation.

3.10 Provide CATV terminal board as shown on the drawings or as required by CATV system supplier. Board shall be 3/4" plywood sized as required by CATV system supplier, minimum 2' x 2'. Unless shown otherwise on the drawings, CATV terminal board to be mounted on wall adjacent to telephone terminal board and painted to match wall.

3.11 Provide duplex receptacle on separate circuit beside each CATV terminal board location and other communications equipment requiring 120 volt power

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2017 UDALL HIGH SCHOOL SCIENCE CLASSROOM REMODEL UNIFIED SCHOOL DISTRICT #463

DRAWINGS ISSUED		
NO.	DATE	ITEM ISSUED
4	11/21	ISSUED FOR BIDS
3	11/13	BOE MEETING
2	10/23	REVIEW
1	10/11	CONSTRUCT DOCS

COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV CHECKED BY: DR

ELECTRICAL SPECIFICATIONS

E4.2

17316.00-107

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SECTION 28 31 11 - FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 SCOPE & RELATED DOCUMENTS:

A. The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance of all operations in connection with the installation of the Fire Alarm System Network shown on the drawings and as herein specified and as directed by the Architect/Engineer.

B. The requirements of the conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.

C. The complete installation is to conform to the applicable sections of NFPA_71, NFPA_72, NFPA 90A, Life safety code 101, ADA, FM, UL, Local Code Requirements of the City and National Electrical Code with particular attention to Article “Fire Alarm Systems”, unless noted otherwise in these specifications or on the drawings.

D. The work covered by this section of the specifications is to be coordinated with the related work as specified elsewhere under the project specifications.

E. The installation shall be per the manufacturers rules and specifications.

F. The manufacturer shall be licensed and certified in accordance with any City Ordinance, and shall provide Certificate upon demand of the building owner, architect or engineer. The manufacturer shall coordinate and provide a test of the system in the presence of the Local Fire Department _ Fire Prevention Division in accordance with the Fire Departments Testing requirements. The manufacturer shall submit any or all calculation and diagrams to City or State Fire Departments as required to get system approved. Successful Fire Alarm manufacturer is to provide signed & sealed drawings to City or State Fire Departments as required to get system approved.

G. It shall be the responsibility of the Contractor to provide all equipment and material compatible to the system supplied. All equipment shall be located as shown on the drawings. Any equipment not specifically mentioned in this specification or not shown on the drawings, but required for the operation of a completely functional system shall be furnished and installed.

H. Fire alarm drawings from manufacturer and programming displays on final read out shall indicate owner approved room numbers.

1.2 QUALITY ASSURANCE:

A. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable. The system components shall meet the requirements of the Americans with Disabilities Act (ADA).

B. All equipment shall be U.L. approved for both fire and security and installed in accordance with the requirements of the National Electric Code, Americans with Disabilities Act (ADA), local codes and these specifications, with the stricter requirement governing in case of possible variance. Systems equipment shall be jointly guaranteed by the Electrical Contractor and the systems' manufacturer for a period of one (1) year from the date of acceptance.

C. Manufacturers equipment shall conform to the standards herein and the manufacturer must supply proof of having produced similar equipment for at least ten years, provide the Engineer with a written history of similar local systems now rendering satisfactory service. Supplier of this equipment must also have had service and sales of the same equipment for the past 4 years. The supplier shall be licensed and certified in accordance with any local laws and ordinances and shall provide proof of same upon demand of the building owner, Governing agencies, Architect or Engineer. The manufacturer shall coordinate and provide a test of the system in the presence of the local Fire Department in accordance with the Fire Departments Testing requirements.

1.3 GENERAL:

A. Contractor shall connect all new fire alarm devices to the existing fire alarm control panel located in the main office storage room. Existing system is Silent Knight SK-5208 series system. Contractor to modify and expand existing system as required to add additional devices.

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1.4 OPERATION:

A. The fire alarm control panel shall monitor addressable devices within the buildings and shall report to the annunciator panel.

B. The F.A.C.P. shall be 24 VDC operation with 120 VAC operating power. Internally mounted, properly sized, sealed gelyte lead acid batteries shall be provided for operating the system in standby mode for 24 hours followed by alarm mode for 5 minutes.

C. Provide alarm initiation from manual stations located at each exit, automatic smoke/heat sensors located as shown, duct smoke sensors in the air handling units, smoke and fire/smoke dampers, sprinkler water flow and sprinkler tamper switches. Provide audiovisual alarm indicating devices on the inside. All devices shall be located as shown on the drawings.

D. Provide a general alarm indication throughout the new building and existing building when any fire alarm initiating device described is activated.

E. Provide the closure of all smoke doors, and shutdown of all air handling equipment controlled during a general alarm. This function shall remain in effect until the system has been completely returned to its normal state (silencing of signals alone shall not reset this control status). Where connections are shown to door holders and smoke sensors provided with door hardware, provide capacity in the control panel to power the door holders provided with the door hardware. Provide additional 10 percent power capacity in the control panel for additional future door holders.

F. The entire system may be reset only following the resetting of individual alarm initiation devices and a resetting procedure within the F.A.C.P. system trouble indication devices shall continue to operate until this operation is complete.

G. System shall be large enough to allow expansion of new fire alarm into existing building if applicable. Provide space for additional batteries, cards and items required without the change of Backbox.

H. If fire sprinkler systems are provided in the project, provide separate zone annunciation for each flow switch plus a common zone annunciation for all tamper switches.

I. If kitchen hoods are provided in this project, the control panel shall monitor the kitchen hood system and shall generate a general alarm if activated. A separate zone in the control panel shall be provided for the kitchen hood system.

J. Provide Digital Control Communicator (DACT) to comply with applicable FCC codes. Unit shall feature either pulse or touch tone dialing. “Call waiting” tones shall not prevent proper operation. It shall feature full line seizure with on board relay. Communicator shall transmit upon any alarm activation in the building. Verify format and provide interface as required. Mount communicator on wall adjacent to control panel and provide wiring between communicator and monitoring control panel per manufacturers requirements. First year monitoring fees shall be included in the Contractor's Bid if monitoring is required.

K. If existing fire alarm systems are indicated on the drawings, all existing fire alarm control panels to remain or any existing 120 volt stations and signals to remain shall be interconnected with the new fire alarm control panel such that if any system has an alarm initiated, all systems shall be activated sounding signals and operating control functions as if only one system existed. All annunciation, control, and reset shall be from the new control panel. Provide modules and equipment as required to connect to the existing control panels. Provide resettable relay and IAM unit at nearest existing 120 volt manual station for connection to the new control panel. Provide addressable relay at nearest existing 120 volt signal for connection to the new control panel. Provide signal reset of 120 volt system in the new control panel. Verify all requirements with existing conditions and with system supplier and provide all wiring and equipment as required.

