CONSTRUCTION DRAWINGS FOR

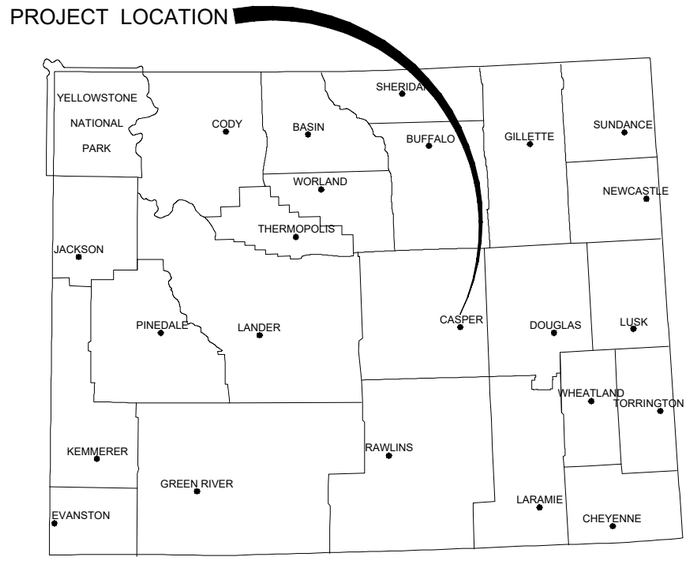
CASPER COLLEGE
GATEWAY BUILDING GENERATOR

CASPER, WYOMING
JULY 2023

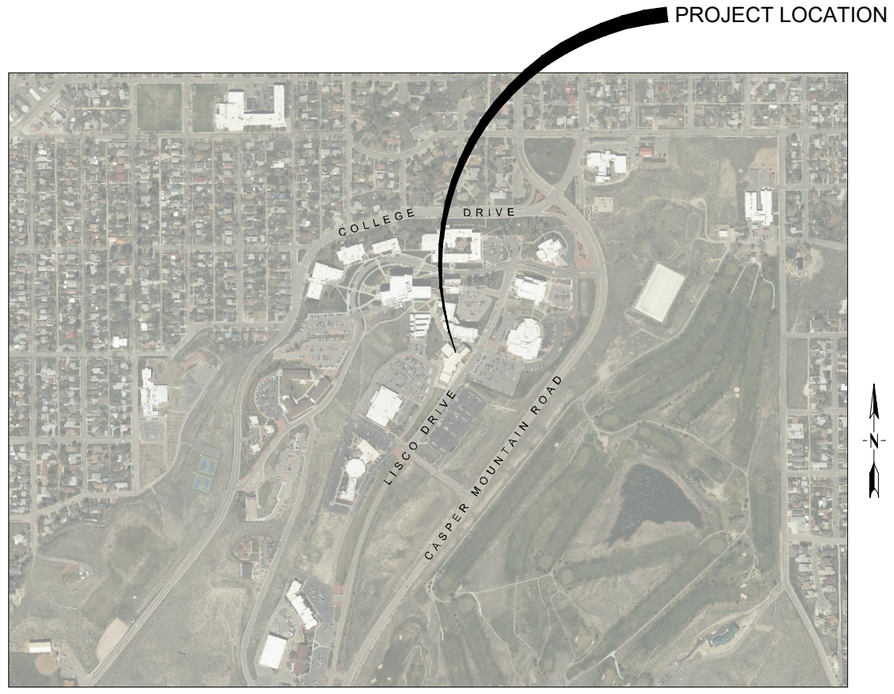
PREPARED BY:

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists

152 N. Durbin St, Suite 440, Casper, WY 82601
307.577.0450 www.m-m.net



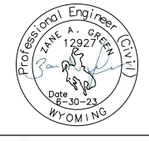
LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

SHEET INDEX		
SHT. NO.	DWG. NO.	TITLE
1	G-1	COVER SHEET
2	G-2	GENERAL ELECTRICAL NOTES
3	G-3	GENERAL ELECTRICAL NOTES
4	G-4	GENERAL ELECTRICAL NOTES
2	C-1	PROJECT LOCATION MAP
3	C-2	DEMOLITION PLAN
4	C-3	CIVIL SITE PLAN
5	E-0	ELECTRICAL LEGENDS AND SYMBOLS
6	E-1	ELECTRICAL SITE PLAN
7	E-2	ONE-LINE DIAGRAM
8	D-1	DETAILS

