ELECTRICAL LEGEND - LIGHTING

REFERENCE FIXTURE SCHEDULE FOR MOUNTING TYPE, MOUNTING HEIGHT, AND FIXTURE TYPE.

- DOUBLE FACE EXIT SIGN, CEILING MOUNTED, PROVIDE UNSWITCHED CONDUCTOR.
- WALL MOUNTED DOUBLE FACE EXIT SIGN PROVIDE UNSWITCHED CONDUCTOR. MOUNT AT +8'-0" UNO.
- SINGLE FACE EXIT SIGN, CEILING MOUNTED PROVIDE UNSWITCHED CONDUCTOR.
- WALL MOUNTED SINGLE FACE EXIT SIGN PROVIDE UNSWITCHED CONDUCTOR. MOUNT AT +8'-0" UNO.
- ARROW INDICATES DIRECTION TO BE SHOWN ON SIGN.
- 1'X1' LIGHT FIXTURE.
- 1'X1' LIGHT FIXTURE, PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR.
- TRACK LIGHT
- 1'X4' LIGHT FIXTURE.
- 1'X4' LIGHT FIXTURE, PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR.
- 2'X4' LIGHT FIXTURE.
- 2'X4' LIGHT FIXTURE, PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR.
- 2'X2' LIGHT FIXTURE.
- 2'X2' LIGHT FIXTURE, PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR.
- DIRECT/INDIRECT LIGHT FIXTURE. SEE SCHEDULE FOR LENGTH.
- DIRECT/INDIRECT LIGHT FIXTURE. SEE SCHEDULE FOR LENGTH. PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR
- STRIP FLUORESCENT LIGHT FIXTURE. SEE SCHEDULE FOR LENGTH.
- STRIP FLUORESCENT LIGHT FIXTURE. SEE SCHEDULE FOR LENGTH. PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR
- WALL MOUNTED LIGHT FIXTURE.
- WALL MOUNTED LIGHT FIXTURE, PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR.
- RECESSED LIGHT FIXTURE
- RECESSED LIGHT FIXTURE. PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR.
- ROUND LIGHT FIXTURE
- ROUND EMERGENCY LIGHT FIXTURE
- WALL MOUNTED LIGHT FIXTURE.
- WALL MOUNTED EMERGENCY LIGHT FIXTURE.
- POLE LIGHT 1 HEAD WITH POLE
- TIME CLOCK
- PHOTO CONTROL CELL LOCATED 12" ABOVE ROOF FACING NORTH.
- OCCUPANCY SENSOR. PROVIDE RELAYS AND POWER PACKS AS REQUIRED
- LED DRIVER
- EMERGENCY EGRESS LIGHTING WITH OUT FIXTURE HEADS. CONNECT TO AN UNSWITCHED CONDUCTOR.
- EMERGENCY EGRESS LIGHTING. CONNECT TO AN UNSWITCHED CONDUCTOR.
- XXX INDICATES FIXTURE TYPE. REFER TO FIXTURE SCHEDULE.
- EXTERIOR WALL PACK
- EMERGENCY EXTERIOR WALL PACK. PROVIDE EMERGENCY BALLAST CONNECTED TO AN UNSWITCHED CONDUCTOR

DEVICES

- SWITCH, TYPE AS INDICATED, +46"AFF
  - 2 DOUBLE POLE
  - 3 3-WAY
  - 4 4-WAY
  - K KEYED
  - P PILOT LIGHT
  - D DIMMER
  - HP HORSEPOWER RATED
  - TO THERMAL OVERLOAD
  - LV LOW VOLTAGE
  - OS OCCUPANCY SENSOR
  - OR LOW VOLTAGE, MOMENTARY OVERRIDE
  - VS VACANCY SENSOR
  - a SUPERSCRIPT INDICATES LIGHTS TO BE SWITCHED TOGETHER
- DUAL LEVEL SWITCHING, INSIDE AND OUTSIDE LAMPS OF FIXTURE TO BE SWITCHED SEPARATELY.
- DUAL LEVEL SWITCHING WITH OCCUPANCY SENSOR, INSIDE AND OUTSIDE LAMPS OF FIXTURE TO BE SWITCHED SEPARATELY.
- SINGLE CONVENIENCE OUTLET, +18" AFF UNO
- FLOOR MOUNT SINGLE CONVENIENCE OUTLET
- DUPLEX CONVENIENCE OUTLET, +18" AFF UNO
- FLOOR MOUNT DUPLEX CONVENIENCE OUTLET
- EMERGENCY DUPLEX CONVENIENCE OUTLET, +18" AFF UNO
- SWITCHED DUPLEX CONVENIENCE OUTLET, +18" AFF UNO
- FLOOR MOUNTED SWITCHED DUPLEX CONVENIENCE OUTLET
- FOURPLEX CONVENIENCE OUTLET, +18"AFF UNO
- FLOOR MOUNT FOURPLEX CONVENIENCE OUTLET
- CONNECTION POINT TO EQUIPMENT SPECIFIED, ELECTRICAL CONTRACTOR TO SUPPLY RACEWAY AND CONDUCTORS AND MAKE FINAL CONNECTION TO EQUIPMENT UNDER THIS SECTION. UNO
- FLOOR MOUNTED CONNECTION POINT, SEE NOTE ABOVE FOR REQUIREMENTS
- FLOOR MOUNTED JUNCTION BOX
- JUNCTION BOX
- WALL MOUNTED PUSH BUTTON, MOUNT AT SWITCH HEIGHT UNO
- HC WALL MOUNTED PUSH BUTTON, HANDICAPPED MOUNT AT SWITCH HEIGHT UNO
- WALL MOUNTED PUSH BUTTON, MOUNT AT SWITCH HEIGHT UNO
- MOTOR STARTER/CONTACTOR, SIZE/POLES NEMA 1 UNO AS INDICATED
- COMBINATION STARTER AND DISCONNECT, SIZE/POLES, STARTER SIZE AS INDICATED, NEMA 1 UNO
- FUSED DISCONNECT SWITCH, SIZE/POLES, FUSE SIZES AS INDICATED, NEMA 1 UNO
- NON-FUSED DISCONNECT SIZE/ POLES AS INDICATED, NEMA 1 UNO
- T XX THERMOSTAT, +46" AFF PROVIDE CONDUIT, J-BOX, CONDUCTORS AS REQUIRED TO CONTROL ASSOCIATED UNITS. UNO COORDINATE WITH DIVISION 15.
- POWER POLE - DUAL CHANNEL
- T TRANSFORMER
- PANELBOARD, SEE SCHEDULE FOR TYPE.
- EQUIPMENT CABINET, SURFACE MOUNTED
- EQUIPMENT CABINET FLUSH MOUNTED
- SURFACE MULTI-OUTLET RACEWAY
- # # MECHANICAL EQUIPMENT CALL OUT
- # KITCHEN EQUIPMENT CALLOUT

ONE LINE

- DELTA WYE TRANSFORMER UNO
- # PANEL NAME VOLTAGE PHASE — PANEL BOARD, SEE SCHEDULE FOR TYPE AND SIZE
- ##A #P — CIRCUIT BREAKER, SIZE AND POLES INDICATED
- ##A — FUSE, SIZE AND TYPE INDICATED, PROVIDE FUSE FOR EACH POLE
- ##A #P — INTERRUPTER SWITCH, SIZE AND POLES INDICATED
- ##A #P — FUSED SWITCH, SIZE/POLES AND FUSE SIZE INDICATED
- ##A #P — DRAW OUT CIRCUIT BREAKER, SIZE AND POLES INDICATED
- 125A 3P — INDIVIDUAL BREAKER WITH SHUNT TRIP, SIZE AND POLES INDICATED. NEMA 1 UNO
- 125A 3P — INDIVIDUAL BREAKER, SIZE AND POLES INDICATED. NEMA 1 UNO
- GFP — GROUND FAULT PROTECTION
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSION
- LSIGN — ADJUSTABLE BREAKER SETTINGS (PER SPECIFICATIONS):
  - 'L'=LONG TIME
  - 'S'-SHORT TIME
  - 'I'-INSTANTANEOUS
  - 'G'-GROUND FAULT
  - 'R'-ENERGY REDUCING MAINTENANCE SWITCH W/STATUS INDICATOR
- GROUND
- ST — SHUNT TRIP COIL
- M — MOTOR
- 100A 3P — DISCONNECT SWITCH, SIZE AND POLES INDICATED. NEMA 1 UNO
- OVERHEAD SERVICE DROP
- XXXA/XP — GENERATOR SET, MAIN BREAKER SIZE INDICATED
- AUTOMATIC TRANSFER SWITCH (ATS)
- M METER AND BASE
- N NEUTRAL
- T TRANSFORMER
- PAD MOUNT TRANSFORMER

FIRE ALARM

- F — PULL STATION, +44" AFF WITH PRE-ALARM COVER
- F — FIRE ALARM HORN, +84" AFF UNO
- F 15 — FIRE ALARM STROBE, +84" AFF UNO, STROBE INTENSITY INDICATED. 'C' INDICATES CEILING MOUNTED
- F 15 — FIRE ALARM HORN/STROBE +84" AFF, UNO, STROBE INTENSITY INDICATED. 'C' INDICATES CEILING MOUNTED
- F — FIRE ALARM BELL, +84" AFF UNO, 'C' INDICATES CEILING MOUNTED
- F — FIRE ALARM CHIME, +84" AFF UNO, 'C' INDICATES CEILING MOUNTED
- F 16 — FIRE ALARM CHIME/STROBE, +84" AFF UNO, STROBE INTENSITY INDICATED. 'C' INDICATES CEILING MOUNTED
- SPEAKER STROBE, +84" AFF UNO. 'C' INDICATES CEILING MOUNTED
- EOL — END OF LINE RESISTOR
- FS — FLOW SWITCH, PROVIDE MONITOR MODULE AS REQUIRED
- TS — TAMPER SWITCH, PROVIDE MONITOR MODULE AS REQUIRED
- PS — PRESSURE SWITCH, PROVIDE MONITOR MODULE AS REQUIRED
- FSA — FIRE SYSTEM ANNUNCIATOR, FLUSH MOUNTED +54"UNO
- PIV — POST INDICATOR VALVE, PROVIDE MONITOR MODULE AS REQUIRED
- DH — ELECTROMAGNETIC DOOR HOLDER
- R — RELAY
- CM — CONTROL MODULE
- MM — MONITOR MODULE
- FIRE ALARM KNOX BOX
- FIRE ALARM CONTROL PANEL
- NAC EXTENDER PANEL
- F — FIRE/SMOKE DAMPER
- F — LED INDICATOR LIGHT, CEILING MOUNTED UNO
- F T — LED INDICATOR LIGHT WITH TEST SWITCH, CEILING MOUNTED UNO
- SD — DUCT-MOUNTED SMOKE DETECTOR
- F # — SMOKE DETECTOR, CEILING MOUNTED UNO
  - H HEAT
  - I IONIZATION
  - ID IN DUCT
  - P PHOTOELECTRIC
  - R RELAY
  - WG PROVIDE PROTECTIVE WIRE GUARD
- BS.BR — BEAM DETECTOR, SENDER & RECEIVER

COMMUNICATIONS

- #D,#T — TELEPHONE/DATA OUTLET, +18" AFF UNO, FOUR-SQUARE DEEP TYPE BOX WITH SINGLE GANG MUDRING, WITH QUANTITY OF DATA (#D) AND TELEPHONE (#T) CABLES INDICATED
- FLOOR MOUNTED TELEPHONE/DATA OUTLET
- IC — INTERCOM
- S — CEILING MOUNTED SPEAKER WITH BACKBOX
- S — WALL MOUNTED SPEAKER, WITH BACKBOX +80" UNO
- V — VOLUME CONTROL, MOUNT AT SWITCH HEIGHT UNO, FOUR-SQUARE DEEP TYPE BOX WITH SINGLE GANG MUDRING
- TV — TELEVISION OUTLET, +18" AFF UNO. FOUR-SQUARE TYPE BOX WITH SINGLE GANG MUDRING
- TV — CEILING MOUNTED TELEVISION OUTLET
- TTB — TELEPHONE TERMINAL BOARD

ELECTRICAL ABBREVIATIONS

A	AMPERES
AC	6" ABOVE BACKSPLASH
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AF	AMP FRAME
AIC	AMPS INTERRUPTING CAPACITY
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BD	BOTTOM OF DECK
BS	BOTTOM OF STRUCTURE
C	CEILING MOUNTED
C	CONDUIT
CB	CIRCUIT BREAKER
CF	COMPACT FLUORESCENT
CKT	CIRCUIT
CO	CONDUIT ONLY, PROVIDE PULL-LINE
CT	CURRENT TRANSFORMER
CTL	CONTROL
DC	DIRECT CURRENT
(D)	DEMOLITION
DEMO	DEMOLITION
DET	DETAIL
DTT	DOUBLE TWIN TUBE
E	EMERGENCY
(E)	EXISTING
EC	ELECTRICAL CONTRACTOR
EL	EMERGENCY LIGHT
F	FUSE
(F)	FUTURE
FACP	FIRE ALARM CONTROL PANEL
G/GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
HH	HAND HOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTO
HPS	HIGH PRESSURE SODIUM
HVAC	HEATING, VENTILATION, & AIR CONDITIONING
IG	ISOLATED GROUND
IPCO	IDAHO POWER COMPANY
J-BOX	JUNCTION BOX
KA	KILOAMP
KVA	KILO VOLT-AMP
KW	KILOWATT
KWH	KILOWATT HOUR
LCP	LIGHTING CONTROL PANEL
MB	MAIN BREAKER
MBR	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUGS ONLY
MMC	MODULAR METERING CENTER
MH	METAL HALIDE
MSB	MAIN SWITCH BOARD
MTG	MOUNTING
N	NEUTRAL
(N)	NEW
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OH	OVERHEAD
OS	OCCUPANCY SENSOR
P	POLES
PC	PHOTO-CONTROL
PVC	POLYVINYL CHLORIDE
PWR	POWER
RE:	REFERENCE
REC	RECEPTACLE
(R)	RELOCATED
SF	SQUARE FEET
TBD	TO BE DETERMINED
TDR	TIME DELAY RELAY
TK	TOE KICK
TSP	TWISTED SHIELDED PAIR
TRT	TRIPLE TUBE
TTB	TELEPHONE TERMINAL BOARD
(TYP.)	TYPICAL
UC	UNDERCABINET
UG	UNDERGROUND
U.N.O.	UNLESS NOTED OTHERWISE
V	VOLT
VA	VOLT-AMPERE
W	WATT
WG	WIRE GUARD
WP	WEATHER PROOF/NEMA 3R

PROVIDED/ PROVIDE BY INSTALLED/ INSTALL	PROVIDE AND INSTALL / PROVIDED AND INSTALLED BY / PROVIDE AND INSTALL

NOTE: THIS IS A STANDARD LIST OF COMMONLY USED ELECTRICAL ABBREVIATIONS. SOME OF THE ABBREVIATIONS SHOWN ABOVE MAY NOT BE USED IN THIS DRAWING PACKAGE.

SECURITY

- CCTV CAMERA POWER SUPPLY
- CCTV SYSTEM POWER SUPPLY
- ADJUSTABLE CAMERA (PAN/TILT/ZOOM)
- FIXED CAMERA
- CAMERA IN OUTDOOR HOUSING
- ADJUSTABLE CAMERA (PAN/TILT/ZOOM) IN OUTDOOR HOUSING
- CCTV OUTLET, +18" UNO
- CEILING MOUNTED CCTV OUTLET
- K — SECURITY SYSTEM KEYPAD CONTROLLER COORDINATE BOX SIZE AND MUDRING WITH VENDOR
- CR — CARD READER
- M — CEILING MOUNTED MOTION SENSOR
- M 80' — WALL MOUNTED MOTION SENSOR, MOUNTING HEIGHT INDICATED
- PANIC BUTTON - MOUNTED UNDER COUNTER

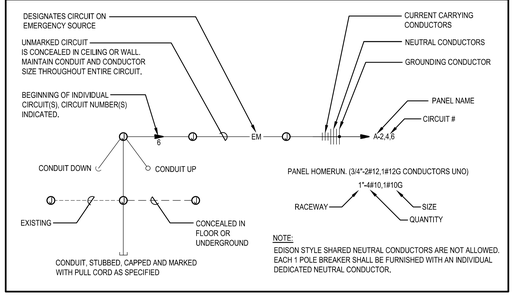
NURSE STATION

- N — NURSE CALL CORRIDOR LIGHT WALL MOUNTED +90" UNO
- N — NURSE CALL CORRIDOR LIGHT, CEILING MOUNTED
- N E — NURSE CALL EMERGENCY STATION
- N SR — NURSE CALL STAFF REGISTRATION STATION
- N D — NURSE CALL DUTY STATION
- N M — NURSE CALL MASTER STATION
- N S — NURSE CALL STAFF STATION
- N C — NURSE CALL CODE BLUE STATION
- N P — NURSE CALL PATIENT STATION
- N DB — NURSE CALL DOUBLE BED STATION

COORDINATE BOX SIZE AND MUDRING WITH NURSE CALL VENDOR.

NOTE: THIS IS A STANDARD LIST OF COMMONLY USED ELECTRICAL SYMBOLS. SOME OF THE SYMBOLS SHOWN MAY NOT HAVE BEEN USED IN THIS DRAWING PACKAGE.

CIRCUITING SYMBOLS



NOTE:
EDISON STYLE SHARED NEUTRAL CONDUCTORS ARE NOT ALLOWED. EACH 1 POLE BREAKER SHALL BE FURNISHED WITH AN INDIVIDUAL DEDICATED NEUTRAL CONDUCTOR.

SHEET INDEX

E000	ELECTRICAL SHEET INDEX
E001	LIGHTING COMPLIANCE REPORT
E002	LIGHTING COMPLIANCE REPORT
E003	ELECTRICAL SPECIFICATIONS
E004	ELECTRICAL SPECIFICATIONS
E005	ELECTRICAL SPECIFICATIONS
E100	ELECTRICAL SITE PLAN
E100P	PHOTOMETRIC SITE PLAN
E101	MAIN LEVEL FIRE ALARM PLAN
E102	UPPER LEVEL FIRE ALARM PLAN
E201	MAIN LEVEL LIGHTING PLAN
E202	UPPER LEVEL LIGHTING PLAN
E301	MAIN LEVEL MECHANICAL POWER/POWER/SPECIAL SYSTEMS PLAN
E302	UPPER LEVEL MECHANICAL POWER/POWER/SPECIAL SYSTEMS PLAN
E400	ENLARGED ELECTRICAL UNIT PLANS
E401	ENLARGED ELECTRICAL UNIT PLANS
E402	ENLARGED ELECTRICAL UNIT PLANS
E403	ENLARGED ELECTRICAL UNIT PLANS
E404	ENLARGED ELECTRICAL KITCHEN PLAN
E500	ELECTRICAL ROOF PLAN
E600	ONE-LINE DIAGRAM / ELECTRICAL DETAILS
E601	ELECTRICAL DETAILS
E700	ELECTRICAL SCHEDULES
E701	ELECTRICAL SCHEDULES

LEGEND IS GENERAL IN NATURE. NOT ALL OF THE SYMBOLS SHOWN ARE USED IN THIS PROJECT.

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OVER 30 YEARS OF EXCELLENCE
project number: 16-658

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KURT EDWARD LECHTENBERG
9/21/16
STATE OF UTAH

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CONSULTANT:

OWNER:
T.C. ENTERPRISE

PROJECT:
PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

ELECTRICAL COVER SHEET

PROJECT #: 14-286.01
DRAWN BY: JM
CHECKED BY: JM

SHEET #
E000

COMcheck Software Version 4.0.4.1

Interior Lighting Compliance Certificate

Project Information

Energy Code: 2012 IECC
Project Title: PARDOE ASSISTED LIVING - MIDVALE
Project Type: New Construction

Construction Site:
6968 SOUTH 700 WEST
MIDVALE, UT 84095

Owner/Agent:

Designer/Contractor:
Musgrove Engineering P.A.
234 S. Whisperwood Way
Boise, ID 83709
(208) 384-0585

Additional Efficiency Package

Reduced interior lighting power. Requirements are implicitly enforced within interior lighting allowance calculations.

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B X C)
1-Health care clinic	29666	0.87	25722
		Total Allowed Watts =	25722

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
1-Health care clinic				
LED 1: B/BE: 2X4 GRID: Other:	1	10	78	780
LED 2: C/CE: 1X4 GRID: Other:	1	17	37	629
LED 3: D/DE: RECESSED CAN: Other:	1	201	20	4020
LED 4: DS: RECESSED CAN IN SHOWER: Other:	1	46	39	1794
LED 5: E1: 16" SURFACE: Other:	1	139	29	3989
LED 6: E2: 16" SURFACE: Other:	1	14	14	200
Compact Fluorescent 1: F: 17" SURFACE: Twin Tube 13W: Electronic:	4	53	58	3074
Incandescent 1: H: CYLINDER PENDANT: Other:	1	2	540	1080
Compact Fluorescent 2: I: CHANDELIER: Other: Electronic:	1	1	82	82
LED 7: VP1: ELEVATOR PIT LIGHT: Other:	1	1	38	38
LED 8: NL: NIGHT LIGHT: Other:	1	92	5	460
Compact Fluorescent 3: WS1: WALL SCONCE: Triple 4-pin 13W: Electronic:	2	81	26	2106
LED 9: WS2: BATHRM VANITY: Other:	1	48	18	864
			Total Proposed Watts =	19116

Interior Lighting PASSES: Design 26% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2012 IECC requirements in COMcheck Version 4.0.4.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Kurt Lechtenberg — Name - Title
Signature
9/22/16 — Date

COMcheck Software Version 4.0.4.1

Exterior Lighting Compliance Certificate

Project Information

Energy Code: 2012 IECC
Project Title: PARDOE ASSISTED LIVING - MIDVALE
Project Type: New Construction
Exterior Lighting Zone: 2 (Residential mixed use area)

Construction Site:
6968 SOUTH 700 WEST
MIDVALE, UT 84095

Owner/Agent:

Designer/Contractor:
Musgrove Engineering P.A.
234 S. Whisperwood Way
Boise, ID 83709
(208) 384-0585

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
Entry canopy	793 ft2	0.25	Yes	198
Other door (not main entry)	12 ft of door	20	Yes	240
Illuminated length of facade wall or surface	361 ft	2.5	No	902
Driveway	7000 ft2	0.06	Yes	420
			Total Tradable Watts (a) =	858
			Total Allowed Watts =	1761
			Total Allowed Supplemental Watts (b) =	600

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 600 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Entry canopy (793 ft2): Tradable Wattage				
LED 1: G: RECESSED CAN: Other:	1	8	26	208
LED 2: WS3: WALL SCONCE: Other:	1	4	27	108
LED 4: EM1: EMERGENCY: Other:	1	1	12	12
Other door (not main entry) (12 ft of door width): Tradable Wattage				
LED 4 copy 1: EM1: EMERGENCY: Other:	1	3	12	36
Illuminated length of facade wall or surface (361 ft): Non-tradable Wattage				
LED 2 copy 1: WS3: WALL SCONCE: Other:	1	4	27	108
LED 6: WP1: WALL PACK: Other:	1	5	36	180
LED 7: WP2: WALL PACK: Other:	1	6	36	216
Driveway (7000 ft2): Tradable Wattage				
LED 8: PL1: POLE LIGHT: Other:	1	107	2	214
			Total Tradable Proposed Watts =	578

Exterior Lighting PASSES: Design 60% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2012 IECC requirements in COMcheck Version 4.0.4.1 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Kurt Lechtenberg — Name - Title
Signature
9/22/16 — Date

COMcheck Software Version 4.0.4.1

Inspection Checklist

Energy Code: 2012 IECC

Requirements: 100.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202, E601, E700
C103.2 [PR8][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E100, E601, E700
C406 [PR9][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.2.1 [EL22][1]	Automatic controls to shut off all building lighting installed in all buildings.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202, E601
C405.2.1.1 [EL23][1]	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202
C405.2.1.2 [EL15][1]	Lighting controls installed to uniformly reduce the lighting load by at least 50%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202
C405.2.2.3 [EL16][1]	Daylight zones provided with individual controls that control the lights independent of general area lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202
C405.2.3 [EL17][1]	Sleeping units have at least one master switch at the main entry door that controls wired luminaires and switched receptacles.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E400
C405.2.2.2 [EL18][1]	Occupancy sensors installed in required spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202
C405.2.2.3 [EL20][1]	Primary sidelighted areas are equipped with required lighting controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202
C405.2.2.3 [EL21][1]	Enclosed spaces with daylight area under skylights and rooftop monitors are equipped with required lighting controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.4 [EL25][1]	Automatic lighting controls for exterior lighting installed.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E100, E601
C405.2.3 [EL4][1]	Separate lighting control devices for specific uses installed per approved lighting plans.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202
C405.3 [EL19][1]	Fluorescent luminaires with odd numbered lamp configurations that are within 10 feet center to center (if recess mounted) or are within 1 foot edge to edge (if pendant or surface mounted) shall be tandem wired.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.4 [EL6][1]	Exit signs do not exceed 5 watts per face.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E700

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

LIGHTING COMPLIANCE REPORT

PROJECT #: 16058.01
DRAWN BY: ZN
CHECKED BY: JM

SHEET #
E001

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.6 [EL24][1]	Exterior grounds lighting over 100 W provides >60 lm/W unless on motion sensor or fixture is exempt from scope of code or from external LPD.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E100, E700
C405.2.3 [EL8][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E201, E202, E601, E700

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C408.2.5.1 [FI16][1]	Furnished as-built drawings for electric power systems within 30 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C303.3, C408.2.5.2 [FI17][1]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.5.2 [FI18][1]	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Interior Lighting fixture schedule for values.*
C405.6.2 [FI19][1]	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Interior Lighting fixture schedule for values.*
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.3 [FI48][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C406 [FI34][1]	Efficient HVAC performance, efficient lighting system, or on-site supply of renewable energy consistent with what is shown the approved plans.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

LIGHTING COMPLIANCE REPORT

PROJECT #: 14-088.01
DRAWN BY: RM
CHECKED BY: JM

SHEET #
E002

SECTION 16010 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Provisions of this Section shall apply to all Sections of Division 16.

1.2 SCOPE OF WORK

A. Furnish and install all materials and equipment and provide all labor required and necessary to complete the work shown on the drawings and/or specified in all Sections of Division 16 and all other work and miscellaneous items, not specifically mentioned, but reasonably inferred for a complete installation, including all accessories required for testing the system. It is the intent of the drawings and specifications that all systems be complete and ready for operation.

1.3 CODE COMPLIANCE

A. All work and materials shall comply with the latest rules, codes and regulations, including, but not limited to, the following:

1.Occupational Safety and Health Act Standards (OSHA)

2.NFPA #70 - National Electric Code (NEC)

3.ADA Standards - Americans with Disabilities Act

4.ANSI/IEEE C-2 - National Electrical Safety Code

5.NECA - Standard of Installation

6.International Building Code

7.International Fire Code

8.International Energy Conservation Code

9.NFPA #72 - Fire Code

10.NFPA #101 - Life Safety Code

11.All other applicable Federal, State and local laws and regulations.

B. Work to be executed and inspected in accordance with local codes and ordinances. Permits, fees or charges for inspection or other services shall be paid for by the contractor. Local codes and ordinances are to be considered as minimum requirements and must be properly executed without expense to the owner; but do not relieve the contractor from work shown that exceeds minimum requirements.

1.4 DRAWINGS AND SPECIFICATIONS

A. All drawings and all specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division.

B. Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduits and wiring is not assured. Exact requirements shall be governed by architectural, structural and mechanical conditions of the job. Consult all other drawings in preparation of the bid. Extra lengths of wiring or addition of pull or junction boxes, etc., necessitated by such conditions shall be included in the bid. Check all information and report any apparent discrepancies before submitting bid.

C. Change in location, type, function, brand name, finish, etc., shall not be made without permission of engineer.

D. Some equipment is specifically designated on the drawings. It is not the intent to sole source any item unless explicitly stated. Items have been specified based upon design requirements. All bidders are encouraged to submit products for approval. Prior approval must be obtained as required by these contract documents. Bids submitted with non-approved items will be considered invalid and bidders will be held to provide approved materials at no additional cost to the owner. Submittals received by the engineer after award of contract on non-approved equipment will not be reviewed nor will they be returned.

E. Where conflicting direction is given within the specifications and drawings, the contractor shall include the most expensive option in the bid.

1.5 SAFETY AND WORKMANSHIP

A. Safety: The contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

B. No act, service, drawing review or construction review by the owner is intended to include review of the adequacy of the contractor's safety measures in, on, or near the construction site.

1.6 INSTRUCTION OF OWNER'S PERSONNEL

A. The contractor shall conduct an on-site instructional tour of the entire project. The personnel designated by the owner shall be instructed in: operation of all electrical systems, trouble-shooting procedures, preventative maintenance procedures, uses of Operation and Maintenance manuals, relamping and cleaning of lighting fixtures and operation of all special systems.

1.7 PROJECT COMPLETION

A. Upon completion of all work and operational checks on all systems, the contractor shall request that a final construction observation be performed.

B. The engineer shall compile a punch list of items to be completed or corrected. The contractor shall notify the engineer upon completion of the items.

1.8 GUARANTEE

A. All work under this section shall be guaranteed in writing to be free of defective work, materials, or parts for a period of one (1) year, except lamps which shall be guaranteed for ninety (90) days, after final acceptance of the work under this contract or the period indicated under the Division 1 specifications whichever is longer.