The Contractor shall be responsible that all existing fire alarm system devices, cables, and wiring are in working order prior to work on new and existing systems. The Contractor shall meet with the Owner's representative to test the existing system prior to construction/demolition, and document any areas of the existing system that are not working properly, which will relieve those areas from the Contractors responsibility. Otherwise, it will be the responsibility of the Contractor to maintain the existing fire alarm system in working order throughout the construction, and in the event of a failure in any part of the system due to construction related activities, the Contractor will be expected to immediately make all necessary repairs to restore the system as fully operational, at no additional expense to the Owner.

1.5 CONTROL OPERATION:

A. The fire alarm control panel shall allow for loading or editing special instructions and operating sequences as required. The system shall be capable of on site programming to accommodate and facilitate expansion, building parameter changes or changes as required by local codes. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control panel. Loss of primary and secondary power shall not erase the instructions stored in memory.

B. The ability for selective input/output control functions based on ANDing, ORing, timing and special coded operations shall also be incorporated in the resident software programming of the system.

C. To accommodate and facilitate job site changes, initiation circuits shall be individually configurable on site to provide either alarm/trouble operation, alarm only, trouble only, current limited alarm, no alarm, normally closed device monitoring, a non-latching circuit or an alarm verification circuit.

D. To accommodate and facilitate job site changes, indicating appliance circuits shall be individually configurable on site to provide upon activation a fast marchtime, slow march time, temporal code, PNIS code or a master code until silenced or reset upon any output circuit. The PNIS coded pulse on and off time may be selectable on site to provide 16 different duty cycles between ¼ second and 5 seconds.

E. The system shall have the capability to store a minimum of 300 alarms and 300 troubles in a historical data file.

F. An alarm shall be displayed on an 80 character LCD display. The top line of 40 characters shall be the point label and the second line shall be the device type identifier. The system alarm red LED shall flash on the control panel and the remote annunciator until the alarm has been acknowledged at the control panel or the remote annunciator. Once acknowledged, this same LED shall latch on. A subsequent alarm received from another zone after acknowledged shall flash the system alarm LED on the control panel and remote annunciator. The LCD display shall show the new alarm information by device as applicable as follows:

1. Manual stations, smoke sensors each floor
2. Duct smoke sensors and fire/smoke damper sensors (if shown or required)
3. Sprinkler system flow switch if installed (typical each zone)
4. Sprinkler system tamper switch if installed (common for all zones)
5. Elevator smoke sensor, main floor (if shown or required)
6. Elevator smoke sensor, all remaining floors (if shown or required)
7. Elevator smoke sensor, elevator equipment room (if shown or required)
8. Kitchen hood (if installed)

G. A pulsing alarm tone shall occur within the control panel and the remote annunciator until acknowledged.

H. The activation of any system smoke sensor shall initiate an Alarm Verification operation whereby the panel will reset the activated sensor and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke sensor, the system shall process the alarm as described previously. If no second alarm occurs within one minute the system shall resume normal operation. The Alarm Verification shall operate only on smoke sensor alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation shall be selectable by zone.

I. The control panel shall have the capability to display the number of times a zone/device has gone into a verification mode.

J. Alarm verification zones shall have the capability of being divided into seven different groups where by only two verification zones from a group will confirm the first activation and cause the panel to follow programmed alarm sequence.

K. Fire Sprinkler System:

1. The control panel shall have a dedicated Supervisory Service LED and a dedicated Supervisory Service Acknowledge Switch.
2. The activation of any standpipe or sprinkler valve tamper switch shall activate the system supervisory service audible signal and illuminate the LED at the control panel and the remote annunciator. Differentiation between valve tamper activation and opens and/or grounds on fire alarm initiation circuit wiring shall be provided.
3. Activating the Supervisory Service Acknowledge Switch shall silence the supervisory audible signal while maintaining the Supervisory Service LED on indicating the tamper contact is still in the off-normal station.
4. Restoring the valve to the normal position shall cause the Supervisory Service LED to extinguish thus indicating restoration to normal position.
5. Restoring the valve to the normal position shall cause the supervisory service audible signal to pulse thus indicating restoration to normal position. Activating the Supervisory Service Acknowledge Switch will silence the audible signal and restore the system to normal.
6. Provide 120 volt circuit to exterior fire sprinkler bell. Verify location with fire sprinkler system contractor.
7. Provide power and monitoring circuit to fire sprinkler system air compressor if installed. Verify location with fire sprinkler system contractor.

L. A manual evacuation switch shall be provided to operate the systems alarm indicating appliances. Other control circuits shall not be activated. However, a true alarm shall be processed as described previously.

M. Activation of an auxiliary bypass switch shall override the automatic functions either selectively or throughout the system.

N. Alarm and trouble conditions shall be immediately displayed on the control panel from Alphanumeric LCD display. If more alarms or troubles are in the system the operator may scroll to display new alarms.

O. The system shall have an alarm list key that will allow the operator to display all alarms, troubles, and supervisory service conditions with the time of occurrence.

P. The actuation of the enable walk test program at the control panel shall activate the “Walk Test” mode of the system which shall cause the following to occur:

1. The city connection circuit shall be disconnected.
2. Control relay functions shall be bypassed.
3. The control panel shall show a trouble condition.
4. The alarm activation of any initiation device shall cause the audible signals to code a number of pulses to match the zone number.
5. The panel shall automatically reset itself after signaling is complete.
6. Any momentary opening of an initiating or indicating appliance circuit wiring shall cause the audible signals to sound for 4 seconds to indicate the trouble condition.
7. The control panel shall have the capacity of 8 distinctive walk test groups.

Q. All auxiliary manual controls shall be supervised so that all switches must be returned to the normal automatic position to clear system trouble.

R. Each independently supervised circuit shall include a discrete LED read-out to indicate disarrangement conditions per circuit.

S. The incoming power to the system shall be supervised so that any power failure must be audibly and visually indicated at the control panel and the remote annunciator. A green”power on” LED shall be displayed continuously while incoming power is present.

T. The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be audibly and visually indicated at the control panel and remote annunciator.

U. The System Expansion Modules shall be electrically supervised for module placement. Should a module become disconnected from the C.P.U. the system trouble indicator must illuminate and audible trouble signal must sound.

V. The system shall have provisions for disabling and enabling all circuits individually for maintenance and testing purposes.

W. Wiring to a hardwired (non-serial) remote annunciator shall be supervised for open and ground conditions. A separate annunciator trouble LCD Read-out Indication must be provided. It shall illuminate and an audible trouble signal shall sound at the control panel upon the detection of an open or ground condition.