CONSTRUCTION DRAWINGS
JULY 2023



APPROVED BY: _____
ZANE GREEN, P.E.
PROJECT MANAGER

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists

QUALITY ASSURANCE	
ZANE GREEN, P.E. PROJECT MANAGER	07\06\23 Q.A. APPROVAL DATE
TIM BRUGGER, P.E. OFFICE QUALITY ASSURANCE COORDINATO	(000711) 23-13 Q.A. PROJECT NUMBER
RILEY OLSON, P.E. PEER REVIEWER	

SET NO. _____

MORRISON-MAIERLE PROJECT NO. 6002.013

W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\013-01_CS1-COVER SHEET.DWG PLOTTED BY:KENT KUEHN ON Jun/30/2023

GENERAL REQUIREMENTS OF ELECTRICAL

A. SUMMARY
1. THE REQUIREMENTS LISTED IN THIS SECTION ARE SUPPLEMENTAL TO THE DIVISION 01 GENERAL REQUIREMENTS.
2. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL AND LOW-VOLTAGE CONTRACTORS TO EXAMINE AND REFER TO ALL ARCHITECTURAL, CIVIL, STRUCTURAL, MECHANICAL, PLUMBING AND LANDSCAPE DRAWINGS AND SPECIFICATIONS FOR CONSTRUCTION CONDITIONS WHICH MAY AFFECT THE SCOPE OF ELECTRICAL, COMMUNICATIONS, ELECTRONIC SAFETY AND SECURITY WORK. INSPECT THE BUILDING SITE AND EXISTING FACILITIES FOR VERIFICATION OF PRESENT CONDITIONS. MAKE PROPER PROVISIONS FOR THESE CONDITIONS IN PERFORMANCE OF THE WORK AND COST THEREOF.
3. ELECTRICAL, COMMUNICATIONS, ELECTRONIC SAFETY AND SECURITY WORK FOR THIS PROJECT SHALL INCLUDE ALL ITEMS, ARTICLES, MATERIALS AND THE ASSOCIATED LABOR MENTIONED, SCHEDULES OR SHOWN IN THESE SPECIFICATIONS AND IN THE ACCOMPANYING DRAWINGS.
4. FURNISH AND INSTALL ALL EQUIPMENT, MATERIALS AND ANY REQUIRED INCIDENTAL ITEMS REQUIRED BY GOOD PRACTICE TO COMPLETE THE SYSTEMS DESCRIBED HEREIN.
5. REFER TO DIVISION 01 FOR ALL LISTED ALTERNATES AND PROVIDE SEPARATE PRICING AND WORK AS INDICATED IN DIVISION 01 AND CONTRACT DOCUMENTS.

B. DEFINITIONS - THROUGHOUT CONTRACT DOCUMENTS THESE WORDS AND PHRASES ARE USED:
1. CONTRACT DOCUMENTS - ALL DRAWINGS, SPECIFICATIONS, ADDENDA AND CHANGE ORDERS THAT DOCUMENT WORK TO BE DONE.
2. DEMOLITION – CAREFULLY DISCONNECT AND REMOVE ITEMS. ALL REASONABLE CAUTION SHALL BE TAKEN TO AVOID DAMAGING REMOVED EQUIPMENT AND TO RETAIN ITS OPERABILITY.
3. REMOVE BACK TO SOURCE - REMOVE ALL CONDUIT AND WIRE BACK TO PANELBOARD OR LAST LIVE DEVICE.
4. EQUIVALENT OR EQUAL - PRODUCT OF LIKE TYPE AND FUNCTION THAT COMPLIES WITH ALL APPLICABLE PROVISIONS OF DRAWINGS AND SPECIFICATIONS AND WHICH HAS BEEN APPROVED AS SUBSTITUTE FOR SPECIFIED ITEM.
5. FURNISH - PURCHASE MATERIAL AS SHOWN AND SPECIFIED, AND PLACE MATERIAL TO APPROVED LOCATION ON SITE OR ELSEWHERE AS NOTED OR AGREED UPON.
6. INSTALL - SET IN PLACE AND CONNECT, READY FOR USE AND IN COMPLETE AND PROPERLY OPERATING FINISHED CONDITION.
7. PROVIDE - FURNISH AND INSTALL WITH ALL PRODUCTS, LABOR, SUB-CONTRACTS, AND APPURTENANCES REQUIRED FOR A COMPLETE AND PROPERLY OPERATING, FINISHED CONDITION.
8. ROUGH-IN - PROVIDE CONDUIT RACEWAY SYSTEM WITH JUNCTION BOXES, FITTINGS, STRAPS, BUSHINGS, ETC., FOR FUTURE INSTALLATION OF WIRING, DEVICES, DISCONNECTS AND BREAKERS. PROVISION SHALL BE MADE IN PANELBOARD (HARDWARE, ETC.) FOR FUTURE INSTALLATION OF BREAKERS.
9. SERVICEABLE - ARRANGED SO THAT COMPONENT OR PRODUCT IN QUESTION MAY BE PROPERLY REMOVED AND REPLACED WITHOUT DISASSEMBLY, DESTRUCTION OR DAMAGE TO SURROUNDING INSTALLATION.