B. Repair, revision or replacement of any and all defects, failure or inoperativeness shall be done by the contractor at no cost to the owner.

PART 2 - PRODUCTS

2.1 MATERIAL APPROVAL

A. The design, manufacturer and testing of electrical equipment and materials shall conform to or exceed latest applicable NEMA, IEEE or ANSI standards.

B. All materials must be new, unless noted otherwise, and UL listed. Materials that are not covered by UL testing standards shall be tested and approved by an independent testing laboratory or a governmental agency, which laboratory shall be acceptable to the owner and code enforcing agency.

2.2 SHOP DRAWINGS AND MATERIALS LIST

A. Submit shop drawings and materials lists as specified for review.

2.3 OPERATION AND MAINTENANCE MANUALS

A. Submit Operation and Maintenance Manuals of all Division 16 equipment to architect.

2.4 RECORD DRAWINGS

A. Submit record drawings to owner.

2.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle materials in a manner to prevent damage.

B. Protect equipment from weather and dampness.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

A. Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work.

B. Provide experienced foreman with a minimum of three years' experience working on this type of building placed in charge of this work at all times.

3.2 COORDINATION

A. Coordinate work with other trades to avoid conflict and to provide correct rough-in and connection for equipment furnished under trades that require electrical connections. Inform contractors of other trades of the required access to and clearances around electrical equipment to maintain serviceability and code compliance.

B. Verify equipment dimensions and requirements with provisions specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work. Changes or additions subject to additional compensation, which are made without the authorization of the owner, shall be at contractor's risk and expense.

3.3 MANUFACTURER'S INSTRUCTIONS

A. All installations are to be made in accordance with manufacturer's recommendations. A copy of such recommendations shall at all times be kept in the job superintendent's office and shall be available to the engineer.

B. Follow manufacturer's instructions where they cover points not specifically indicated on drawings and specifications. If they are in conflict with the drawings and specifications obtain clarification from the engineer before starting work.

3.4 QUALITY ASSURANCE

A. The contractor shall insure that all workmanship, all materials employed, all required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.

B. Provide quality assurance tests and operational check on all components of the electrical distribution system, all lighting fixtures, and special systems.

3.5 CUTTING AND PATCHING

A. Perform all cutting and fittings required for work of this section in rough construction of the building.

B. All patching of finished construction of building shall be performed under the sections of specifications covering those materials.

C. No joists, beams, girders or columns shall be cut by any contractor without obtaining written permission from the architect/engineer.

END OF SECTION 16010

SECTION 16060 - GROUNDING

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.3 SYSTEM DESCRIPTION

1.4 Retain paragraph and subparagraph below if Contractor or manufacturer selects testing agency. Delete if Contractor is allowed to perform ground-resistance testing.

A. Ground the electrical service system neutral at service entrance equipment to concrete encased electrode, metal underground water pipe, and effectively grounded metal frame of building.

B. Ground each separately-derived system neutral to nearest effectively grounded metal structural frame of building or point of service entrance ground.

C. Provide communications system grounding conductor to point of service entrance ground.

D. Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductors in raceways and cables, receptacle ground connectors, and plumbing systems.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Section 16120 - Conductors and Cables.

2.2 Bare only copper conductors are permitted in Division 16 Section "Conductors and Cables," delete paragraph below.

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or device enclosure.

D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow tracer. Where not available, green and yellow tape at each junction box or device enclosure.

E. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

F. Bare Copper Conductors: Medium hard drawn copper conductor, stranded, sized as shown on the drawings.

G. Hardware: Bolts, nuts and washers shall be bronze; cadmium plated steel or other non-corrosive material, approved for the purpose.

H. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.2 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

D. Below grade compression fittings: Thomas & Betts, Series 52000, 53000, and 54000 or equivalent.

E. Use connector and sealant approved for purpose on all below grade clamp or compression type connections.

2.3 GROUNDING ELECTRODES

2.3Copper-clad steel is most common. See Evaluations for discussion on where other materials might be more appropriate.

A. Ground Rods: Copper-clad steel, 5/8 inch diameter, minimum length 8 feet.

Select paragraph above or paragraph and subparagraph below. Sectional types are used when rods longer than 10 feet (3 m) are installed.

PART 3 - EXECUTION

3.1 APPLICATION

3.2Delete paragraph below if only copper conductors are specified in Division 16 Section "Conductors and Cables."

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections.

D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

3.3 Delete paragraph and subparagraphs below if grounding bus is not required, or edit to suit Project.

E. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1.Use insulated spacers 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.

3.4Edit below to suit Project.

F. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade.

3.2 EQUIPMENT GROUNDING CONDUCTORS

3.3 NEC permits two basic types of equipment grounding conductors: metallic raceway or cable sheath as the conductor, or a separate equipment grounding conductor. The installation of an equipment grounding conductor provides an additional degree of safe operation when compared to relying on raceway as the conductor. Revise paragraphs and subparagraphs in this Article to suit Project.

A. Comply with NEC Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NEC are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

3.4 Select paragraph above or paragraph and subparagraphs below.

C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:

1.Feeders and branch circuits.

2.Lighting circuits.

3.Receptacle circuits.

4.Single-phase motor and appliance branch circuits.

5.Three-phase motor and appliance branch circuits.

6.Flexible raceway runs.

D. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate equipment grounding conductor terminal of the applicable derived system or service, unless otherwise installed.

F. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways bonded to outlet or equipment, sized per Section 250 of the NEC.

3.5 Coordinate paragraph and subparagraphs below with Drawings and Specification Sections for systems referenced. Edit to suit Project.

G. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1.Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on grounding bar.

2.Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.6 Grounding electrode specified in paragraph below may supplement equipment grounding conductor and be in excess of NFPA 70 requirements. Delete if unnecessary and not desired. Coordinate with evaluations.

H. Provide green insulated ground conductor to exterior post light standards.

I. Provide grounding and bonding at pad-mounted transformer in accordance with Section 16460.

3.2If connections specified in paragraph below circumvent dielectric fittings intended to isolate interior piping systems from galvanic action, delete paragraph and revise piping Section to require dielectric connection.

A. Ground Rods: Where indicated, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.

1.Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.

2.Interconnect ground rods with grounding electrode conductors. Use exothermic welds, unless otherwise indicated. Make connections without exposing steel or damaging copper coating.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

3.5 Delete below if not applicable. See Evaluations.

E. UFER Ground (Concrete-Encased Grounding Electrode): Fabricate according to NEC 250, using a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.4 CONNECTIONS

3.5Coordinate paragraph and subparagraphs below with Drawings.

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1.Use electroplated or hot-tri-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.

2.Make connections with clean, bare metal at points of contact.

3.Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.

4.Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.

5.Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

3.6 Delete reference to UL 486B in paragraph below if aluminum conductors are not used.

E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 SYSTEM NEUTRAL GROUND

A. Ground the neutral conductor of each transformer or generator to limit the maximum potential above ground due to normal operating voltage and limit the voltage level due to abnormal conditions.

B. Ground generators or transformers with secondary voltage 600 volt or less as follows:

1.3 phase, 4 wire Wye connected: ground neutral point

3.6 EQUIPMENT GROUND

A. Ground non-current carrying metal parts of electrical equipment enclosures, frames, conductor raceways or cable trays to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Install a grounding conductor in each raceway system. Equipment grounding conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size grounding conductors per NEC 250 unless otherwise shown on the drawings.

B. Install metal raceway couplings, fittings, and terminations secure and tight to ensure good grounding continuity. Provide grounding conductor sized per NEC through all raceway and conduit systems.

C. Lighting fixtures shall be securely connected to equipment grounding conductors. Outdoor lighting standards shall have a factory installed ground lug for terminating the grounding conductor.

D. Motors shall be connected to equipment ground conductors with a bolted solderless lug connection on the metal frame.

3.7 FIELD QUALITY CONTROL

3.8 Retain one of three paragraphs below.

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

END OF SECTION 16060

SECTION 16113 - UNDER SLAB AND UNDERGROUND ELECTRICAL WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes under slab conduits and related electrical work.

PART 2 - PRODUCTS

2.1 CONDUIT

A. All shall be provided with fittings and accessories approved for the purpose. Refer to Section 16130.

2.2 PRECAST CONCRETE MANHOLE

A. Structural reinforced, size as indicated, with inserts for cable racks and pulling eyes.

2.3 BARE COPPER GROUND CONDUCTOR

A. Medium hard drawn copper conductor, # 4/0 AWG stranded (unless otherwise noted).

PART 3 - EXECUTION

3.1 GENERAL

A. Electrical system layouts indicated on the drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit.

3.2 CONDUIT INSTALLATION

A. Plastic conduit shall be installed on 2 inch sand base and covered by 2 inch sand back fill. Multiple runs shall maintain 3 inch minimum separation between runs. Plastic conduit shall not be installed in rock base.

B. Underground conduit entering building shall be provided with one 10 foot section of rigid steel conduit at point of penetration of foundation, footing or basement wall, with approximately equal lengths inside and outside building line. Ream the smaller inside diameter conduit smooth to prevent conductor damage.

C. Stagger conduit couplings by a minimum of 12 inches. All risers to grade shall be rigid steel.

D. All rigid steel conduits shall be encased in 3 inch minimum concrete envelope.

E. After completion of concrete encased duct bank, a 1/2 inch mandrel, ¼ inch less in diameter than a conduit, shall be pulled through each conduit.

F. Install 1/8 inch diameter pull line in each underground conduit.

G. Burial depths of conduits shall comply with the NEC (minimum).

H. Provide underground type plastic line markers: permanent, brightly colored, continuously printed plastic tape, intended for direct burial service, not less than 6 inches wide, reading "Caution Buried Electrical Line." Install continuous line markers located directly over buried line at 6 inches above top of conduit, during back filling operation.

END OF SECTION 16113

SECTION 16120 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes building wires and cables and associated components.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. IMC: Intermediate metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

E. RMC: Rigid metal conduit.

F. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. IMC: ANSI C80.6.

C. PVC-coated Steel Conduit and Fittings: NEMA RN 1; rigid steel conduit with external 40 mil PVC coating and internal two mil urethane coating.

D. EMT and Fittings: ANSI C80.3. Fittings: Set-screw type.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket. Fittings: NEMA FB 1; compatible with conduit/tubing materials.

2.2 NONMETALLIC CONDUIT AND TUBING

A. RNC: NEMA TC 2, Schedule 40 PVC. Fittings: NEMA TC 3; match to conduit and material.

2.3 METAL WIREWAYS

A. Material: Sheet metal sized and shaped as indicated.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Finish: Manufacturer's standard enamel finish.

2.4 OUTLET AND DEVICE BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Cast-Metal Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.

2.5 FLOOR BOXES

A. Floor Boxes: Cast metal, fully adjustable, rectangular, unless otherwise specified.

2.6 PULL AND JUNCTION BOXES

A. Small Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Cast-Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.

2.7 ENCLOSURES AND CABINETS

A. Hinged-Cover Enclosures: NEMA 250, Type 1, 3R, or 4, with continuous hinge cover and flush latch, key operable.

1.Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

B. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS

A. Outdoors: Use the following wiring methods:

1.Exposed: Rigid steel or IMC.

2.Concealed: Rigid steel or IMC.

3.Underground, Single Run: RNC or PVC Externally Coated Rigid Steel Conduit where required by NEC 517.13.

4.Underground, Grouped: RNC or PVC Externally Coated Rigid Steel Conduit where required by NEC 517.13.

5.Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

6.Boxes and Enclosures: NEMA 250, Type 3R or Type 4.

B. Indoors: Use the following wiring methods:

1.Exposed: EMT or "Wiremold" metallic raceways or equal.

2.Exposed in public areas: "Wiremold" metallic raceways or equal. Use of exposed raceways in public areas must be approved by the architect prior to installation for each location. Use of exposed EMT in areas visible to the public is not allowed unless specifically approved by the architect prior to installation. Replacement of unapproved installations of exposed raceways will be at the expense of the contractor if deemed necessary by the architect or engineer.

3.Concealed: EMT or MC-Cable. Note:MC-Cable is not approved for "homeruns"

4.Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except in wet or damp locations, use LFMC.

5.Damp or Wet Locations: Rigid steel conduit.

6.Boxes and Enclosures: NEMA 250, Type 1, except as follows:

a.Damp or Wet Locations: NEMA 250, Type 4, stainless steel.

3.3 INSTALLATION

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.

B. Minimum Raceway Size: 1/2-inch trade size. 3/4-inch minimum for "homeruns".

C. Conceal conduit and EMT, unless otherwise indicated, within finished walls, ceilings, and floors.

D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

E. Install raceways level and square and at proper elevations. Provide adequate headroom.

F. Complete raceway installation before starting conductor installation.

G. Route exposed raceways parallel and perpendicular to walls and adjacent piping.

H. Use temporary closures to prevent foreign matter from entering raceways.

I. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

J. Make bends in rigid conduit so it is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

K. Use raceway fittings compatible with raceways and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.

L. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.

M. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.

1.Run parallel or banked raceways together; on common supports where practical.

2.Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

O. Join raceways with fittings designed and approved for the purpose and make joints tight.

1.Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.

2.Use insulating bushings to protect conductors.

P. Tighten set screws of threadless fittings with suitable tools.

Q. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with slotted part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.

R. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end reaches against the inside wall of the box. Where close nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

S. Install pull wires in empty raceways. Utilize polyester line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.

T. Telephone and Signal System Raceways: In addition to the above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

U. Install raceway sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install sealing fittings at the following points:

1.Where conduits pass from warm to cold locations, such as the boundaries of refrigerated spaces.

2.Where conduit pass from the interior to the exterior of a building.

3.Where otherwise required by NEC.

V. Apply firestopping to cable and raceway penetrations of fire-rated floor, ceiling and wall assemblies to achieve fire-resistance rating of the assembly.

W. Route conduit through roof openings for piping and ductwork where possible; otherwise, install roof penetrations in accordance with roofing system requirements. Coordinate with roofing installer.

X. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inserts flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.

Y. Flexible Connections: Use maximum of 6 feet of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.

Z. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.

AA. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.

BB. Conduits shall not be routed on or above the roof without prior approval from the Engineer. Insted, the branch circuits shall be routed at the structure level below the roof to feed roof-top equipment. When approval is granted to route conduits on or above the roof, the conduits shall be strapped to COOPER Industries DB series support blocks at intervals not exceeding NEC requirements. The conduits shall not be rested directly on the roof. It shall be permissible to penetrate the roof adjacent mechanical or electrical equipment to power that respective equipment.

3.4 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components.

B. Install individual and multiple-raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers, at least every 8 feet.

D. Size supports for multiple raceway installations so capacity can be increased by a 25-percent minimum in the future.

E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

F. Install 1/4-inch diameter or larger threaded steel hanger rods, unless otherwise indicated.

G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

I. Simultaneously install vertical conductor supports with conductors.

J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

K. Install metal channel racks for mounting cabinets, panelboards; disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit. Perform fastening according to the following unless other fastening methods are indicated:

1.Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.

2.New Concrete: Concrete inserts with machine screws and bolts.

3.Existing Concrete: Expansion bolts.

4.Steel: Spring-tension clamps on steel.

5.Light Steel: Sheet-metal screws.

6.Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

N. Do not drill structural steel members.

O. Aill supports and attachments shall meet project seismic zone requirements.

3.5 BOX INSTALLATION

A. Do not install boxes back-to-back in walls.

B. Locate boxes in masonry walls to require cutting of masonry unit edge only. Coordinate masonry cutting to achieve neat openings for boxes.

C. Provide knockout closures for unused openings.

D. Support boxes independently of conduit except for cast boxes that are connected to two rigid metal conduits, both supported within 12 inches of box.

E. Use 4" boxes with multiple-gang mudring where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.

F. Install boxes in walls without damaging wall insulation.

G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

H. Position outlets to locate lighting fixtures as shown on reflected ceiling plans.

I. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.

J. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud walls, and adjustable steel channel fasteners for flush ceiling outlet boxes.

K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.

L. For boxes installed in metal construction, use rigid support metal bar hangers or metal bar fastened to two studs or with metal screws to metal studs.

M. Set floor boxes level and adjust to finished floor surface.

N. Set floor boxes level and trim after installation to fit flush to finished floor surface.

O. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

P. Locate pull and junction boxes above accessible ceilings or in unfinished areas. Support pull and junction boxes independent of conduit.

Q. Minimum box size to be 4" square by 2 1/8" deep.

3.6 LABELING

A. Label coverplate of all pull and junction boxes by system served. Indicate panel circuits for power and lighting boxes.

3.7 CLEANING

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION 16130

SECTION 16140 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes receptacles, switches, and finish plates.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter,

1.4 SUBMITTALS

A. Submit shop drawings and product data.

1.5 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

1.Wiring Devices:

a.Bryant; Hubbell, Inc.

b.GE Company; GE Wiring Devices.

c.Hubbell Wiring Device - Kellems

d.Leviton Manufacturing Co., Inc.

e.Pass & Seymour/Legrand; Wiring Devices Div.

f.Cooper Wiring Devices

g.Or approved equal.

2.2 RECEPTACLES

A. Straight-Blade and Locking Receptacles: Specification grade (construction specification grade prohibited), shall be:

B. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. White color.

2.2 SWITCHES

A. Snap Switches: General-duty, quiet type, rated 20 amperes, 120/277 volts AC. Handle: white plastic. Pilot light type (where indicated): lighted handle.

2.4 WALL PLATES

A. Single and combination types match corresponding wiring devices.

1.Cover plate: Smooth white plastic.

2.Cover plate for surface mounted devices: Galvanized steel.

3.Weatherproof cover plate: While in use, gasketed, cast metal, hinged device covers.

4.Plate-Securing Screws: Metal with head color to match plate finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

C. Install wiring devices after painting is complete.

D. Do not share neutral conductor on load side of dimmers.

E. Arrangement of Devices: Unless otherwise indicated, mount flush, vertically, with height as indicated or to line ones above counters.

F. Group adjacent switches under single, multigang wall plates.

G. Protect devices and assemblies during painting.

H. Install wall switches with off position down.

I. Install cover plates on switch, receptacle, and blank outlets.

3.2 IDENTIFICATION

A. Switches and receptacles: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on the outside of the face plate for receptacles and on the inside of the face plate for switches; utilize durable wire markers or tags within all outlet boxes. Labels shall be Brother ½" TZ tape, black ink on clear, extra-strength adhesive tape, with size 18 text or engineer approved equal. Use matching label printer.

3.2 CONNECTIONS

A. Connect wiring device grounding terminal to outlet box with bonding jumper.

B. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.

C. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity. Check each device to verify operation.

B. Test GFCI operation according to manufacturer's written instructions.

C. Replace damaged or defective components.

3.5 CLEANING

A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION 16140

SECTION 16231 - PACKAGED ENGINE GENERATORS AND TRANSFER SWITCHES

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SCOPE OF WORK

A. Provide, install, and acceptance test a complete and operable Emergency/Standby electric generating system, including all devices and equipment specified herein, as shown on the drawings, or required for the service. Equipment shall be new, factory tested, and delivered ready for installation.

1.3 APPROVED MANUFACTURERS

A. Onan, Caterpillar, or Kohler.

1.4 SUBMITTALS

A. Provide four (4) sets of the following information for review:

1. Manufacturer's product literature and performance data, sufficient to verify compliance to specification requirements.
2. Manufacturer's certification of prototype testing.
3. Manufacturer's published warranty documents.
4. Shop drawings showing plan and elevation views with certified overall dimensions, as well as wiring interconnection details.
5. Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point_to_point manner.
6. Manufacturer's installation instructions.

1.5 WARRANTY

A. Shall be provided for all products against defects in materials and workmanship for one year period from the start_up date.

1.6 SUPPLIER

A. The supplier shall be the manufacturer's authorized distributor, who shall provide initial start_up services, conduct field acceptance testing, and warranty service. The supplier shall have 24_hour service availability and factory_trained service technicians authorized to perform warranty service on all products provided.

1.7 MANUALS

A. Operators and spare parts manuals shall be provided for all system equipment. The manuals shall include outline, interconnection, wiring, and control drawings accurately describing the equipment provided. Provide ladder logic for all programmable logic controllers in the system.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver engine generator set and system components to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards.

1.9 EXTRA MATERIALS

1.9 Extra materials may not be allowed for publicly funded projects.

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every ten of each type and rating, but not less than one of each.
2. Indicator Lamps: Two for every six of each type used, but not less than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 DIESEL ENGINE GENERATOR SET

A. 2 or 4 cycle, 1800 rpm, diesel engine generator set. Generator set ratings: size as indicated on the drawings, standby rating, based on site conditions noted below. System voltage of: 120/208 Volts AC, Three phase, Four, wire, 60 hertz.

B. Site Conditions: The generator set shall be rated for the following site conditions: altitude 2800 feet, ambient temperatures up to 104 degrees F. The sizing of the generator shall be no more than 5% under the KW rating indicated on the plans when all derating factors for the generator set are considered for the above site conditions based on manufactures data.

C. Prototype tests and evaluation:

1. Prototype tests shall have been performed on a complete and functional unit, component level type tests) will not substitute for this requirement. Prototype testing shall comply with the requirements of NFPA 110 for level 1 systems.

D. Performance

1. Voltage regulation shall be +/_ 0.5 percent for any constant load between no load and rated load. Random voltage variation with any steady load from no load to full load shall not exceed +/- 0.5 percent.
2. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25%.
3. The diesel engine_generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine_generator set at operating temperature.

E. Engine

1. The engine shall be diesel, radiator and fan cooled. The horsepower rating of the engine at its minimum tolerance level shall be sufficient to drive the alternator and all connected accessories. Engine accessories and features shall include:
   a. An electronic governor system shall provide automatic isochronous frequency regulation,
   b. Skid_mounted radiator and cooling system rated for full load operation in 104 degrees F ambient as measured at the generator set air inlet. Radiator shall be provided with a duct adapter flange. The cooling system shall be filled with 50/50 ethylene glycol/water mixture by the equipment supplier. Rotating parts shall be guarded against accidental contact per OSHA requirements.
   c. An electric starter(s) capable of three complete cranking cycles without overheating.
   d. Positive displacement, mechanical, full pressure, lubrication oil pump,
   e. Full flow lubrication oil filters with replaceable spin_on canister elements and dipstick oil level indicator,
   f. An engine driven, mechanical, positive displacement fuel pump. Fuel filter with replaceable spin_on canister element.
   g. Replaceable dry element air cleaner with restriction indicator.
   h. Flexible supply and return fuel lines.
   i. Engine mounted battery charging alternator, 45 ampere minimum, and solid_state voltage regulator.

F. AC Generator

1. The AC generator shall be; synchronous, four pole, revolving field, drip-proof construction, single pre&lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system.
2. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or bellow rated voltage.

G. Generator Set Control

1. The generator set shall be provided with a microprocessor-based control system, which is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification. The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered. All switches, lamps and meters shall be oil_tight and dust_tight, and the enclosure door shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts. The generator set mounted control shall include the following features and functions:
   a. Three position control switch labeled RUN/OFF/AUTO.
   i. In the RUN position the generator set shall automatically start, and accelerate to rated speed and voltage. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
   b. Red "mushroom_head" push_button EMERGENCY STOP switch.
   i. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.
   c. Generator Set Alarm and Status Message Display:
   i. The generator set shall be provided with alarm and status indicating lamps to indicate non_automatic generator status, and existing alarm and shutdown conditions. The lamps shall be high_intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. The generator set control shall indicate the existence of the following alarm and shutdown conditions on a digital display panel:
      a low oil pressure (alarm)
      b low oil pressure (shutdown)
      c oil pressure sender failure (alarm)
      d low coolant temperature (alarm)
      e high coolant temperature (alarm)
      f high coolant temperature (shutdown)
      g engine temperature sender failure (alarm)
      h low coolant level (alarm or shutdown__selectable)
      i fail to crank (shutdown)
      j overcrank (shutdown)
      k overspeed (shutdown)
      l low DC voltage (alarm)
      m high DC voltage (alarm)
      n weak battery (alarm)
      o low fuel_daytank (alarm)
      p high AC voltage (shutdown)
      q low AC voltage (shutdown)
      r under frequency (shutdown)
      s over current (warning)
      t over current (shutdown)
      u short circuit (shutdown)
      v over load (alarm)
      w emergency stop (shutdown)
2. Engine Status Monitoring:
   a. The following information shall be available from a digital status panel on the generator set control :
   i. engine oil pressure (psi or kPA)
   ii. engine coolant temperature (degrees F or C)
   iii. engine oil temperature (degrees F or C)
   iv. engine speed (rpm)
   v. number of hours of operation (hours)
   vi. number of start attempts
   vii. battery voltage (DC volts)
3. Control Functions:
   a. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15 second rest period between cranking periods.
   b. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.
   c. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting. The governor control shall be suitable for use in paralleling applications without component changes.
   d. The control system shall include time delay start (adjustable 0_300 seconds) and time delay stop (adjustable 0_600 seconds) functions.
   e. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.
4. Alternator Control Functions:
   a. The generator set shall include an automatic voltage regulation system which is matched and prototype tested with the governing system provided. It shall be immune from misoperation due to load_induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three_phase RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque_matching characteristic, which shall reduce output voltage in proportion to frequency below a threshold of 58 HZ. The voltage regulator shall include adjustments for gain, damping, and frequency roll_off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alpha-numeric LED readout to indicate setting level.
   b. The voltage regulation system shall include provisions for reactive load sharing and electronic voltage matching for paralleling applications. Motorized voltage adjust pot is not acceptable for voltage matching.
   c. Controls shall be provided to monitor the output current of the generator set and initiate an alarm when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The controls shall shut down and lock out the generator set when output current approaches the thermal damage point of the alternator.
   d. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition when total load on the generator set exceeds the generator set rating for in excess of 5 seconds.
   e. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.
   f. An AC over/under voltage monitoring system which responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds.
   g. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 10VDC or more than 16 VDC. During engine starting, the low voltage limit shall be disabled, and if DC voltage drops to less than 7 volts for more than two seconds a "weak battery" alarm shall be initiated.

H. Base

1. The engine_generator set shall be mounted on a heavy duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails.

I. Generator set auxiliary equipment and accessories

1. Vibration Isolation
   a. Vibration isolators, spring&pad type, quantity as recommended by the generator set manufacturer. Isolators shall include seismic restraints if required by site location.
2. Exhaust Silencer
   a. Exhaust muffler shall be provided for each engine, size and type as recommended by the generator set manufacturer. The mufflers shall be critical grade. Exhaust system shall be installed according to the generator set manufacturers recommendations and applicable codes and standards.
3. Starting and Control Batteries
   a. Starting battery bank, calcium/lead antimony type, 24 volt DC, sized as recommended by the generator set manufacturer, shall be supplied for each generator set with battery cables and connectors.

J. Generator set main circuit breaker

1. Generator main circuit breaker; set, mounted and wired, UL listed, molded case type with electronic trip unit, sized as indicated on the drawings, 3 pole, 600 volts. Submittals shall demonstrate that the circuit breaker provides proper protection for the alternator by a comparison of the trip characteristic of the breaker with the thermal damage characteristic of the alternator. Field circuit breakers are not acceptable for generator overcurrent protection.

K. Remote annunciator

1. You must install a 20-light LED remote alarm annunciator with horn, located as shown on the drawings or in a location which can be conveniently monitored by facility personnel. The remote annunciator shall provide all the functions and visual alarms called for by NFPA Standard 110 for level 1 systems; and in addition shall provide indications for high battery voltage, low battery voltage, loss of normal power to the charger. Spare lamps shall be provided to allow future addition of other alarm and status functions to the annunciator. Provision for the sounding of the annunciator in a fashion consistent with the specified functions shall be provided. Alarm silence and lamp test switch(s) shall be provided. LED lamps shall be replaceable, and indicating lamp color shall be capable of changes needed for specific application requirements. Alarm horn shall be switchable for all annunciation points. Alarm horn (when switched on) shall sound for first fault, and all subsequent faults, regardless of whether first fault has been cleared, in compliance with NFPA110 3-5.6.2.

L. Sub-base fuel storage tank

1. Provide a dual wall sub_base fuel storage tank with 24 hour (600 gallon maximum) capacity. The tank shall be constructed of corrosion resistant steel and shall be UL listed. The equipment, as installed, shall meet all local and regional requirements for above ground tanks. Provide with rupture alarm and low level alarm.

M. Enclosure

1. Provide generator with standard weatherproof housing.

2.2 TRANSFER SWITCH EQUIPMENT

A. Provide complete factory assembled transfer equipment with electronic controls designed for surge voltage isolation, and including voltage sensors on all phases of both sources, linear operator, permanently attached manual handles, positive mechanical and electrical interlocking, and mechanically held contacts.

B. Transfer Switch Ratings:

1. Refer to the project drawings for specifications on the sizes and types of transfer switch equipment, withstand and closing ratings, number of poles, voltage and ampere ratings, enclosures, and accessories.

C. All transfer switches and accessories shall be UL listed and labeled, tested per UL Standard 1008, and CSA Approved.

D. Main contacts shall be rated for 600 Volts AC minimum.

E. Transfer switches shall be rated to carry 100 percent of rated current continuously in the enclosure, in ambient temperatures of -40 to +50 degrees C, relative humidity up to 95% (non_condensing), and altitudes up to 10,000 feet (3000M).

F. Transfer switch equipment shall have a withstand and closing rating (WCR) in RMS symmetrical amperes greater than the available fault currents. The transfer switch and its upstream protection shall be coordinated. The transfer switch shall be third-party listed and labeled for use with the specific protective device(s) installed in the application.