1.6 MULTIPLE ADDRESSABLE PERIPHERAL NETWORK (IDNET):

A. Communication with addressable devices: The system must provide communication with all initiating and control devices individually. All of these devices are to be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:

Alarm
Trouble
Open
Short
Ground
Device Fail/or Incorrect Device

B. All addressable devices are to have the capability of being disabled or enabled individually.

C. Up to 127 addressable devices may be multi-dropped from a single pair of wires. Systems that require factory reprogramming to add or delete devices are unacceptable.

D. Format - The communication format must be a poll/response protocol to allow t-tapping of the wire to addressable devices and be completely digital. A high degree of communication reliability must be obtained by using parity data bit error checking routines for address codes and check sum routines for the data transmission protocol. Systems that do not utilize full digital transmission protocol (i.e. -that may use time pulse width methods to transmit data, etc..) will not be acceptable since they are considered unreliable and prone to errors.

E. Identification of Addressable Devices - Each addressable device must be uniquely identified by an address code entered on each device at time of installation. The use of jumpers to set address will not be acceptable due to the potential of vibration and poor contact.

F. Wiring Type, Distance, Survivability and Configuration Wiring types will be approved by the equipment manufacturer. The system must allow up to 2,500 feet wire length to the furthest addressable device.

G. Sensor Operation:

1. Smoke sensors shall be smoke density measuring devices having no self contained alarm set point (fixed threshold). The alarm decision for each sensor shall be determined by the control panel. The control panel shall determine the condition of each sensor by comparing the sensor valve to the stored values.
2. The control panel shall maintain a moving average of the sensors' smoke chamber value to automatically compensate (move the threshold) for dust and dirty conditions that could affect detection operation. The system shall automatically maintain a constant smoke obscuration sensitivity for each sensor (via the floating threshold) by compensating for environmental factors. Photoelectric sensor smoke obscuration sensitivity shall be adjustable to within 0.3% of either limit of the UL window (0.5% to 4.0%) to compensate for any environment.
3. The system shall automatically indicate when an individual sensor needs cleaning. When a sensor's average value reaches a predetermined level, a “DIRTY SENSOR” trouble condition shall be audibly and visibly indicated at the control panel for the individual sensor. Additionally, the LED on the sensor base shall glow steady giving a visible indication at the sensor location. If a “DIRTY SENSOR” is left unattended, and its average value increases to a second predetermined value, an “EXCESSIVELY DIRTY SENSOR” trouble condition shall be indicated at the control panel for the individual sensor. To prevent false alarms, these “DIRTY” conditions shall in no way decrease the amount of smoke obscuration necessary for system activation. For scheduling of maintenance, the control panel shall be able to generate an “ALMOST DIRTY” indication for any sensor approaching a “DIRTY” trouble condition.
4. The control panel shall continuously perform an automatic self-test routine on each sensor, which will functionally check sensor electronics and ensure the accuracy of the values being transmitted to the control panel. Any sensor that fails this test shall indicate a “SELF TEST ABNORMAL” trouble condition with the sensor location at the control panel.
5. An operator at the control panel, having a proper access level, shall have the capability to manually access the following information for each sensor:

Primary status
Device type
Present average value
Present sensitivity selected *
Peak detection values *
Sensor range (normal, dirty, etc.)
Values shall be in “percent of smoke obscuration” format so that no interpretation is required by the operator.

6. An operator at the control panel, having a proper access level, shall have the capability to manually control the following for each sensor:

Clear peak detection values
Enable or disable the point
Clear verification tally
Establish alarm sensitivity
Control a sensor's relay driver output

7. It shall be possible to program the control panel to automatically change the sensitivity settings of each sensor based on time-of-day and day-of-week (for example, to be more sensitive during unoccupied times and less sensitive during occupied periods). There shall be seven (7) sensitivity settings available for each sensor.
8. The control panel shall have the capability of being programmed for a pre-alarm or two-stage function. This function allows an indication to occur when, for example, a 3% sensor reaches a threshold of 1.5% smoke obscuration.
9. Individually identified sensors as well as conventional initiating device and notification appliance circuits shall be supported within a single control panel. Provide a minimum of 20% more capacity than indicated on the drawings.
10. For increased smoke detection assurance, all individually addressed smoke sensors shall be provided with alarm verification. Only a verified alarm shall initiate the alarm sequence operation.

1.8 POWER REQUIREMENTS:

A. Each control panel shall receive 120 VAC power from a dedicated circuit with locking clip over circuit breaker. 120 VAC power shall be at 20 Amps, unless otherwise noted. Label circuit breaker "Fire Alarm Control Circuit" in red.

B. All circuits requiring system operating power shall be 24VDC and shall be individually fused at the control panel.

PART 2 _ PRODUCTS

2.1 FIRE ALARM CONTROL PANEL:

A. Contractor shall connect all new fire alarm devices to the existing fire alarm control panel located in the main office storage room. Existing system is Silent Knight SK-5208 series system. Contractor to modify and expand existing system as required to add additional devices..

2.2 REMOTE ANNUNCIATOR(S):

A. Where shown on the drawings or required by the local Authority Having Jurisdiction, provide and install a SimplexGrinnell Alpha/Numeric Fire Alarm Annunciator with a two line by 40 character (80 character total) LCD display. Annunciator shall Display all Alpha/Numeric messages as displayed at the FACP. Annunciator shall also contain an alarm, trouble and supervisory service LED and alarm acknowledgment switches, system reset and alarm silence switch, display time key, (4) programmable control keys with indicating LED's, alarmed silence LED and a key switch to activate or deactivate all other switches. The annunciators shall mount in a common flush mounted steel cabinet. Connect to the FACP with one Clifford 1P18B1OS, twisted shielded pair of 18's and two #14 power wires. Capabilities shall exist for a maximum of (32) annunciators per 4100 FACP. Verify location of annunciator with local fire department and owner.

2.3 PERIPHERAL DEVICES:

A All remote devices requiring outlet boxes shall be mounted on flush outlet boxes as recommended by the manufacturer, or as specified elsewhere in this division of the specifications. Any required surface devices (where approved by the Engineer) shall be installed on surface outlet boxes that are at a minimum the same size as the device. No part of a surface device shall overlap the outlet box. Verify all installation requirements and box types with manufacturer prior to rough-in.

B All devices shall be supervised for trouble conditions. The system control panel shall be capable of indicating the type of trouble condition (open, short, device missing/failed). Should a device fail, it shall not hinder the operation of other system devices. Should a problem occur on a particular wire run, it shall not affect other wire runs.

