ITS and Toll Plaza Generator Replacement Design

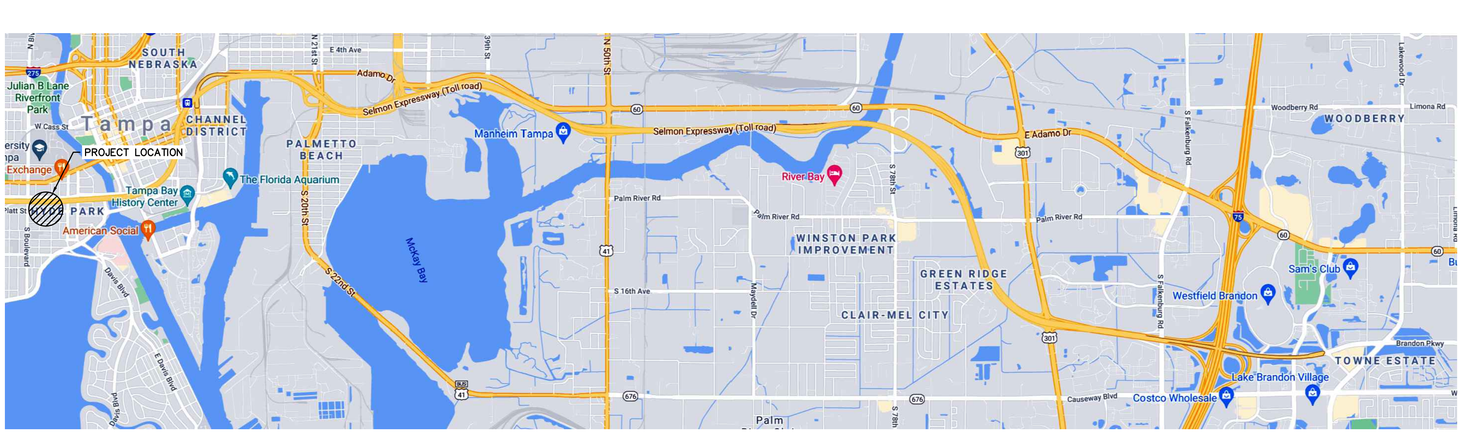
WEST TOLL PLAZA
ISSUE DATE: 01.13.2022
ISSUE PHASE: CONSTRUCTION DOCUMENTS

HALL ENGINEERING GROUP
PROJECT NO. 2010D

TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY

HALL® ENGINEERING GROUP

Electrical · Lighting · Mechanical · Low Voltage
www.hallenggroup.com | Tel: 813.374.2121
FL. C.O.A. #: 27620



00 THE LEE ROY SELMON EXPRESSWAY FROM S. BOULEVARD TO BRANDON PARKWAY
SCALE:NONE

DRAWING INDEX	
SHEET NO.	SHEET TITLE
	COVER SHEET
E1.0	ELECTRICAL LEGEND, SPECIFICATIONS & DETAILS
E2.0	ELECTRICAL SITE PLAN
E3.0	POWER ONE-LINE DIAGRAM
MP1.0	FLOOR PLAN MECHANICAL/FUEL GAS

DRAWING SPECIFICATIONS

GENERAL:

A. REFER TO FDOT STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIRMENTS.

B. PROVIDE SHALL MEAN FURNISH AND INSTALL.

C. THE COMPLETE ELECTRICAL SYSTEM WHICH SHALL BE PROVIDED BY THE CONTRACTOR SHALL INCLUDE ALL WORK, MATERIALS AND APPARATUSES SPECIFIED HEREINAFTER AND INDICATED ON THE DRAWINGS. ALL WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY AND NO SUBSTANDARD WORK WILL BE ACCEPTED.

D. PROVIDE ALL WORK AND ELECTRICAL SYSTEMS COMPONENTS REQUIRED TO SERVE LOADS AS SPECIFIED HEREINAFTER AND INDICATED ON THE DRAWINGS. THE WORK SHALL INCLUDE COMPLETE TESTING OF ALL ELECTRICAL SYSTEMS AT THE COMPLETION OF THE WORK AND MAKING ANY CHANGES AND ADJUSTMENTS NECESSARY FOR THE PROPER FUNCTIONING OF THE SYSTEMS.

E. MAKE A THOROUGH EXAMINATION OF THE SITE AND THE CONTRACT DOCUMENTS PRIOR TO EXECUTING THE CONTRACT. NO CLAIM FOR ADDITIONAL COMPENSATION WILL BE RECOGNIZED FOR DIFFICULTIES ENCOUNTERED WHICH AN EXAMINATION OF SITE CONDITIONS AND CONTRACT DOCUMENTS WOULD HAVE REVEALED.

F. THE PLANS ARE GENERALLY DIAGRAMMATIC. COORDINATE ALL WORK WITH OTHER TRADES AS REQUIRED TO AVOID INTERFERENCES BETWEEN TRADES (i.e. BEAMS, CONDUITS, EQUIPMENT, PIPING, ETC).

G. REMOVE ALL EXISTING EQUIPMENT, DEVICES, CONDUCTORS, RACEWAYS, ETC. MADE UNNECESSARY BY THE NEW INSTALLATION. PRIOR TO REMOVAL FROM SITE, COORDINATE WITH OWNER TO DETERMINE IF OWNER WISHES TO RETAIN ANY REMOVED EQUIPMENT.

WORK PERFORMANCE:

A. JOB SITE SAFETY AND WORKER SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.

B. ARRANGE, PHASE AND PERFORM ALL WORK DURING TIME PERIODS SCHEDULED WITH AND ACCEPTABLE TO THE OWNER BEFORE PROCEEDING. NO ADDITIONAL COMPENSATION WILL BE AUTHORIZED FOR WORK NECESSITATED BY ILL-TIMED, DEFECTIVE, OR NON-CONFORMING WORK.

C. THE CONTRACTOR SHALL ENSURE THAT ALL SYSTEMS OPERATE AS DESIGNED AND/OR REQUIRED AND SHALL REVIEW THEIR OPERATION WITH THE OWNER UPON COMPLETION OF CONSTRUCTION AND TESTING. COMPILE COMPLETE AND UPDATED AS-BUILT DRAWNGS/DOCUMENTS AND ISSUE ONE (1) SET TO THE OWNER.

D. ELECTRICAL WORK SHALL BE ACCOMPLISHED WITH ALL AFFECTED CIRCUITS OR EQUIPMENT DE-ENERGIZED. WHEN AN ELECTRICAL OUTAGE CANNOT BE ACCOMPLISHED IN THIS MANNER FOR THE REQUIRED WORK, THE FOLLOWING REQUIREMENTS ARE MANDATORY:

1. ELECTRICIANS MUST USE AND WEAR FULL PROTECTIVE EQUIPMENT (PPE) (i.e. CERTIFIED AND TESTED INSULATING MATERIAL TO COVER EXPOSED ENERGIZED ELECTRICAL COMPONENTS, CERTIFIED AND TESTED INSULATED TOOLS, ETC.) WHILE WORKING ON ENERGIZED SYSTEMS IN ACCORDANCE WITH NFPA 70E. THE LEVEL OF PPE SHALL BE DETERMINED BY A COMPUTER GENERATED ARC FLASH CALCULATION PROVIDED AND PAID FOR BY THE CONTRACTOR. THE ARC FLASH DATA SHALL BE PRESENTED WITH THE SUBMITTAL BELOW.
2. WORK ON ENERGIZED CIRCUITS OR EQUIPMENT CANNOT BEGIN UNTIL PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE OWNER.