G. Construction:

1. Transfer switches shall be double_throw, electrically and mechanically interlocked, and mechanically held in both positions.
2. Transfer switches rated through 1000 amperes shall be equipped with permanently attached manual operating handles and quick_make, quick_break, make_one_center contact mechanisms suitable for safe manual operation under load.
3. Main switch contacts shall be high_pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent interphase flashover. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.
4. Transfer switches designated on the drawings as 4_poles shall be provided with a switched neutral pole. The neutral pole shall be of the same construction and have the same ratings as the phase poles. All poles shall be switched simultaneously using a common crossbar. Equipment using add_on accessory overlapping contacts are not acceptable.
5. Transfer switches which are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs, sized to carry 100% of the current designated on the switch rating.
6. Enclosures shall be UL listed. The enclosure shall provide NEC wire bend space. The cabinet door shall be key_locking. Controls on cabinet door shall be key_operated.
7. Transfer switches shall be mounted in NEMA "1" enclosures. The cabinet shall provide required wire bend space. Manual operating handles and all control switches (other than key_operated switches) shall be accessible to authorized personnel only by opening the key_locking cabinet door.

H. Automatic Controls:

1. Transfer switches shall be provided with a fully automatic control system, and provisions for manual operation as described in this section.
2. Control shall be solid_state and designed for a high level of immunity to power line surges and transients, demonstrated by test to IEEE Standard 587_1980. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs.
3. Solid_state undervoltage sensors shall simultaneously monitor all phases of both sources. Pick_up and drop_out settings shall be adjustable. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase. Voltage sensors shall have field calibration of actual supply voltage to nominal system voltage.
4. Provide Phase Sequence Monitor and Balance module to protect against inadvertent phase rotation hookup and monitor for voltage phase imbalance between phases.
5. The switch shall transfer when the emergency source reaches the set point voltage and frequency. Provide a adjustable time delay on transfer, adjustable from 0 to 120 seconds.
6. The switch shall retransfer the load to the normal source after a time delay retransfer, adjustable from 0 to 30 minutes. Retransfer time delay shall be immediately bypassed if the emergency power source fails.
7. Controls shall signal the engine_generator set to stop after a time delay, adjustable from 0 to 10 minutes, bypassed for immediate stop.
8. Power for transfer operation shall be from the source to which the load is being transferred.
9. The control shall include latching diagnostic indicators to pinpoint the last successful step in the sequence of control functions, and to indicate the present status of the control functions in real time, as follows:
   a. Source 1 OK
   b. Start Gen Set
   c. Source 2 OK
   d. Transfer Timing
   e. Transfer Complete
   f. Retransfer Timing
   g. Retransfer Complete
   h. Timing for Stop
10. The control shall include remote transfer inhibit and area protection features.
11. Transfer switches shall be equipped with a field adjustable controls to allow the operator to control the transfer switch operating time during switching in both directions. The controls shall control the time the load is isolated from both power sources, to allow load residual voltage to decay before closure to the opposite source. The transfer switch operating speed control feature shall have an adjustable range of 0 to 7.5 seconds. Phase angle monitor is not acceptable substitute for this feature.

I. Front Panel Devices:

1. Provide devices mounted on cabinet front consisting of:
   a. A key_operated selector switch to provide the following positions and functions:
   b. Test _ Simulates normal power loss to control for testing of generator set. Controls shall provide for a test with or without load transfer.
   c. Normal _ Normal operating position.
   d. Retransfer _ Momentary position to override retransfer time delay and cause immediate return to normal source, if available.

J. Battery Charger: Provide a float charge battery charger rated 10 amps. DC output voltage shall be as required for the starting batteries. An ammeter shall display charging current. The battery charger shall have fused AC input and fused DC output. Include fault indications and Form C contact for AC Fail, High Battery Voltage, and Low Battery Voltage.

K. Manual Selector Switch: Provide a manual/automatic retransfer selector switch to provide either automatic retransfer after the retransfer time delay, or a manual retransfer when selected by an operator.

2.3 BYPASS-ISOLATION SWITCH

A. Transfer switches shall include (integral to the transfer switch assembly) a transfer switch bypass and isolation equipment as described in this section. The bypass_isolation switch shall provide a means for manually bypassing the transfer switch from either source (Normal or Emergency) to the load, while under load if necessary, and to isolate the transfer switch from both sources for maintenance or repair. Designs which bypass to only one source are not acceptable under this specification.

1. Ratings:
   a. Bypass_isolation switch equipment shall be UL Listed per Standard 1008, CSA Approved, with continuous current rating, voltage and frequency ratings, and withstand and closing ratings equal to the transfer switch ratings at the specified conditions of ambient temperature, humidity, and altitude.
2. Construction:
   a. The bypass_isolation and transfer switches shall be mechanically held in each position. Switching mechanisms shall be break before make on all poles, including the neutral pole on four pole switches. The switch mechanism shall be an over center toggle device which provides stored energy contact operation during both opening and closing. The speed of contact operation shall be independent of the force applied to the operating handles, which permits manual operation under load.
3. Bypass Switch:
   a. Shall be a fully rated manually_operated switch, rated for the same loads as the automatic transfer switch. Bypass switch shall provide bypass to either normal or emergency source by use of a door_mounted keyed source selector switch and a permanently mounted external operating handle. Equipment shall provide manual bypass without load break to the source connected to the load by the transfer switch. Equipment requiring load break before bypass is not acceptable under this specification.
   b. Equipment shall provide for manual bypass operation to the source opposite that to which the transfer switch is connected. This shall cause the transfer switch to go automatically to a position disconnected from both sources. Equipment that does not provide a rapid means of opposite source bypass is not acceptable under this specification.
4. Interlocks:
   a. Positive mechanical interlocks shall prevent all possible source to source interconnections. Designs which depend on electrical interlocks to prevent source to source interconnections, or which intentionally interconnect the sources, are not acceptable. The interlock system shall assure a properly sequenced, mechanically guided bypass and isolation action.
   b. The equipment shall utilize automatic, solenoid_activated mechanical stops to prevent manually bypassing to a dead source. Equipment that does not prevent dead source bypass is not acceptable.
5. Isolation
   a. A drawout isolation mechanism shall provide closed door isolation of the transfer switch, using a permanently mounted, external handle. The isolation mechanism shall be interlocked so that either the transfer switch must be bypassed or the transfer switch must be open, before the mechanism will permit isolation of the transfer switch.
   b. The isolation mechanism shall provide for three position operation; Connected, Test, and Isolated. In the Connected position, isolation contacts shall be fully engaged and closed, with the transfer switch control cable connected. In the Test position, isolation contacts shall be open and the transfer switch control cable connected. The Test position shall allow operational testing of transfer switch and controls without power disruption to the load. In the Isolated position, the transfer switch and control shall be completely isolated from all power sources. In the isolated position, safety shutters shall close to cover bypass switch power terminals minimizing the possibility of accidental contact with energized parts. In the isolated position, the transfer switch shall be capable of being withdrawn from the cabinet, and removed using overhead lifting equipment. Mechanisms that do not allow for drawout and removal for servicing using overhead lifting equipment are not acceptable under this specification. When re_installing the transfer switch, from isolated to connected position, the isolation mechanism shall move the transfer switch control cable connector to the closed position on the same source as the bypass switch.

B. Enclosure: Nema "1" enclosure. Enclosure construction shall be welded steel, Wire bend space shall comply with National Electrical Code for the maximum size and number of conductors the terminal lugs will accept. A key locking handle shall be provided. Front panel mounted controls shall require use of a key.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in available space as indicated on the drawings. Interrupt Rating shall be fully rated. The short circuit current rating indicated shall be an integrated rating of switchboard and its devices. Series Rating shall not be used unless otherwise specifically noted.

B. Installation of equipment, including temporary furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

C. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's recommendations and seismic requirements of the area.

D. Equipment shall be initially started and operated by representatives of the manufacturer.

E. All equipment shall be physically inspected for damage. Switches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to final testing of the system.

3.2 FACTORY TESTS

A. Equipment supplied shall be fully tested at the factory for function and performance.

B. Factory testing may be witnessed by the owner. Supplier is responsible to provide two weeks notice for testing.

C. Generator set factory tests on the equipment shall be performed at rated load and rated PF. Generator sets that have not been factory tested at rated PF will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady_state governing, single step load pickup, and function of safety shutdowns.

D. Transfer equipment factory tests: Each transfer switch supplied shall be factory tested before shipment. Factory tests shall include a complete functional test of the transfer switch controls, including calibration of the voltage sensors.

3.3 ON-SITE ACCEPTANCE TEST

A. The complete installation shall be tested in accordance with Section 16040 following completion of all site work. Testing shall be conducted by representatives of the manufacturer. The owner shall be notified in advance and shall have the option to witness the tests.

3.4 TRAINING

A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 10 persons. Training date shall be coordinated with the owner.

END OF SECTION 16231

MAIN SWITCHBOARDS 16441- 4

SECTION 16441 - MAIN SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2SUMMARY

A. This section includes main switchboards.

B. Related sections:

1. Section 16060 - Grounding.

1.3REFERENCES

A. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.

B. NEMA AB 1 - Molded Case Circuit Breakers.

C. NEMA PB 2 - Dead Front Distribution Switchboards.

D. NEMA PB 2.1 - Instructions for Safe Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less.

1.4SUBMITTALS

A. Product Data: For each type of switchboard, overcurrent protective device, ground-fault protector, accessory, and component indicated. Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Include front and side views of enclosures with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; size and number of bus bars per phase, neutral, and ground; switchboard instrument details; instructions for handling and installation of switchboard; and electrical characteristics including voltage, frame size and trip ratings, withstand ratings, one line and wiring diagrams, and time-current curves of all equipment and components.

1.5OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data. Include the following:

1. Routine maintenance requirements for switchboards and all installed components.
2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
3. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.6DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle in accordance with NEMA PB2.1 and manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.7COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

1.8SPARE PARTS

A. Keys: Furnish 3 each to owner.

B. Fuses: Furnish to owner 3 spare fuses of each type and rating installed.

C. Fuse Pullers: Furnish one fuse puller to owner.

PART 2 - PRODUCTS

2.1MANUFACTURERS

A. General Electric, Cutler-Hammer, Siemens, Square D Co;. Schneider Electric Brands, or approved equal.

2.2 SWITCHBOARD CONSTRUCTION AND RATINGS:

A. Factory-assembled, dead front, metal-enclosed, and self-supporting switchboard assembly conforming to NEMA PB 2, and complete from incoming line terminals to load-side terminations. Provide lugs appropriate for conductors used.

B. Switchboard electrical ratings and configurations as shown on Drawings. Interrupt Rating shall be fully rated. The short circuit current rating indicated shall be an integrated rating of switchboard and its devices. Series Rating shall not be used unless otherwise specifically noted.

C. Line and Load Terminations: Accessible from the front of the switchboard, suitable for the conductor materials used.

D. Bus Material: Copper sized in accordance with NEMA PB 2.

E. Bus Arrangement: Use A-B-C sequence in left-to-right, top-to-bottom, and front-to-rear arrangement format.

F. Bus Connections: Bolted, accessible from front or rear for maintenance.

G. Enclosure shall be NEMA PB 2 Type 1 - General Purpose. Sections shall align at front and rear. Provide NEMA 3R Enclosure when indicated on plans.

H. Switchboard Height (NEMA 1) : 90 inches, excluding floor sills, lifting members and pull boxes.

I. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.

J. Future Provisions: Fully equip spaces for future devices with bussing and bus connections, suitably insulated and braced for short circuit currents. Continuous current rating as indicated on Drawings.

2.3 SWITCHING AND OVERCURRENT PROTECTIVE DEVICES

A. Main Circuit Breaker Assemblies:

1. Main Circuit breakers (unless otherwise indicated on plans) shall be insulated case type as indicated on plans with interrupter insensitive, solid state trips, current sensors and solid state logic circuit integral with the frame. All circuit breakers shall be of same design for over-current and ground fault trip coordination.
2. All Main Circuit Breakers rated for 1200 Amp or higher shall have the following features:
   a. UL listed for 80 percent load application unless otherwise indicated on plans as 100% rated.
   b. Adjustable [L] Long time time-delay and ampere setting.
   c. Adjustable [S] Short time-delay and pick-up.
   d. Adjustable [I] Instantaneous trip.
   e. Adjustable [R] Reduced Entergy Lat-Through (RELT) Instantaneous trip. This feature shall be provided on breakers to provide a temporary setting for the instantaneous trip setting of the breaker. Setting shall be adjustable down to 1.5X of the rating plug and shall be enabled through a switch mounted on front of the switchboard. The switch shall be combined with an indicating light that positively indicates that the RELT is enabled or disabled.
   f. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard.
   g. Short circuit, overload and ground fault trip indicators.
   h. Trip device of circuit breakers shall be of same type for tripping coordination and shall allow for the UL listed field installation of internal accessories (Auxiliary Switch, Shunt Trip, Undervoltage release, Bell Alarm Switch) without removal of cover to install. Breaker shall include Accessories as indicated on plans.
   i. Circuit breaker handle accessories shall provide provisions for locking handle in the 'ON' or ' OFF' position

B. ALL

B. Feeder Breaker Assemblies 1200 Amp and above:

1. Feeder Circuit breakers 1200 Amp may be Molded Case or Individually Mounted, 1600 Amp and above shall be Insulated Case with temperature insensitive, solid state trips, current sensors and solid state logic circuit integral with the frame. All circuit breakers shall be of same design for over-current and ground fault trip coordination. The Circuit breakers shall have the following features:
   a. UL listed for 80 percent load application unless otherwise indicated on plans as 100% rated.
   b. Adjustable [L] Long time time-delay and ampere setting.
   c. Adjustable [S] Short time-delay and pick-up.
   d. Adjustable [I] Instantaneous trip.
   e. Adjustable [G] Ground fault pick-up and delay where indicated or required be NEC.
   f. Adjustable [R] Reduced Entergy Lat-Through (RELT) Instantaneous trip. This feature shall be provided on breakers to provide a temporary setting for the instantaneous trip setting of the breaker. Setting shall be adjustable down to 1.5X of the rating plug and shall be enabled through a switch mounted on front of the switchboard. The switch shall be combined with an indicating light that positively indicates that the RELT is enabled or disabled.
   g. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard.
   h. Short circuit, overload and ground fault trip indicators.

C. Feeder Circuit Breaker Assemblies below 1200 Amp:

1. Feeder Circuit breakers below 1200 Amp shall be digital solid state true RMS sensing Molded Case Circuit Breakers with temperature insensitive, solid state trips, current sensors and solid state logic circuit integral with the frame. All circuit breakers shall be of same design for over-current and ground fault trip coordination. The Circuit Breakers shall have the following minimum features:
   a. UL listed for 80 percent load application unless otherwise indicated on plans,
   b. Long time pickup (ampere setting) determined by interchangeable rating plug .
   c. Adjustable instantaneous with short time tracking function.
   d. Circuit Breaker shall allow the UL listed field installation internal accessories (Auxiliary Switch, Shunt Trip, Undervoltage release, Bell Alarm Switch) without removal of cover to install. Circuit Breaker shall include Accessories as indicated on plans.
   e. Circuit breaker handle accessories shall provide provisions for locking handle in the 'ON' or 'OFF' position

2. Where specifically indicated or required by NEC

   a. Adjustable [L] Long time time-delay and ampere setting.
   b. Adjustable [S] Short time-delay and pick-up.
   c. Adjustable [I] Instantaneous trip.
   d. Adjustable [G] Ground fault pick-up and delay where indicated or required be NEC.
   e. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard
   f. Short circuit, overload and groun
   g. Trip device of circuit breakers shall be of same type for tripping coordination.

D. Feeder Circuit Breaker Assemblies 150 Amp and below:

1. Feeder Circuit breakers 150 Amp and below shall be thermal Magnetic Circuit breaker : Inverse time Current element for low level overloads, and instantaneous magnetic trip element for short circuits, unless otherwise indicated or required to meet Section 2.4 C above. Minimum features below:

   a. UL listed for 80 percent load application unless otherwise indicated on plans.
   b. Circuit Breaker shall allow the UL listed field installation internal accessories (Auxiliary Switch, Shunt Trip, Undervoltage release, Bell Alarm Switch) without removal of cover to install. Circuit Breaker shall include Accessories as indicated on plans.
   c. Circuit breaker handle accessories shall provide provisions for locking handle in the 'ON' or 'OFF' position

2. Where specifically indicated or required by NEC

   a. Adjustable [L] Long time time-delay and ampere setting with Long time pickup (ampere setting) determined by interchangeable rating plug.
   b. Adjustable [S] Short time-delay and pick-up.
   c. Adjustable [I] Instantaneous trip.
   d. Adjustable [G] Ground fault pick-up and delay where indicated or required be NEC.
   e. Where Indicated special zone control interlocking for main breaker and future main and tie breaker of double-ended substation switchboard
   f. Short circuit, overload and groun
   g. Trip device of circuit breakers shall be of same type for tripping coordination.

E. Fused Switch Assemblies:

1. FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: FS W-F-870. Designed to reject all except Class R fuses, type as specified.
2. Switch handles shall be provided with provisions for locking handle in the 'ON' or 'OFF' position,
3. Fusible Switch Assemblies, Larger than 800 Amperes: Bolted pressure contact switches. Fuse wire type: Manual operating handles and all control switches (other than key_operated switches) shall be accessible to authorized personnel only by opening the key_locking cabinet door.
4. Fuse Manufacturers: Bussmann, Shawmut, Brush, or approved equal.
5. Fuse Sizes: as indicated on the drawings. Provide an appropriate sized spare fuse cabinet (with nameplate and directory) with one spare set of fuses (minimum of three) for each current rating and type used on the entire project. All fuses shall be of the same manufacturer.

2.4 INSTRUMENTATION (when indicated on plans)

A. Three five ampere current transformers per breaker, including main terminated in a shorting block.

B. Three 120V potential transformers for main incoming voltage.

C. Meter ,Provide a UL listed and digital multifunction power monitor. The monitor case shall be fully enclosed and shielded. The monitor shall accept a voltage monitoring range of up to 600 volts, phase to phase. The Monitor shall provide true RMS measurements of voltage, phase to neutral and phase to phase; current, per phase and neutral; real power, reactive power, apparent power, power factor and frequency. The Monitor shall monitor maximim average demand values for all current and power readings. The demand interval shall be user programmable. The Monitor shall have an accuracy of +/- 0.1% or better for volts and amps, and 0.2% for power functions, and shall meet IEC687 (0.2%).The monitor shall include a three line, integrated, light-emitting diode (LED) display. The display shall provide user access to all phase voltages (phase to neutral and phase to phase), currents (phase and neutral) , watts, VARs, VA, power factor, frequency and kwh. The monitor shall be microprocessor based and shall be fully user programmable. The monitor shall be provided with an RS485 digital communications port. The Monitor shall communicate using a MODBUS RTU protocol and shall have a communication baud rate of at least 57k . The monitor shall be provided with one KYZ pulse outputs

2.5 OPTIONAL FEATURES

A. When indicated on drawings, provide single phasing protection with UL listed phase monitor, relays, shunt trip coils and all necessary accessories and wiring to trip designated circuit breakers (with motor loads) when voltage of any phase drops below 88 percent of rated voltage. Taylor "Phase Guard" Model PND with a two second delay.

2.6 LUGS AND HARDWARE

A. Cable connectors shall be mechanical type lugs, suitable for copper or aluminum cables. All hardware used on conductors shall have high tensile strength and a suitable protective finish. All connections shall be made with Belville washers.

2.7 PROVISIONS FOR HANDLING

A. Provide adequate lifting means.

B. Switchboard shall be capable of being rolled or moved into installation position and bolted directly to the floor without use of floor sills.

2.8 WIRING

A. Provide all necessary control and instrumentation wiring.

B. Provide fuses, fuse blocks, control transformers, terminal blocks with suitable numbering strips, relays, auxiliary contact switches on circuit breakers as required.

C. Locate terminal blocks for remote load monitoring transducers in CT compartment for future extension by Owner.

D. All low voltage and control wiring shall be physically isolated from live busses so that safe access can be obtained without de-energizing the switchboard.

PART 3 - EXECUTION

3.1INSTALLATION

A. Install switchboard in locations shown on Drawings, in accordance with manufacturer's written instructions and NEMA PB 2.1.

B. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

C. Provide 2" high concrete leveling pad under switchboard. Dimension 6" larger than footprint of equipment. Anchor to pad with ¾" anchor bolts.

3.2IDENTIFICATION

A. Provide engraved lamacoid nameplate for the switchboard and each component.

B. Provide warning signs.

3.3ADJUSTING AND CLEANING

A. Set field-adjustable switches and circuit breaker trip ranges.

B. Adjust all operating mechanisms for free mechanical movement.

C. On completion of installation, inspect interior and exterior of switchboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END O

SECTION 16851 - FIRE ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes fire alarm systems.

B. Related Sections include the following:

1. Division 8 Section "Door Hardware" for door closers and holders with associated smoke detectors, electric door locks, and release devices that interface with the fire alarm system.

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. NICET: National Institute for Certification in Engineering Technologies.

D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. Noncoded, addressable system; multiplexed signal transmission dedicated to fire alarm service only.

B. Noncoded, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1.5 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Premises protection includes Type 5B Fully Sprinkled and Type E Occupancy.

C. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Verified automatic alarm operation of smoke detectors.
6. Automatic sprinkler system water flow.
7. Fire extinguishing system operation.
8. Fire standpipe system.

D. Fire alarm signal shall initiate the following actions:

1. Alarm notification appliances shall operate continuously.
2. Identify alarm at the FACP and remote annunciators.
3. De-energize electromagnetic door holders.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
9. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
10. Record events in the system memory.
11. Record events by the system printer.

E. Supervisory signal initiation shall be by one or more of the following devices or actions:

1. Operation of a fire-protection system valve tamper.
2. Operation of any duct detectors or in duct detectors.

F. System trouble signal initiation shall be by one or more of the following devices or actions:

1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at the FACP.
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.
6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

G. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP and remote annunciators. Record the event on system printer.

1.6 SUBMITTALS

Prior to the start of work, the contractor shall provide a complete and comprehensive submittal for review by the engineer. These are to describe the proposed system and its equipment. Failure to provide a complete submittal shall be grounds for summary rejection of any incomplete submittal documentation. Contractor's who provide re-submittal's, due to prior rejection shall be subject to a re-review fee, should the Engineer elect to do so. The complete submittal shall include, but not be limited to, all of the following material:

A. Power Calculations:

1. Battery capacity calculations shall be a minimum of 125% of the calculated requirement.
2. *Supervisory power requirements for all equipment.*
3. Alarm power requirements for all equipment.
4. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst case condition plus 25% spare capacity.
5. Voltage-drop calculations for wiring runs demonstrating worst case condition.

B. Complete manufacturers catalog data including supervisory power usage, alarm power usage, physical dimensions, finish and mounting requirements.

C. Complete drawings covering the following shall be submitted by the contractor for the proposed system. Floor plans in a CAD compatible format showing all equipment and raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used. Floor plans will be prepared at 1/8" scale.

D. A complete proposed system database including a description of all logic strings, control by event programming and point identification labels on a 3.5" high density floppy disk and in a formatted printed form, as required for off site editing, shall be submitted for evaluation by the owner.

1. The program shall include all required interactive control functions between the local network systems and the methods for implementing these actions.

E. Provide the address, telephone number, and contact person(s) of the manufacturer's local service facility for normal and off-hour warranty issues.

F. If the fire alarm system and its equipment are supplied by a manufacturer's distributor, as part of the submittal documentation, the manufacturer shall provide, on its corporate letterhead, a "letter of support". Said "letter of support" shall state that, when in the opinion of the Engineer, the distributor's efforts require back-up and/or assistance, the manufacturer shall provide, at no cost to the Owner, all required technical support during the installation phase and for a one (1) year guarantee period starting on the date of final acceptance by the owner and the authority having jurisdiction. If said "letter of support" is not submitted, the manufacturer's equipment will be deemed unacceptable and shall be grounds for summary rejection.

G. Provide a fire alarm system function matrix. Matrix shall illustrate alarm output events in association with initiating devices input events. Matrix shall represent a summary of the installed system alarm, supervisory and trouble functions. Include any and all departures, exceptions, variances or substitutions from these specifications and/or drawings at the time of bid. Failure to provide this requirement shall be cause for summary rejection of submittal documents where additional departures are discovered. (See Appendix-A-NFPA-72 for minimum matrix requirements - A.10.6.2.3(9) 2002.

H. For each system control panel and/or transponder panel, provide panel ampere loading during both normal and alarm modes, with time calculations to substantiate compliance with battery back-up power requirements (battery Ampere-Hour capacity), described elsewhere in these specifications.

I. For each system control panel and/or transponder panel, provide written schedule of active and spare addresses provided on each addressable circuit to substantiate compliance with circuit usage/spare requirements, described elsewhere in these specifications.

J. For each system control panel and system transponder notification appliance circuit provide a written schedule of spare capability in amperes available for future possible use.

K. Provide manufacturer's printed product data, catalog pages and descriptions of any special installation requirements and/or procedures. Drawings depicting any special physical installation requirements shall show physical plans, elevations, all dimensions, conduit entry, minimum access clearances and any other details required.

L. Provide shop drawings as follows:

1. Drawing or catalog page showing actual dimensions of the main FCS.
2. Drawing(s) or catalog page(s) showing actual dimensions of any additional system control panels, amplifier cabinets and/or battery cabinets.
3. Drawing or catalog page showing actual dimensions of the remote annunciator(s).
4. Single line riser diagram showing, all equipment, all connections and number and size of all conductors and conduits.
5. Provide samples of various items when so requested by the architect/engineer.

M. The fire protection contractor shall provide copies of certification for service technician's formal training by the system manufacture. As a minimum, certification documents shall indicate training dates, systems qualified, name of individual certified and current status.

N. Product Data: For each type of product indicated within 90 days of notice to proceed.

O. Within 90 days of notice to proceed, the contractor shall submit a programming printout and digital copy of the program to the Engineer for review.

P. Qualification Data: For Installer: NICE ET Level II certification within 60 days of notice to proceed.

Q. Field quality-control test reports: provide test reports 10 days prior to final test requirements.

R. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual, Include abbreviated operating instructions for mounting at the FACP.

S. Documentation:

1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Architect, and authorities having jurisdiction.
2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Architect, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.
   a. Hard copies on paper to Owner, Architect, and authorities having jurisdiction.
   b. Electronic media may be provided to Architect.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Personnel certified by NICET as Fire Alarm Level II.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. 30 days after award of bid, the contractor shall conduct a meeting with the owner; owner's representative, the Engineer and the architect to discuss compliance of the specifications and drawings.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
3. Smoke, Fire, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
5. Keys and Tools: One extra set for access to locked and tamper proofed components.
6. Audible and Visual Notification Appliances: One of each type installed.
7. Fuses: Two of each type installed in the system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. *FACP and Equipment:*
   a. Silent Knight; a GE-Honeywell Company 5820 XL Series.

2. Wire and Cable:
   a. Comtran Corporation.
   b. HelixHiTemp Cables, Inc.; a Draka USA Company.
   c. Rockbestos-Suprenant Cable Corporation; a Marmon Group Company.
   d. West Penn Wire/CDT; a division of Cable Design Technologies.
3. Audible and Visual Signals:
   a. Gentex

2.2 FACP

A. General Description:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Multipurpose type, containing the following:
   a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
   b. Heat sensor, combination rate-of-rise and fixed temperature.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.
7. Where noted on drawings provide a welded wire screen protective cover.
8. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
   a. Rate-of-rise temperature characteristic shall be selectable at the FACP for 15 or 20 deg F (8 or 11 deg C) per minute.
   b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at the FACP to operate at 135 or 155 deg F (57 or 68 deg C).
   c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.
2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:
   a. Sensor: LED or infrared light source with matching silicon-cell receiver.
   b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.
2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
   a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.
5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating status, Provide remote status and alarm indicator and test station where indicated.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
8. Each sensor shall have multiple levels of detection sensitivity.
9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.5 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
2. Where called for on plans to have a wire, guard provide and install a welded wire screen guard of appropriate size. Polycarbonate or other transparent protective covers are prohibited.

B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn.

C. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output: as indicated.
2. Strobe Leads: Factory connected to screw terminals.
3. Where called for on plans to have a wire guard, provide and install a welded wire screen guard of appropriate size. Polycarbonate or other transparent protective covers are prohibited.

2.6 SPRINKLER SYSTEM REMOTE INDICATORS

A. Remote status and alarm indicator and test stations, with LED indicating lights. Light is connected to flash when the associated device is in an alarm or trouble mode. Lamp is flush mounted in a single-gang wall plate. A red, laminated, phenolic-resin identification plate at the indicating light identifies, in engraved white letters, device initiating the signal and room where the smoke detector or valve is located. For water-flow switches, the identification plate also designates protected spaces downstream from the water-flow switch.

2.7 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching door plate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted, unless otherwise indicated.
3. Rating: 24-V dc.
4. Material and Finish: Match door hardware.

2.8 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.

1. Mounting: Flush cabinet, NEMA 250, Class 1.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LED's permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

2.9 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall where indicated to a circuit-breaker shunt trip for power shutdown and to release doors.

2.10 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Listed and labeled according to UL 632.

B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising 2 lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

C. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.

D. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.11 GUARDS FOR PHYSICAL PROTECTION

A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

1. Factory fabricated and furnished by manufacturer of the device.
2. Finish: Paint of color to match the protected device.

2.12 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG size as recommended by system manufacturer.

1. Circuit Integrity Cable: Twisted shielded pair. NFPA 70 Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Line-Voltage Circuits: No. 12 AWG, minimum.

D. All wire and cable shall be installed in conduit.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Smoke or Heat Detector Spacing:

1. Smooth ceiling spacing shall not exceed [30 feet (9 m)].
2. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.
3. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.

B. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.

C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of the duct.

D. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

E. Audible Alarm-Indicating Devices: Install between 80" and 96" above finished floor or on ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

F. Visible Alarm-Indicating Devices: Install integral to each alarm horn.

G. Device Location-Indicating Lights: Locate in public space near the device they monitor.

H. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

I. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

3.2 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.

B. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceways and Boxes."

1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:

1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, NFPA 70 Types MI and CI, is not permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables may be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Electrical Identification."

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.4 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to witness field tests and inspections and prepare test reports. Contact Green Fire Protection two weeks prior to test. The contractor shall provide all personnel for this test with Green Fire Protection to witness. There shall be two tests, one prior to the Fire Marshall test and one with the Fire Marshall.

C. Perform the following field tests and inspections and prepare test reports:

1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct witness of Green Fire Protection.
3. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
4. Testing: Follow procedure and record results complying with requirements in NFPA 72.
   a. Detectors that are outside their marked sensitivity range shall be replaced.
5. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NFPA 70.
6. Contact Green Fire Protection to inspect conduit rough in, wireless cable testing, and to visually inspect cable terminations prior to cover.

D. At no time shall the contractor make changes to the documents without written permission from the Engineer.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Division 1 Section "Closeout Procedures and Demonstration and Training."

END OF SECTION 13851

SECTION 16741 - TELECOM RACEWAY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes telecom raceway systems.

1.3 RELATED WORK

A. Section 16130 - Raceways and Boxes.

1.4 SYSTEM DESCRIPTION

A. Conduit, cable trays and boxes to form an empty raceway system.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Conduit: Refer to Section 16130.

B. Outlet, pull or junction boxes: Refer to Section 16130.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide pullboxes in telecom conduit runs spaced less than 100 feet apart, and on the backboard side of runs with more than two right angle bends.

B. Place telecom label on pull and junction boxes.

C. Provide pullwire in each telecom conduit run.

END OF SECTION 16741

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OVER 30 YEARS OF EXCELLENCE

project number: 16-658

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KURT EDWARD LECHTENBERG
9/21/16
STATE OF UTAH

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

ELECTRICAL SPECIFICATIONS

PROJECT #: 14-288.01
DRAWN BY: RM
CHECKED BY: JM

SHEET #
E005

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GENERAL NOTES:

A. CONTRACTOR SHALL COORDINATE WITH AN UNDERGROUND LOCATING SERVICE PRIOR TO COMMENCING WORK. COORDINATE WITH OTHER SITE DISCIPLINES.

B. ROUTE CONDUITS IN COMMON TRENCH WHERE POSSIBLE REFER TO TRENCHING DETAIL. RE:SITE TRENCHING DETAIL

C. SEE ARCHITECTURAL AND CIVIL DRAWINGS FOR ADDITIONAL INFORMATION.

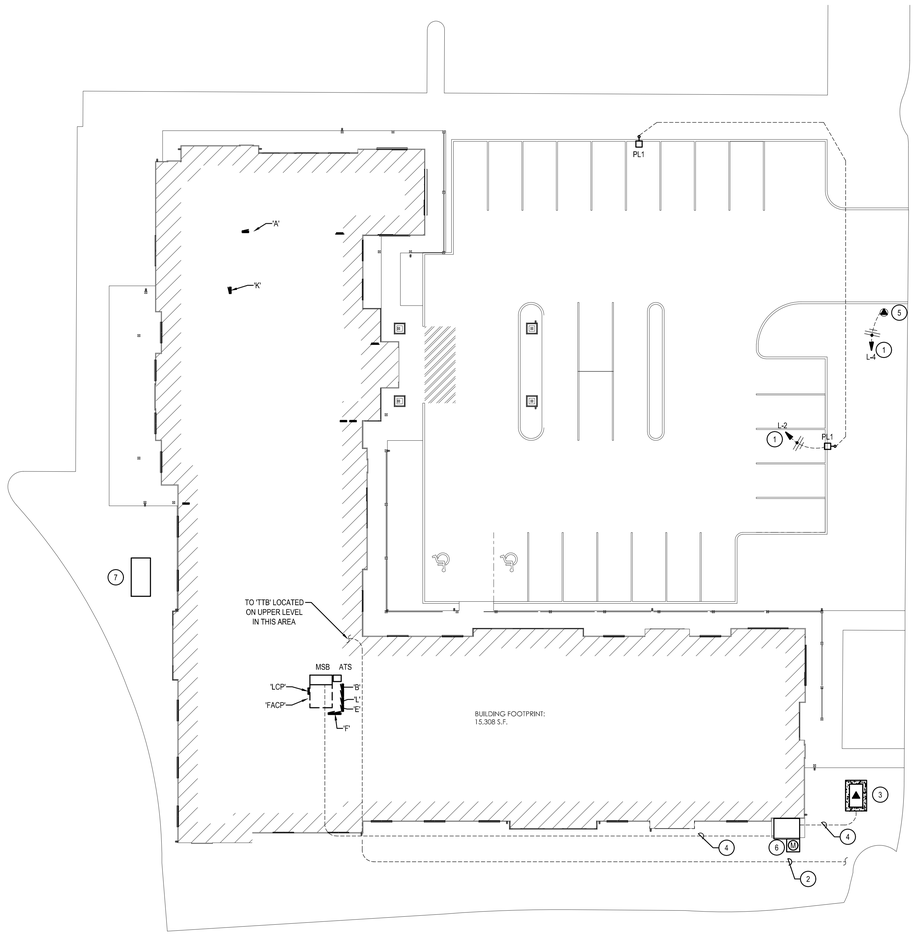
D. SITE LIGHTING AND UTILITY EQUIPMENT SHOWN IN APPROXIMATE LOCATION. COORDINATE EXACT LOCATION WITH CIVIL DRAWINGS, PROPERTY LINES AND UTILITY COMPANIES PRIOR TO ROUGH-IN.

E. PROVIDE PULL-LINE IN ALL EMPTY CONDUITS.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. ROUTE CIRCUIT THROUGH LIGHTING CONTROL PANEL. RE:LIGHTING CONTROL PANEL DETAIL.
2. (1)4" CONDUIT FOR PHONE SERVICE, (1)2" CONDUIT FOR CATV SERVICE AND (1)4" CONDUIT FOR FIBER OPTIC CABLE SERVICE. COORDINATE INSTALLATIONS REQUIREMENTS WITH UTILITIES. STUB CONDUITS 12" ABOVE FLOOR AT 'TTB' AND STUB CONDUITS TO NEAREST TELEPHONE UTILITY PEDESTAL. COORDINATE UTILITY LOCATION PRIOR TO ROUGH-IN. PROVIDE CONDUIT AS REQUIRED. MARK LOCATION WITH MONUMENT MARKER. PROVIDE PULL-LINE WITH EACH CONDUIT.
3. PAD MOUNTED TRANSFORMER AND PAD BY UTILITY.
4. UNDERGROUND SECONDARY. RE:ONE-LINE DIAGRAM.
5. CONNECTION FOR MONUMENT SIGN. VERIFY EXACT LOCATION AND CONNECTION REQUIREMENTS WITH SIGN SUPPLIER PRIOR TO ROUGH-IN.
6. CT METERING SWITCHBOARD AND METER. RE:ONE-LINE DIAGRAM.
7. APPROXIMATE LOCATION OF DIESEL GENERATOR. COORDINATE EXACT LOCATION WITH CIVIL AND ARCHITECT. RE:ONE-LINE DIAGRAM



1 **ELECTRICAL SITE PLAN**
SCALE: 1/16" = 1'-0"

6.27.2016 - PERMIT SET

CONSULTANT:

OWNER: **T.C. ENTERPRISE**

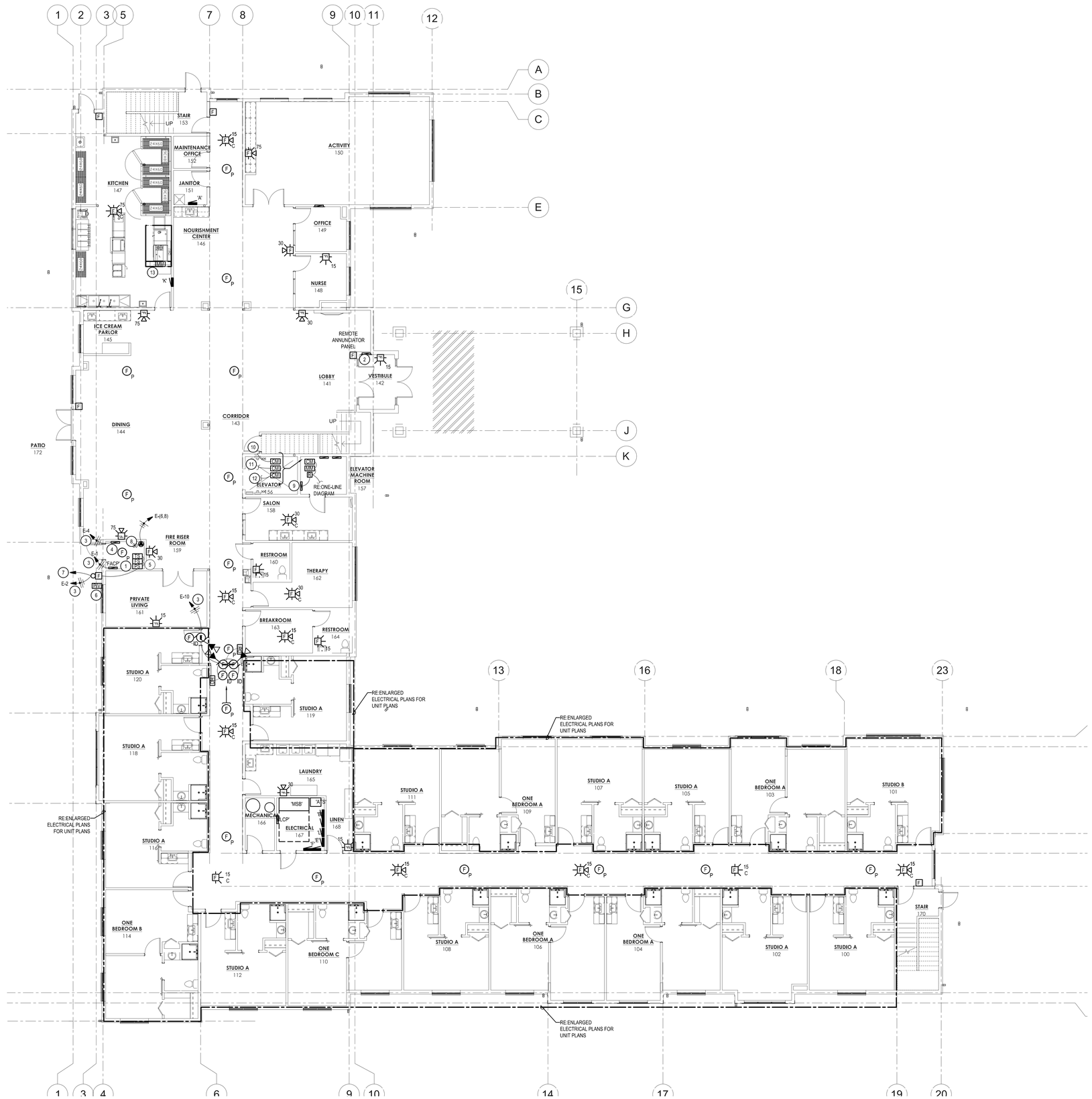
PROJECT: **PARDOE ASSISTED LIVING - MIDVALE**
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

ELECTRICAL SITE PLAN

PROJECT #: 16288.01
DRAWN BY: PW
CHECKED BY: JM

SHEET #
E100



1 MAIN LEVEL FIRE ALARM PLAN

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

GENERAL NOTES:

A. INSTALL PLENUM RATED FIRE ALARM CONDUCTORS FROM DEVICES INDICATED TO FIRE ALARM CONTROL PANEL OR NAC EXTENDER PANEL(S) AS REQUIRED. STUB 3/4" CONDUIT FROM DEVICE TO VOID ABOVE CEILING. PROVIDE NAC EXTENDER PANELS (QUANTITY AS REQUIRED) IN LOCATIONS INDICATED AND CIRCUITING AS REQUIRED FOR A COMPLETE INSTALLATION. CIRCUIT THE FIRE ALARM NOTIFICATION AND INITIATION DEVICES PER THE ELECTRICAL SPECIFICATIONS. FURNISH AND INSTALL ALL APPURTENANCES AND PROGRAMMING REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. REFER TO ELECTRICAL FIRE ALARM SPECIFICATIONS FOR SYSTEM REQUIREMENTS AND SUBMITTAL PROCEDURES.

B. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN NEW WALLS, EXISTING FURRED OUT WALLS AND EXISTING ACCESSIBLE CEILINGS USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. FIRE ALARM CONTROL PANEL.
2. FLUSH MOUNTED REMOTE ANNUNCIATOR PANEL.
3. PROVIDE RED HANDLED, LOCKABLE TYPE CIRCUIT BREAKER IN PANEL AT POSITION INDICATED.
4. NAC EXTENDER PANEL(S) AS REQUIRED.
5. COORDINATE QUANTITY OF TAMPER SWITCHES, FLOW SWITCHES AND PRESSURE SWITCHES WITH FIRE SPRINKLER CONTRACTOR. PROVIDE ALL REQUIRED MONITOR MODULES.
6. COORDINATE LOCATION OF PIV WITH SPRINKLER CONTRACTOR.
7. TO FIRE ALARM CONTROL PANEL.
8. CONNECTION FOR DRY SYSTEM COMPRESSOR. COORDINATE EXACT LOCATION AND POWER REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
9. PROVIDE AND INSTALL MONITOR MODULE AND CFONTROL MODULE FOR SHUNT TRIP POWER TO BREAKER. PROVIDE AND INSTALL ALL RELAYS AND OTHER HARDWARE REQUIRED. CONNECT TO FACP.
10. TO FACP FOR PRIMARY RECALL OF ELEVATORS. PROVIDE AND INSTALL ALL CONDUIT, CONDUCTORS, CARDS, RELAYS, AND ANY OTHER HARDWARE AND PROGRAMMING REQUIRED.
11. TO FACP FOR SECONDARY RECALL OF ELEVATORS. PROVIDE AND INSTALL ALL CONDUIT, CONDUCTORS, CARDS, RELAYS, AND ANY OTHER HARDWARE AND PROGRAMMING REQUIRED.
12. TO FACP FOR FIRE HAT SIGNAL. PROVIDE AND INSTALL ALL CONDUIT, CONDUCTORS, CARDS, RELAYS, AND ANY OTHER HARDWARE AND PROGRAMMING REQUIRED.
13. MONITOR MODULE FOR KITCHEN HOOD 'HCP'.

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project number: 16-058

THE RICHARDSON DESIGN PARTNERSHIP, L.L.C.
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LICENSED PROFESSIONAL ENGINEER
No. 5189384-2202
KURT EDWARD LECHTENBERG
9/21/16
STATE OF UTAH

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

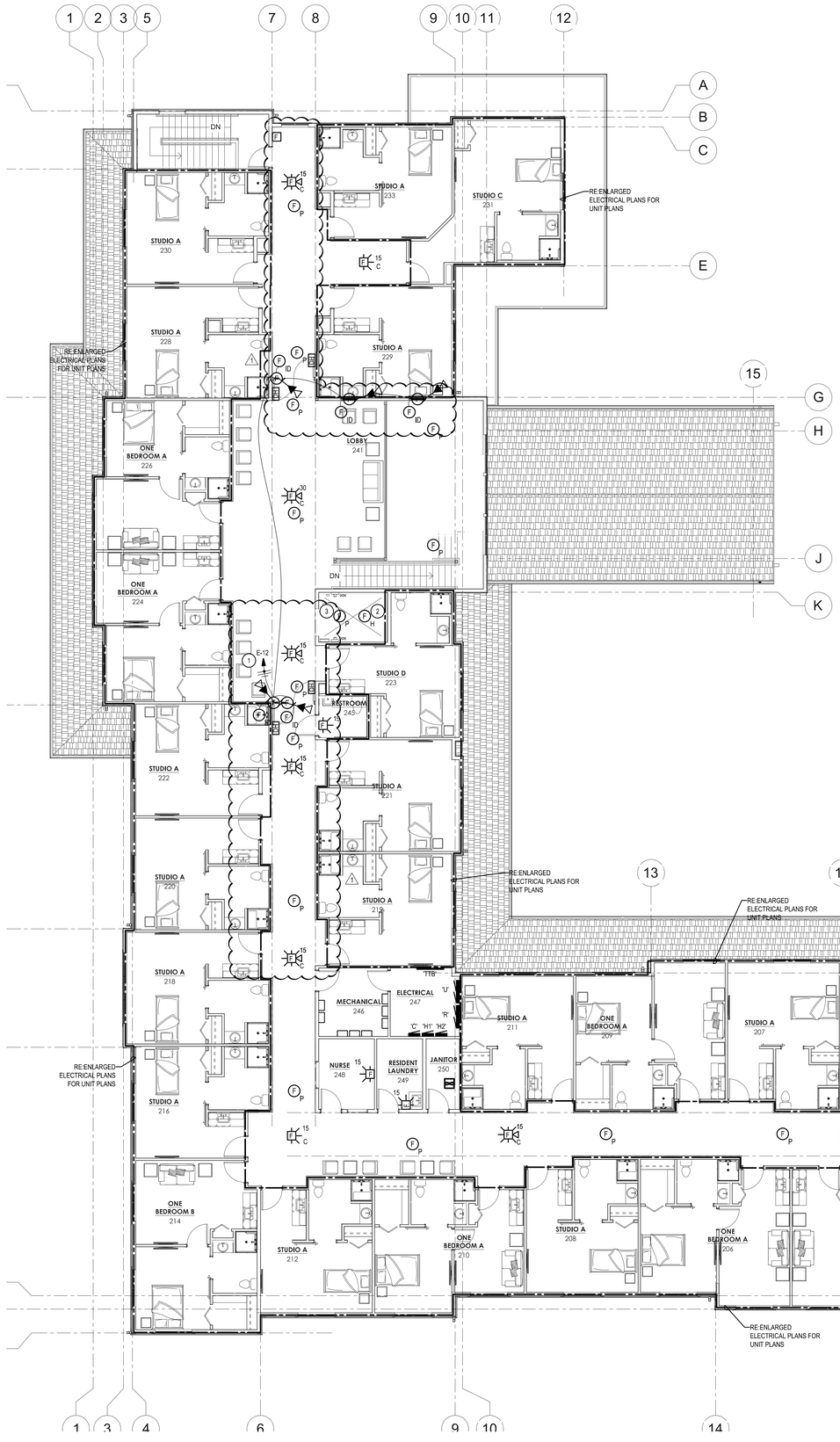
DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

MAIN LEVEL FIRE ALARM PLAN

PROJECT #: 14-268.01
DRAWN BY: JM
CHECKED BY: JM

SHEET #
E101



1 UPPER LEVEL FIRE ALARM PLAN

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

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GENERAL NOTES:

A. INSTALL PLENUM RATED FIRE ALARM CONDUCTORS FROM DEVICES INDICATED TO FIRE ALARM CONTROL PANEL OR NAC EXTENDER PANEL(S) AS REQUIRED. STUB 3/4" CONDUIT FROM DEVICE TO VOID ABOVE CEILING. PROVIDE NAC EXTENDER PANELS (QUANTITY AS REQUIRED) IN LOCATIONS INDICATED AND CIRCUITING AS REQUIRED FOR A COMPLETE INSTALLATION. CIRCUIT THE FIRE ALARM NOTIFICATION AND INITIATION DEVICES PER THE ELECTRICAL SPECIFICATIONS. FURNISH AND INSTALL ALL APPURTENANCES AND PROGRAMMING REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. REFER TO ELECTRICAL FIRE ALARM SPECIFICATIONS FOR SYSTEM REQUIREMENTS AND SUBMITTAL PROCEDURES.

B. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN NEW WALLS, EXISTING FURRED OUT WALLS AND EXISTING ACCESSIBLE CEILINGS USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. PROVIDE RED HANDLED, LOCKABLE TYPE CIRCUIT BREAKER IN PANEL AT POSITION INDICATED.
2. MOUNT HEAT DETECTOR WITHIN 18" OF SPRINKLER HEAD AT THE TOP OF THE SHAFT.
3. SMOKE DETECTOR MOUNTED AT THE TOP OF THE SHAFT.

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
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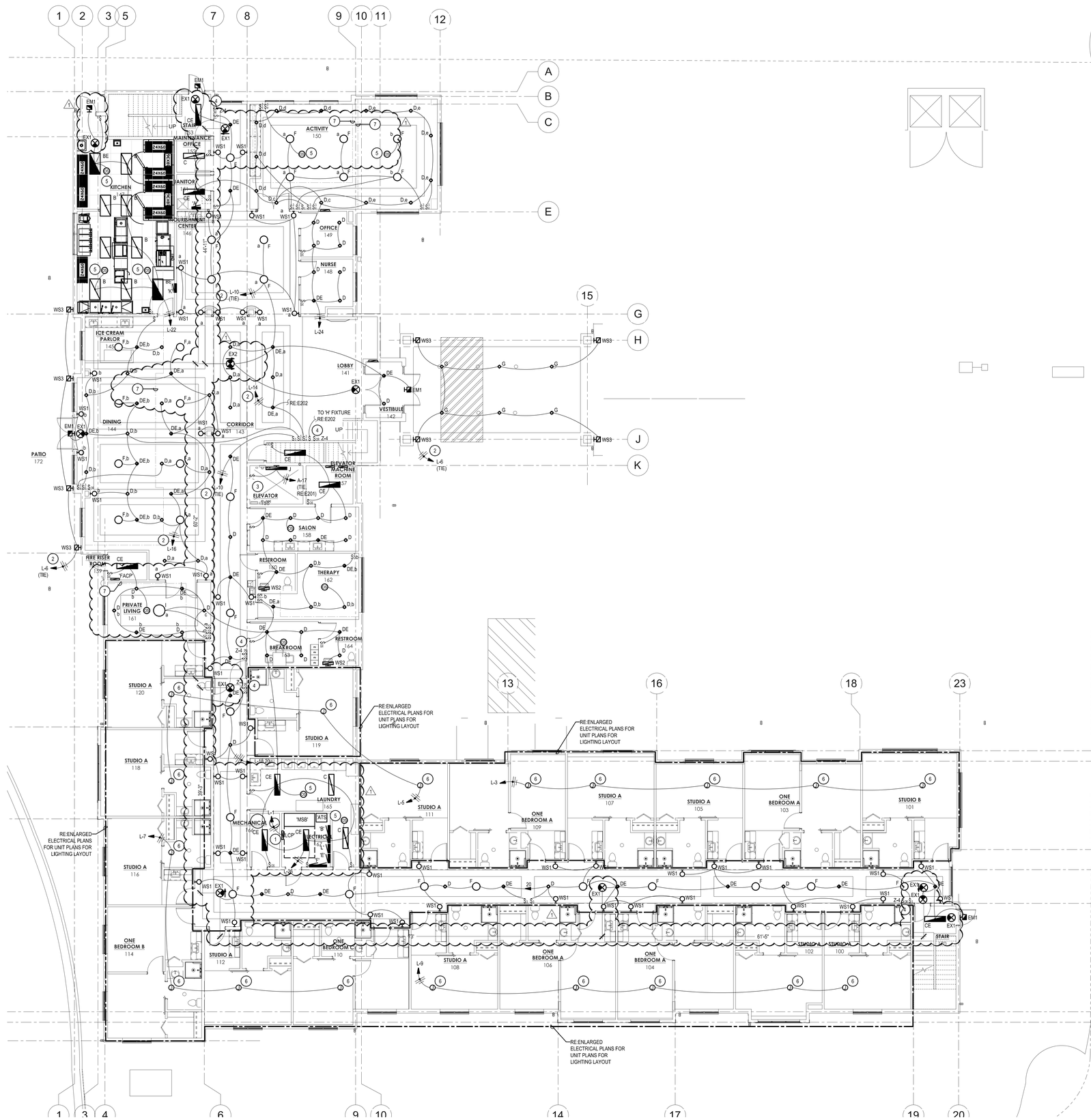
DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

UPPER LEVEL FIRE ALARM PLAN

PROJECT #: 14-288.01
DRAWN BY: ZN
CHECKED BY: TM

SHEET #
E102



1 MAIN LEVEL LIGHTING PLAN

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

GENERAL NOTES:

A. THESE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE: THEREFORE THE DIVISION 16 CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISIONS PRIOR TO ROUGHIN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE CONTRACTOR.

B. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN NEW WALLS. EXISTING FURRED OUT WALLS AND EXISTING ACCESSIBLE CEILINGS USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. LIGHTING CONTROL PANEL. RE:LIGHTING CONTROL ZONE DETAIL.
2. ROUTE CIRCUIT THROUGH LIGHTING CONTROL PANEL. RE:LIGHTING CONTROL ZONE DETAIL.
3. MOUNT FIXTURE AND ASSOCIATED SWITCH ABOVE THE LOWEST LEVEL OF ENTRY INTO THE ELEVATOR PIT.
4. PROVIDE MOMENTARY LOW-VOLTAGE OVERRIDE SWITCH WITH CABLING BACK TO LIGHTING CONTROL PANEL AS REQUIRED. SWITCH SHALL BE LABELED 'OVERRIDE' AND PROVIDE 2 HOURS OF OPERATION FOR THE LIGHTING DURING NON-BUSINESS HOURS.
5. CONNECT SUCH THAT EITHER OCCUPANCY SENSOR WILL CONTROL THE LIGHTING IN THIS ROOM.
6. JUNCTION BOX REPRESENTS THE LIGHTING LOAD FOR THE UNIT. REFER TO ENLARGED PLANS FOR LIGHTING LAYOUT.
7. DAYLIGHT ZONE.

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CONSULTANT:

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PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

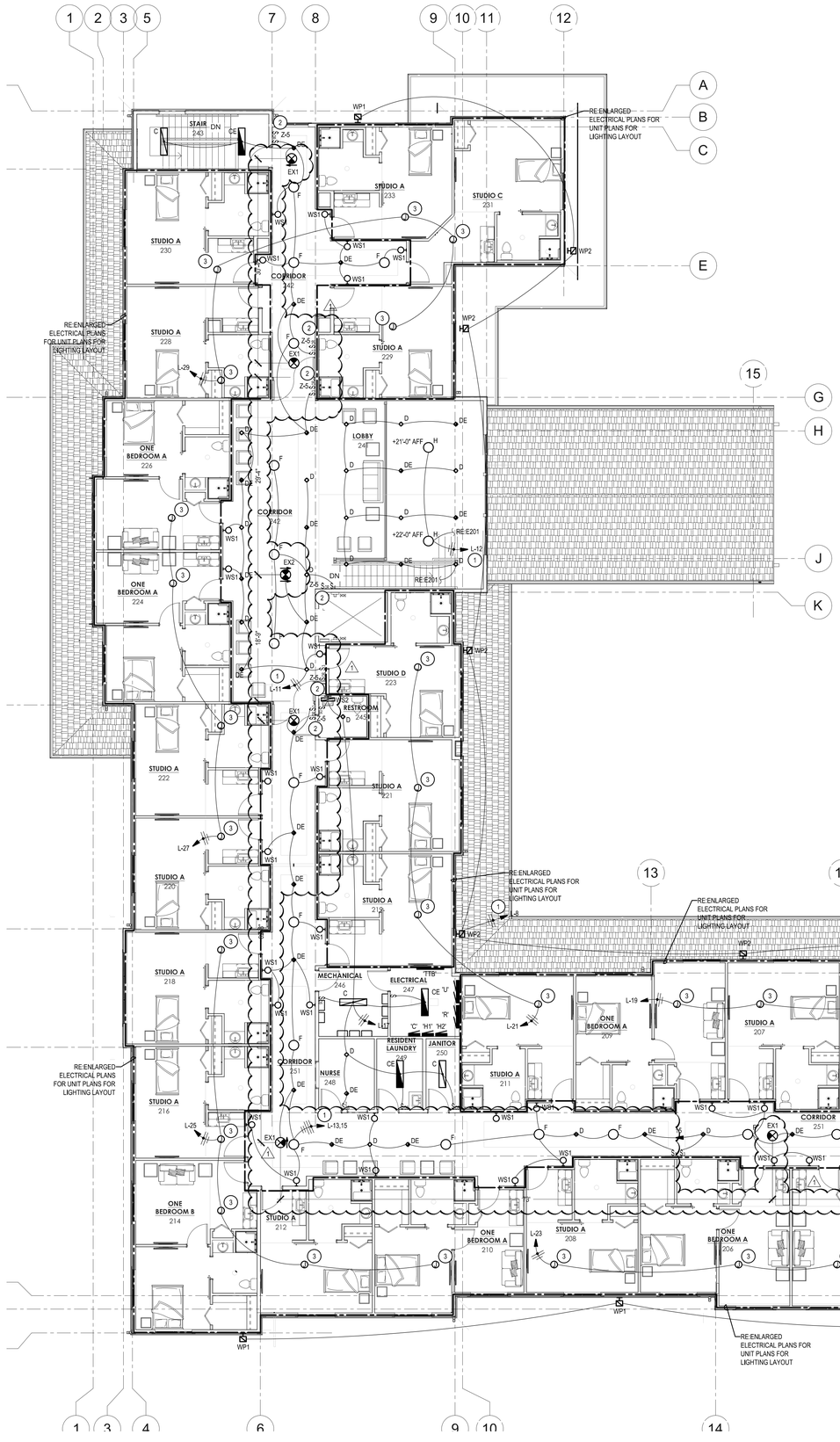
DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

MAIN LEVEL LIGHTING PLAN

PROJECT #: 16-288.01
DRAWN BY: TM
CHECKED BY: JM

SHEET #
E201



1 UPPER LEVEL LIGHTING PLAN

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

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GENERAL NOTES:

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B. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN NEW WALLS. EXISTING FURRED OUT WALLS AND EXISTING ACCESSIBLE CEILINGS USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. ROUTE CIRCUIT THROUGH LIGHTING CONTROL PANEL. RE:LIGHTING CONTROL ZONE DETAIL.
2. PROVIDE MOMENTARY LOW-VOLTAGE OVERRIDE SWITCH WITH CABLING BACK TO LIGHTING CONTROL PANEL AS REQUIRED. SWITCH SHALL BE LABELED 'OVERRIDE' AND PROVIDE 2 HOURS OF OPERATION FOR THE LIGHTING DURING NON-BUSINESS HOURS.
3. JUNCTION BOX REPRESENTS THE LIGHTING LOAD FOR THE UNIT. REFER TO ENLARGED PLANS FOR LIGHTING LAYOUT.