C. Addressable Manual fire alarm stations, double action, plainly marked to “Push and Pull Down” to sound alarm, located as shown on the drawings at a height of 48” from finished floor to top, semi flush mounted. Circuit shall be 2-wire addressable loop supervision. Provide matching backbox for surface mounting only where job conditions require and where prior approval of the Architect is obtained. Where tamperproof devices are indicated on the drawings, provide station with tamperproof clear Lexan shield with alarm and battery. Alarm to sound when shield is lifted. A manual station shall be installed at all exit doors on all floors, whether or not indicated on the drawings. A manual station shall be installed at interior fire sprinkler system riser location, or as determined by Local Fire Marshall, whether or not indicated on the drawings. Provide manual stations with wire guards in gymnasiums, multi-purpose rooms, and where noted on the drawings.

D. True Alarm Sensors and Addressable Sensor Bases shall be photoelectric sensor with matching base, mounted on a flush mounted outlet box. The addressable smoke sensors shall be of the photoelectric type and shall communicate actual smoke chamber values to the system control panel. The sensors shall be listed to UL Standard 268 and shall be documented as compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications. Each sensor base shall contain a LED that will flash each time it is scanned by the control panel (once every 4 seconds). When the control panel determines that a sensor is in the alarm or a trouble condition, the control panel shall command the LED on that sensor's base to turn on steady indicating the abnormal condition. Sensors which do not provide a visible indication of an abnormal condition at the sensor location shall not be acceptable. Each sensor shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location. Each sensor shall be scanned by the control panel for its type identification to prevent inadvertent substitution of another sensor type. The control panel shall operate with the installed device but shall initiate a “Wrong Device” trouble condition until the proper type is installed or the programmed sensor type is changed. The sensor's electronics shall be immune from false alarms caused by EMI and RFI. Where designated on the drawings, provide unit with sounder base with Piezo horn and relay to power remote LED indicator light.

Smoke sensors shall be installed on the ceiling at each control panel, extender panel, and annunciator location.

E. True Alarm Duct Sensors shall be air duct sensor housing with sampling tubes, relay, and photoelectric True Alarm Sensor, designed to detect the presence of smoke within the duct work, installed where indicated on the electrical drawings or where required by codes. A duct smoke sensor shall be installed on each duct from the unit as required by governing Codes, whether or not indicated on the drawings. Sensors shall operate as described under True Alarm Sensors above. Sensors shall be equipped with a functional test device circuit capable of simulating a maximum acceptable amount of smoke for alarm. The test device circuit shall provide individual local tests of all components of the smoke sensor and shall not require generation of actual smoke within the ductwork. Two (2) sampling tubes of the proper length to accommodate accurate sampling of air within the ductwork shall be supplied for each sensor location. Intake sampling tube shall penetrate the duct a minimum 75% of its diameter. Provide each duct sensor with a Remote Test Switch, mounted on outlet box in nearest mechanical room or janitor closet. Verify location with Authority Having Jurisdiction prior to rough-in. Label each test switch to identify function and unit served or damper served. If required by the fire alarm system supplier, Mechanical Contractor shall modify ductwork where fire/smoke dampers are located as required to install duct smoke sensors on the ductwork at the fire/smoke damper locations.

At every smoke or fire/smoke damper Electrical Contractor shall install a duct smoke sensor and relay to close damper and shut down associated mechanical unit on activation of sensor. Refer to Mechanical drawings, specifications, and addendum items, and/or Mechanical Contractor for locations and control requirements. Provide 120 volt control power at damper if required. Not all smoke or fire/smoke dampers may be shown on the drawings, however, <u>ALL</u> smoke or fire/smoke dampers shall be provided with the above requirements.

F. Individually addressable modules (IAM) shall be used for monitoring of water flow, valve tamper, nonaddressable sensors, and for control of evacuation indicating appliances and mechanical systems.

1. An addressable interface module shall be provided for interfacing normally open direct contact devices to an addressable signaling line circuit. The device shall be a SimplexGrinnell Type IAM
2. IAM's shall be capable of mounting in a standard 4” square, 2 1/8” deep electric box. Verify box size with manufacturer. IAM's shall include cover plates to allow surface or flush mounting. Iam's shall receive their 24VDC power from a separate two wire pair running from an appropriate power supply.
3. There shall be three types of devices:

Type 1: Monitor Zone Adapter Module (ZAM)
Type 2: Relay IAM
Type 3: IAM (Individually Addressable Module

4. For Type 1 and/or Type 3 above:

For conventional 2-wire smoke sensor and/or contact device monitoring with Style B or Style D (NFPA-72 initiating device circuit) wiring supervision.

Type 1 only:

This type of addressable device module shall provide power to, and monitor the status of a zone consisting of conventional 2wire smoke sensors and/or N/O contact devices as specified elsewhere and identified on the drawings. The supervision of the initiating device circuit wiring shall be Style B. These IAM's shall communicate the zone's status (normal, alarm, trouble) to the control panel.

Type 3 only:

This type of addressable device module shall monitor the status of a zone consisting of conventional N/O contact devices as specified elsewhere and identified on the drawings. The supervision of the initiating device circuit wiring shall be Style B. These IAM's shall communicate the zone's status (normal, alarm, trouble) to the control panel. This device cannot power 2-wire smoke sensors.

5. For Type 2 above:

For non-supervised control. This type of addressable device shall provide double pole, single throw relay switching for loads up to 120VAC.

6. The IAM shall be supervised and uniquely identified by the control panel. Device identification shall be transmitted to the control panel for processing according to the program instructions. Should the IAM become non-operational, tampered with, or removed, a discrete trouble signal, unique to the device, shall be transmitted to, and annunciated at, the control panel.
7. The IAM shall be capable of being programmed for its “address” location on the addressable device signaling ling circuit. The IAM shall be compatible with addressable manual stations and addressable sensors on the same addressable circuit.

G. Interior audio/visual fire alarm signal device unless noted otherwise on the drawings shall be wall mount or ceiling mount A/V unit, as indicated on the drawings, in color as selected by the Architect. Device shall be U.L. listed to Standard 1971 and meeting the requirements of ADA. A/V shall be 24VDC and shall be electro-mechanical in design with electronic control (no moving parts) providing 87db reverberant at 10 feet, with 24VDC xenon flasher, 110 CD (U.L.) intensity unless noted otherwise on the drawings, mounted on a flush mounted box. Visual only devices shall be wall mount or ceiling mount (as indicated on the drawings) strobe in color as selected by the Architect, with the same features as the strobe on the audio/visual unit, 110 CD (U.L.) intensity unless noted otherwise on the drawings. Candela intensities listed on the drawings are based on U.L. intensities. A/V units shall be provided with horn, strobe, and adaptor. Interior horn only units for high ambient noise level locations shall be 100dB at 10 feet, 24VDC, mounted on a flush mounted box. See the drawings for individual locations. Strobes shall be capable of being mounted in a vertical or horizontal position and still meet the requirements of U.L. for polar light distribution. Provide strobe circuit with Synchronized Flash Module for all strobe units. If multiple sound cards are used, audible signals shall be synchronized such that all signals are the same throughout the building, to preserve the temporal code pattern. Exterior audio alarm device shall be vibrating type horn, mounted on a weatherproof surface box. Provide horns and strobes with wire guards in gymnasiums, multi-purpose rooms, and where noted on the drawings. Visual signals mounted in cold rooms shall be capable of operating with-in cold room temperatures. Where combination piezo horns and visual signals are indicated on the drawings, provide wall mounted A/V unit with integral piezo horn, 24VAC, designed for supervision of wiring and 24VAC xenon flasher with candela intensity as noted on the drawings, mounted on a flush box. Piezo horn only without visual signal shall be 24VAC, designed for supervision of wiring.