C. CODES, STANDARDS AND REGULATIONS
1. CODES - PERFORM ALL WORK IN STRICT ACCORDANCE WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODES; INCLUDING, BUT NOT LIMITED TO LATEST LEGALLY ENACTED EDITIONS OF FOLLOWING CODES:
   a. NFPA 70, NATIONAL ELECTRIC CODE – NEC
   b. NFPA 72, NATIONAL FIRE ALARM CODE
   c. ANSI-C2, NATIONAL ELECTRICAL SAFETY CODE – NESC
   d. INTERNATIONAL BUILDING CODE – IBC
   e. INTERNATIONAL FIRE CODE – IFC
   f. INTERNATIONAL ENERGY CONSERVATION CODE – IECC
2. STANDARDS - REFERENCE TO STANDARDS INFERS THAT INSTALLATION, EQUIPMENT AND MATERIAL SHALL BE WITHIN LIMITS FOR WHICH IT WAS DESIGNED, TESTED AND APPROVED, IN CONFORMANCE WITH CURRENT PUBLICATIONS AND STANDARDS OF FOLLOWING ORGANIZATIONS:
   a. AMERICAN NATIONAL STANDARDS INSTITUTE – ANSI
   b. AMERICAN SOCIETY FOR TESTING AND MATERIALS – ASTM
   c. AMERICAN SOCIETY OF HEATING REFRIGERATING AND AIR CONDITIONING ENGINEERS – ASHRAE (STANDARD 90-75)
   d. INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS – IEEE
   e. INSULATED CABLE ENGINEERS ASSOCIATION – ICEA
   f. NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION – NECA
   g. NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION – NEMA
   h. NATIONAL FIRE PROTECTION ASSOCIATION – NFPA
   i. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION – OSHA
   j. UNDERWRITERS' LABORATORIES, INC. – UL
   k. RULES AND REGULATIONS OF THE STATE/LOCAL FIRE MARSHAL
   l. STANDARDS AND REQUIREMENT OF THE SERVING UTILITIES
   m. STATE AND LOCAL ORDINANCES
3. REGULATIONS - DESIGN HAS BEEN PERFORMED IN ACCORDANCE WITH APPLICABLE REGULATIONS AND GUIDELINES NOTED BELOW. CONTRACTOR SHALL CAREFULLY APPLY THESE REGULATIONS AND BRING ANY DISCREPANCIES TO IMMEDIATE ATTENTION OF ARCHITECT/ENGINEER.
   a. AMERICANS WITH DISABILITIES ACT – ADA
   b. **ARCHITECTURAL BARRIERS ACT – ABA**

D. FEES AND PERMITS
1. ELECTRICAL CONTRACTOR SHALL PAY FOR ALL PERMITS OR FEES IN CONNECTION WITH ELECTRICAL WORK. FEES SHALL INCLUDE ANY OR ALL USER FEES, GOVERNMENT FEES, SYSTEM DEVELOPMENT FEES, CONNECTION FEES OR OTHER FEES THAT ARE REQUIRED TO BE PAID BEFORE SYSTEMS CAN BE CONNECTED OR USED.
2. SCHEDULE ALL REQUIRED ELECTRICAL INSPECTIONS WITH LOCAL ELECTRICAL INSPECTOR. NOTIFY ENGINEER OF ALL ITEMS OF DISCREPANCY NOTED BY ELECTRICAL INSPECTOR IF THOSE ITEMS AFFECT COST OR FUNCTION OF SYSTEM, OR IF THEY CONFLICT WITH ELECTRICAL DRAWINGS AND SPECIFICATIONS.
3. ALL UTILITY COST AND FEES FROM THE UTILITY WORK SHALL BE THE RESPONSIBILITY OF THE OWNER. CONTRACTOR TO COORDINATE ALL UTILITY REQUIREMENTS, STANDARDS AND RESPONSIBILITIES WITH SERVING UTILITY FOR A COMPLETE SCOPE OF WORK PRIOR TO BID.
4. DELIVER ALL INSPECTION CERTIFICATES TO ARCHITECT/ENGINEER PRIOR TO FINAL ACCEPTANCE OF WORK.