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9/21/16
STATE OF UTAH

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

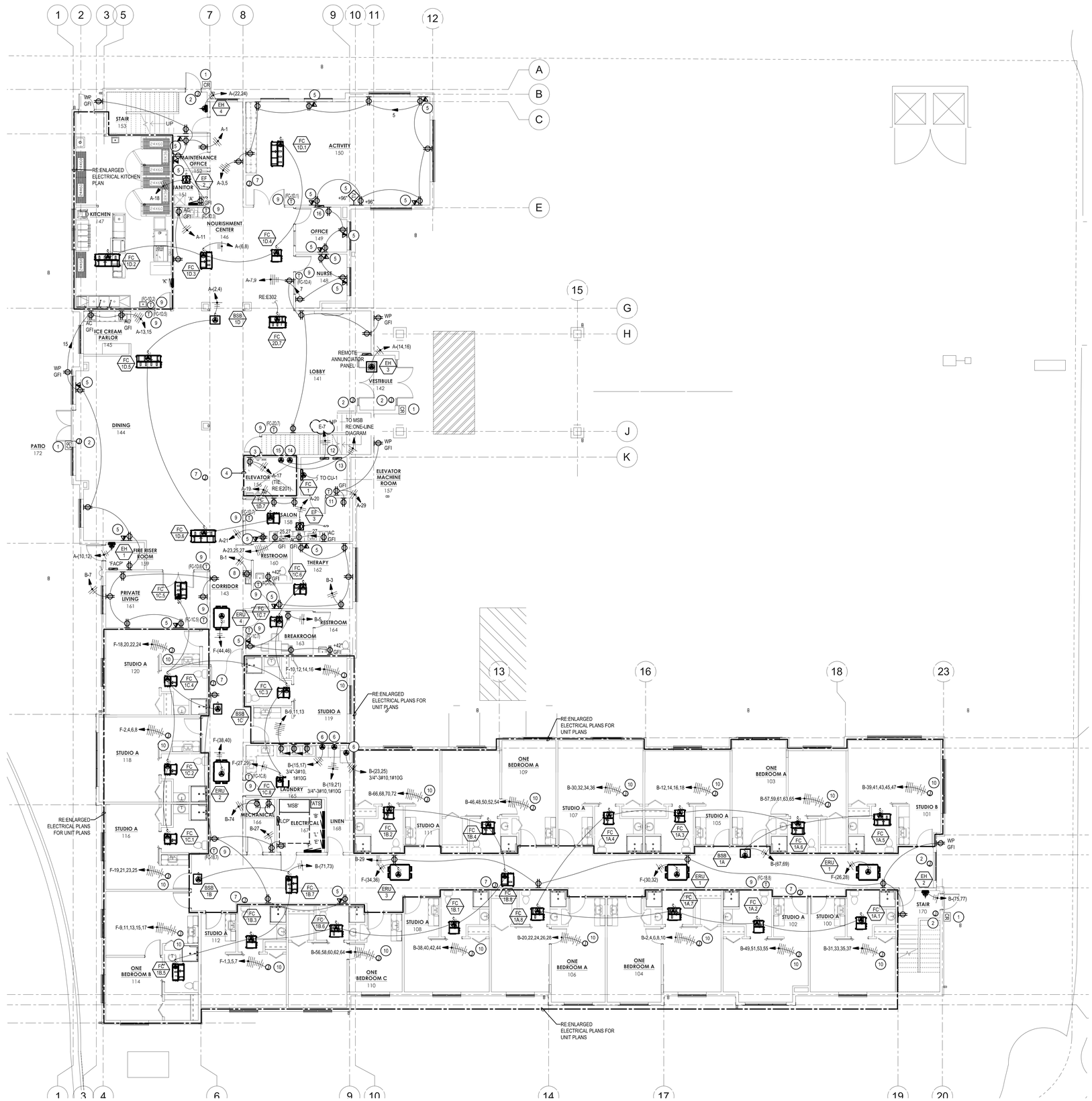
DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

UPPER LEVEL LIGHTING PLAN

PROJECT #: 14-288.01
DRAWN BY: ZN
CHECKED BY: TM

SHEET #
E202



1 MAIN LEVEL MECHANICAL POWER/POWER/SPECIAL SYSTEMS PLAN

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

GENERAL NOTES:

A. REFER TO ARCHITECTURAL ELEVATIONS FOR OUTLET HEIGHTS WHERE THE SPECIFIC OUTLET HEIGHT IS NOT INDICATED ON THIS SHEET. REFER TO THE ELECTRICAL LEGEND FOR THE DEFAULT OUTLET HEIGHT WHEN NOT INDICATED ON ELEVATIONS OR ON THIS SHEET.

B. THESE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE: THEREFORE THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISION PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE CONTRACTOR.

C. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN NEW WALLS. EXISTING FURRED OUT WALLS AND EXISTING ACCESSIBLE CEILINGS USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.

D. INSTALL PULL-LINE IN ALL EMPTY CONDUITS FOR FUTURE CABLE PULL.

E. TERMINATE ALL CONDUITS WITH INSULATED THROAT BUSHING.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. JUNCTION BOX FOR OWNER PROVIDED CARD READER. STUB 3/4" CONDUIT TO TTB. TERMINATE WITH INSULATED THROAT BUSHING.
2. STUB 3/4" CONDUIT FROM DOOR FRAME TO TTB. TERMINATE WITH INSULATED THROAT BUSHING.
3. RECEPTACLE TO BE MOUNTED ABOVE THE LOWEST LEVEL OF ENTRY INTO THE ELEVATOR PIT.
4. ALL CONDUIT, JUNCTION BOXES AND DEVICES TO BE MOUNTED +50" ABOVE PIT FLOOR. ANY CONDUIT, JUNCTION BOXES AND DEVICES MOUNTED BELOW +48" SHALL BE NEMA 4 RATED.
5. STUB 3/4" CONDUIT ABOVE ACCESSIBLE CEILING. TERMINATE WITH INSULATED THROAT BUSHING.
6. CONNECTION FOR DRYER. COORDINATE EXACT LOCATION AND POWER REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
7. JUNCTION BOX FOR WIRELESS ACCESS POINT, ROUTE 3/4" CONDUIT TO TTB. COORDINATE EXACT LOCATION WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
8. RECEPTACLE FOR DRINKING FOUNTAIN. PROVIDE GFCI BREAKER IN PANEL AT POSITION INDICATED.
9. 1/2" CONDUIT TO CORRESPONDING MECHANICAL UNIT. BOX, CONDUIT, AND CONDUCTORS TO BE PROVIDED BY ELECTRICAL CONTRACTOR. LEAVE 12" SLACK AT BOX AND MECHANICAL UNIT. MECHANICAL CONTRACTOR TO MAKE FINAL CONNECTIONS. COORDINATE BOX SIZE AND QUANTITY OF CONDUCTOR(S) WITH MECHANICAL CONTRACTOR. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
10. JUNCTION BOX REPRESENTS THE ELECTRICAL CIRCUITS FOR THE UNIT. REFER TO ENLARGED PLANS FOR ELECTRICAL LAYOUT.
11. LINE VOLTAGE HEAT RISE T-STAT. 1/2" CONDUIT TO ASSOCIATED MECHANICAL UNIT. BOX, CONDUIT, AND CONDUCTORS TO BE PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR. COORDINATE WITH MECHANICAL CONTRACTOR.
12. 20 AMP BREAKER IN LOCKABLE NEMA ENCLOSURE FOR ELEVATOR LIGHTS AND CONVENIENCE RECEPTACLES.
13. ELEVATOR BUSSMAN CONTROL MODULE. RE:ONE-LINE DIAGRAM.
14. CONNECTION FOR ELEVATOR LIGHTS AND RECEPTACLES. COORDINATE REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
15. CONNECTION FOR ELEVATOR CONTROLLER. COORDINATE REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
16. REMOTE GENERATOR ANNUNCIATOR.

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CONSULTANT:

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6968 SOUTH 700 WEST
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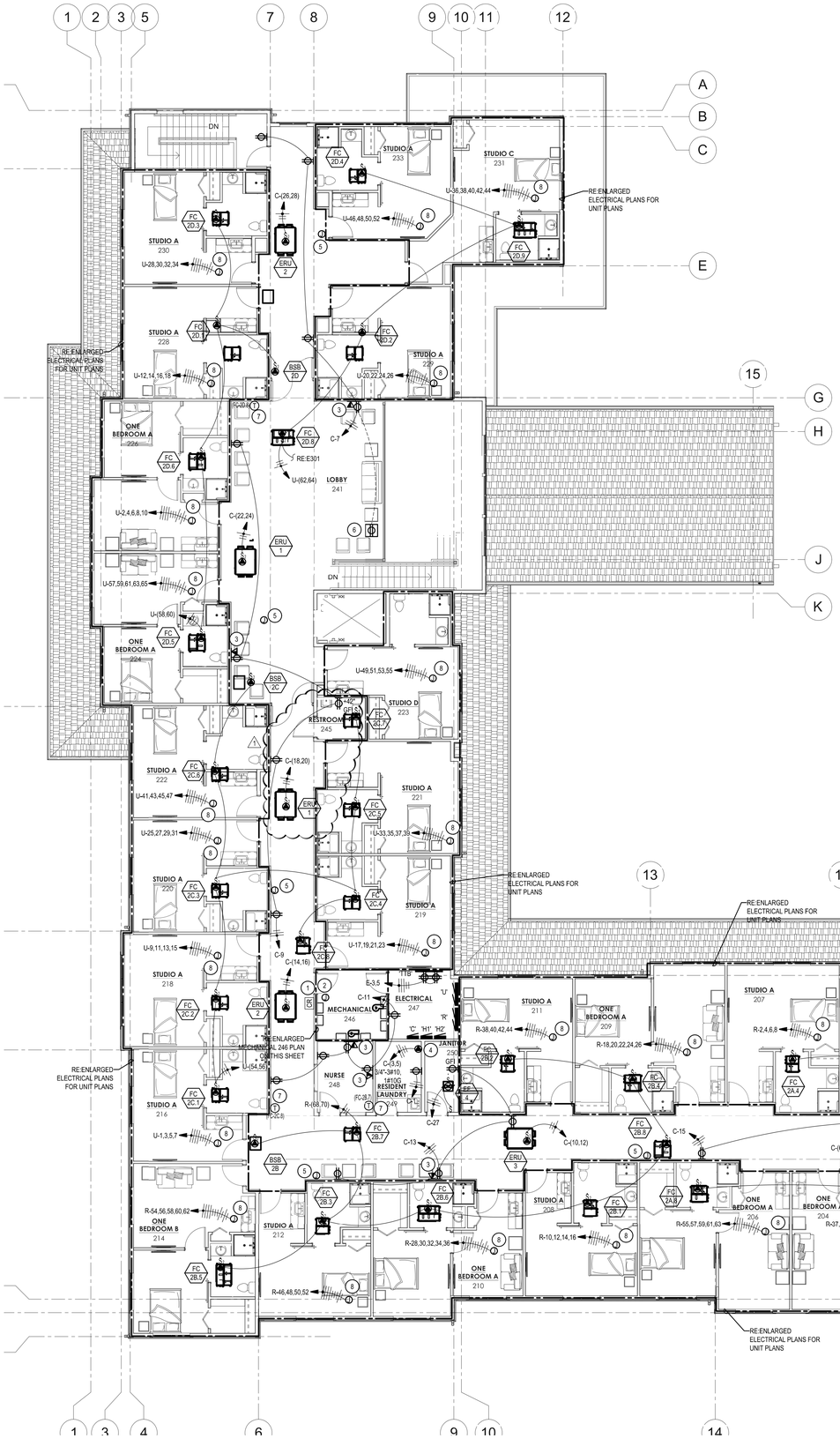
DATE	DESCRIPTION
6/27/16	PERMIT SET
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6.27.2016 - PERMIT SET

MAIN LEVEL MECH/ POWER/ SPECIAL SYSTEMS PLAN

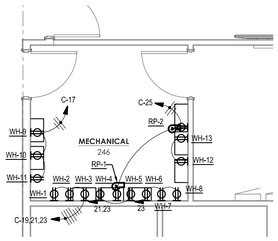
PROJECT #: 14-268.01
DRAWN BY: JM
CHECKED BY: JM

SHEET #
E301



1 UPPER LEVEL MECHANICAL POWER/POWER/SPECIAL SYSTEMS PLAN

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



1 ENLARGED MECHANICAL 246 ELECTRICAL PLAN

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

GENERAL NOTES:

A. REFER TO ARCHITECTURAL ELEVATIONS FOR OUTLET HEIGHTS WHERE THE SPECIFIC OUTLET HEIGHT IS NOT INDICATED ON THIS SHEET. REFER TO THE ELECTRICAL LEGEND FOR THE DEFAULT OUTLET HEIGHT WHEN NOT INDICATED ON ELEVATIONS OR ON THIS SHEET.

B. THESE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE: THEREFORE THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISION PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE CONTRACTOR.

C. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN NEW WALLS. EXISTING FURRED OUT WALLS AND EXISTING ACCESSIBLE CEILINGS USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.

D. INSTALL PULL-LINE IN ALL EMPTY CONDUITS FOR FUTURE CABLE PULL.

E. TERMINATE ALL CONDUITS WITH INSULATED THROAT BUSHING.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. JUNCTION BOX FOR OWNER PROVIDED CARD READER. STUB 3/4" CONDUIT TO TTB. TERMINATE WITH INSULATED THROAT BUSHING.
2. STUB 3/4" CONDUIT FROM DOOR FRAME TO TTB. TERMINATE WITH INSULATED THROAT BUSHING.
3. STUB 3/4" CONDUIT TO TTB. TERMINATE WITH INSULATED THROAT BUSHING.
4. CONNECTION FOR DRYER. COORDINATE EXACT LOCATION AND POWER REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
5. JUNCTION BOX FOR WIRELESS ACCESS POINT LOCATED ABOVE ACCESSIBLE CEILING. COORDINATE EXACT LOCATION WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
6. MULTI-SERVICE FLOOR BOX. UTILIZE HUBBLE B SERIES OR EQUAL WITH BRASS DEVICE PLATES AND ALL REQUIRED DEVICES FOR A COMPLETE INSTALLATION.
7. 1/2" CONDUIT TO CORRESPONDING MECHANICAL UNIT. BOX, CONDUIT, AND CONDUCTORS TO BE PROVIDED BY ELECTRICAL CONTRACTOR. LEAVE 12" SLACK AT BOX AND MECHANICAL UNIT. MECHANICAL CONTRACTOR TO MAKE FINAL CONNECTIONS. COORDINATE BOX SIZE AND QUANTITY OF CONDUCTOR(S) WITH MECHANICAL CONTRACTOR. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
8. JUNCTION BOX REPRESENTS THE ELECTRICAL CIRCUITS FOR THE UNIT. REFER TO ENLARGED PLANS FOR ELECTRICAL LAYOUT.

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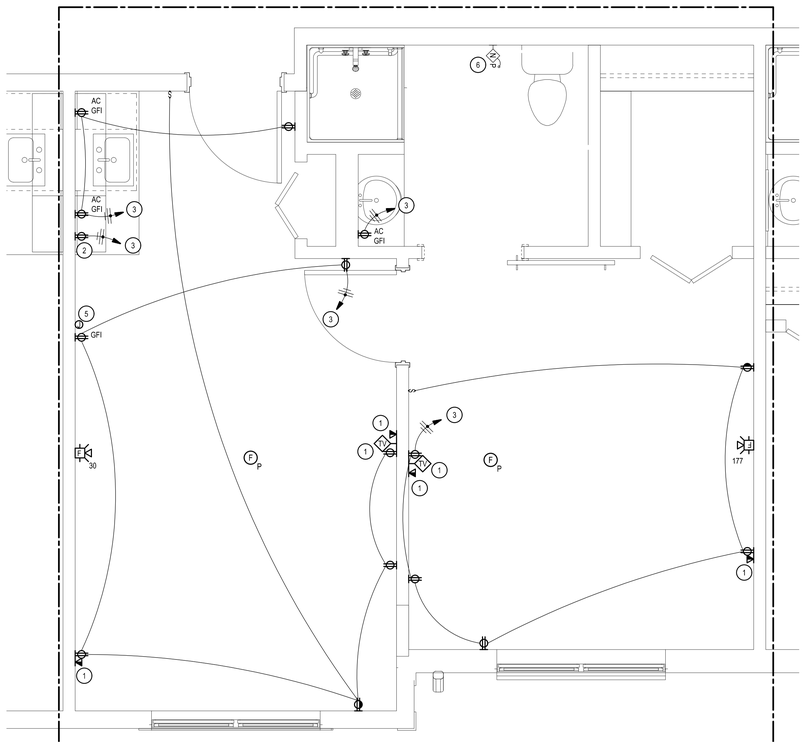
DATE	DESCRIPTION
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6.27.2016 - PERMIT SET

UPPER LEVEL MECH/ POWER/ SPECIAL SYSTEMS PLAN

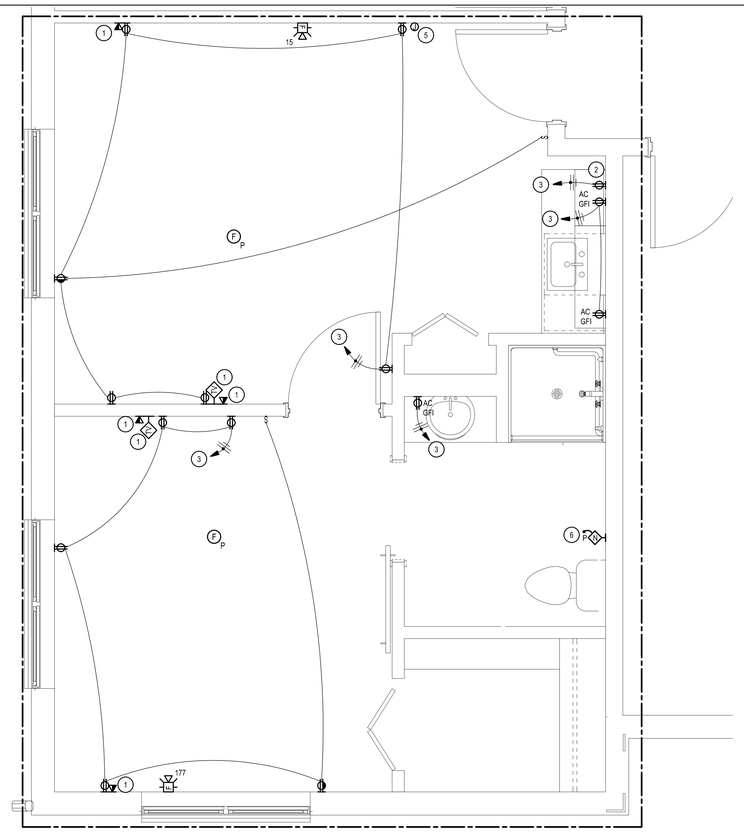
PROJECT #: 1-268.01
DRAWN BY: ZAL
CHECKED BY: TM

SHEET #
E302



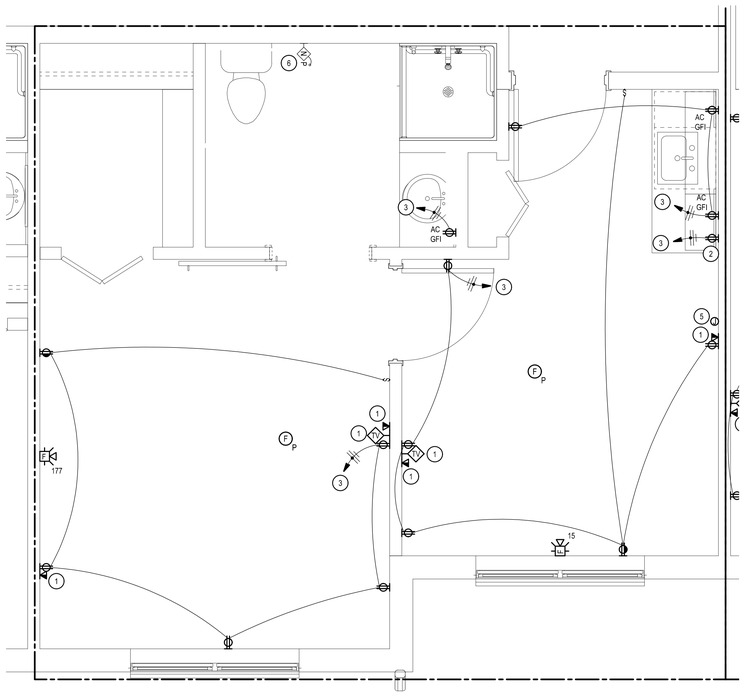
1 ENLARGED ONE BEDROOM A - ELECTRICAL PLAN

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



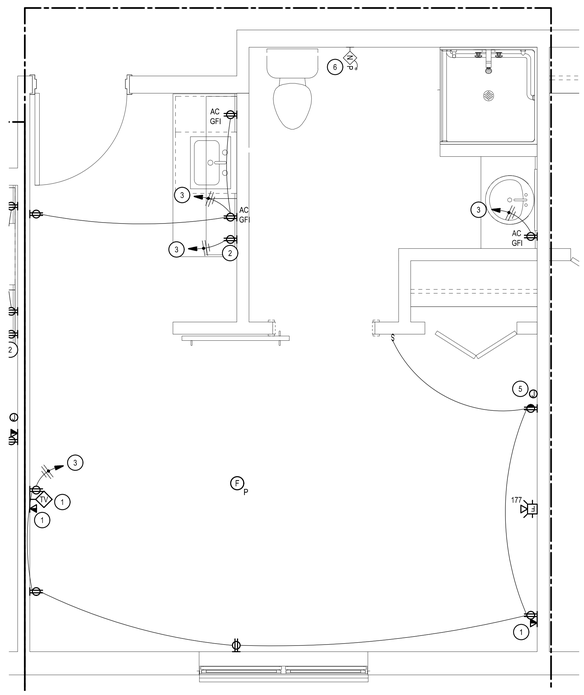
2 ENLARGED ONE BEDROOM B - ELECTRICAL PLAN

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



3 ENLARGED ONE BEDROOM C - ELECTRICAL PLAN

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



4 ENLARGED STUDIO A - ELECTRICAL PLAN

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

GENERAL NOTES:

A. REFER TO ARCHITECTURAL ELEVATIONS FOR OUTLET HEIGHTS WHERE THE SPECIFIC OUTLET HEIGHT IS NOT INDICATED ON THIS SHEET. REFER TO THE ELECTRICAL LEGEND FOR THE DEFAULT OUTLET HEIGHT WHEN NOT INDICATED ON ELEVATIONS OR ON THIS SHEET.

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D. INSTALL PULL-LINE IN ALL EMPTY CONDUITS FOR FUTURE CABLE PULL.

E. TERMINATE ALL CONDUITS WITH INSULATED THROAT BUSHING.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. STUB 3/4" CONDUIT TO TTB. TERMINATE WITH INSULATED THROAT BUSHING.
2. RECEPTACLE FOR UNDER COUNTER REFRIGERATOR. PROVIDE GFCI BREAKER IN PANEL AT POSITION INDICATED.
3. REFER TO OVERALL PLANS FOR PANEL NAME AND CIRCUIT NUMBER FOR EACH INDIVIDUAL UNIT.
4. NOT USED.
5. PROVIDE A WIRELESS VOICE RESPONSE COMMUNICATOR AT THIS LOCATION AND CONNECT TO ADJACENT POWER AND TELEPHONE OUTLETS.
6. PROVIDE A WIRELESS BATHROOM PULL CORD STATION.

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OVER 30 YEARS OF EXCELLENCE
project number: 16-058

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LICENSED PROFESSIONAL ENGINEER
No. 5189384-2202
KURT EDWARD LECHTENBERG
9/21/16
STATE OF UTAH

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

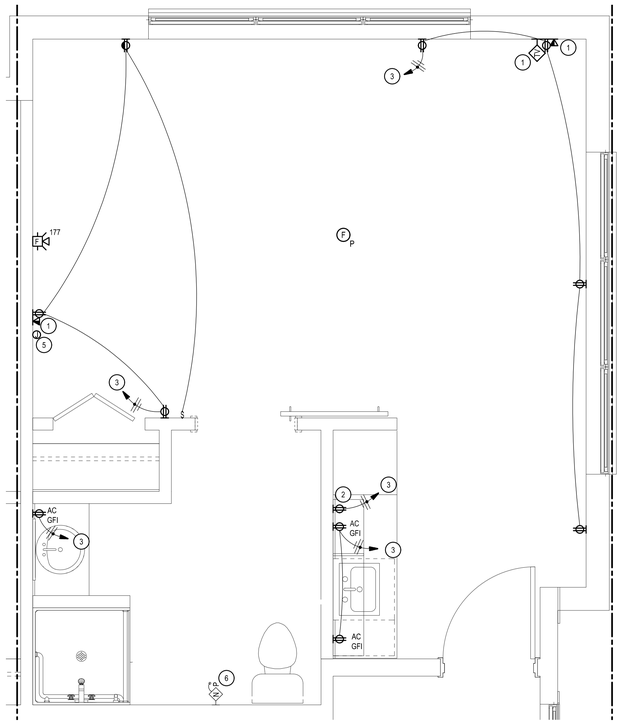
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6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

ENLARGED ELECTRICAL UNIT PLANS

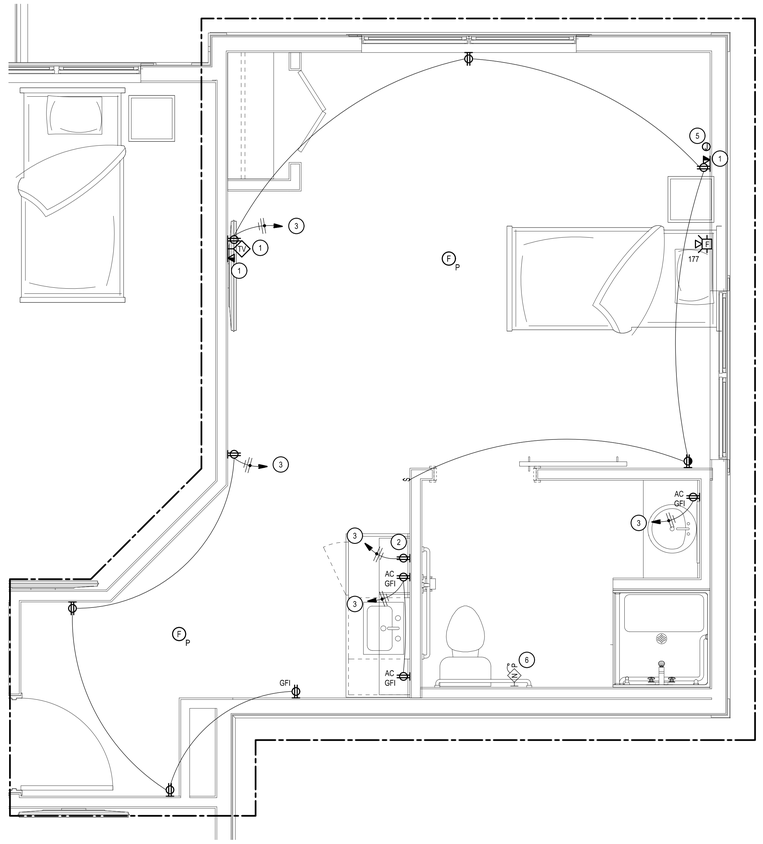
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DRAWN BY: JBA
CHECKED BY: JM

SHEET #
E400



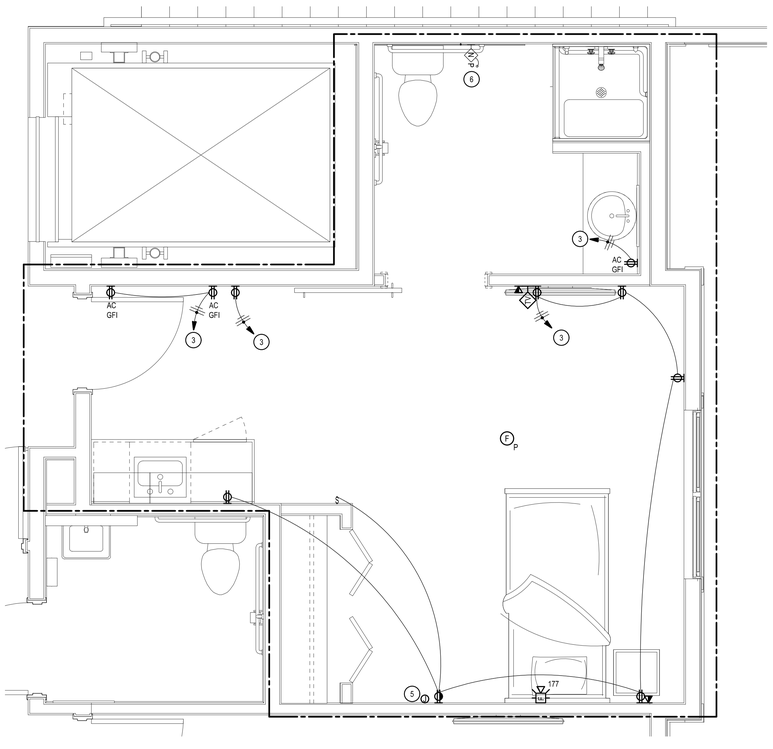
1 ENLARGED STUDIO B - ELECTRICAL PLAN

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



2 ENLARGED STUDIO C - ELECTRICAL PLAN

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



3 ENLARGED STUDIO D - ELECTRICAL PLAN

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

GENERAL NOTES:

A. REFER TO ARCHITECTURAL ELEVATIONS FOR OUTLET HEIGHTS WHERE THE SPECIFIC OUTLET HEIGHT IS NOT INDICATED ON THIS SHEET. REFER TO THE ELECTRICAL LEGEND FOR THE DEFAULT OUTLET HEIGHT WHEN NOT INDICATED ON ELEVATIONS OR ON THIS SHEET.