E. NEW WORK SHALL BE INSTALLED AND CONNECTED TO EXISTING WORK NEATLY AND CAREFULLY. PROVIDE PROTECTIVE MATS, COVERS, ETC. AS REQUIRED FOR ALL EXISTING WORK SUSCEPTIBLE TO DAMAGE. VERIFY SPECIFIC LOCATIONS AND REQUIREMENTS WITH THE OWNER. DISTURBED OR DAMAGED WORK AS A RESULT OF ELECTRICAL WORK SHALL BE REPLACED OR REPAIRED TO ITS PRIOR CONDITIONS.

F. ENSURE THAT ELECTRICAL SERVICE REMAINS UNINTERRUPTED FOR OTHER BUILDINGS AND FACILITIES AT ALL TIMES. PERFORM ALL TEMPORARY WORK NECESSARY TO MAINTAIN CONTINUITY OF ELECTRICAL SERVICE WHEN CONNECTION IS MADE TO EXISTING SYSTEMS. EXISTING SERVICE SHALL NOT BE INTERRUPTED WITHOUT PRIOR CONSENT OF THE OWNER AND MAY BE INTERRUPTED ONLY AT AND FOR THE SPECIFIED TIME DESIGNATED BY THE OWNER. THE CONTRACTOR SHALL BE GUIDED BY THE OWNER AT ALL TIMES IN MATTERS AFFECTING THE EXISTING FACILITIES.

G. ELECTRICAL EQUIPMENT SHALL NOT BE STORED OUTDOORS. EQUIPMENT SHALL BE STORED IN AN OWNER/ENGINEER APPROVED MEDIUM AND LOCATION.

CODES & STANDARDS:

A. PERFORM WORK IN COMPLIANCE WITH THE LATEST EDITION OF ALL APPLICABLE, FEDERAL, STATE AND LOCAL CODES, REGULATIONS AND STANDARDS, TO INCLUDE THOSE LISTED BELOW, ADOPTED BY THE AUTHORITY HAVING JURISDICTION. WHERE DIFFERENCES MAY OCCUR THE MORE STRINGENT REQUIREMENTS SHALL GOVERN. IN CASE OF CONFLICT PROVIDE WRITTEN NOTIFICATION AND OBTAIN A DECISION FROM THE ENGINEER.

1. NFPA 70: NATIONAL ELECTRICAL CODE (2017)
2. NFPA 70E: STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE (2018)
3. NFPA 241: STANDARD FOR SAFEGUARDING CONSTRUCTION, ALTERATION AND DEMOLITION OPERATIONS (2019)
4. FBC: FLORIDA BUILDING CODE (2020)
5. OSHA PART 1910: OCCUPATIONAL SAFETY AND HEALTH STANDARDS
6. OSHA PART 1926: SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION
7. FDOT STANDARDS – SEE FDOT WEBSITE

WARRANTY:

A. CONTRACTOR SHALL WARRANTY ALL WORK FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUBSTANTIAL COMPLETION. CONTRACTOR SHALL RECTIFY ANY DEFECTS DUE TO FAULTY MATERIALS OR WORKMANSHIP AND PAY FOR ANY DAMAGE TO OTHER WORK RESULTING THEREFROM WITHIN SAID PERIOD. THE OWNER WILL GIVE NOTICE OF DEFECTS WITH REASONABLE PROMPTNESS.

B. PROVIDE COMPLETE WARRANTY INFORMATION FOR EACH ITEM TO INCLUDE PRODUCT OR EQUIPMENT; DATE OR BEGINNING OF WARRANTY OR BOND; DURATION OF WARRANTY OR BOND; AND NAMES, ADDRESSES, AND TELEPHONE NUMBERS AND PROCEDURES FOR FILING A CLAIM AND OBTAINING WARRANTY SERVICES.

SUBMITTALS:

A. SUBMIT ONE (1) ELECTRONIC PDF COPY. THE ENGINEER WILL RETURN SUBMITTAL REVIEW COMMENTS NO LATER THAN 14 CALENDAR DAYS OF RECEIPT.

B. APPROVAL SHALL BE OBTAINED FOR ALL EQUIPMENT AND MATERIAL BEFORE DELIVERY TO THE JOB SITE. DELIVERY, STORAGE OR INSTALLATION OF EQUIPMENT OR MATERIAL WHICH HAS NOT HAD PRIOR APPROVAL, WILL NOT BE PERMITTED AT THE JOB SITE.

C. ALL SUBMITTALS SHALL INCLUDE ADEQUATE DESCRIPTIVE LITERATURE, CATALOG CUTS, SHOP DRAWINGS AND OTHER DATA NECESSARY FOR THE ENGINEER TO ASCERTAIN THAT THE PROPOSED EQUIPMENT AND MATERIALS COMPLY WITH SPECIFICATION REQUIREMENTS. CATALOG CUTS SUBMITTED FOR APPROVAL SHALL BE LEGIBLE AND CLEARLY IDENTIFY EQUIPMENT BEING SUBMITTED.

D. SUBMITTALS FOR INDIVIDUAL SYSTEMS AND EQUIPMENT ASSEMBLIES WHICH CONSIST OF MORE THAN ONE ITEM OR COMPONENT SHALL BE MADE FOR THE SYSTEM OR ASSEMBLY AS A WHOLE. PARTIAL SUBMITTALS WILL NOT BE CONSIDERED FOR APPROVAL

E. SUBMITTAL OF SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES WILL BE ACCEPTED ONLY WHEN SUBMITTED BY THE CONTRACTOR. DATA SUBMITTED FROM SUBCONTRACTORS AND MATERIAL SUPPLIERS DIRECTLY TO THE ARCHITECT/ENGINEER WILL NOT BE PROCESSED.

F. SUBMITTALS SHALL BE MARKED TO SHOW SPECIFICATION REFERENCE INCLUDING THE SECTION AND PARAGRAPH NUMBERS. SUBMIT EACH SECTION SEPARATELY AND INCLUDE THE FOLLOWING:

1. INFORMATION THAT CONFIRMS COMPLIANCE WITH CONTRACT REQUIREMENTS. INCLUDE THE MANUFACTURER'S NAME, MODEL OR CATALOG NUMBERS, CATALOG INFORMATION, TECHNICAL DATA SHEETS, SHOP DRAWINGS, PICTURES, NAMEPLATE DATA AND TEST REPORTS AS REQUIRED.
2. PARTS LIST WHICH SHALL INCLUDE THOSE REPLACEMENT PARTS RECOMMENDED BY THE EQUIPMENT MANUFACTURER, QUANTITY OF PARTS, CURRENT PRICE AND AVAILABILITY OF EACH PART.