E. INTENT OF SPECIFICATIONS AND DRAWINGS
1. PLANS AND SPECIFICATIONS ARE INTENDED TO RESULT IN COMPLETE ELECTRICAL INSTALLATION IN FULL COMPLIANCE WITH ALL APPLICABLE CODES, STANDARDS AND ORDINANCES.
2. PLANS AND SPECIFICATIONS ARE TO SUPPLEMENT EACH OTHER AND ANY DETAILS CONTAINED IN ONE SHALL BE INCLUDED AS IF CONTAINED IN BOTH.
3. ELECTRICAL DRAWINGS SHALL SERVE AS WORKING DRAWINGS, BUT ARCHITECTURAL DRAWINGS SHALL TAKE PRECEDENCE IF ANY DIMENSIONAL DISCREPANCIES EXIST.
4. DRAWINGS ARE PARTLY DIAGRAMMATIC AND DO NOT SHOW ROUTING OF CONDUITS, EXACT LOCATION OF PRODUCTS, OR INSTALLATION FEATURES IN EXACT DETAIL. LOCATIONS OF DEVICES, FIXTURES AND EQUIPMENT ARE APPROXIMATE UNLESS DIMENSIONED.
5. RISER DIAGRAMS AND CONTROL SCHEMATICS ARE NOT TO SCALE AND DO NOT SHOW PHYSICAL ARRANGEMENT OF EQUIPMENT. DO NOT USE RISER DIAGRAMS OR SCHEMATICS TO OBTAIN LINEAL CONDUIT AND CABLING DISTANCES.
6. ITEMS ARE SHOWN ON DRAWINGS IN LOCATIONS TO MINIMIZE INTERFERENCE WITH OTHER EQUIPMENT, STRUCTURAL MEMBERS, ETC. EXACT FINISH LOCATIONS ARE NOT INDICATED, HOWEVER, AND ALL WORK SHALL BE DONE TO AVOID INTERFERENCE, PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.
7. IN EVENT THAT DISCREPANCIES OF ANY KIND EXIST OR REQUIRED ITEMS/DETAILS HAVE BEEN OMITTED, CONTRACTOR SHALL NOTIFY ARCHITECT/ENGINEER IN WRITING OF SUCH DISCREPANCY OR OMISSION AT LEAST TEN DAYS PRIOR TO BID DATE. FAILURE TO DO SO SHALL BE CONSTRUED AS WILLINGNESS OF CONTRACTOR TO SUPPLY ALL NECESSARY MATERIALS AND LABOR REQUIRED FOR PROPER COMPLETION OF WORK.