B. THESE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE: THEREFORE THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISION PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE CONTRACTOR.

C. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN NEW WALLS. EXISTING FURRED OUT WALLS AND EXISTING ACCESSIBLE CEILINGS USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.

D. INSTALL PULL-LINE IN ALL EMPTY CONDUITS FOR FUTURE CABLE PULL.

E. TERMINATE ALL CONDUITS WITH INSULATED THROAT BUSHING.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

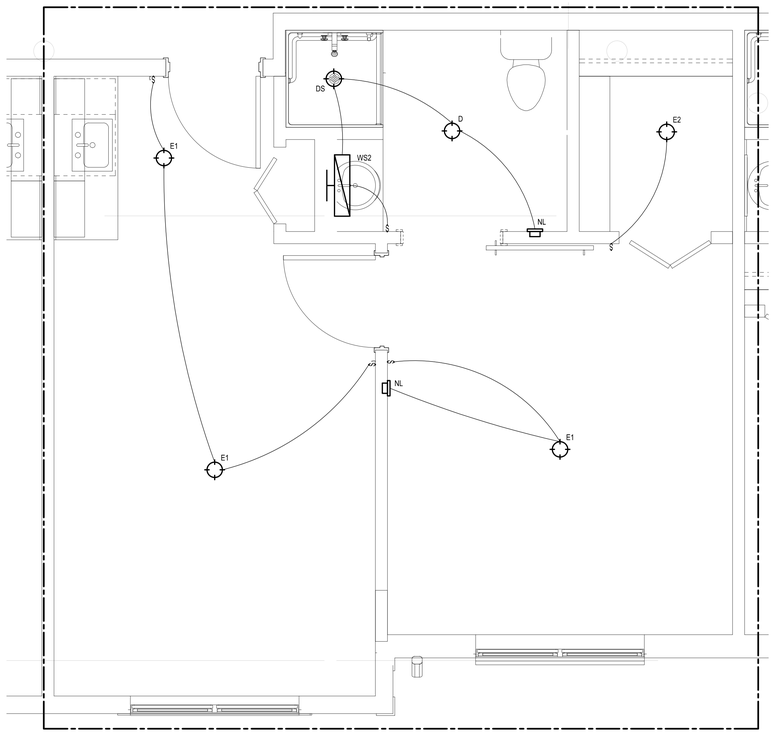
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9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

ENLARGED ELECTRICAL UNIT PLANS

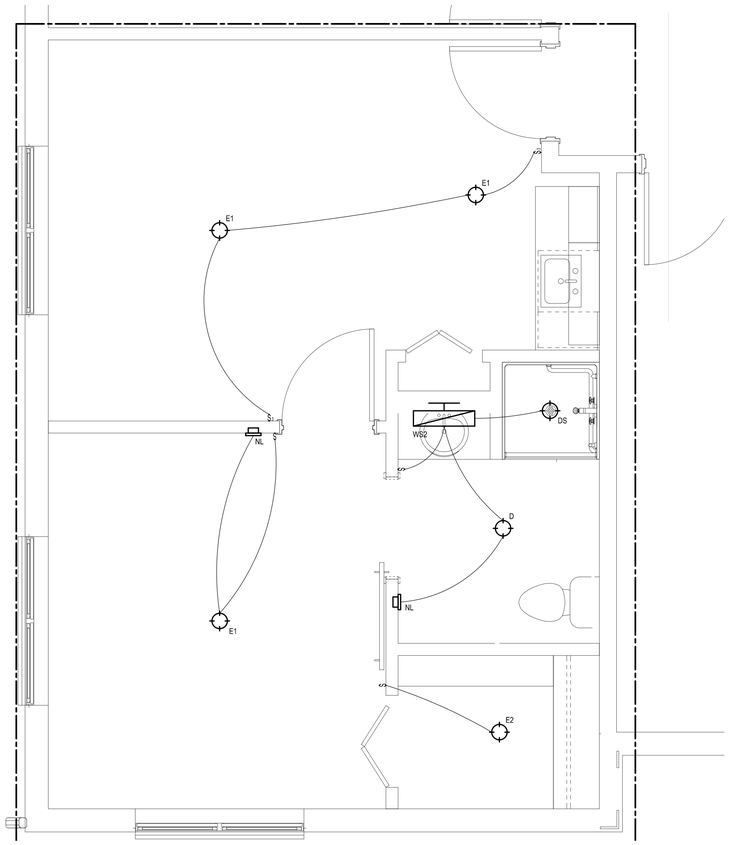
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DRAWN BY: RM
CHECKED BY: TM

SHEET #
E401



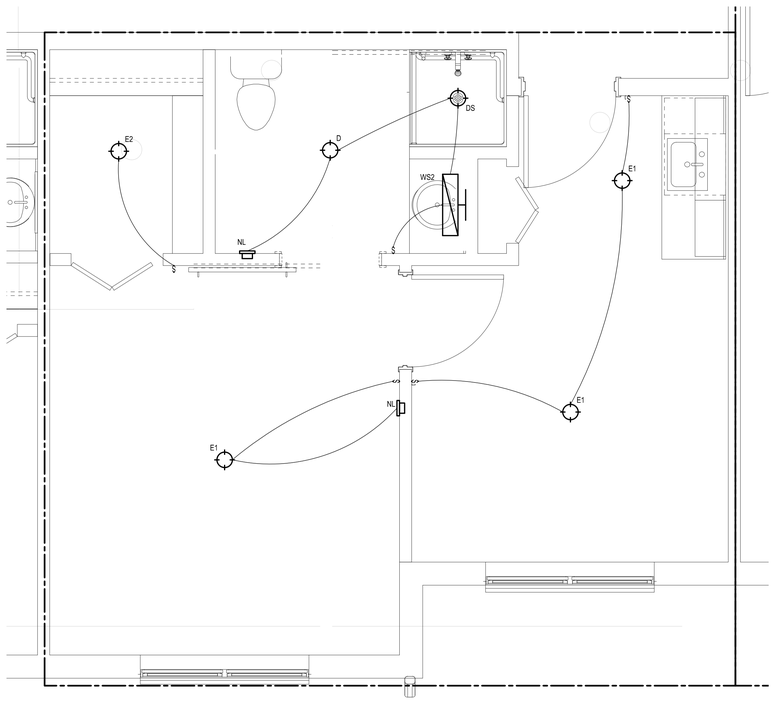
1 ENLARGED ONE BEDROOM A - LIGHTING PLAN

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



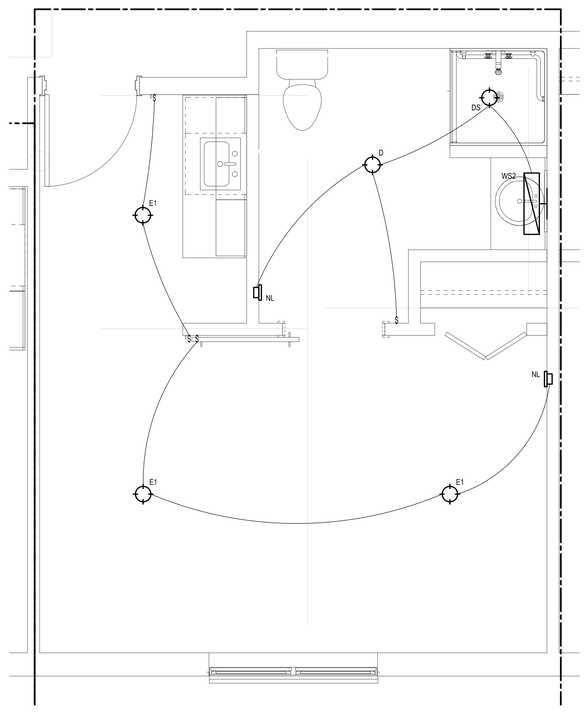
2 ENLARGED ONE BEDROOM B - LIGHTING PLAN

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



3 ENLARGED ONE BEDROOM C - LIGHTING PLAN

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



4 ENLARGED STUDIO A - LIGHTING PLAN

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

GENERAL NOTES:

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KEYED NOTES:

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9/21/16
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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

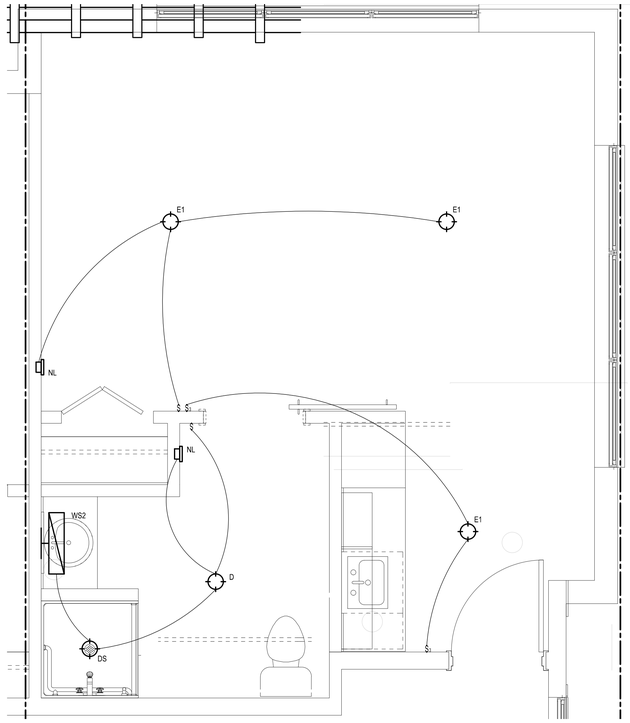
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ENLARGED ELECTRICAL UNIT PLANS

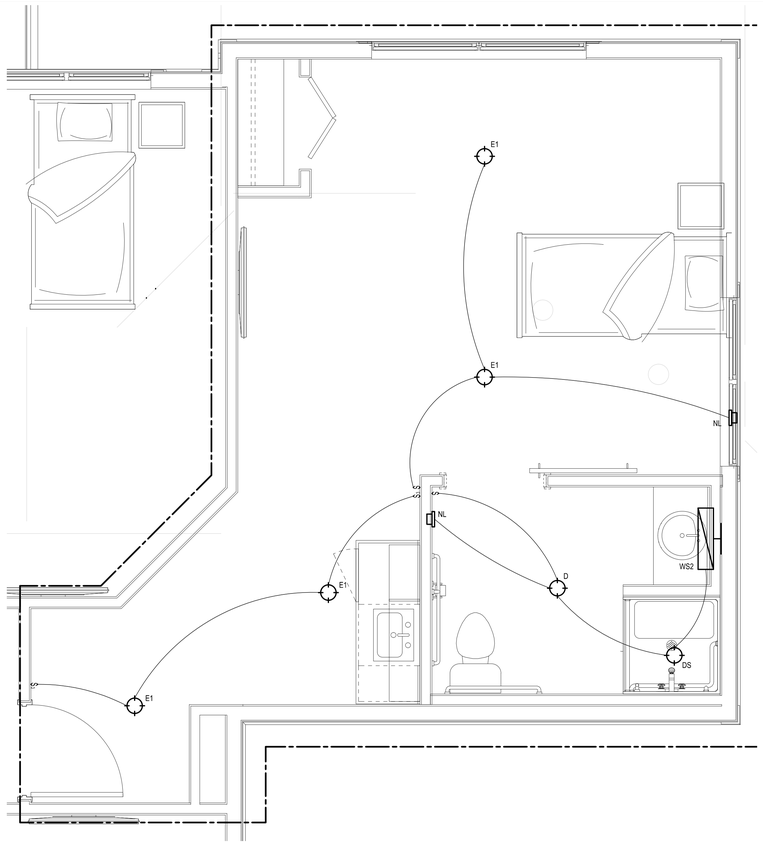
PROJECT #: 14-288.01
DRAWN BY: ZM
CHECKED BY: JM

SHEET #
E402



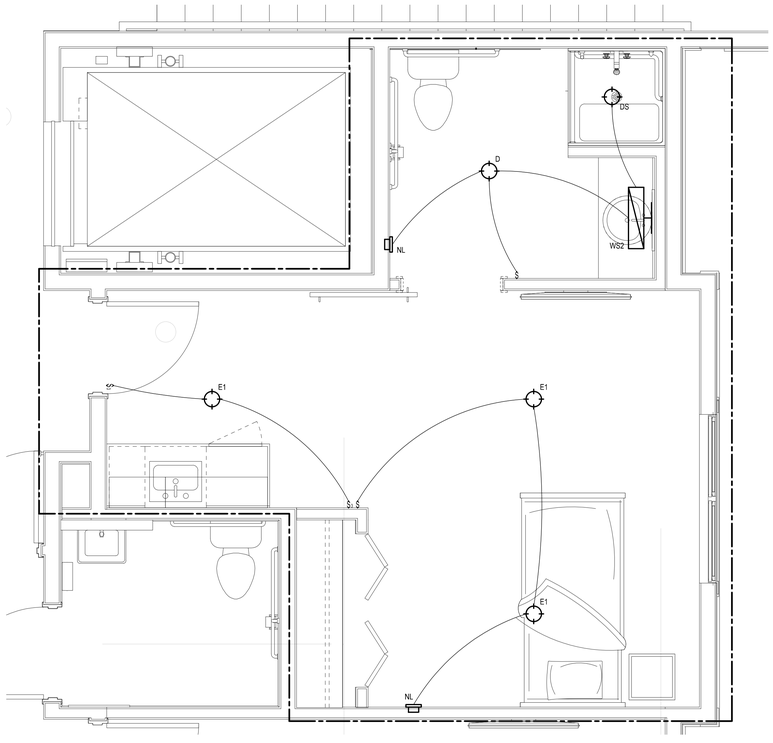
1 **ENLARGED STUDIO B - LIGHTING PLAN**

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



2 **ENLARGED STUDIO C - LIGHTING PLAN**

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



3 **ENLARGED STUDIO D - LIGHTING PLAN**

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

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CONSULTANT:

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6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

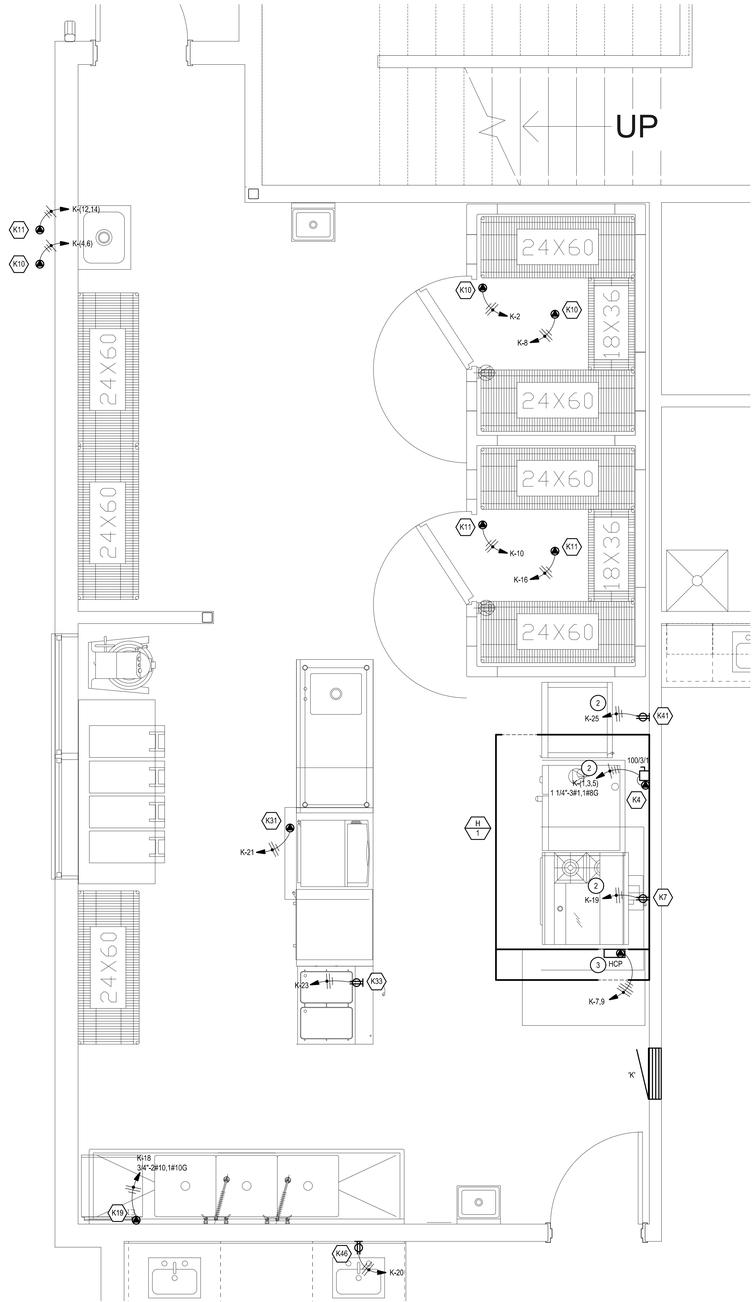
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6/27/16	PERMIT SET
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6.27.2016 - PERMIT SET

ENLARGED ELECTRICAL UNIT PLANS

PROJECT #: 16-088.01
DRAWN BY: RCN
CHECKED BY: TM

SHEET #
E403



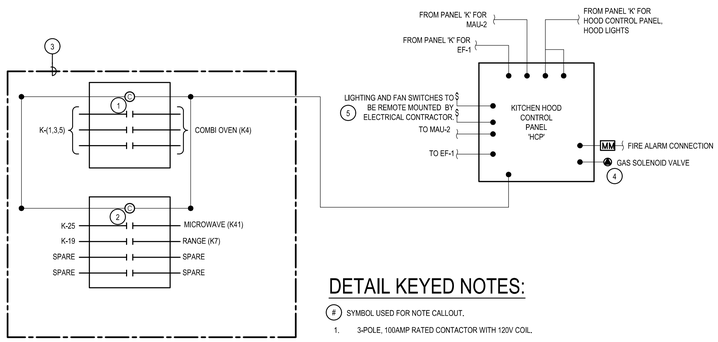
1 ENLARGED KITCHEN PLAN

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

ELECTRICAL KITCHEN EQUIPMENT SCHEDULE

UNIT NUMBER	EQUIPMENT DESCRIPTION	QUANTITY	AMPS	VOLTS/ø	DISC SW*	RECEPT.
K4	COMBI OVEN	1	70.0	208/3	100/3/1	+24" AFF
K7	RANGE	1	4.0	120/1	N/A	GFCI 5-20R, +24" AFF
K-10	WALK-IN FREEZER LIGHTS	1	10.0	120/1	N/A	J-BOX DROP FROM ABOVE
	WALK-IN FREEZER COND. UNIT	1	7.0	208/1	30/2/3R	J-BOX
	WALK-IN FREEZER EVAP.	1	1.0	120/1	N/A	J-BOX DROP FROM ABOVE
K11	WALK-IN COOLER LIGHTS	1	10.0	120/1	N/A	J-BOX DROP FROM ABOVE
	WALK-IN COOLER COND. UNIT	1	13.0	208/1	30/2/3R	J-BOX
	WALK-IN COOLER EVAP.	1	1.0	120/1	N/A	J-BOX DROP FROM ABOVE
K19	DISHWASHER, UNDERCOUNTER	1	16.0	120/1	N/A	J-BOX, +24" AFF
K31	ICE CUBER	1	7.0	120/1	N/A	J-BOX
K33	HOT FOOD SERVING COUNTER	1	12.5	120/1	N/A	GFCI 5-20R, +24" AFF
K41	MICROWAVE OVEN	1	9.6	120/1	N/A	GFCI 5-20R, +60" AFF
K46	ICE CREAM CABINET	1	6.7	120/1	N/A	GFCI 5-20R

*NEMA 3R WHERE OUTSIDE. PROVIDE FUSHING PER HVAC EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
**ALL CONDUCTORS SHALL BE COPPER TYPE "XHHW".



DETAIL KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. 3-POLE, 100AMP RATED CONTACTOR WITH 120V COIL.
2. 30AMP RATED CONTACTOR WITH 120V COIL AND A MINIMUM OF (4) POLES.
3. HOOD CONTACTOR CABINET 'KCP'. PROVIDE NEMA 1 ENCLOSURE SIZED TO ACCOMMODATE ALL COMPONENTS AS REQUIRED.
4. PROVIDE CONNECTION TO GAS SOLENOID VALVE. VALVE SHALL CLOSE TO ELIMINATE SUPPLY OF GAS UPON ACTIVATION OF ANSUL SYSTEM. COORDINATE VALVE LOCATION WITH PLUMBING CONTRACTOR.
5. REMOTE MOUNTED SWITCHES FOR HOOD LIGHTS AND EXHAUST FAN CONTROLLER.

2 KITCHEN HOOD CONTACTOR PANEL DETAIL

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

GENERAL NOTES:

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KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. COORDINATE LOCATION OF CONDENSING UNIT WITH EQUIPMENT SUPPLIER.
2. ROUTE CIRCUITS THROUGH KITCHEN HOOD CONTACTOR, PANEL 'HCP'. RE:KITCHEN HOOD CONTACTOR PANEL DETAIL.
3. COORDINATE LOCATION OF HOOD CONTROL PANEL 'HCP' WITH SUPPLIER/INSTALLER.

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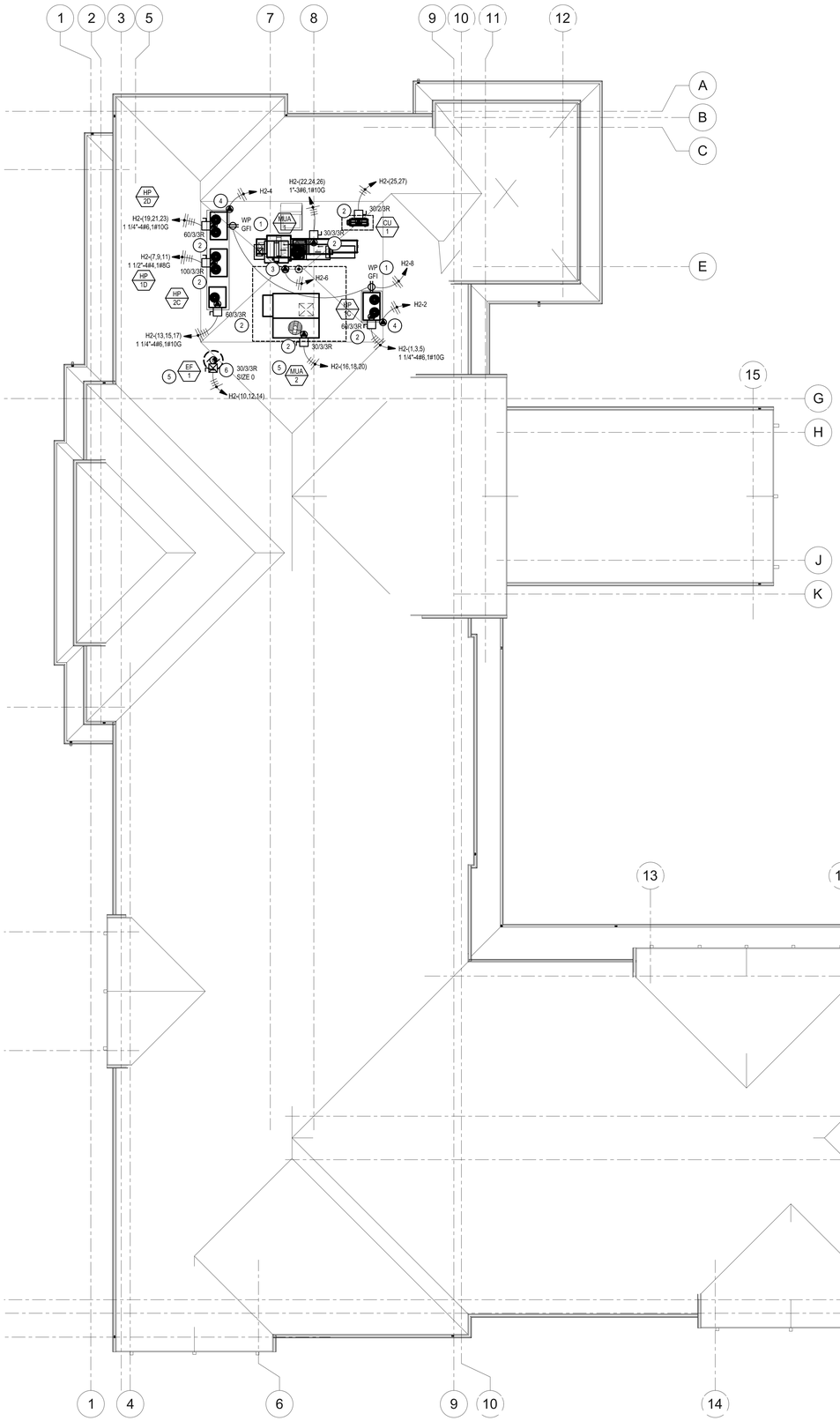
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9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

ENLARGED ELECTRICAL KITCHEN PLAN

PROJECT #: 14-268.01
DRAWN BY: JM
CHECKED BY: JM

SHEET #
E404



1 ELECTRICAL ROOF PLAN

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

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project number: 16-058

GENERAL NOTES:

A. MECHANICAL EQUIPMENT SHOWN IN APPROXIMATE LOCATION. COORDINATE WITH MECHANICAL CONTRACTOR.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. MOUNT RECEPTACLE ON RIGID CONDUIT 12" ABOVE ROOF DECK OR ON MECHANICAL UNIT WHERE APPLICABLE.
2. FIELD COORDINATE DISCONNECT AND CONDENSER LOCATION WITH MECHANICAL CONTRACTOR TO MAINTAIN ALL REQUIRED CLEARANCES.
3. HEAT TAPE LOCATED FOR ROOF DRAINS. WRAP HEAT TAPE AROUND ROOF DRAIN AND OVERFLOW DRAIN DOWNSPOUT. EXTEND HEAT TAPE 4' DOWN THE DRAINPIPE. MAKE ALL CONNECTIONS. RE:HEAT TAPE DETAIL.
4. PROVIDE AND INSTALL HEAT TAPE FOR HEAT PUMP UNITS. THE HEAT TAPE IS TO WRAP AROUND THE BASE ON THE UNIT(S). UTILIZE RECHEM ICESTOP 12W/FT OR EQUAL HEAT TAPE. PROVIDE ONE PENTAIR DIGITRACE #AMC-1A OR EQUAL THERMOSTAT FOR CONTROL OF EACH CIRCUIT. COORDINATE THE INSTALLATION WITH THE MECHANICAL CONTRACTOR.
5. INTERLOCK EXHAUST FAN WITH H-1. COORDINATE WITH MECHANICAL CONTRACTOR.
6. PROVIDE AND INSTALL COMBINATION STARTER/DISCONNECT WITH HOA CONTROL. PROVIDE TRANSFORMER AND DEVICES AS REQUIRED FOR CONTROL BY ASSOCIATE EQUIPMENT.