G. MANUALS: SUBMIT IN ACCORDANCE WITH "A" ABOVE FOR REVIEW AND COMMENT.

1. MAINTENANCE AND OPERATION MANUALS: SUBMIT AS REQUIRED FOR SYSTEMS AND EQUIPMENT SPECIFIED IN THE TECHNICAL SECTIONS. FURNISH THREE (3) COPIES, BOUND IN HARDBACK BINDERS, (MANUFACTURER'S STANDARD BINDERS) OR AN APPROVED EQUAL. FURNISH ONE COMPLETE MANUAL AS SPECIFIED IN THE TECHNICAL SECTION BUT IN NO CASE LATER THAN PRIOR TO PERFORMANCE OF SYSTEMS OR EQUIPMENT TEST, AND FURNISH THE REMAINING MANUALS PRIOR TO CONTRACT COMPLETION.
2. INSCRIBE THE FOLLOWING IDENTIFICATION ON THE COVER: THE WORDS 'MAINTENANCE AND OPERATION MANUAL," THE NAME AND LOCATION OF THE SYSTEM, EQUIPMENT, BUILDING, NAME OF CONTRACTOR, AND CONTRACT NUMBER. INCLUDE IN THE MANUAL THE NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF EACH SUBCONTRACTOR INSTALLING THE SYSTEM OR EQUIPMENT AND THE LOCAL REPRESENTATIVES FOR THE SYSTEM OR EQUIPMENT.

MATERIALS AND METHODS:

A. MATERIALS AND APPARATUSES SHALL COMPLY WITH ALL APPLICABLE TESTS, RATINGS, SPECIFICATIONS, AND REQUIREMENTS OF THE IEEE, NEMA, NFPA AND UL, SHALL BEAR THE UL LABEL OF APPROVAL AND BE LISTED FOR THE PROPOSED APPLICATION.

B. FINISHED PRODUCTS SHALL BE FACTORY PRIMED AND FINISH COATED WITH THE MANUFACTURER'S PRIME COAT AND STANDARD FINISH UNLESS SPECIFIED OTHERWISE BY THE OWNER/ENGINEER.

C. UNLESS OTHERWISE SPECIFIED, UNFINISHED PRODUCTS SHALL BE GALVANIZED, COATED OR PLATED TO RESIST CORROSION.

D. INSTALLATIONS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AS RECOMMENDED BY THE MANUFACTURER AND AS CLOSE AS PRACTICABLE TO LOCATIONS INDICATED ON DRAWINGS.

E. INSTALLATIONS SHALL FACILITATE MAINTENANCE AND REPAIR OR REPLACEMENT OF EQUIPMENT COMPONENTS. ACCESS, WORKING SPACES AND CLEARANCES SHALL NOT BE LESS THAN SPECIFIED BY THE NEC FOR ALL VOLTAGES SPECIFIED.

IDENTIFICATION:

A. INSTALL LABEL TAGS ON ALL WIRE AND CABLE IN JUNCTION BOXES, WIREWAYS AND WIRING GUTTERS OF PANELS. TAGS SHALL IDENTIFY WIRE OR CABLE CIRCUIT NUMBER AND/OR EQUIPMENT SERVED AS INDICATED ON DRAWINGS.

B. JUNCTION BOXES SHALL BE LABELED IN A PERMANENT MANNER REFLECTING PANELBOARD/CIRCUIT NUMBER OF BRANCH CIRCUIT WIRING CONTAINED WITHIN.

C. PANELBOARD DIRECTORIES SHALL BE TYPEWRITTEN, REFLECTING RECORD CONDITIONS TO INCLUDE CIRCUIT NUMBER, TYPE AND LOCATION OF LOAD.

D. INSTALL PLASTIC PLACARDS ON EQUIPMENT REFLECTING, EQUIPMENT NAME, NUMBER AND RATING.

RACEWAYS:

A. RACEWAYS:

1. INTERIOR EXPOSED, CONCEALED IN WALLS OR ABOVE CEILINGS: ELECTRICAL METALLIC TUBING (EMT).
2. INTERIOR CONNECTIONS TO MOTORS, TRANSFORMERS AND VIBRATING EQUIPMENT: FLEXIBLE METAL CONDUIT (FMC).
3. EXTERIOR EXPOSED: GALVANIZED STEEL RIGID METAL CONDUIT (RMC).
4. EXTERIOR CONNECTIONS TO MOTORS, TRANSFORMERS AND VIBRATING EQUIPMENT: LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC).
5. UNDERGROUND: SCHEDULE 40 PVC.
6. PENETRATIONS THROUGH CONCRETE SLABS SHALL BE MADE WITH PVC COATED RIGID GALVANIZED STEEL CONDUIT.

B. ALL BENDS IN PVC LARGER THAN 1" NOMINAL TRADE SIZE SHALL BE MADE WITH PVC COATED RIGID METAL CONDUIT.

C. ALL CONDUIT SHALL BE PROPERLY ALIGNED, GROUPED AND SUPPORTED. EXPOSED CONDUIT SHALL BE INSTALLED AT RIGHT ANGLES TO OR PARALLEL TO THE PRINCIPAL STRUCTURAL MEMBERS. PROVIDE SUPPORT A MINIMUM OF 18" FROM BENDS AND BOXES AND ON INTERVALS NOT TO EXCEED 8'-0". CONDUIT IS NOT TO SPAN ANY SPACE UNSUPPORTED.

D. UNDERGROUND CONDUITS SHALL BE INSTALLED WITH MINIMUM 36" COVER.

E. PROVIDE NYLON PULL CORD AND LEAVE IN PLACE IN EACH EMPTY CONDUIT.

BOXES:

A. ALL BOXES SHALL BE RIGIDLY MOUNTED AND SHALL BE EQUIPPED WITH SUITABLE SCREW FASTENED COVERS. OPEN KNOCK-OUTS OR HOLES IN BOXES SHALL BE PLUGGED WITH A SUITABLE BLANKING DEVICE.

B. EXTERIOR BRANCH BOXES SHALL BE WEATHERPROOF CAST "FS" BOXES.

C. HANDHOLES AND COVERS SHALL BE HUBBELL QUAZITE OR EQUAL, UL LISTED, LOCKABLE COVERS, OPTIONS AS NEEDED, STAINLESS STEEL BOLTS.

CONDUCTORS:

A. INTERIOR BUILDING CONDUCTORS SHALL BE COPPER WITH THHN/THWN-2 90°C INSULATION; EXTERIOR BUILDING CONDUCTORS SHALL BE COPPER WITH XHHW-2 90°C INSULATION. THE FOLLOWING SYSTEMS OF COLOR CODING SHALL BE STRICTLY ADHERED TO AND SHALL BE CONSISTENTLY FOLLOWED THROUGHOUT:

1. GROUND WIRES: GREEN
2. GROUNDED NEUTRAL WIRES: WHITE
3. 208/120 VOLT, UNGROUNDED PHASE WIRES: BLACK, RED AND BLUE

NOTE: WHERE EXISTING COLOR CODING DIFFERS FROM COLOR CODING ASSIGNED HERE-IN, USE EXISTING COLOR CODING AS REQUIRED TO MAINTAIN CONSISTENCY.

B. UNDERGROUND SPLICES, JOINTS, TERMINATIONS, ETC. SHALL BE WATERPROOF AND LOCATED IN PULLBOX.

C. FOR NEW CIRCUITS, MULTIPLE CIRCUITS IN SAME CONDUIT SHALL NOT SHARE NEUTRAL CONDUCTORS.

D. REMOVE AND DISPOSE OF ALL UNUSED CONDUIT AND WIRING BACK TO LAST ACTIVE DEVICE OR PANEL.

E. INSTALL SPLIT BOLT CONNECTORS FOR COPPER CONDUCTOR SPLICES AND TAPS, 6 AWG AND LARGER.

F. INSTALL SOLDERLESS PRESSURE CONNECTORS WITH INSULATING COVERS FOR COPPER CONDUCTOR SPLICES AND TAPS, 8 AWG AND SMALLER.