F. CONTRACTOR'S RESPONSIBILITY - CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF COMPLETE AND FUNCTIONAL PIECE OF WORK IN ACCORDANCE WITH TRUE INTENT OF CONTRACT DOCUMENTS. PROVIDE ALL INCIDENTAL ITEMS REQUIRED FOR COMPLETE INSTALLATION AND SATISFACTORY OPERATION OF ALL EQUIPMENT, WHETHER OR NOT SPECIFICALLY NOTED IN CONTRACT DOCUMENTS.
1. QUALIFICATIONS
   a. CONTRACTOR SHALL EMPLOY ON THIS PROJECT, CAPABLE, EXPERIENCED AND RELIABLE FOREMAN AND SUCH SKILLED WORKMEN AS MAY BE REQUIRED FOR VARIOUS CLASSES OF WORK TO BE PERFORMED.
   b. WHERE SPECIAL SKILLS AND CERTIFICATION ARE REQUIRED, CONTRACTOR SHALL ENSURE THAT WORK IS PERFORMED BY INDIVIDUALS WITH REQUIRED EXPERIENCE, SKILL AND CERTIFICATION.
   c. IF, IN ENGINEER'S OPINION, CONTRACTOR'S EMPLOYEES DO NOT POSSESS NECESSARY QUALIFICATIONS TO PERFORM SPECIALTY WORK, CONTRACTOR WILL BE REQUIRED TO OBTAIN SERVICES OF WORKMEN WHO ARE APPROVED BY MANUFACTURER AND CERTIFIED BY APPLICABLE AGENCY OR GROUP. THESE WORKMEN, IF REQUIRED, SHALL BE PROVIDED AT NO ADDITIONAL EXPENSE.
   d. REFER TO OTHER SPECIFICATION SECTIONS FOR ADDITIONAL REQUIRED CONTRACTOR QUALIFICATIONS AND CERTIFICATION.
2. LICENSING AND CERTIFICATION - ALL ELECTRICAL WORK SHALL BE ACCOMPLISHED BY ELECTRICIANS, LICENSED BY STATE IN WHICH WORK IS BEING DONE, CERTIFIED AS REQUIRED, AND SKILLED IN THEIR CRAFT. ELECTRICIAN MAY ELECT TO HIRE SUBCONTRACTORS FOR PORTIONS OF WORK (SUCH AS DATA SYSTEMS) WHO ARE NOT LICENSED ELECTRICIANS, BUT HAVE REQUIRED CERTIFICATES AND ARE LICENSED IN THEIR DISCIPLINE BY STATE IN WHICH WORK IS BEING DONE.
3. COORDINATION
   a. CONTRACTOR SHALL CONSULT ALL CONTRACT DOCUMENTS, SHOP DRAWINGS OF OTHER TRADES, AND ACTUAL BUILDING DIMENSIONS TO PREDETERMINE THAT HIS WORK AND EQUIPMENT WILL FIT AS PLANNED. DO NOT SCALE DRAWINGS FOR FABRICATION. NO EXTRA PAYMENT WILL BE ISSUED FOR MATERIALS OR ITEMS WHICH DO NOT FIT BECAUSE OF CONTRACTOR'S FAILURE TO VERIFY AS-BUILT BUILDING DIMENSIONS.
   b. CONTRACTOR SHALL CHECK LOCATION OF FIXTURES, OUTLETS, EQUIPMENT, CONDUIT, ETC., TO DETERMINE THEY CLEAR ALL OPENINGS, STRUCTURAL MEMBERS, PIPING, DUCTS AND MISCELLANEOUS EQUIPMENT HAVING FIXED LOCATIONS.
   c. CHANGES IN LOCATION OF ELECTRICAL WORK, NECESSARY DUE TO OBSTACLES OR INSTALLATION OF OTHER TRADES SHOWN ON CONTRACT DOCUMENTS, SHALL BE MADE BY ELECTRICAL CONTRACTOR AT NO EXTRA COST.
   d. CONTRACTOR SHALL COORDINATE WITH PLUMBING AND MECHANICAL CONTRACTORS TO AVOID INSTALLATION OF PIPING AND DUCTWORK ABOVE OR BELOW PANELBOARDS IN VIOLATION OF NATIONAL ELECTRICAL CODE.
   e. LAY OUT ALL WORK IN ADVANCE AND AVOID CONFLICT WITH OTHER WORK IN PROGRESS. PHYSICAL DIMENSIONS SHALL BE DETERMINED FROM ARCHITECTURAL AND STRUCTURAL PLANS. VERIFY LOCATIONS FOR JUNCTION BOXES, DISCONNECT SWITCHES, STUB-UPS, ETC., FOR CONNECTION TO EQUIPMENT FURNISHED BY OTHERS, OR IN OTHER DIVISIONS OF THIS WORK.
   f. CONTRACTOR SHALL COORDINATE AND PLAN WORK TO PROCEED WITH WORK OF OTHER TRADES.
   g. CONTRACTOR SHALL INFORM GENERAL CONTRACTOR OF ALL REQUIRED OPENINGS IN BUILDING STRUCTURE FOR INSTALLATION OF ELECTRICAL EQUIPMENT.
   h. CONTRACTOR SHALL CHECK DIMENSIONS OF ALL ELECTRICAL EQUIPMENT INSTALLED, PROVIDED BY HIMSELF OR BY OTHERS, SO CORRECT CLEARANCES AND CONNECTIONS CAN BE MADE.
   i. CONSULTING ALL CONTRACT DOCUMENTS AND SHOP DRAWINGS OF OTHER TRADES, CONTRACTOR SHALL DETERMINE WHERE ELECTRICAL JUNCTION/PULL BOXES AND EQUIPMENT CAN BE INSTALLED TO MAINTAIN PROPER ACCESSIBILITY. WHERE ACCESSIBILITY CANNOT BE MAINTAINED BY JUDICIOUS PLACEMENT OF BOXES, ELECTRICAL CONTRACTOR SHALL COORDINATE WITH GENERAL CONTRACTOR TO PROVIDE, FABRICATE, INSTALL, ADJUST, PAINT, ETC. ACCESS DOORS THROUGH NON-ACCESSIBLE FLOOR, WALL, AND CEILING FINISHES TO ALLOW ACCESS TO ALL ELECTRICAL JUNCTION AND PULL BOXES, ELECTRICAL DEVICES, ELECTRICAL EQUIPMENT, ETC. AT ALL REQUIRED LOCATIONS WHETHER SHOWN OR NOT SHOWN ON PLANS. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR DETERMINING SIZE AND LOCATION OF THE ACCESS DOORS. REPORT ANY CONFLICTS TO ARCHITECT/ENGINEER.