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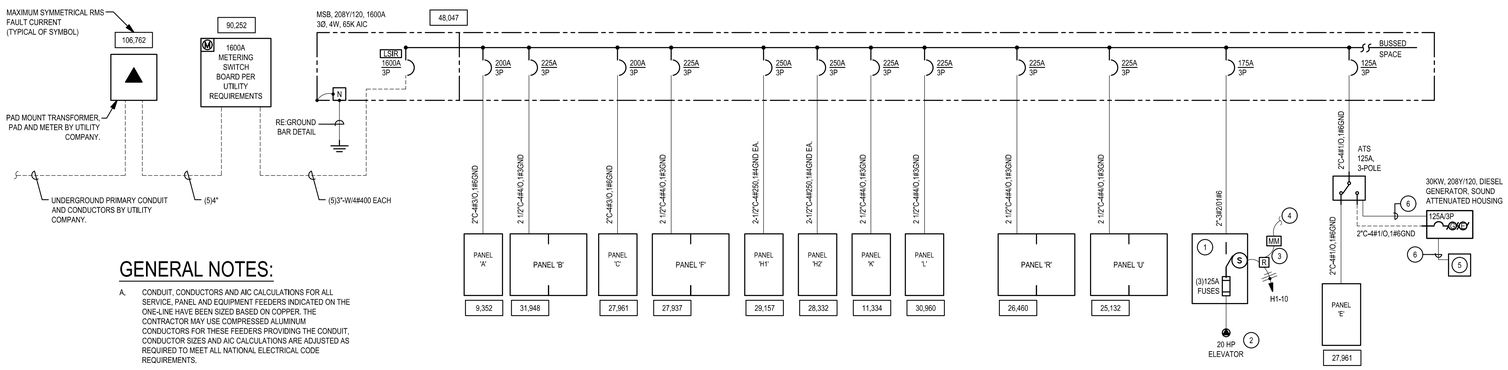
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ELECTRICAL ROOF PLAN

PROJECT #: 16.088.01
DRAWN BY: RW
CHECKED BY: MI

SHEET #
E500



GENERAL NOTES:

A. CONDUIT, CONDUCTORS AND AIC CALCULATIONS FOR ALL SERVICE, PANEL AND EQUIPMENT FEEDERS INDICATED ON THE ONE-LINE HAVE BEEN SIZED BASED ON COPPER. THE CONTRACTOR MAY USE COMPRESSED ALUMINUM CONDUCTORS FOR THESE FEEDERS PROVIDING THE CONDUIT, CONDUCTOR SIZES AND AIC CALCULATIONS ARE ADJUSTED AS REQUIRED TO MEET ALL NATIONAL ELECTRICAL CODE REQUIREMENTS.

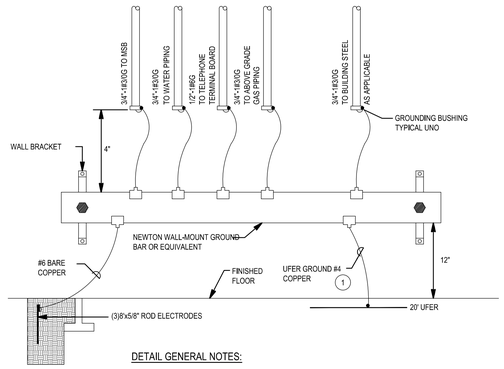
B. FURNISH AND INSTALL ENGRAVED LABEL ON THE FRONT OF THE MAIN SERVICE EQUIPMENT NOTING THE AVAILABLE FAULT CURRENT VALUE SHOWN.

KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. PROVIDE BUSSMAN POWER MODULE SWITCH # PS2T48R1KRAF1 WITH (3)CLASS J FUSES AS INDICATED OR APPROVED EQUAL. VERIFY FUSE RATING WITH ELEVATOR SUPPLIER. PROVIDE SMALLER FUSES AND FUSE REDUCERS IF REQUIRED.
2. COORDINATE WITH ELEVATOR INSTALLER.
3. PROVIDE RELAY AND MONITOR MODULE TO MONITOR POWER TO SHUNT TRIP BREAKER.
4. CONNECT TO FIRE ALARM SYSTEM.
5. REMOTE GENERATOR ANNUNCIATOR.
6. 1 1/4" CONDUIT WITH CONTROL CABLING AS REQUIRED.

1 ONE-LINE DIAGRAM
NTS



DETAIL GENERAL NOTES:

A. ALL CONDUCTORS SHALL BE IN EMT CONDUIT UNLESS NOTED OTHERWISE. ALL CONDUIT SHALL HAVE A GROUNDING BUSHING AT EACH END.

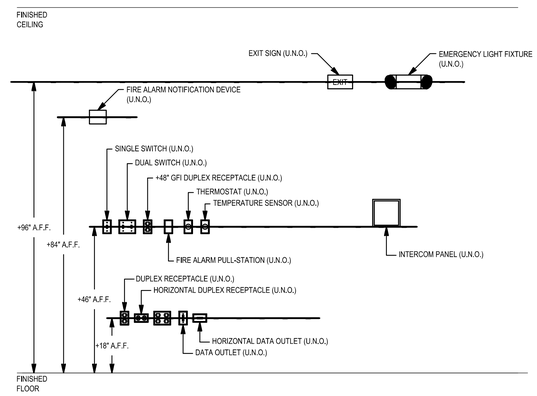
B. ALL CONNECTIONS SHALL BE EXOTHERMIC WELD, LISTED PRESSURE CONNECTORS, LISTED CLAMPS OR OTHER LISTED MEANS.

DETAIL KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. UFER GROUND TO BE 20' OF #4 AWG COPPER OR 1/2" MINIMUM DIAMETER STEEL REINFORCING BAR PER 250.52.

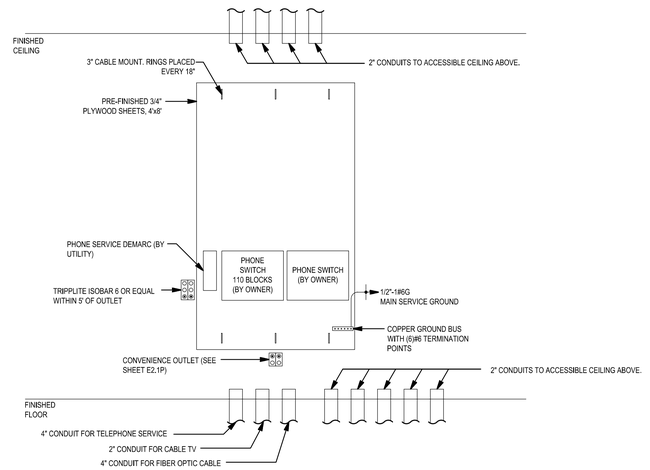
2 GROUNDING BAR DETAIL
NTS



DETAIL GENERAL NOTES:

1. PROVIDE FRAMING AS REQUIRED.

3 STANDARD MOUNTING HEIGHTS
NOT TO SCALE



4 TELEPHONE TERMINAL BOARD DETAIL
NOT TO SCALE

MUSGROVE ENGINEERING, P.A.
234 S. Whisperwood Way
Boise, Idaho 83709
208.384.0585
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OVER 30 YEARS OF EXCELLENCE
project number: 16-058

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LICENSED PROFESSIONAL ENGINEER
No. 5189384-2202
KURT EDWARD LECHTENBERG
9/21/16
STATE OF UTAH

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CONSULTANT:

T.C. ENTERPRISE
OWNER:

PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095
PROJECT:

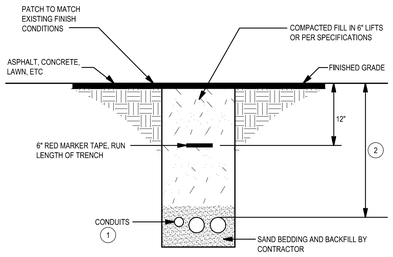
DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

ONE-LINE DIAGRAM/ ELECTRICAL DETAILS

PROJECT #: 14-268.01
DRAWN BY: RM
CHECKED BY: JM

SHEET #
E600

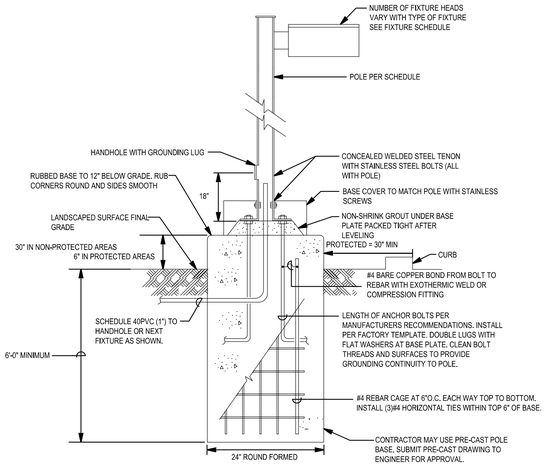


DETAIL KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. IF MULTIPLE CONDUITS SHARE TRENCH, PROVIDE SPACING BETWEEN CONDUITS. PROVIDE ZIP TIES, AND TIE ALL CONDUITS TOGETHER TO ENSURE STABILITY.
2. BURIAL DEPTH TO BE VERIFIED WITH UTILITIES AND AUTHORITY HAVING JURISDICTION:
   ELECTRICAL FEEDERS, COMMUNICATIONS: 24" MINIMUM
   UNDERGROUND SECONDARY: 30" MINIMUM
   UNDERGROUND PRIMARY: 42" MINIMUM

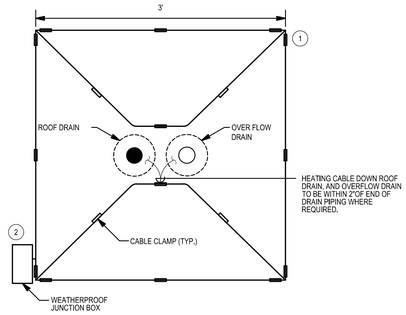
1 SITE TRENCHING DETAIL
NTS



DETAIL GENERAL NOTES:

1. INCREASE THE SPECIFIED HEIGHT OF THE POLE BY 2'-0" TO ENSURE UNIFORM FIXTURE MAINTAIN HEIGHT WHERE THE 6" BASE IS USED.
2. PROTECTED AREA IMPLIES THE POLE IS INSTALLED AT LEAST 30" FROM PARKING OR DRIVE AREAS.

2 SITE LIGHTING POLE BASE DETAIL
NTS



DETAIL KEYED NOTES:

(#) SYMBOL USED FOR NOTE CALLOUT.

1. DESIGN BASES ON RAYCHEM ICESTOP HEATING CABLES. PROVIDE ALL SYSTEM COMPONENTS NECESSARY FOR A COMPLETE, OPERABLE SYSTEM INCLUDING, BUT NOT LIMITED TO CABLES, CLAMPS, END SEALS AND POWER CONNECTIONS. COORDINATE WITH CIRCUIT VOLTAGE. ENGINEER APPROVED EQUALS ALLOWED.
2. SERVING CIRCUIT BREAKER(S) FOR HEAT TRACE LOADS SHALL BE 30mA GFCI.
3. PROVIDE AND INSTALL ONE PENTAIR DIGITRACE #AMC-1A OR EQUAL THERMOSTAT CONTROL FOR EACH CIRCUIT.

3 HEAT TAPE CABLING DETAIL
NTS

CONTROL ZONES		
ZONE	**DESCRIPTION**	**CKTS**
1	LTS-PARKING LOT	L-2
2	MONUMENT SIGN	L-4
3	LTS-EXTERIOR BLDG	L-6, 8
4	LTS-1ST FLR HALL,LOBBY,DINING	L-10,12,14,16,18,20
5	LTS-2ND FLR HALLS	L-11, 13, 15

NOTES:
1. PROVIDE UNSWITCHED LEG TO EGRESS FIXTURES.
2. PROVIDE TIMECLOCK PROGRAMMING AS REQUIRED
   COORDINATE TIME SCHEDULE WITH OWNER.

4 LIGHTING CONTROL PANEL DETAIL
NTS

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1 CITY COMMENTS

6.27.2016 - PERMIT SET

ELECTRICAL DETAILS

PROJECT #: 14-088.01
DRAWN BY: JM
CHECKED BY: JM

SHEET #
E601

LIGHTING FIXTURE SCHEDULE 16-058

	TYPE	DESCRIPTION	MTG.	LAMPS	WATTS	MFG. & CATALOG NUMBER	OR EQUAL BY	NOTES
	B	2'X4' LED GRID TROFFER	CEILING GRID	78W LED 3500K 8000 LUMENS	78	H.E. WILLIAMS AHTG-24-LED-L80/835-A-UNV	LIGHTOLIER METALUX LITHONIA	1
	BE	2'X4' LED GRID TROFFER WITH EMERGENCY DRIVER	CEILING GRID	78W LED 3500K 8000 LUMENS	78	H.E. WILLIAMS AHTG-24-LED-L80/835-A-EM/BSL310-UNV	LIGHTOLIER METALUX LITHONIA	1
	C	1'X4' LED SURFACE MOUNTED	SURFACE MOUNTED	37W LED 3500K 3300 LUMENS	37	H.E. WILLIAMS HES-14-LED-L33/835-A-UNV	LIGHTOLIER METALUX LITHONIA	1
	CE	1'X4' LED SURFACE MOUNTED WITH EMERGENCY DRIVER	SURFACE MOUNTED	37W LED 3500K 3300 LUMENS	37	H.E. WILLIAMS HES-14-LED-L33/835-A-EM-UNV	LIGHTOLIER METALUX LITHONIA	1
	D	6" RECESSED DOWN LIGHT WITH HOUSING, WHITE TRIM	CEILING RECESSED	20W LED 4000K 1200 LUMENS	20	HALO H2750ICAT-ML5612840-696WB-120V	LIGHTOLIER JUNO LITHONIA	1
	DE	6" RECESSED DOWN LIGHT WITH HOUSING, WHITE TRIM WITH EMERGENCY DRIVER	CEILING RECESSED	20W LED 4000K 1200 LUMENS	20	HALO H2750ICAT-ML5612840-696WB-120V EMERGENCY DRIVER	LIGHTOLIER JUNO LITHONIA	1
	DS	6" LENSED RECESSED LED SHOWER LIGHT WITH HOUSING, MATTE WHITE TRIM	CEILING RECESSED	39W LED 4000K 1041 LUMENS	39	H.E. WILLIAMS LSL60-L20/840-DGL-DRV-120	LIGHTOLIER JUNO LITHONIA	1
	E1	SURFACE MOUNT CEILING LIGHT, 16" DIAMETER, FABRIC	SURFACE MOUNTED	28.7W LED 3500K 2195 LUMENS	28.7	ADVENT SPI AIC11864 L28.7WDML-120-3500K-FB04		1
	E2	RESIDENTIAL CLOSET SURFACE MOUNT CEILING LIGHT, 16" DIAMETER, FABRIC	SURFACE MOUNTED	14.3W LED 3500K 1098 LUMENS	14.3	ADVENT SPI AIC11864 L14.3WDML-120-3500K-FB04		1
	F	SURFACE MOUNT CEILING LIGHT, 17" DIAMETER BRUSHED ALUMINUM TRIM, MATTE WHITE ACRYLIC DIFFUSER	SURFACE MOUNTED	(4) 13W TWIN TUBE	58	VISA LIGHTING CM1732-4LF14-BA		1
	G	6" LENSED RECESSED LED LIGHT WITH HOUSING, MATTE WHITE TRIM, ACCENT CONE WITH CLEAR ACRYLIC LENS, WET LOCATION	CEILING RECESSED	26W LED 3500K 2000 LUMENS	26	H.E. WILLIAMS L60C-L20-835-CS-W-WET/CC-DRV-120	LIGHTOLIER METALUX LITHONIA	1
	H	CYLINDER PENDANT, BRUSHED ALUMINUM COLOR, OVERALL HEIGHT BASED OFF OF MOUNTING HEIGHT LABELED ON PLANS	CEILING SUSPENDED	(9) 60W INC.	540	VISA LIGHTING CP4350-9N60-BA		
	I	CHANDELIER, BRUSHED ALUMINUM FINISH, MATTE WHITE ACRYLIC DIFFUSER, 42W TRIPLE 4-PIN UPLIGHT, 40W CIRCULAR BOWL, DIMMABLE	CEILING SUSPENDED	(1) 42W TRT (1)40W T-5	82	VISA LIGHTING CP4214-6TF42-2FCS40/22-BA-DIM(L)-OAH(32)MVOLT		
	VP1	ELEVATOR PIT, WALL MOUNT LED, 120V	WALL MOUNTED	38W LED 4000K 2900 LUMENS	38	H.E. WILLIAMS 96-4-L29-840-DCL-EM/10W-DRV-120		1
	NL	NIGHTLIGHT, WITH CLEAR COLOR LENS	WALL MOUNTED +18"	5W LED	5	COOPER LIGHTING MHN-UNV-W-TP		1
	PL1	AREA POLE LIGHT, 4 LIGHT SQUARES, SL4 TYPE DISTRIBUTION, BRONZE COLOR	POLE MOUNTED +20'-0"	107W LED 9.976 LUMENS	107	McGRAW-EDISON GLEON-AE-02-LED-E1-SL4-BZ-HSS POLE: SSS-5-A-18-S-F-**-1-X		1
	WS1	WALL SCONCE, 16" TALL, BRUSHED ALUMINUM TRIM, MATTE WHITE ACRYLIC DIFFUSER, BOTTOM LENS, MOUNT BOTTOM OF FITURE AT 7'-1" AFF	WALL MOUNTED	(2) 13W TRT	26	VISA LIGHTING CB3554-2LF13(MVOLT)-BA-BL		
	WS1 EM	WALL SCONCE, 16" TALL, BRUSHED ALUMINUM TRIM, MATTE WHITE ACRYLIC DIFFUSER, BOTTOM LENS, MOUNT BOTTOM OF FITURE AT 7'-1" AFF WITH EMERGENCY DRIVER	WALL MOUNTED	(2) 13W TRT	26	VISA LIGHTING CB3554-2LF13(MVOLT)-BA-BL-XEM		
	WS2	WALL MOUNT, 25" VANITY LIGHT, LED	WALL MOUNTED	18W LED 3500K	18	VISA LIGHTING CV1800-LNW-1700	LIGHTWAY SHAPER	
	WS3	WALL SCONCE, BRUSHED ALUMINUM TRIM, MATTE WHITE ACRYLIC DIFFUSER, SEALED & GASKETED FOR WET LOCATION, 20" TALL	WALL MOUNTED	27W LED 3500K 2000 LUMENS	27	VISA LIGHTING OW1042-LNW2000-BA-120V		
	WP1	WALL PACK, HORIZONTAL, DARK BRONZE, MOUNT AT 23' ABOVE GROUND LEVEL TYPE III DISTRIBUTION	WALL MOUNTED	36W LED 4000K 3000 LUMENS	36	H.E. WILLIAMS VWMH-L30/740-T3-DBZ-SDGL-UNV	METALUX LITHONIA	1
	WP2	WALL PACK, HORIZONTAL, DARK BRONZE, MOUNT AT 23' ABOVE GROUND LEVEL FORWARD THROW	WALL MOUNTED	36W LED 4000K 3000 LUMENS	36	H.E. WILLIAMS VWPH-L30/740-FT-DBZ-SDGL-UNV	LIGHTOLIER METALUX LITHONIA	1
⚠1	EX1	EXIT LIGHT WITH BATTERY PACK, TOP OR SIDE MOUNT AS APPPLICABLE, EDGE LIGHT, ARROWS AS SHOWN, SINGLE FACE	AS SHOWN ON PLANS	4W LED	4	EXITRONIX 902E-U-NC-RC-BA PROVIDE DIRECTIONAL CHEVRONS AS INDICATED ON PLANS		1
	EX2	EXIT LIGHT WITH BATTERY PACK, TOP OR SIDE MOUNT AS APPLICABLE, EDGE LIGHT, ARROWS AS SHOWN, DOUBLE FACE	AS SHOWN ON PLANS	4W LED	4	EXITRONIX 903E-U-NC-RC-BA PROVIDE DIRECTIONAL CHEVRONS AS INDICATED ON PLANS		1
	EM1	EMERGENCY EGRESS, KEIT, COMPACT, LOW PROFILE, MIN 90 MINUTES ILLUMINATION, DARK BRONZE, WET LOCATION, COLD WEATHER	WALL MOUNTED	12W LED INCLUDED	12	EXITRONIX TR-WB-BR-CL-SRW		1
	EM2	EMERGENCY BUGEYE FIXTURE WITH BATTERY, MIN 90 MINUTES ILLUMINATION	WALL MOUNTED	3.4W LED INCLUDED	3.4	EXITRONIX LL30H		1

LIGHTING FIXTURE SCHEDULE NOTES:

1. SUBSTITUTIONS WILL BE ALLOWED IF SUBMITTED PRIOR TO BID DATE BY THE GREATER OF: 7 BUSINESS DAYS OR THE TIME PERIOD SPECIFIED BY DIVISION 1 SPECIFICATIONS, AND IF DEEMED EQUAL BY THE ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING SUBSTITUTED FIXTURES MEET OR EXCEED THE SPECIFICATIONS OF THE FIXTURES SPECIFIED.
2. PROVIDE WITH DUAL BALLAST FOR DUAL LEVEL SWITCHING. INSIDE AND OUTSIDE LAMPS TO BE SWITCHED INDEPENDENTLY WHERE POSSIBLE.
3. PROVIDE WITH EMERGENCY BALLAST. INSTALL PILOT LIGHT AND TEST SWITCH (REMOTE IF REQUIRED)
4. PROVIDE FIXTURE WITH 12V, 35W QUARTZ LAMP FOR EMERGENCY CIRCUIT.
5. PROVIDE 1250 LUMEN, EMERGENCY BALLAST RATED FOR -20 DEGREES CELSIUS STARTING TEMPERATURES WHERE INDICATED ON DRAWINGS.

ELECTRICAL LOAD SUMMARY (MSB)

FEEDER	VOLTAGE	CONNECTED LOAD (KVA)								TOTAL CONNECTED LOAD		TOTAL DEMAND LOAD	
		LIGHTING	RECEP	MOTORS	KITCHEN	HVAC	ELEC HEAT	WATER HEAT	MISC	KVA	AMPS	KVA	AMPS
PANEL A	120/208Y	0.0	9.9	0.3	0.0	3.6	6.9	0.0	0.0	20.7	57.5	20.7	57.5
PANEL B	120/208Y	0.0	42.3	0.0	0.0	4.3	19.6	0.0	0.0	66.2	183.8	50.0	139.0
PANEL C	120/208Y	0.0	5.3	10.2	0.0	0.0	5.8	6.2	0.0	27.4	76.2	27.4	76.2
ATS FOR PANEL E	120/208Y	0.0	0.7	2.4	0.0	0.0	0.0	0.0	1.4	4.5	12.5	4.5	12.5
PANEL F	120/208Y	0.0	15.1	0.0	0.0	10.5	0.0	0.0	0.0	25.6	71.1	23.0	64.0
PANEL H1	120/208Y	0.0	0.4	0.0	0.0	54.7	1.8	0.0	0.1	57.0	158.3	57.0	158.3
PANEL H2	120/208Y	0.0	0.4	1.3	0.0	62.3	1.8	0.0	17.7	83.5	231.8	83.5	231.8
PANEL K	120/208Y	0.0	0.0	0.0	40.1	0.0	0.0	0.0	0.0	40.1	111.3	26.0	72.3
PANEL L	120/208Y	21.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	21.3	59.2	21.3	59.2
PANEL R	120/208Y	0.0	39.2	0.0	0.0	0.0	0.0	0.0	4.1	43.3	120.3	28.7	79.7
PANEL U	120/208Y	0.0	35.2	0.0	0.0	4.4	0.0	0.0	0.0	39.6	110.1	27.0	75.1
ELEVATOR	120/208Y	0.0	0.0	34.2	0.0	0.0	0.0	0.0	0.0	34.2	95.0	34.2	95.0
TOTAL	120/208Y	21.1	148.5	48.3	40.1	139.8	35.9	6.2	23.5	463.4	1287.1	385.4	1070.5

PANEL: A — **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 — 3 PH 4 WIRE — **AMPERE RATING:** 200 MLO — **SC RATING:** 22000 AIC — **MOUNTING:** SURFACE
CKT NOTES: 1. RED HANDLE, LOCKABLE BREAKER — **REMARKS:**

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	REC-EXTERIOR, STAIR, MAIN. OFFICE		9.6	20 1	16			15 2	7.0		BSB-1D, FC-1D.1-1D.7	2
3	REC-ACTIVITY		7.5	20 1		14.5		" "	7.0		***	4
5	REC-ACTIVITY		7.5	20 1			15.6	15 2	8.1		FC-1D.1-1D.4	6
7	REC-OFFICE & NURSE		9.0	20 1	17.1			" "	8.1		***	8
9	REC-LOBBY & EXTERIOR		7.5	20 1		17.1		20 2	9.6		EH-1	10
11	REC-NOURISHMENT CENTER		3.0	20 1			12.6	" "	9.6		***	12
13	REC-ICE CREAM PARLOR		3.0	20 1	12.6			20 2	9.6		EH-3	14
15	REC-DINING & EXTERIOR		7.5	20 1		17.1		" "	9.6		***	16
17	REC & LT.-ELEVATOR PIT		3.0	20 1			3.659	20 1	0.7		EF-2	18
19	REC-SALON		3.0	20 1	4.467			20 1	1.5		EF-3	20
21	REC-SALON		3.0	20 1		12.6		20 2	9.6		EH-4	22
23	REC-SALON		5.0	20 1			14.6	" "	9.6		***	24
25	REC-SALON		5.0	20 1	5			20 1			SPARE	26
27	REC-SALON		5.0	20 1		5		20 1			SPARE	28
29	REC-FIRE RISER, ELEV RM. & EXTERIOR		4.5	20 1			4.5	20 1			SPARE	30
31	SPARE			20 1	0			20 1			SPARE	32
33	SPARE			20 1		0		20 1			SPARE	34
35	SPARE			20 1			0	20 1			SPARE	36
37	SPARE			20 1	0			20 1			SPARE	38
39	SPARE			20 1		0		20 1			SPARE	40
41	SPARE			20 1			0	20 1			SPARE	42
					55.2	66.3	51.0	AMPS				
					6.6	8.0	6.1	KW			20.7 TOTAL KW	

PANEL: B — **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 — 3 PH 4 WIRE — **AMPERE RATING:** 225 MLO — **SC RATING:** 35000 AIC — **MOUNTING:** SURFACE
CKT NOTES: 1. RED HANDLE, LOCKABLE BREAKER — **REMARKS:** PROVIDE BREAKER HANDLE TIES AS REQUIRED BY THE NEC 210.4
PROVIDE SECTION 1 WITH FEED THROUGH LUGS.
MAINTAIN SPECIFIED CONDUIT AND FEEDER SIZE FROM SECTION 1 TO SECTON

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	REC-DRINKING FOUNTAIN		4.5	20 1	10.5			20 1	6.0		REC-REFRIGERATOR - ONE BDRM A 104	2
3	REC-THERAPY		9.0	20 1		13.5		20 1	4.5		REC-KITCHEN - ONE BDRM A 104	4
5	REC-BREAKROOM		6.0	20 1			15	20 1	9.0		REC-LIVING RM - ONE BDRM A 104	6
7	REC-PRIVATE LIVING		9.0	20 1	16.5			20 1	7.5		REC-BEDRM - ONE BDRM A 104	8
9	WASHING MACHINE		8.0	20 1		9.5		20 1	1.5		REC-BATHROOM - ONE BDRM A 104	10
11	WASHING MACHINE		8.0	20 1			14	20 1	6.0		REC-REFRIGERATOR - STUDIO A 105	12
13	WASHING MACHINE		8.0	20 1	12.5			20 1	4.5		REC-KITCHEN - STUDIO A 105	14
15	DRYER		24.0	30 2		31.5		20 1	7.5		REC-STUDIO - STUDIO A 105	16
17	***		24.0	" "			25.5	20 1	1.5		REC-BATHROOM - STUDIO A 105	18
19	DRYER		24.0	30 2	30			20 1	6.0		REC-REFRIGERATOR - ONE BDRM A 106	20
21	***		24.0	" "		28.5		20 1	4.5		REC-KITCHEN - ONE BDRM A 106	22
23	DRYER		24.0	30 2			33	20 1	9.0		REC-LIVING RM - ONE BDRM A 106	24
25	***		24.0	" "	31.5			20 1	7.5		REC-BEDRM - ONE BDRM A 106	26
27	REC-CORRIDOR		9.0	20 1		10.5		20 1	1.5		REC-BATHROOM - ONE BDRM A 106	28
29	REC-CORRIDOR		9.0	20 1			15	20 1	6.0		REC-REFRIGERATOR - STUDIO A 107	30
31	REC-REFRIGERATOR - STUDIO A 100		6.0	20 1	10.5			20 1	4.5		REC-KITCHEN - STUDIO A 107	32
33	REC-KITCHEN - STUDIO A 100		4.5	20 1		12		20 1	7.5		REC-STUDIO - STUDIO A 107	34
35	REC-STUDIO - STUDIO A 100		7.5	20 1			9	20 1	1.5		REC-BATHROOM - STUDIO A 107	36
37	REC-BATHROOM - STUDIO A 100		1.5	20 1	7.5			20 1	6.0		REC-REFRIGERATOR - STUDIO A 108	38
39	REC-REFRIGERATOR - STUDIO B 101		6.0	20 1		10.5		20 1	4.5		REC-KITCHEN - STUDIO A 108	40
41	REC-KITCHEN - STUDIO B 101		3.0	20 1			10.5	20 1	7.5		REC-STUDIO - STUDIO A 108	42
43	REC-STUDIO - STUDIO B 101		6.0	20 1	7.5			20 1	1.5		REC-BATHROOM - STUDIO A 108	44
45	REC-STUDIO - STUDIO B 101		4.5	20 1		10.5		20 1	6.0		REC-REFRIGERATOR - ONE BDRM A 109	46
47	REC-BATHROOM - STUDIO B 101		1.5	20 1			6	20 1	4.5		REC-KITCHEN - ONE BDRM A 109	48
49	REC-REFRIGERATOR - STUDIO A 102		6.0	20 1	15			20 1	3.0		REC-LIVING RM - ONE BDRM A 109	50
51	REC-KITCHEN - STUDIO A 102		4.5	20 1		12		20 1	7.5		REC-BEDRM - ONE BDRM A 109	52
53	REC-STUDIO - STUDIO A 102		7.5	20 1			9	20 1	1.5		REC-BATHROOM - ONE BDRM A 109	54
55	REC-BATHROOM - STUDIO A 102		1.5	20 1	7.5			20 1	6.0		REC-REFRIGERATOR - ONE BDRM C 110	56
57	REC-REFRIGERATOR - ONE BDRM A 103		6.0	20 1		10.5		20 1	4.5		REC-KITCHEN - ONE BDRM C 110	58
59	REC-KITCHEN - ONE BDRM A 103		4.5	20 1			12	20 1	7.5		REC-LIVING RM - ONE BDRM C 110	60
61	REC-LIVING RM - ONE BDRM A 103		9.0	20 1	16.5			20 1	7.5		REC-BEDRM - ONE BDRM C 110	62
63	REC-BEDRM - ONE BDRM A 103		7.5	20 1		9		20 1	1.5		REC-BATHROOM - ONE BDRM C 110	64
65	REC-BATHROOM - ONE BDRM A 103		1.5	20 1			7.5	20 1	6.0		REC-REFRIGERATOR - STUDIO A 111	66
67	BSB-1A, FC-1A.1-1A.8		8.4	15 2	12.9			20 1	4.5		REC-KITCHEN - STUDIO A 111	68
69	***		8.4	" "		15.9		20 1	7.5		REC-STUDIO - STUDIO A 111	70
71	BSB-1B, FC-1E.1-1B.8		9.5	15 2			11	20 1	1.5		REC-BATHROOM - STUDIO A 111	72
73	***		9.5	" "	12.5			20 1	3.0		REC-MECHANICAL ROOM	74
75	EH-2		9.6	20 2		9.6		20 1			SPARE	76
77	***		9.6	" "			9.6	20 1			SPARE	78
79	SPARE			20 1	0			20 1			SPARE	80
81	SPARE			20 1		0		20 1			SPARE	82
83	SPARE			20 1			0	20 1			SPARE	84
					190.9	183.5	177.1	AMPS				
					22.9	22.0	21.3	KW			66.2 TOTAL KW	