H. Air handling unit shutdown relays and duct smoke sensor relays shall be addressable, programmable fan shutdown relay, 24 VDC operation, mounted in surface cabinet with LED indicator indicating when relay is energized. These relays shall be controlled and powered from the 4100 control panel. Contacts shall be 2P D.T. rated at 10 amps resistive 28 VDC/120VAC.

I. Magnetic door holders shall be wall mounted electromagnetic holders unless indicated otherwise on the drawings, installed and wired by the Electrical Contractor. Each door shall require a magnetic door holder near the top of the door. Verify location of holder with the door supplier. The fire alarm control shall be equipped with auxiliary relays to release holders as required by the initiating alarm circuit. Voltage of the door holders shall be 24 VDC.

J. Waterflow Switch if installed shall have two normally open alarm contacts and tamper switch and equipped with adjustable retard feature. Provide proper unit to fit water pipe size required. This device shall be installed by the sprinkler contractor and wired by the electrical contractor. Gate Valve Switch shall have two normally closed trouble contacts, to be mounted on gate valves as directed. This device shall be installed by the sprinkler contractor and wired by the electrical contractor.

K. Thermal (heat) sensor heads shall be combination rate-of-rise/fixed temperature heat sensor (135 degrees) with matching base. The thermal type sensor shall be a plug-in unit which mounts to a twist-lock base. The sensor shall be a combination rate-of-rise/fixed temperature sensor U.L. listed as a rate compensated heat sensor. Where indicated otherwise on the drawings, provide combination rate-of-rise/fixed temperature heat sensor (200 degrees) with matching base, or fixed temperature heat sensor (200 degrees) with matching base. See the drawings for temperature ratings. The sensors shall fit into a base that is common with both photoelectric and ionization sensors and shall be compatible with other addressable sensors, addressable manual station, and addressable Zone Adapter Modules on the same circuit. There shall be no limit to the amount of sensors, stations or Zone Adapter Modules which may be activated or “in alarm” simultaneously. Each rate-of-rise sensor shall be capable of operating at a selectable rate-of-rise operation of 15 or 20 degrees Fahrenheit per minute and shall be self-restorable. Fixed temperature sensing is independent of rate-of-rise sensing and operates at 135 degrees Fahrenheit. Each sensor shall be capable of being configured for utility monitoring and capable of sensing temperature between 32 and 158 degrees Fahrenheit.

L. Fire alarm signal circuit power extender if required shall provide an internal power supply, battery charger and supervised notification appliance circuits, style Y or style Z. The extender panel shall connect as an addressable device to the host panel. The extender panel shall monitor each output NAC for trouble conditions and Earth faults and report back to the host panel if trouble occurs. Provide with additional signal circuits as required. The extender panel shall be capable of being remotely mounted from the host control panel and shall be housed in a beige steel cabinet to match host control panel. Provide dedicated 120 volt circuit to each extender panel, with locking clip over circuit breaker. Extender panels shall be located in Storage Rooms, Mechanical Rooms, or Janitor Rooms only. Extender panels shall not be located in public access areas. Verify locations of extender panel with Engineer and Architect prior to installation.

M. Elevator Interface Relays shall be 24 VDC operation, mounted in surface cabinet. These relays shall be controlled and powered from the Control Panel. Contacts shall be 2PDT rated at 10 amps resistive 28 VDC/120 VAC.

N. Remote smoke sensor annunciator panel for patient or resident rooms shall be LED annunciator panel. Annunciator panel shall be provided with audible signal, reset, and signal silence. Mount panels in flush backbox.

O. Room Smoke Sensor Remote Lamp shall be red LED lamp on single gang cover plate. Lamp to activate on activation of room smoke sensor.

P. Residential Smoke Sensors for handicapped apartments shall be Photoelectric type. Sensors shall be 120VAC operation with 9VDC battery back-up for smoke sensor and horn and shall be U.L. Listed to U.L. Standard 217. Sensors shall incorporate a built in piezo horn rated at 90db at 10 feet, red LED alarm/power on indicator, test button, 9VDC Alkaline battery, and minimum 177 candela strobe light for hearing impaired individuals. Strobe shall have a white lens with "FIRE" imprinted on three sides. Sensors shall also contain form "c" auxiliary contacts. Sensor shall contain <u>no</u> radioactive material. Provide local 120VAC un-switched power to each sensor. Sensors shall be capable of tandem wiring and shall be wired such that activation of any sensor will also activate other sensors in the same unit. Sensors installed in patient or resident rooms shall be connected to the Remote Smoke Sensor Annunciator Panel and not connected to the central fire alarm system.

Q. Residential Smoke Sensors shall be Photoelectric type. Sensors shall be 120VAC operation with 9VDC battery back-up and shall be UL Listed to UL Standard 217. Sensors shall incorporate a built in piezo horn rated at 90db at 10 feet, red LED alarm/power on indicator, test button, low or missing battery indicator, 9VDC Alkaline battery, and tamper proof locking base. Sensors shall be provided with tandem interconnection of up to (20) units. Where noted on the drawings, sensors shall be provided with integral 135 degree F. thermals and/or dry contacts for remote annunciation. (Maximum tandem interconnection of up to (6) units). Sensors shall be wired such that activation of any sensor will also activate other sensors in the same unit. Sensor shall contain <u>no</u> radioactive material. Provide local 120VAC un-switched power to each sensor.