G. INSTALL INSULATED SPRING WIRE CONNECTORS WITH PLASTIC CAPS FOR COPPER CONDUCTOR SPLICES AND TAPS, 10 AWG AND SMALLER.

H. "PUSH-IN" OR "STAB" TYPE CONNECTORS ARE NOT ACCEPTABLE.

GROUNDING:

A. THE ELECTRICAL SYSTEMS SHALL BE COMPLETELY AND EFFECTIVELY GROUNDED AS REQUIRED BY THE NEC AND AS SPECIFIED HEREINAFTER.

B. ALL METALLIC RACEWAYS SHALL BE MECHANICALLY AND ELECTRICALLY SECURE AT ALL JOINTS AND AT ALL BOXES, CABINETS, FITTINGS, AND EQUIPMENT. METALLIC RACEWAYS SHALL BE CONNECTED TO A DIRECT GROUND AT THE POINT OF ELECTRICAL SERVICE ENTRANCE AND SHALL BE ELECTRICALLY CONTINUOUS THROUGHOUT THE ENTIRE SYSTEM.

C. ALL GROUND CONDUCTORS SHALL BE INSULATED COPPER UON.

D. GROUND CONDUCTORS SHALL BE CONNECTED TO GROUND BUS IN PANELBOARDS.

E. TERMINATE FEEDER AND BRANCH CIRCUIT INSULATED EQUIPMENT GROUNDING CONDUCTORS WITH GROUNDING LUG, BUS, OR BUSHING. CONDUCTORS LOOPED UNDER SCREW OR BOLT HEADS WILL NOT BE PERMITTED.

F. INSTALL CLAMP-ON CONNECTORS ON CLEAN METAL CONTACT SURFACES TO ENSURE ELECTRICAL CONDUCTIVITY AND CIRCUIT INTEGRITY.

G. TEST THE GROUNDING SYSTEM TO ASSURE CONTINUITY AND THAT RESISTANCE TO GROUND DOES NOT EXCEED 5 OHMS UNLESS OTHERWISE NOTED. TEST EACH GROUND ROD FOR RESISTANCE TO GROUND BEFORE MAKING ANY CONNECTIONS TO THE ROD; THEN TIE ENTIRE GROUNDING SYSTEM TOGETHER AND TEST FOR RESISTANCE TO GROUND. MAKE RESISTANCE MEASUREMENTS IN NORMALLY DRY WEATHER, NOT LESS THAN 48 HOURS AFTER RAINFALL. MAKE GROUND RESISTANCE MEASUREMENTS WITH A GROUND RESISTANCE TEST METER CALIBRATED WITHIN THE LAST TWELVE MONTHS.

EQUIPMENT:

A. OUTDOOR EQUIPMENT SHALL BE NEMA 3R OR NEMA 4X AS REQUIRED.

B. CIRCUIT BREAKERS SHALL BE BOLT-ON TYPE.

C. SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE UON.

D. FUSES SHALL BE CLASS RK1 UON.

E. SURGE PROTECTIVE DEVICE MANUFACTURERS SHALL BE: PQ PROTECTION, ADVANCED PROTECTION TECHNOLOGIES, ATLANTIC SCIENTIFIC, OR CURRENT TECHNOLOGY.

LEGEND

SYMBOL	DESCRIPTION	MOUNTING/REMARKS
CTB	COMMUNICATIONS TERMINAL BOARD: 3/4" PT PLYWOOD, 2 COATS GRAY PAINT BOTH SIDES	AS NOTED
	DUPLEX RECEPTACLE: 20 A, 125 VAC	TOP 20" AFF
	DISTRIBUTION PANELBOARD: 600 VAC	TOP 78" AFF
	BRANCH CIRCUIT PANELBOARD: 240 VAC	TOP 78" AFF
	ELECTRICAL EQUIPMENT: DENOTED BY LABEL	AS NOTED
	ELECTRIC UTILITY METER/CABINET	AS REQUIRED BY UTILITY COMPANY
	DISCONNECT SWITCH	TOP 78" AFF
	ELECTRICAL TRANSFORMER	CONCRETE PAD
(#) (#)	KEYED NOTES	REFER TO LIKE-NUMBERED NOTES
'EQUIP'	EQUIPMENT LABEL	REFER TO RESPECTIVE SCHEDULE

ABBREVIATIONS:

A	AMPS OR AMPERE	FC	FOOTCANDLE	NEC	NATIONAL ELECTRICAL CODE
A/E	ARCHITECT/ENGINEER	FLA	FULL LOAD AMPS	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
AF	AMPERE FRAME	FO	FIBER OPTIC		
AFCI	ARC-FAULT CIRCUIT INTERRUPTER	FT	FOOT (FEET)	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
AFF	ABOVE FINISHED FLOOR	GC	GENERAL CONTRACTOR	NO	NORMALLY OPEN
AFG	ABOVE FINISHED GRADE	GEN	GENERATOR	NTS	NOT TO SCALE
AHJ	AUTHORITY HAVING JURISDICTION	GFCI	GROUND-FAULT CIRCUIT INTERRUPTER	OB	OUTLET BOX
AIC	AMPERE INTERRUPTING CAPACITY	GND	GROUND	P	POLE
AL	ALUMINUM	HOA	HAND-OFF-AUTO	PA	PUBLIC ADDRESS
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	HP	HORSEPOWER	PB	PULL BOX
ASD	ADJUSTABLE SPEED DRIVE	HPS	HIGH PRESSURE SODIUM	PH/ϕ	PHASE
AT	AMPERE TRIP	HV	HIGH VOLTAGE	PNL	PANELBOARD (PANEL)
ATS	AUTOMATIC TRANSFER SWITCH	HZ	HERTZ	RECPT	RECEPTACLE
AUTO	AUTOMATIC	IG	ISOLATED GROUND	SCC	SHORT CIRCUIT CAPACITY
AWG	AMERICAN WIRE GAUGE	IN	INCH (INCHES)	SF	SQUARE FOOT (FEET)
BLDG	BUILDING	JB	JUNCTION BOX	SPEC	SPECIFICATION
BFG	BELOW FINISHED GRADE	kcmil	THOUSAND CIRCULAR MIL	SPD	SURGE PROTECTIVE DEVICE
BRKR	BREAKER	kV	KILOVOLT	SS	STAINLESS STEEL
C	CONDUIT	kVA	KILOVOLT AMPERE	SWBD	SWITCHBOARD
CB	CIRCUIT BREAKER	kW	KILOWATT	SWGR	SWITCHGEAR
CKT	CIRCUIT	kWh	KILOWATT HOUR	TR	TAMPER RESISTANT
COMM	COMMUNICATIONS	LED	LIGHT EMITTING DIODE	TYP	TYPICAL
CT	CURRENT TRANSFORMER	LPS	LIGHTNING PROTECTION SYSTEM	U	UNKNOWN CIRCUIT
CU	COPPER	LTG	LIGHTING	UL	UNDERWRITERS LABORATORY
°C	DEGREES CELSIUS	LTNG	LIGHTNING	UON	UNLESS OTHERWISE NOTED
°F	DEGREES FAHRENHEIT	LV	LOW VOLTAGE	UPS	UNINTERRUPTIBLE POWER SUPPLY
DISC	DISCONNECT	MAX	MAXIMUM	UTIL	UTILITY
DP	DISTRIBUTION PANELBOARD	MCA	MINIMUM CIRCUIT AMPACITY	V	VOLT OR VOLTAGE
DS	DISCONNECT SWITCH	MCB	MAIN CIRCUIT BREAKER	VA	VOLT AMPERE
DWG	DRAWING	MCC	MOTOR CONTROL CENTER	VD	VOLTAGE DROP
EC	ELECTRICAL CONTRACTOR	MDP	MAIN DISTRIBUTION PANELBOARD	VFD	VARIABLE FREQUENCY DRIVE
EG	EQUIPMENT GROUND	MH	METAL HALIDE	W	WATT OR WIRE
ELEC	ELECTRIC OR ELECTRICAL	MHz	MEGAHERTZ	WP	WEATHERPROOF
ELEV	ELEVATOR	MIN	MINIMUM	WR	WEATHER RESISTANT
EMER	EMERGENCY	MLO	MAIN LUGS ONLY	WT	WATERTIGHT
EPO	EMERGENCY POWER OFF	MOCP	MAXIMUM OVERCURRENT PROTECTION	XFER	TRANSFER
EPS	EMERGENCY POWER SUPPLY	MTS	MANUAL TRANSFER SWITCH	XFMR	TRANSFORMER
EXIST	EXISTING	N	NEUTRAL	XP	EXPLOSION RATED
FA	FIRE ALARM	NA	NOT APPLICABLE		
		NC	NORMALLY CLOSED		