PANEL: C — **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 — 3 PH 4 WIRE — **AMPERE RATING:** 200 MLO — **SC RATING:** 35000 AIC — **MOUNTING:** SURFACE
CKT NOTES: 1. RED HANDLE, LOCKABLE BREAKER — **REMARKS:**

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	WASHING MACHINE		8.0	20 1	14			15 2	6.0		ERU-1	2
3	DRYER		24.0	30 2		30		" "	6.0		***	4
5	***		24.0	" "			30	15 2	6.0		ERU-1	6
7	REC-HALL		7.5	20 1	13.5			" "	6.0		***	8
9	REC-HALL		7.5	20 1		13.5		15 2	6.0		ERU-3	10
11	REC-MECH. ELEC. NURSE. & HALL		9.0	20 1			15	" "	6.0		***	12
13	REC-HALL & JANITOR		6.0	20 1	12			15 2	6.0		ERU-2	14
15	REC-HALL		6.0	20 1		12		" "	6.0		***	16
17	WH-9, 10, & 11		12.0	20 1			18	15 2	6.0		ERU-1	18
19	WH-1, 2, & 3		12.0	20 1	18			" "	6.0		***	20
21	WH-4 & 5		8.0	20 1		14		15 2	6.0		ERU-1	22
23	WH-6, 7, & 8		12.0	20 1			18	" "	6.0		***	24
25	WH-12 & 13		8.0	20 1	14			15 2	6.0		ERU-2	26
27	EF-4		0.7	20 1		6.66		" "	6.0		***	28
29	SPARE			20 1			0	20 1			SPARE	30
31	SPARE			20 1	0			20 1			SPARE	32
33	SPARE			20 1		0		20 1			SPARE	34
35	SPARE			20 1			0	20 1			SPARE	36
37	SPARE			20 1	0			20 1			SPARE	38
39	SPARE			20 1		0		20 1			SPARE	40
41	SPARE			20 1			0	20 1			SPARE	42
					71.5	76.2	81.0	AMPS				
					8.6	9.1	9.7	KW			27.4 TOTAL KW	

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CONSULTANT:

OWNER: T.C. ENTERPRISE

PROJECT: PARDOE ASSISTED LIVING - MIDVALE
6968 SOUTH 700 WEST
MIDVALE, UTAH 84095

DATE	DESCRIPTION
6/27/16	PERMIT SET
9/16/16	1\ CITY COMMENTS

6.27.2016 - PERMIT SET

ELECTRICAL SCHEDULES

PROJECT #: 14.28631
DRAWN BY: RM
CHECKED BY: TM

SHEET #
E700

PANEL: E | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 125 MLO | **SC RATING:** 22000 AIC
CKT NOTES: | **REMARKS:** | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	FIRE ALARM CONTROL PANEL	1	1.5	20 1	3			20 1	1.5	1	FIRE ALARM BELL	2
3	REC-TELEPHONE TERMINAL BOARD		3.0	20 1		4.5		20 1	1.5	1	NAC-EXTENDER PANELS	4
5	REC-TELEPHONE TERMINAL BOARD		3.0	20 1			13	20 2	10.0	1	DRY SYSTEM COMPRESSOR	6
7	ELEVATOR LIGHTS & RECEPTACLES		5.0	20 1	15			" "	10.0	1	"	8
9	SPARE			20 1		1		20 1	1.0	1	FIRE SMOKE DAMPERS	10
11	SPARE			20 1			1	20 1	1.0	1	FIRE SMOKE DAMPERS	12
13	SPARE			20 1	0			20 1			SPARE	14
15	SPARE			20 1		0		20 1			SPARE	16
17	SPARE			20 1			0	20 1			SPARE	18
19	SPARE			20 1	0			20 1			SPARE	20
21	SPARE			20 1		0		20 1			SPARE	22
23	SPARE			20 1			0	20 1			SPARE	24
25	SPARE			20 1	0			20 1			SPARE	26
27	SPARE			20 1		0		20 1			SPARE	28
29	SPARE			20 1			0	20 1			SPARE	30
31	SPARE			20 1	0			20 1			SPARE	32
33	SPARE			20 1		0		20 1			SPARE	34
35	SPARE			20 1			0	20 1			SPARE	36
37	SPARE			20 1	0			20 1			SPARE	38
39	SPARE			20 1		0		20 1			SPARE	40
41	SPARE			20 1			0	20 1			SPARE	42
					18.0	5.5	14.0	AMPS				
					2.2	0.7	1.7	KW			4.5 TOTAL KW	

PANEL: F | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 225 MLO | **SC RATING:** 35000 AIC
CKT NOTES: | **REMARKS:** PROVIDE BREAKER HANDLE TIES AS REQUIRED BY THE NEC 210.4 | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER
PROVIDE SECTION 1 WITH FEED THROUGH LUGS.
MAINTAIN SPECIFIED CONDUIT AND FEEDER SIZE FROM SECTION 1 TO SECTON

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	REC-REFRIGERATOR - STUDIO A 112		6.0	20 1	12			20 1	6.0		REC-REFRIGERATOR - STUDIO A 118	2
3	REC-KITCHEN - STUDIO A 112		4.5	20 1		9		20 1	4.5		REC-KITCHEN - STUDIO A 118	4
5	REC-STUDIO - STUDIO A 112		7.5	20 1			15	20 1	7.5		REC-STUDIO - STUDIO A 118	6
7	REC-BATHROOM - STUDIO A 112		1.5	20 1	3			20 1	1.5		REC-BATHROOM - STUDIO A 118	8
9	REC-REFRIGERATOR - ONE BDRM B 114		6.0	20 1		12		20 1	6.0		REC-REFRIGERATOR - STUDIO A 119	10
11	REC-KITCHEN - ONE BDRM B 114		4.5	20 1			9	20 1	4.5		REC-KITCHEN - STUDIO A 119	12
13	REC-LIVING RM - ONE BDRM B 114		9.0	20 1	16.5			20 1	7.5		REC-BATHROOM - STUDIO A 119	14
15	REC-BEDRM - ONE-BDRM B 114		7.5	20 1		9		20 1	1.5		REC-BATHROOM - STUDIO A 119	16
17	REC-BATHROOM - ONE BDRM B 114		1.5	20 1			7.5	20 1	6.0		REC-REFRIGERATOR - STUDIO A 120	18
19	REC-REFRIGERATOR - STUDIO A 116		6.0	20 1	10.5			20 1	4.5		REC-KITCHEN - STUDIO A 120	20
21	REC-KITCHEN - STUDIO A 116		4.5	20 1		12		20 1	7.5		REC-STUDIO - STUDIO A 120	22
23	REC-STUDIO - STUDIO A 116		7.5	20 1			5	20 1	1.5		REC-BATHROOM - STUDIO A 120	24
25	REC-BATHROOM - STUDIO A 116		1.5	20 1	7.5			15 2	6.0		ERU-1	26
27	BSB 1C, FC-1C,1-1C,8		7.8	15 2		13.8		" "	6.0		"	28
29	"		7.5	" "			13.5	15 2	6.0		ERU-1	30
31	ERU-2		6.0	15 2	12			" "	6.0		"	32
33	"		6.0	" "		12		15 2	6.0		ERU-3	34
35	SPARE			20 1			6	" "	6.0		"	36
37	SPARE			20 1	6			15 2	6.0		ERU-2	38
39	SPARE			20 1		6		" "	6.0		"	40
41	SPARE			20 1			0	20 1			SPARE	42
43	SPARE			20 1	6			15 2	6.0		ERU-4	44
45	SPARE			20 1		6		" "	6.0		"	46
47	SPARE			20 1			0	20 1			SPARE	48
49	SPARE			20 1	0			20 1			SPARE	50
51	SPARE			20 1		0		20 1			SPARE	52
53	SPARE			20 1			0	20 1			SPARE	54
55	SPARE			20 1	0			20 1			SPARE	56
57	SPARE			20 1		0		20 1			SPARE	58
59	SPARE			20 1			0	20 1			SPARE	60
61	SPARE			20 1	0			20 1			SPARE	62
63	SPARE			20 1		0		20 1			SPARE	64
65	SPARE			20 1			0	20 1			SPARE	66
67	PREPARED SPACE				0			20 1			SPARE	68
69	PREPARED SPACE					0		20 1			SPARE	70
71	PREPARED SPACE						0	20 1			SPARE	72
73	PREPARED SPACE				0			20 1			SPARE	74
75	PREPARED SPACE					0		20 1			SPARE	76
77	PREPARED SPACE						0	20 1			SPARE	78
79	PREPARED SPACE				0						PREPARED SPACE	80
81	PREPARED SPACE					0					PREPARED SPACE	82
83	PREPARED SPACE						0				PREPARED SPACE	84
					73.5	79.8	60.0	AMPS				
					8.8	9.6	7.2	KW			25.6 TOTAL KW	

PANEL: H1 | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 250 MLO | **SC RATING:** 35000 AIC
CKT NOTES: | **REMARKS:** | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	HP-1A		38.0	45 3	43			20 1	5.0		HEAT TAPE AROUND HEAT PUMPS	2
3	"		38.0	" "		43		20 1	5.0		HEAT TAPE AROUND HEAT PUMPS	4
5	"		38.0	" "			43	20 1	5.0		HEAT TAPE AROUND ROOF DRAIN	6
7	HP-1B		38.0	45 3	41			20 1	3.0		REC-ROOF TOP	8
9	"		38.0	" "		39		20 1	1.0		ELEVATOR CONTROLS MODULE	10
11	"		38.0	" "			38	20 1			SPARE	12
13	HP-2A		38.0	45 3	38			20 1			SPARE	14
15	"		38.0	" "		38		20 1			SPARE	16
17	"		38.0	" "			38	20 1			SPARE	18
19	HP-2B		38.0	45 3	38			20 1			SPARE	20
21	"		38.0	" "		38		20 1			SPARE	22
23	"		38.0	" "			38	20 1			SPARE	24
25	SPARE			20 1	0			20 1			SPARE	26
27	SPARE			20 1		0		20 1			SPARE	28
29	SPARE			20 1			0	20 1			SPARE	30
31	SPARE			20 1	0			20 1			SPARE	32
33	SPARE			20 1		0		20 1			SPARE	34
35	SPARE			20 1			0	20 1			SPARE	36
37	SPARE			20 1	0			20 1			SPARE	38
39	SPARE			20 1		0		20 1			SPARE	40
41	SPARE			20 1			0	20 1			SPARE	42
					160.0	158.0	157.0	AMPS				
					19.2	19.0	18.8	KW			57 TOTAL KW	

PANEL: H2 | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 225 MLO | **SC RATING:** 35000 AIC
CKT NOTES: | **REMARKS:** | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	HP-1C		38.0	45 3	43			20 1	5.0		HEAT TAPE AROUND HEAT PUMPS	2
3	"		38.0	" "		43		20 1	5.0		HEAT TAPE AROUND HEAT PUMPS	4
5	"		38.0	" "			43	20 1	5.0		HEAT TAPE AROUND ROOF DRAIN	6
7	HP-1D		61.3	70 3	64.9			20 1	3.0		REC-ROOF TOP	8
9	"		61.3	" "		65.4		20 3	3.5		EF-1	10
11	"		61.3	" "			65.4	" "	3.5		"	12
13	HP-2C		30.2	35 3	33.7			" "	3.5		"	14
15	"		30.2	" "		44.7		20 3	14.5		MUA-2	16
17	"		30.2	" "			44.7	" "	14.5		"	18
19	HP-2D		43.0	50 3	57.5			" "	14.5		"	20
21	"		43.0	" "		72		45 3	29.0		MUA-1	22
23	"		43.0	" "			72	" "	29.0		"	24
25	CU-1		8.6	20 2	37.6			" "	29.0		"	26
27	"		8.6	" "		8.6		20 1			SPARE	28
29	SPARE			20 1			0	20 1			SPARE	30
31	SPARE			20 1	0			20 1			SPARE	32
33	SPARE			20 1		0		20 1			SPARE	34
35	SPARE			20 1			0	20 1			SPARE	36
37	SPARE			20 1	0			20 1			SPARE	38
39	SPARE			20 1		0		20 1			SPARE	40
41	SPARE			20 1			0	20 1			SPARE	42
					236.7	233.7	225.1	AMPS				
					28.4	28.0	27.0	KW			83.5 TOTAL KW	

PANEL: K | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 225 MLO | **SC RATING:** 22000 AIC
CKT NOTES: | **REMARKS:** | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	K4-COMBI OVEN		70.0	100 3	80			20 1	10.0		K10-WALK-IN FREEZER LIGHTS	2
3	"		70.0	" "		77		20 2	7.0		K10-WALK-IN FREEZER COND. UNIT	4
5	"		70.0	" "			77	" "	7.0		"	6
7	HOOD CONTROL PANEL HCP		1.0	20 1	2			20 1	1.0		K10-WALK-IN FREEZER EVAP.	8
9	HOOD LIGHTS		5.0	20 1		15		20 1	10.0		K11-WALK-IN COOLER LIGHTS	10
11	SPARE			20 1			13	20 2	13.0		K11-WALK-IN COOLER COND. UNIT	12
13	SPARE			20 1	13			" "	13.0		"	14
15	SPARE			20 1		1		20 1	1.0		K11-WALK-IN COOLER EVAP.	16
17	SPARE			20 1			16	20 1	16.0		K19 -DISHWASHER	18
19	K7-RANGE		4.0	20 1	10.7			20 1	6.7		K46-ICE CREAM CABINET	20
21	K3-ICE CUBER		7.0	20 1		7		20 1			SPARE	22
23	K33-HOT FOOD SERVING COUNTER		12.5	20 1			12.5	20 1			SPARE	24
25	K41-MICROWAVE OVEN		9.6	20 1	9.6			20 1			SPARE	26
27	SPARE			20 1		0		20 1			SPARE	28
29	SPARE			20 1			0	20 1			SPARE	30
31	SPARE			20 1	0			20 1			SPARE	32
33	SPARE			20 1		0		20 1			SPARE	34
35	SPARE			20 1			0	20 1			SPARE	36
37	PREPARED SPACE				0			20 1			PREPARED SPACE	38
39	PREPARED SPACE					0		20 1			PREPARED SPACE	40
41	PREPARED SPACE						0	20 1			PREPARED SPACE	42
					115.3	100.0	118.5	AMPS				
					13.8	12.0	14.2	KW			40.1 TOTAL KW	

PANEL: L | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 225 MLO | **SC RATING:** 35000 AIC
CKT NOTES: | **REMARKS:** | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	LIGHTING CONTROL PANEL		1.5	20 1	2.85			20 1	1.2		LTS-PARKING LOT	2
3	LTS-UNITS 101, 102, 105, 107, & 109		7.6	20 1		12.58		20 1	5.0		MONUMENT SIGN	4
5	LTS-UNITS 111, 118, 119, & 120		5.8	20 1			9.3	20 1	3.5		LTS-ENTRY/CANOPY & BACK PATIO	6
7	LTS-UNITS 110, 112, 114, & 116		6.1	20 1	14.31			20 1	8.2		LTS-EXTERIOR BUILDING	8
9	LTS-UNITS 103, 104, 106, & 108		7.6	20 1		15.74		20 1	8.2		LTS-CORRIDOR/NOURISHMENT CENTER	10
11	LTS-CORRIDOR 242		8.6	20 1			17.61	20 1	9.0		LTS-LOBBY 'H' POSTURE	12
13	LTS-CORRIDOR 215		8.6	20 1	11.96			20 1	3.3		LTS-LOBBY 'D' DE POSTURE	14
15	LTS-CORRIDOR 241		9.4	20 1		15.17		20 1	9.3		LTS-DINING	16
17	LTS-AND FLR SUPPORT RMS		2.5	20 1			9.483	20 1	7.0		LTS-CORRIDOR	18
19	LTS-UNITS 201, 203, 205, 207, & 209		7.6	20 1	13.98			20 1	6.4		LTS-CORRIDOR	20
21	LTS-UNITS 211, 215, 221, & 223		5.8	20 1		12.27		20 1	6.5		LTS-KITCHEN	22
23	LTS-UNITS 200, 202, 204, 206, & 208		7.6	20 1			14.43	20 1	6.9		LTS-ACTIVITY, OFFICES, JAN CLOSET	24
25	LTS-UNITS 210, 212, 214, 216, & 218		7.6	20 1	14.58			20 1	7.0		LTS-SALON, THERAPY, SUPPORT RMS	26
27	LTS-UNITS 220, 222, 224, & 226		6.1	20 1		6.14		20 1			SPARE	28
29	LTS-UNITS 228, 229, 230, 231, & 233		7.5	20 1			7.45	20 1			SPARE	30
31	SPARE			20 1	0			20 1			SPARE	32
33	SPARE			20 1		0		20 1			SPARE	34
35	SPARE			20 1			0	20 1			SPARE	36
37	SPARE			20 1	0			20 1			SPARE	38
39	SPARE			20 1		0		20 1			SPARE	40
41	SPARE			20 1			0	20 1			SPARE	42
					57.5	61.9	58.3	AMPS				
					6.9	7.4	7.0	KW			21.3 TOTAL KW	

PANEL: R | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 225 MLO | **SC RATING:** 35000 AIC
CKT NOTES: | **REMARKS:** PROVIDE BREAKER HANDLE TIES AS REQUIRED BY THE NEC 210.4 | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER
PROVIDE SECTION 1 WITH FEED THROUGH LUGS.
MAINTAIN SPECIFIED CONDUIT AND FEEDER SIZE FROM SECTION 1 TO SECTON

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	REC-REFRIGERATOR - STUDIO A 200		6.0	20 1	12			20 1	6.0		REC-REFRIGERATOR - STUDIO A 207	2
3	REC-KITCHEN - STUDIO A 200		4.5	20 1		9		20 1	4.5		REC-KITCHEN - STUDIO A 207	4
5	REC-STUDIO - STUDIO A 200		7.5	20 1			15	20 1	7.5		REC-STUDIO - STUDIO A 207	6
7	REC-BATHROOM - STUDIO A 200		1.5	20 1	3			20 1	1.5		REC-BATHROOM - STUDIO A 207	8
9	REC-REFRIGERATOR - STUDIO B 201		6.0	20 1		12		20 1	6.0		REC-REFRIGERATOR - STUDIO A 208	10
11	REC-KITCHEN - STUDIO B 201		3.0	20 1			7.5	20 1	4.5		REC-KITCHEN - STUDIO A 208	12
13	REC-STUDIO - STUDIO B 201		6.0	20 1	13.5			20 1	7.5		REC-STUDIO - STUDIO A 208	14
15	REC-STUDIO - STUDIO B 201		4.5	20 1		6		20 1	1.5		REC-BATHROOM - STUDIO A 208	16
17	REC-BATHROOM - STUDIO B 201		1.5	20 1			7.5	20 1	6.0		REC-REFRIGERATOR - ONE BDRM A 209	18
19	REC-REFRIGERATOR - STUDIO A 202		6.0	20 1	10.5			20 1	4.5		REC-KITCHEN - ONE BDRM A 209	20
21	REC-KITCHEN - STUDIO A 202		4.5	20 1		13.5		20 1	9.0		REC-LIVING RM - ONE BDRM A 209	22
23	REC-STUDIO - STUDIO A 202		7.5	20 1			15	20 1	7.5		REC-BEDRM - ONE-BDRM A 209	24
25	REC-BATHROOM - STUDIO A 202		1.5	20 1	3			20 1	1.5		REC-BATHROOM - ONE BDRM A 209	26
27	REC-REFRIGERATOR - ONE BDRM A 203		6.0	20 1		12		20 1	6.0		REC-REFRIGERATOR - ONE BDRM A 210	28
29	REC-KITCHEN - ONE BDRM A 203		4.5	20 1			9	20 1	4.5		REC-KITCHEN - ONE BDRM A 210	30
31	REC-LIVING RM - ONE BDRM A 203		9.0	20 1	18			20 1	9.0		REC-LIVING RM - ONE BDRM A 210	32
33	REC-BEDRM - ONE-BDRM A 203		7.5	20 1		15		20 1	7.5		REC-BEDRM - ONE-BDRM A 210	34
35	REC-BATHROOM - ONE BDRM A 203		1.5	20 1			3	20 1	1.5		REC-BATHROOM - ONE BDRM A 210	36
37	REC-REFRIGERATOR - ONE BDRM A 204		6.0	20 1	12			20 1	6.0		REC-REFRIGERATOR - STUDIO A 211	38
39	REC-KITCHEN - ONE BDRM A 204		4.5	20 1		9		20 1	4.5		REC-KITCHEN - STUDIO A 211	40
41	REC-LIVING RM - ONE BDRM A 204		3.0	20 1			16.5	20 1	7.5		REC-STUDIO - STUDIO A 211	42
43	REC-BEDRM - ONE-BDRM A 204		7.5	20 1	9			20 1	1.5		REC-BATHROOM - STUDIO A 211	44
45	REC-BATHROOM - ONE BDRM A 204		1.5	20 1		7.5		20 1	6.0		REC-REFRIGERATOR - STUDIO A 212	46
47	REC-REFRIGERATOR - STUDIO A 205		6.0	20 1			10.5	20 1	4.5		REC-KITCHEN - STUDIO A 212	48
49	REC-KITCHEN - STUDIO A 205		4.5	20 1	12			20 1	7.5		REC-STUDIO - STUDIO A 212	50
51	REC-STUDIO - STUDIO A 205		7.5	20 1		9		20 1	1.5		REC-BATHROOM - STUDIO A 212	52
53	REC-BATHROOM - STUDIO A 205		1.5	20 1			7.5	20 1	6.0		REC-REFRIGERATOR - ONE BDRM B 214	54
55	REC-REFRIGERATOR - ONE BDRM A 206		6.0	20 1	9			20 1	3.0		REC-KITCHEN - ONE BDRM B 214	56
57	REC-KITCHEN - ONE BDRM A 206		4.5	20 1		13.5		20 1	9.0		REC-LIVING RM - ONE BDRM B 214	58
59	REC-LIVING RM - ONE BDRM A 206		9.0	20 1			16.5	20 1	7.5		REC-BEDRM - ONE-BDRM B 214	60
61	REC-BEDRM - ONE-BDRM A 206		7.5	20 1	9			20 1	1.5		REC-BATHROOM - ONE BDRM B 214	62
63	REC-BATHROOM - ONE BDRM A 206		1.5	20 1		9.9		15 2	8.4		BSB-2A, FC-2A 1-2A 8	64
65	SPARE			20 1			8.4	" "	8.4		"	66
67	SPARE			20 1	8.5			15 2	8.5		BSB-2B, FC-2B,1-2B 8	68
69	SPARE			20 1		8.5		" "	8.5		"	70
71	SPARE			20 1			0	20 1			SPARE	72
73	SPARE			20 1	0			20 1			SPARE	74
75	SPARE			20 1		0		20 1			SPARE	76
77	SPARE			20 1			0	20 1			SPARE	78
79	SPARE			20 1	0			20 1			SPARE	80
81	SPARE			20 1		0		20 1			SPARE	82
83	SPARE			20 1			0	20 1			SPARE	84
					119.5	124.9	116.4	AMPS				
					14.3	15.0	14.0	KW			43.3 TOTAL KW	

PANEL: U | **PROJECT:** PARDOE ASSISTED LIVING - MIDVALE
VOLTAGE: 208Y/120 | 3 PH | 4 WIRE | **AMPERE RATING:** 225 MLO | **SC RATING:** 35000 AIC
CKT NOTES: | **REMARKS:** PROVIDE BREAKER HANDLE TIES AS REQUIRED BY THE NEC 210.4 | **MOUNTING:** SURFACE
1. RED HANDLE, LOCKABLE BREAKER
PROVIDE SECTION 1 WITH FEED THROUGH LUGS.
MAINTAIN SPECIFIED CONDUIT AND FEEDER SIZE FROM SECTION 1 TO SECTON

CKT	DESCRIPTION	CKT NOTE	LOAD AMPS	AMPS/ POLES	PHASE (AMPS) A	B	C	AMPS/ POLES	LOAD AMPS	CKT NOTE	DESCRIPTION	CKT
1	REC-REFRIGERATOR - STUDIO A 216		6.0	20 1	12			20 1	6.0		REC-REFRIGERATOR - ONE BDRM A 226	2
3	REC-KITCHEN - STUDIO A 216		4.5	20 1		9		20 1	4.5		REC-KITCHEN - ONE BDRM A 226	4
5	REC-STUDIO - STUDIO A 216		7.5	20 1			16.5	20 1	9.0		REC-LIVING RM - ONE BDRM A 226	6
7	REC-BATHROOM - STUDIO A 216		1.5	20 1	9			20 1	7.5		REC-BEDRM - ONE-BDRM A 226	8
9	REC-REFRIGERATOR - STUDIO A 218		6.0	20 1		7.5		20 1	1.5		REC-BATHROOM - ONE BDRM A 226	10
11	REC-KITCHEN - STUDIO A 218		4.5	20 1			10.5	20 1	6.0		REC-REFRIGERATOR - STUDIO A 228	12
13	REC-STUDIO - STUDIO A 218		7.5	20 1	12			20 1	4.5		REC-KITCHEN - STUDIO A 228	14
15	REC-BATHROOM - STUDIO A 218		1.5	20 1		9		20 1	7.5		REC-STUDIO - STUDIO A 228	16
17	REC-REFRIGERATOR - STUDIO A 219		6.0	20 1			7.5	20 1	1.5		REC-BATHROOM - STUDIO A 228	18
19	REC-KITCHEN - STUDIO A 219		4.5	20 1	10.5			20 1	6.0		REC-REFRIGERATOR - STUDIO A 229	20
21	REC-STUDIO - STUDIO A 219		7.5	20 1		12		20 1	4.5		REC-KITCHEN - STUDIO A 229	22
23	REC-BATHROOM - STUDIO A 219		1.5	20 1			9	20 1	7.5		REC-STUDIO - STUDIO A 229	24
25	REC-REFRIGERATOR - STUDIO A 220		6.0	20 1	7.5			20 1	1.5		REC-BATHROOM - STUDIO A 229	26
27	REC-KITCHEN - STUDIO A 220		4.5	20 1		10.5		20 1	6.0		REC-REFRIGERATOR - STUDIO A 230	28
29	REC-STUDIO - STUDIO A 220		7.5	20 1			12	20 1	4.5		REC-KITCHEN - STUDIO A 230	30
31	REC-BATHROOM - STUDIO A 220		1.5	20 1	9			20 1	7.5		REC-STUDIO - STUDIO A 230	32
33	REC-REFRIGERATOR - STUDIO A 221		6.0	20 1		7.5		20 1	1.5		REC-BATHROOM - STUDIO A 230	34
35	REC-KITCHEN - STUDIO A 221		4.5	20 1			10.5	20 1	6.0		REC-REFRIGERATOR - STUDIO C 231	36
37	REC-STUDIO - STUDIO A 221		7.5	20 1	10.5			20 1