R. Residential Addressable Smoke Sensors and Addressable Sensor Bases shall be photoelectric sensor with matching base, mounted on a flush mounted outlet box. Provide with relay bases where noted on the drawings. The addressable smoke sensors shall be of the photoelectric type and shall communicate actual smoke chamber values to the system control panel. The sensors shall be listed to UL Standard 268 and shall be documented as compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications. Each sensor base shall contain a LED that will flash each time it is scanned by the control panel (once every 4 seconds). When the control panel determines that a sensor is in the alarm or a trouble condition, the control panel shall command the LED on that sensor's base to turn on steady indicating the abnormal condition. Sensors which do not provide a visible indication of an abnormal condition at the sensor location shall not be acceptable. Each sensor shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location. Each sensor shall be scanned by the control panel for its type identification to prevent inadvertent substitution of another sensor type. The control panel shall operate with the installed device but shall initiate a “Wrong Device” trouble condition until the proper type is installed or the programmed sensor type is changed. The sensor's electronics shall be immune from false alarms caused by EMI and RFI. Where designated on the drawings, provide unit with sounder base with Piezo horn. Each sensor shall be capable of being programmed to operate in single station mode and shall sound in tandem with other sensors with sounder bases within the same suite or apartment. Any alarm from the sensors with sounder bases shall report to the fire alarm control panel and Annunciator and shall cause a local alarm device to sound but shall not cause a general alarm condition or cause the fire alarm digital communicator to call the central monitoring station and fire dept. The sounder bases in all rooms shall respond to a general alarm with a temporal coded evacuation tone. In handicap or hearing impaired units the associated strobes in the units shall operate with the sounders in both the single station and general alarm mode. All associated strobes shall be supervised by the fire alarm system.

S. Chime appliances where indicated on the drawings shall be shall be wall mount or ceiling mount A/V unit, as indicated on the drawings, in color as selected by the Architect. Visual only devices shall be wall mount or ceiling mount (as indicated on the drawings) strobe in color as selected by the Architect, with the same features as the strobe on the audio/visual unit. Device shall be UL Listed under Standard 464 for Audible Signal Appliances and chimes equipped with strobes shall be listed under UL Standard 1971 for Emergency Devices for the Hearing Impaired. In addition, the strobes shall be certified to meet the requirements of FCC Part 15, Class B and shall incorporate low temperature compensation to ensure the lowest possible current consumption. All chime and chime/strobe appliances shall be backward compatible. All chimes shall use solid state components and shall provide field selectable single stroke or vibrating operation with volume control and tone control. All models shall have a peak Anechoic sound output of 83 dB at 10 feet and an adjustable frequency range of 800 to 100 Hz. All inputs shall employ terminals that accept #12 to #18 AWG wire sizes. The strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range and shall incorporate a Xenon flashtube enclosed in a rugged Lexan lens. The strobe shall be of low current design. Where multi-candela chime strobes are specified, the strobe intensity shall be 110 CD (U.L.) intensity unless noted otherwise on the drawings. Candela intensities listed on the drawings are based on U.L. intensities. Provide strobe circuit with Synchronized Flash Module for all strobe units. If multiple sound cards are used, audible signals shall be synchronized such that all signals are the same throughout the building, to preserve the temporal code pattern.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC _ Article “Fire Alarm Systems”, unless noted otherwise in these specifications or on the drawings, or if required may be reclassified as non_power limited and wired in accordance with NEC_Article “Fire Alarm Systems”.

1. Upon completion, the contractor shall so certify in writing to the owner and general contractor.
2. All junction boxes shall be sprayed red and labeled "Fire Alarm". All system cables will be labeled in boxes. Wiring color code shall be maintained throughout the installation.
3. All devices including zams shall be provided with labels indicating the device identification numbers.
4. End of line resister when located in field shall be installed with a box and labeled (E.O.L.).

B. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

C. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation.

D. Contractor and equipment supplier shall jointly provide a proposed riser diagram for the fire alarm system indicating all devices, equipment, and cabling with the shop drawing submittals prior to construction. If changes are made during construction a corrected riser diagram shall be submitted with the operating and maintenance manuals upon project completion. Riser diagram shall use symbols as shown on the drawings and shall have room numbers adjacent to all devices. All wiring shall be in conduit. On Final drawing riser diagram shall reflect owners approved room numbers.

E. This Contractor shall furnish and install all wiring, conduit, junction boxes and outlet boxes required for the installation of a complete system. All wiring shall be installed in metallic conduit, shall be color coded throughout and shall be free and clear of opens, grounds, and shorts between conductors. All Fire Alarm wiring shall be #14 gauge solid copper, with the exception of the MAPNET II addressable cable which shall be West Penn #D975 (.210” OD) and ADA Audio/Visual signals and horns shall be wired with West Penn #995 (.211” OD). (Shielded wiring required only if required by the Manufacturer.). Maximum number of devices on a circuit shall not exceed 80% of the rated circuit capacity. Access control wiring shall be as required by system manufacturer. All equipment shall be grounded with an approved earth ground wire being supplied at the control panel. All wiring shall be in conformance with Article 760 of the National Electric Code. Verify all wiring with system manufacturer prior to installation.

F. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

G. Contractor shall not remove protective covers from smoke sensors until all construction work and cleanup has been performed. If this is not adhered to all cleaning costs to clean dirty smoke sensors shall be paid for by the contractor.

H. A 1” empty conduit with pull wire shall be provided from the fire alarm control panel to the main telephone terminal board for Telephone Co. use. Provide conduit with telephone cable if monitoring is required.

I. Smoke sensors shall be installed on the ceiling at each control panel, extender panel, and annunciator location.

3.2 SERVICE AND TESTING:

A. The manufacturer shall co-ordinate and provide a test of the system in the presence of the Fire Marshal, Owner, and local Fire Department.

B. The manufacturer shall provide supervision of the project during installation, supervision of final connections, and testing of all devices, demonstrate system operation following checkout in the presence of the Architect, Engineer and Owner, and shall after completion of the project and acceptance by same, provide any service incidental to the proper performance of the system during the guarantee period. After the guarantee period, the manufacturer shall provide upon request and at standard rates, the service necessary for the future proper performance of this system. To provide this service, the manufacturer shall have an intrastate service organization consisting of at least three direct fulltime factory trained employees under the supervision of a qualified service manager. Service availability shall be within 120 miles with a maximum 24 hour response time. The prime function of this organization shall be prompt, efficient service. Upon project completion, the equipment supplier shall present a full coverage preventive maintenance agreement to the Owner for his purchase approval covering all service and instructions to the customer, within a minimum of two (2) inspections per year with no additional charge for emergency calls between inspections during normal working hours. Upon completion of Fire Alarm System Testing, submit to Engineer (3) copies of Testing and Inspection Report signed off as 100% functioning by the System Supplier and the Electrical Contractor. Submit forms in NFPA 72 format including db level readings per room marked on floor plans, floor plans to be submitted in operation booklet. Db reading shall be submitted to Engineer prior to walk thru by Engineer, inspecting personnel or final acceptance test. Bind (1) additional copy in the operation instructions booklet.