OBJECT STATE LINETYPES:

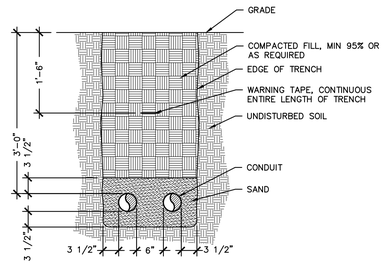
EXISTING OBJECT OR CONSTRUCTION: ———————

EXISTING OBJECT OR CONSTRUCTION TO BE DEMOLISHED: - - - - - - - - - - - - - - - -

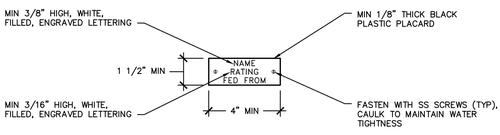
NEW OBJECT OR CONSTRUCTION TO BE PROVIDED: ———————

OBJECT STATE SUBSCRIPTS:

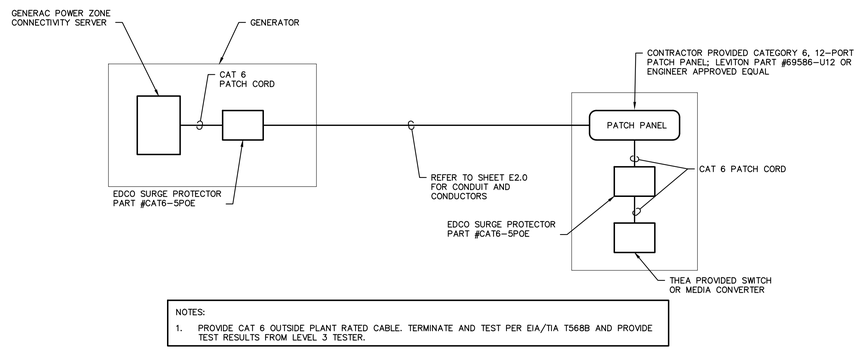
D	EXISTING OBJECT TO BE DEMOLISHED	M	EXISTING OBJECT TO BE REMOVED & RELOCATED
E	EXISTING OBJECT TO REMAIN	R	RELOCATED EXISTING OBJECT



01 TYPICAL CONDUIT TRENCH DETAIL
SCALE:N.T.S

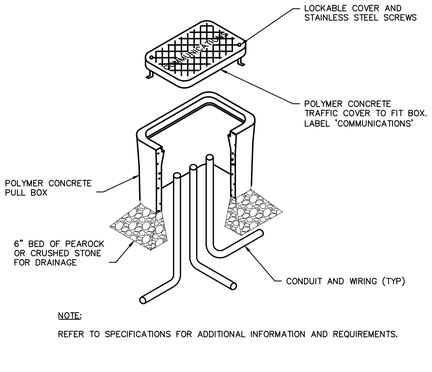


02 EQUIPMENT PLACARD DETAIL
SCALE:N.T.S



NOTES:
1. PROVIDE CAT 6 OUTSIDE PLANT RATED CABLE. TERMINATE AND TEST PER EIA/TIA T568B AND PROVIDE TEST RESULTS FROM LEVEL 3 TESTER.

03 LOW VOLTAGE DIAGRAM
SCALE:NONE



NOTE:
REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

04 TYPICAL CONDUIT TRENCH DETAIL
SCALE:N.T.S

Issue / Revision:

No.	Date:	Description:
1		
2		
3		
4		
5		

Engineer:

Digitally signed by Adam V. Eaches, P.E. #76151
Date: 2022.01.14 11:57:52-05'00'
ADAM V. EACHES, P.E. FL. REG. # 76151

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY ADAM V. EACHES, P.E. ON THE DATE ADJACENT TO THE SEAL. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SHA AUTHENTICATION CODE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

TO THE BEST OF THE ENGINEER'S KNOWLEDGE THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.
THIS DOCUMENT IS VALID FOR 12 MONTHS FROM DATE OF ENGINEER'S SIGNATURE AND SEAL.
© COPYRIGHT 2022 HALL ENGINEERING GROUP. RETAINS INTELLECTUAL AND PHYSICAL RIGHTS TO THIS DOCUMENT AND ITS CONTENT AND PROHIBITS ITS PUBLISHING, DISCLOSURE OR REPRODUCTION WITHOUT CONSENT.

Consultant:

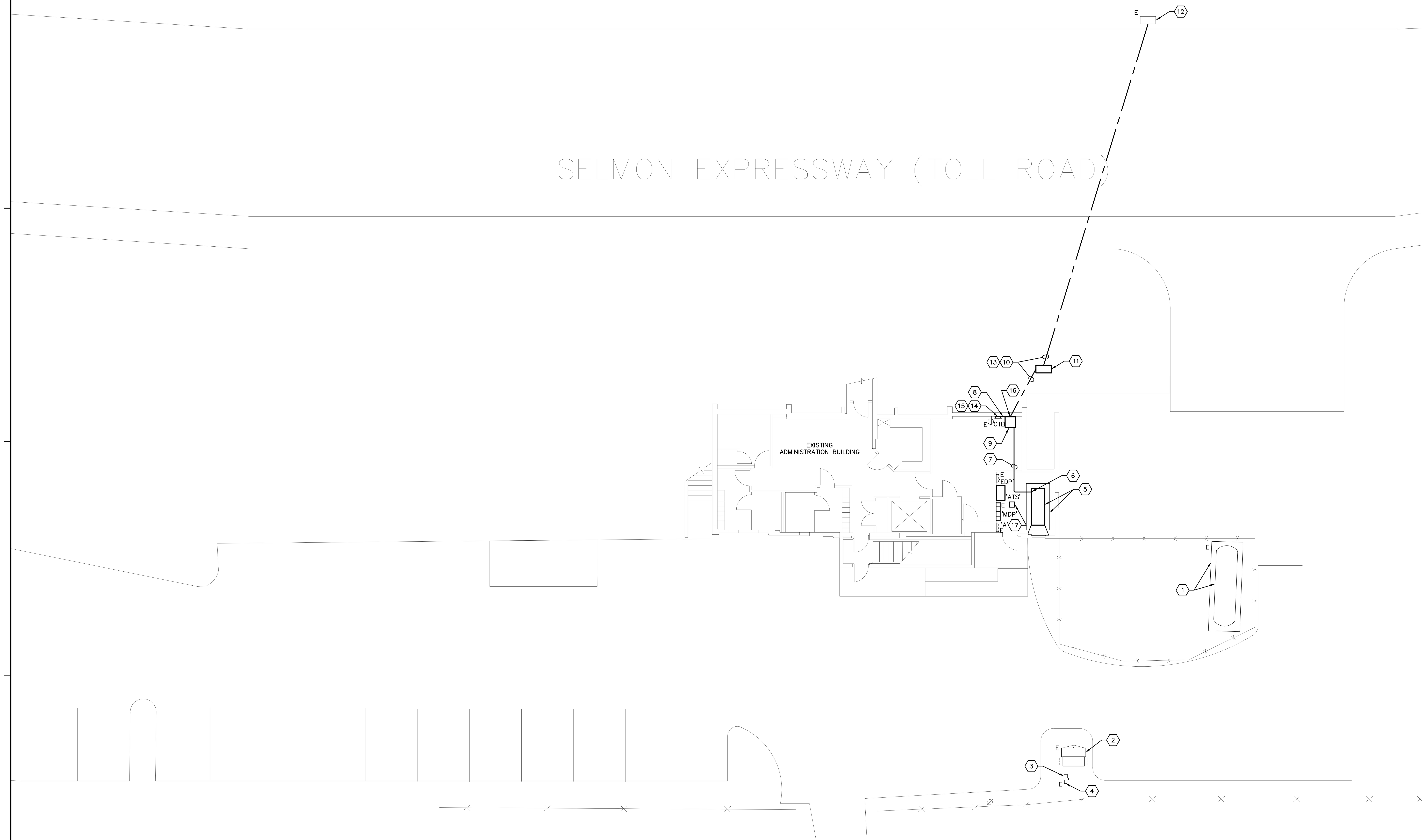
HALL ENGINEERING GROUP
Electrical | Lighting | Mechanical | Low Voltage
www.hallengroup.com | Tel: 813.374.2121
FL C.O.A. #: 27620

Project Name:
ITS AND TOLL PLAZA GENERATOR REPLACEMENT DESIGN
WEST TOLL PLAZA

Sheet Title:
Electrical Legend, Specifications & Details

Project No.: 2010D
Issue Date: 01.13.2022
Drawn By: RM
Checked By: AE
Sheet No.:
E1.0

Z:\2020 Projects\2010D THEA ITS Generator Replacement Design\Drawings\Electrical\Sheet Set\2010D_West_E1.0 Electrical Legend, Specifications & Details.dwg Jan.12.2022 9:53 am



ELECTRICAL SITE PLAN

01 ELECTRICAL SITE PLAN
SCALE: 1' = 10'-0"

0 10' 20'

DRAWING NOTES

1. EXISTING 1000 GALLON PROPANE TANK AND CONCRETE PAD.
2. EXISTING UTILITY TRANSFORMER.
3. EXISTING CONCRETE POST.
4. EXISTING UTILITY METER.
5. NEW GENERATOR ON EXISTING CONCRETE PAD. PROVIDE ANCHORING PER GENERATOR MANUFACTURER'S RECOMMENDATION WITH STAINLESS STEEL (TYPE 316) ANCHORS. PROVIDE VIBRATION ISOLATORS PER GENERATOR MANUFACTURER'S RECOMMENDATION. NOTIFY OWNER/ENGINEER OF ANY CONCERNS WITH ANCHORING NEW GENERATOR TO EXISTING PAD.
6. TERMINATE AT POWER ZONE CONNECTIVITY SERVER PROVIDED WITH GENERATOR. REFER TO LOW VOLTAGE DIAGRAM FOR ADDITIONAL INFORMATION.
7. PROVIDE 1" CONDUIT WITH CAT 6 CABLE TO CTB. ROUTE CONDUIT CONCEALED ABOVE CEILING.
8. PROVIDE 3/4" AC GRADE PLYWOOD 4' X 6' WITH TWO COATS OF FIRE RETARDANT PAINT. MOUNT TO WALL AT 20" AFF.
9. IT CABINET. PROVIDE AND MOUNT TO PLYWOOD, CHATSWORTH PART #11996-736. FUSION SPLICE LC PIGTAILS ON 12 COUNT SINGLEMODE FIBER AND INSTALL IN NEW 1U RACKMOUNT FIBER ENCLOSURE. TEST PER FDOT STANDARDS.
10. PROVIDE (2) 1" CONDUITS. PROVIDE #12 AWG LOCATE WIRE PER FDOT STANDARD SPECIFICATIONS; SECTION 630-2.2. INSTALL LOCATE WIRE AND 12 COUNT SINGLEMODE CORNING OSP FIBER IN ONE CONDUIT. SECOND CONDUIT IS SPARE. CONNECT LOCATE WIRE GROUNDING UNIT (WGU) PER FDOT STANDARD SPECIFICATIONS; SECTION 630-2.3.
11. PROVIDE AND INSTALL NEW 36" X 18" X 30" QUAZITE HANDHOLE WITH HS20 RATING. FIELD COORDINATE EXACT LOCATION WITH OWNER. REFER ALSO TO DETAIL 04 ON SHEET E0.1.
12. CONNECT (2) 1" CONDUITS TO EXISTING HANDHOLE. PROVIDE FIBER SPLICE CASE AND FUSION SPLICE 2 PAIRS INTO THE BROWN BUFFER TUBE PER FDOT STANDARDS.
13. DIRECTIONAL BORE UNDER ROADWAY.
14. MIN 18" X 8" X 1/4" COPPER GROUND BAR ON 2" INSULATED BUSHINGS. CONNECT TO BUILDING STEEL AND GROUNDING ELECTRODE SYSTEM WITH #2 AWG.
15. BOND TO IT CABINET WITH #6 AWG.
16. ROUTE CONDUITS UP BUILDING EXTERIOR. PROVIDE LB FITTING TO PENETRATE INTO BUILDING. SEAL CONDUIT OPENING TO MAINTAIN BUILDING WATER TIGHT ENVELOPE. COORDINATE WORK WITH THEA.
17. EXISTING EXHAUST FAN TO BE REPLACED WITH NEW IN SAME LOCATION. RECONNECT NEW FAN TO EXISTING CIRCUIT.