3.3 GUARANTEE:

A. After all work herein specified has been completed; the Contractor shall guarantee his work to be free from defects for a period of one year. Such defects shall apply to faulty materials or workmanship. In the event of the development of said defects, the Contractor shall remedy the failures at his own expense during normal business hours within a reasonable time after notice. Systems equipment shall be guaranteed by the manufacturer for one year.

3.4 TEMPORARY PROTECTION:

A. Any existing fire systems shown on the drawings shall be maintained in service as much as possible while the new system is being installed. Cut-over to be by zone to minimize unprotected areas of the building.

B. Before shutting off a section of any existing fire detection system to make required connections, plan the work carefully, and assemble all materials to enable completion in the shortest possible time. Work started on connections should be rushed to completion without interruption, and protection restored as promptly as possible.

C. When changes involve shutting off any existing fire detection system devices and components for more than four hours, temporary connections should be made so that reasonable fire detection can be maintained.

D. While replacing any existing systems shown on the drawings, the fire detection system shall be restored each night so far as possible. Impairments to existing systems shall be handled as required in NFPA.

E. Any active smoke detector that is covered for protection during construction shall be uncovered at end of working day.

****
END OF SECTION 16720

DREW RO... LICENSED #21920 11-20-17 KANSAS PROFESSIONAL ENGINEER

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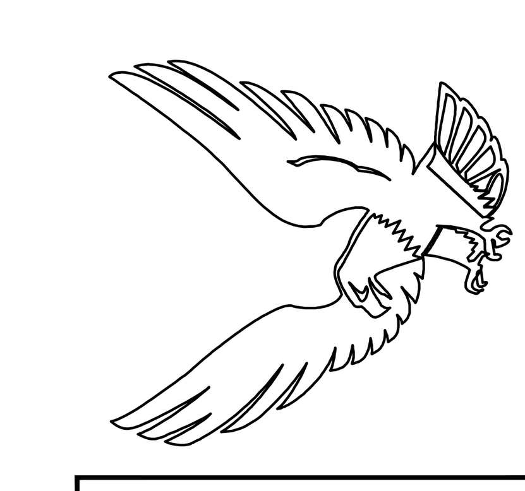
2017
UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
UNIFIED SCHOOL DISTRICT #463



DRAWINGS ISSUED		
NO.	DATE	ITEM ISSUED
4	11/21	ISSUED FOR BIDS
3	11/13	BOE MEETING
2	10/23	REVIEW
1	10/11	CONSTRUCT DOCS

COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV
CHECKED BY: DR

ELECTRICAL SPECIFICATIONS

17316.00-107

E4.3

Integrated Consulting Engineers, Inc.
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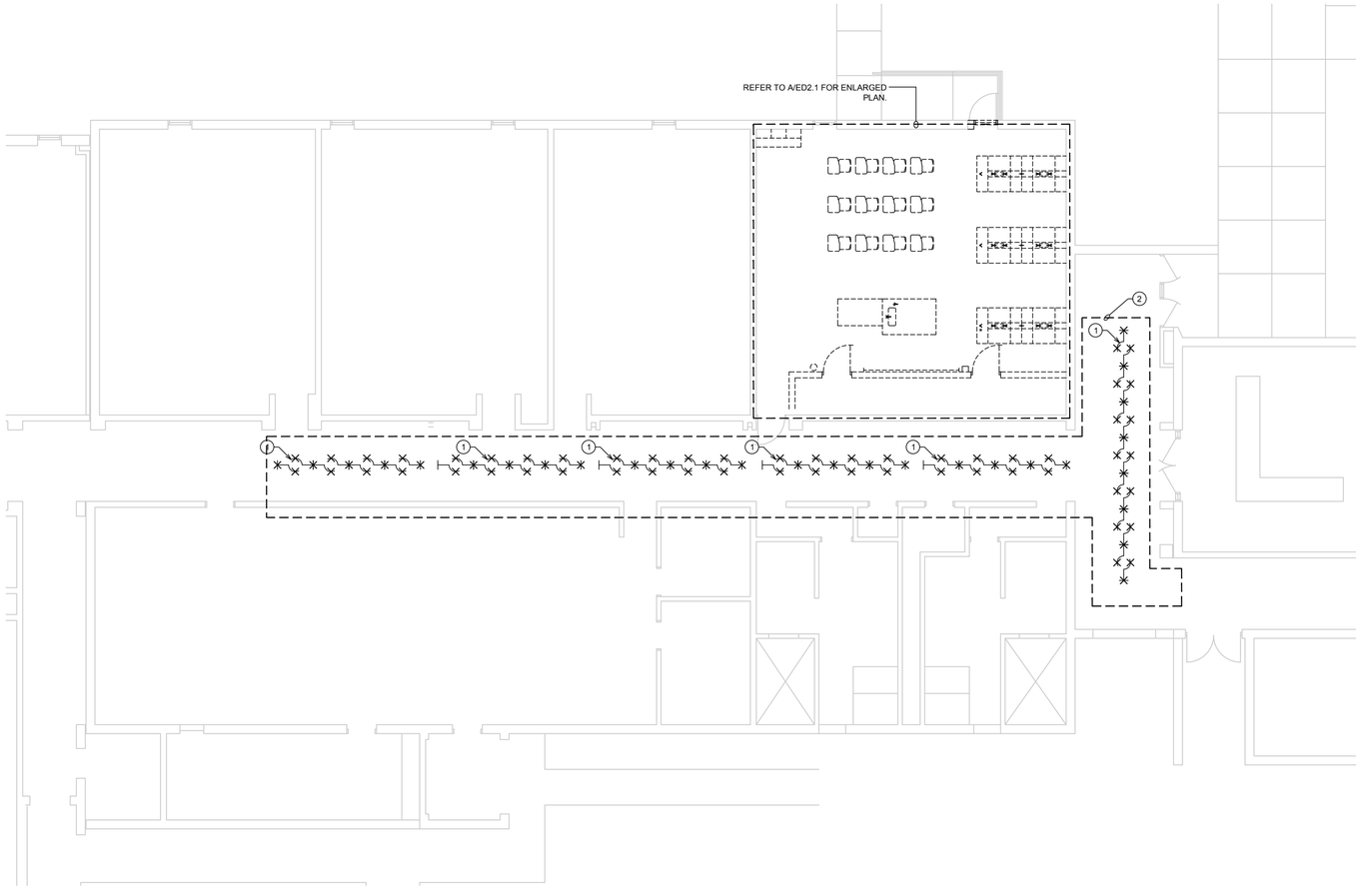
GENERAL NOTES:

1. REFER TO ARCHITECTURAL DEMO DRAWINGS FOR FURTHER INFORMATION.
2. FOR PURPOSES OF THE ELECTRICAL DEMO DRAWINGS, ELECTRICAL DEVICES LOCATED IN EXISTING WALLS THAT ARE TO REMAIN AS IS ARE SHOWN HERE ON THE DEMO DRAWINGS AND ARE NOTED TO BE EITHER REMAIN AS IS WITH AN 'EX' ADJACENT TO THEM. ELECTRICAL DEVICES NOTED TO BE REMOVED NOTED WITH AN 'X' OVER THE DEVICE. REMOVE THE ELECTRICAL DEVICE (RECEPTACLE OR DATA BOX) AND THEIR ASSOCIATED CONDUITS AND WIRING BACK TO THE POINT OF ORIGINATION. ENERGIZE ALL EXISTING DEVICES THAT WERE INTERRUPTED DURING DEMOLITION. WHERE ENTIRE CIRCUITS ARE REMOVED, TURN THE CIRCUIT BREAKER OFF AND LABEL AS 'SPARE'. WHERE EXISTING MECHANICAL EQUIPMENT IS REMOVED, ALL RELATED ELECTRICAL FEEDS TO THE EQUIPMENT THEIR ASSOCIATED CONDUITS BACK.

PLAN NOTES:

(1) EXISTING LIGHT FIXTURE TO BE REMOVED, HOWEVER EXISTING CIRCUITS TO REMAIN IN PLACE AND BE CONNECTED TO NEW LIGHT FIXTURES SHOWN ON E3.0.

(2) REMOVAL OF FIXTURES TO BE PRICED AS ADD-ALTERNATE. REFER TO ARCHITECTURAL BID FORM FOR MORE INFORMATION.



A PARTIAL OVERALL FLOOR PLAN - LIGHTING DEMO
SCALE: 1/8" = 1'-0"

NORTH

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

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COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV
CHECKED BY: DR

OVERALL FLOOR PLAN - LIGHTING DEMO

17316.00-107

ED2.0

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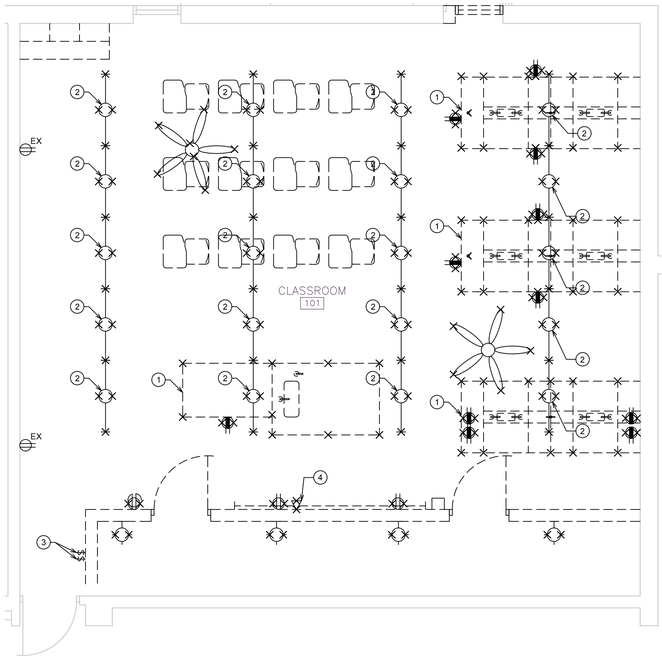

A ENLARGED FLOOR PLAN - DEMO

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

NORTH

0 2' 4' 8'

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

GENERAL NOTES:

1. REFER TO ARCHITECTURAL DEMO DRAWINGS FOR FURTHER INFORMATION.
2. FOR PURPOSES OF THE ELECTRICAL DEMO DRAWINGS, ELECTRICAL DEVICES LOCATED IN EXISTING WALLS THAT ARE TO REMAIN AS IS ARE SHOWN HERE ON THE DEMO DRAWINGS AND ARE NOTED TO BE EITHER REMAIN AS IS WITH AN 'EX' ADJACENT TO THEM. ELECTRICAL DEVICES NOTED TO BE REMOVED NOTED WITH AN 'X' OVER THE DEVICE. REMOVE THE ELECTRICAL DEVICE (RECEPTACLE OR DATA BOX) AND THEIR ASSOCIATED CONDUITS AND WIRING BACK TO THE POINT OF ORIGINATION. ENERGIZE ALL EXISTING DEVICES THAT WERE INTERRUPTED DURING DEMOLITION. WHERE ENTIRE CIRCUITS ARE REMOVED, TURN THE CIRCUIT BREAKER OFF AND LABEL AS 'SPARE'. WHERE EXISTING MECHANICAL EQUIPMENT IS REMOVED, ALL RELATED ELECTRICAL FEEDS TO THE EQUIPMENT THEIR ASSOCIATED CONDUITS BACK.

PLAN NOTES:

1. CONTRACTOR SHALL REMOVE ALL EXISTING ELECTRICAL DEVICES AND DATA DEVICES LOCATED WITHIN SCIENCE LAB DESK. CONTRACTOR SHALL REMOVE ELECTRICAL DEVICE/DATA DEVICE AND THEIR ASSOCIATED CONDUITS/WIRING BACK TO THE POINT OF ORIGINATION.
2. EXISTING LIGHT FIXTURE TO BE REMOVED, HOWEVER EXISTING CIRCUITS TO REMAIN IN PLACE AND BE CONNECTED TO NEW LIGHT FIXTURES SHOWN ON E2.1.
3. EXISTING LIGHT SWITCHES TO BE RELOCATED TO NEW WALL SHOWN ON E2.1. PROVIDE SURFACE MOUNT BOX FOR SWITCHES TO BE LOCATED IN. CONDUIT AND RACEWAYS SHALL BE SURFACE MOUNTED TO BLOCK WALL.
4. CONTRACTOR TO REMOVE EXISTING DATA DEVICE, HOWEVER EXISTING DATA LINES TO BE LEFT IN PLACES TO SEE IF THEIR CURRENT LENGTHS CAN BE RE-USED IN NEW DATA DROP LOCATIONS SHOWN ON E2.1.

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2017
UDALL HIGH SCHOOL
SCIENCE CLASSROOM REMODEL
UNIFIED SCHOOL DISTRICT #463

DRAWINGS ISSUED		
NO.	DATE	ITEM ISSUED
4	11/21	ISSUED FOR BIDS
3	11/13	BOE MEETING
2	10/23	REVIEW
1	10/11	CONSTRUCT DOCS

COMPUTER DRAWING

DATE: NOVEMBER 2017
DRAWN BY: MV
CHECKED BY: DR

ENLARGED FLOOR PLAN - DEMO

ED2.1

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