DRAWING GENERAL NOTES

A. REFER TO SPECIFICATIONS ON SHEET E1.0 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
B. REFER TO FDOT STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
C. REFER TO POWER ONE-LINE DIAGRAM FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
D. REFER TO MECHANICAL PLANS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
E. MAXIMUM 3 QUARTER TURNS (TOTAL 270°) CONDUIT BENDS BETWEEN JUNCTION/PULL BOXES.
F. PROVIDE PLASTIC INSULATED BUSHINGS AND PULL STRINGS FOR ALL LOW VOLTAGE CONDUITS.
G. LOW VOLTAGE SYSTEMS AND POWER CONDUITS SHOULD CROSS AT 90° AND MAINTAIN MINIMUM 12" SEPARATION BETWEEN CONDUITS AT ALL TIMES.
H. MAINTAIN MINIMUM 12" SEPARATION BETWEEN ELECTRICAL AND OTHER UTILITIES/INFRASTRUCTURE.
I. AREAS WHERE WORK IS NOT SHOWN SHALL REMAIN AS EXISTING UNLESS OTHERWISE NOTED.
J. COORDINATE WITH EXISTING UNDERGROUND UTILITIES AND CONDITIONS. HAND DIG TRENCHES AS REQUIRED.
K. EXTEND CONDUITS AND CONDUCTORS AS REQUIRED.
L. FIELD VERIFY EXISTING FIBER INFRASTRUCTURE PRIOR TO BIDDING AND CONSTRUCTION.

Issue / Revision:

No.	Date:	Description:
1		
2		
3		
4		
5		

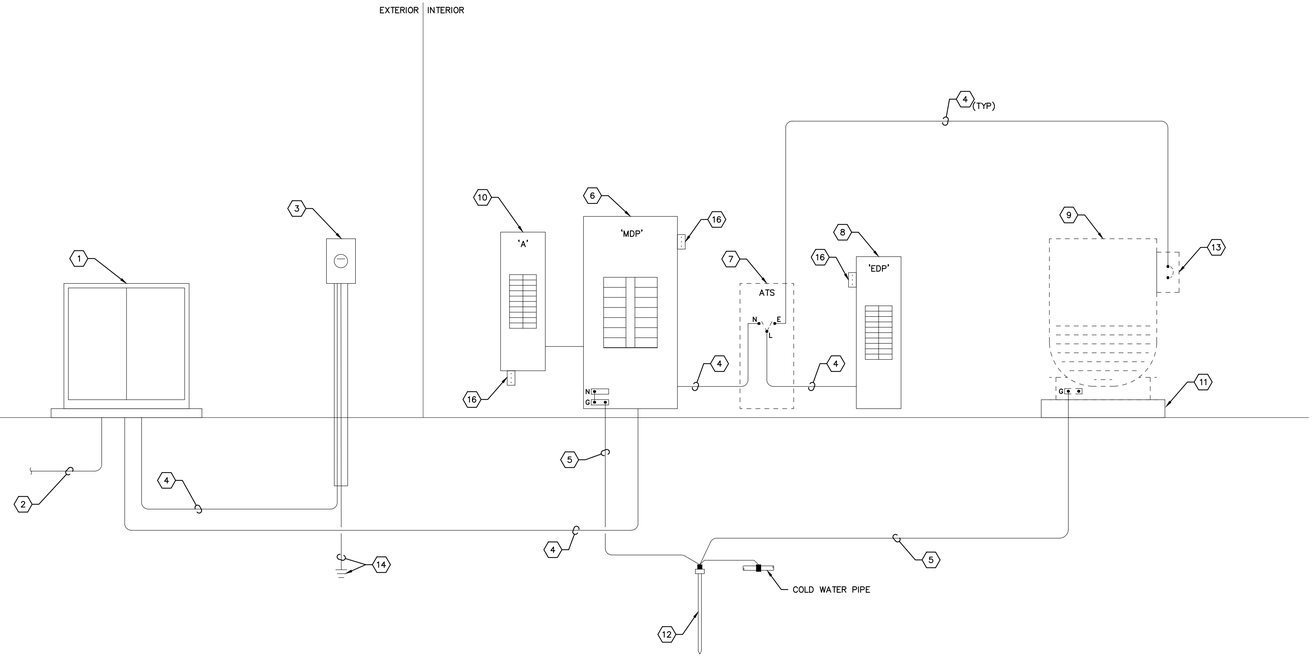
Engineer:
ADAM V. EACHES, P.E.; FL. REG. #:76151. THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY ADAM V. EACHES, P.E. USING A DIGITAL SIGNATURE AND DATE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.
Digitally signed by Adam V. Eaches, P.E. #76151
Date: 2022.01.14 11:58:10-05'00'
ADAM V. EACHES, P.E.; FL. REG. #: 76151

Consultant:
HALL ENGINEERING GROUP
Electrical · Lighting · Mechanical · Low Voltage
www.hallenggroup.com | Tel: 813.374.2121
FL. C.O.A. #: 27620

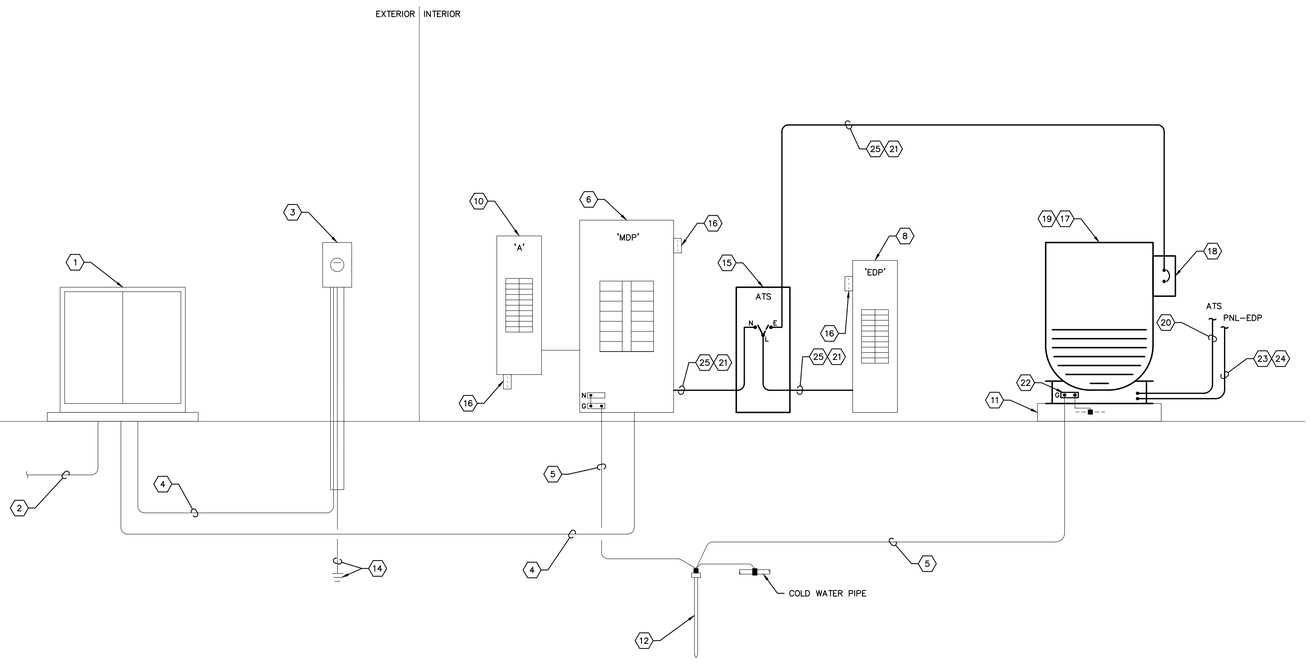
Project Name:
ITS AND TOLL PLAZA GENERATOR REPLACEMENT DESIGN WEST TOLL PLAZA

Sheet Title:
Electrical Site Plan

Project No.: 2010D
Issue Date: 01.13.2022
Drawn By: RM
Checked By: AE
Sheet No.:
E2.0



01 POWER ONE-LINE DIAGRAM - DEMOLITION
SCALE: NONE



02 POWER ONE-LINE DIAGRAM - NEW
SCALE: NONE

DRAWING GENERAL NOTES

A. REFER TO SPECIFICATIONS ON SHEET E1.0 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
B. REFER TO FDOT STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
C. CONTRACTOR SHALL UPDATE ALL PANEL DIRECTORIES.
D. LABEL ALL NEW AND EXISTING EQUIPMENT AND CONDUCTORS.
E. PRIOR TO PROJECT COMPLETION, CONTRACTOR SHALL TEST EMERGENCY POWER SYSTEM IN THE PRESENCE OF THE OWNER AND ENGINEER TO ENSURE THE SYSTEM OPERATES AS INTENDED AND TO THE OWNER'S SATISFACTION.
F. MAXIMUM 3 QUARTER TURNS (TOTAL 270°) CONDUIT BENDS BETWEEN JUNCTION/PULL BOXES.
G. MAINTAIN MINIMUM 12" SEPARATION BETWEEN ELECTRICAL AND OTHER UTILITIES/INFRASTRUCTURE.
H. EXTEND CONDUITS AND CONDUCTORS AS REQUIRED.
I. GENERAC CONTACT: JOHN LUNDAHL AT: 813-309-3980.
J. MINIMIZE DOWNTIME OF ELECTRICAL SERVICE AND EMERGENCY GENERATOR BACKUP. PROVIDE DETAILED CONSTRUCTION AND OUTAGE SCHEDULE AND SUBMIT TO THEA FOR APPROVAL.

(#) DRAWING NOTES

1. EXISTING UTILITY TRANSFORMER WITH 208/120 V, 3ø, 4W SECONDARY.
2. EXISTING PRIMARY UTILITY SERVICE CONDUCTORS.
3. EXISTING UTILITY METER.
4. EXISTING CONDUIT AND CONDUCTORS.
5. EXISTING GROUNDING ELECTRODE CONDUCTOR. TEST FOR CONTINUITY AND REPLACE IF NECESSARY. REFER TO NOTE #12 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
6. EXISTING 700 A MCB, 208/120 V, 3ø, 4W DISTRIBUTION PANELBOARD TO REMAIN.
7. EXISTING ATS TO BE REMOVED.
8. EXISTING 400 A MCB, 208/120 V, 3ø, 4W PANELBOARD TO REMAIN.
9. EXISTING 208/120 V, 3ø, 4W, 100 kW GENERATOR TO BE REMOVED.
10. EXISTING 125 A, 208/120 V, 3ø, 4W PANELBOARD TO REMAIN.
11. EXISTING GENERATOR CONCRETE PAD.
12. EXISTING COPPER CLAD GROUND ROD(S) TO REMAIN. TEST TO ENSURE RESISTANCE TO GROUND DOES NOT EXCEED 5 OHMS; PROVIDE ADDITIONAL GROUND RODS (SPACED MIN 6' APART) AS REQUIRED. FOR ADDITIONAL INFORMATION REFER TO FDOT STANDARD SPECIFICATIONS; SECTION 620-2.2.
13. EXISTING 400/3 OUTPUT CIRCUIT BREAKER TO BE REMOVED.
14. EXISTING GROUNDING.
15. 400 A, 208 V, 3ø, 3-POLE, 4W, 65 kWCR, OPEN TRANSITION ATS; GENERAC, SERIES TX301 OR ENGINEER APPROVED EQUAL.
16. EXISTING SURGE PROTECTIVE DEVICE TO REMAIN.
17. 208/120 V, 3ø, 4W, 100 kW/125 kVA, 60 HZ, STAND-BY PROPANE, UL 2200 GENERATOR SET, CRITICAL GRADE SILENCER AND EXHAUST, COOLANT HEATER, ALTERNATOR HEATER, BATTERY CHARGER; GENERAC, MODEL #SG100 WITH 130 kW ALTERNATOR, MODEL #K0130124Y21 OR ENGINEER APPROVED EQUAL. INCLUDE ALL NECESSARY COMPONENTS, FITTINGS, ISOLATORS, BATTERIES, CONNECTIONS, ETC FOR A COMPLETE AND FULLY OPERATIONAL GENERATOR SET. INCLUDE START-UP, COMMISSIONING SERVICES, LOAD BANK TESTING AND CABLES (2 HR TEST: 1 HR @ 50% LOAD AND 1 HR AT 100% LOAD), AND O&M MANUALS.
18. 400/3 OUTPUT CIRCUIT BREAKER.
19. PROVIDE GENERAC POWER ZONE CONNECTIVITY SERVER. CONNECT CONNECTIVITY SERVER TO GENERATOR CONTROLLER WITH MANUFACTURER RECOMMENDED RS-485 CABLES AND CONNECT TO 12 V POWER SUPPLY WITH 2 #16 AWG.
20. 2 #12 - 3/4" C TO ATS FOR START CIRCUIT.
21. EXTEND/REWORK CONDUIT AS REQUIRED.
22. NO NEUTRAL-GROUND BOND.
23. 2 #10 + #10 EG - 3/4" C FOR BATTERY CHARGER, COOLANT HEATER, AND ALTERNATOR HEATER CIRCUIT.
24. PROVIDE NEW 30/1 CIRCUIT BREAKER IN AVAILABLE SPACE. MATCH EXISTING MANNUFACTURER AND AIC RATING.
25. 4 #600 + #3 EG IN EXISTING 3 1/2" CONDUIT.

LOAD SUMMARY SCHEDULE

LOAD DESCRIPTION (PANEL "EDP")	LOAD
EXISTING LOAD (CALCULATED DEMAND)	99.5 kVA
NEW LOAD (CALCULATED DEMAND)	2.0 kVA
TOTAL LOAD	101.5 kVA
TOTAL AMPERES (@ 208 V, 3 Ø)	281.7 AMPS

NOTES:
1. THE EXISTING LOAD IS PER THE AS-BUILT DRAWINGS DATED 8/13/96; THE LOAD FOR THE TEMPORARY ADMIN TRAILER (NO LONGER IN USE) WAS DEDUCTED.
2. PANEL "EDP" HAS A 400 A MCB AND THEREFORE, THE NEW LOAD IS ACCEPTABLE.

Issue / Revision:

No.	Date:	Description:
1		
2		
3		
4		
5		

Engineer: Digitally signed by Adam V. Eaches, P.E. #76151 Date: 2022.01.14 11:58:28-05'00'
ADAM V. EACHES, P.E. FL. REG. # 76151

Consultant: HALL ENGINEERING GROUP
Electrical - Lighting - Mechanical - Low Voltage
www.hallengroup.com | Tel: 813.374.2121
FL: C.O.A. #: 27620

Project Name:
ITS AND TOLL PLAZA GENERATOR REPLACEMENT DESIGN
WEST TOLL PLAZA

Sheet Title: Power One-Line Diagram

Project No.:	2010D
Issue Date:	01.13.2022
Drawn By:	RM
Checked By:	AE
Sheet No.:	E3.0

Z:\2020 Projects\2010D THEA ITS Generator Replacement Design\Drawings\Electrical\Sheet Set\2010D_West_E3.0 Electrical Power One-Line Diagram.dwg Jan.12.2022 9:48 am