G. REVIEW - ALL WORK AND MATERIAL IS SUBJECT TO REVIEW AT ANY TIME BY THE ARCHITECT/ENGINEER OR HIS REPRESENTATIVE. IF THE ARCHITECT/ENGINEER OR HIS REPRESENTATIVE FINDS MATERIAL THAT DOES NOT CONFORM TO THESE SPECIFICATIONS OR THAT IS NOT PROPERLY INSTALLED OR FINISHED, CORRECT THE DEFICIENCIES IN A MANNER SATISFACTORY TO THE ARCHITECT/ENGINEER AT THE CONTRACTOR'S EXPENSE.

H. TEMPORARY FACILITIES
1. ELECTRICAL UTILITIES
   a. THE ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY ELECTRICAL POWER TO THE CONSTRUCTION SITE AS DIRECTED BY THE GENERAL CONTRACTOR. NO CONNECTIONS TO THE OWNER 'S SYSTEM SHALL BE ALLOWED WITHOUT OWNER 'S WRITTEN APPROVAL. PROVIDE A SEPARATE UTILITY SERVICE AS REQUIRED.
   b. THE ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY ELECTRICAL POWER TO JOB TRAILERS AS DIRECTED BY THE GENERAL CONTRACTOR.
   c. THE ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY COMMUNICATIONS TO JOB TRAILERS AS DIRECTED BY THE GENERAL CONTRACTOR.
   d. ALL COSTS ASSOCIATED WITH TEMPORARY POWER, COMMUNICATIONS AND UTILITY COST SHALL BE PAID BY TO THE GENERAL CONTRACTOR.
   e. THE ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY CONSTRUCTION LIGHTING AS DIRECTED BY THE GENERAL CONTRACTOR TO PROVIDE A SAFE WORKING ENVIRONMENT.
   f. ALL TEMPORARY SERVICES ARE TO BE REMOVED IN THEIR ENTIRETY PRIOR TO OCCUPANCY AS DIRECTED BY THE GENERAL CONTRACTOR.
2. OFFICES
   a. THE ELECTRICAL CONTRACTOR MUST HAVE THE PERMISSION OF THE OWNER AND GENERAL CONTRACTOR OR CONSTRUCTION MANAGER TO INSTALL A TEMPORARY OFFICE/JOB TRAILER ON THE PROJECT SITE.
   b. CONTRACTOR SHALL COMPLETELY REMOVE HIS TEMPORARY INSTALLATIONS WHEN NO LONGER NEEDED AND THE PREMISES SHALL BE COMPLETELY CLEAN, DISINFECTED, PATCHED, AND REFINISHED TO MATCH ADJACENT AREAS.
3. LADDERS AND SCAFFOLDS - THE ELECTRICAL AND LOW-VOLTAGE CONTRACTORS SHALL PROVIDE THEIR OWN LADDERS, SCAFFOLDS, ETC. OF SUBSTANTIAL CONSTRUCTION FOR ACCESS TO THEIR WORK IN VARIOUS PORTIONS OF THE BUILDING AS MAY BE REQUIRED. WHEN NO LONGER NEEDED, THEY SHALL BE REMOVED BY THE CONTRACTOR.
4. PROTECTION DEVICES - THE ELECTRICAL AND LOW-VOLTAGE CONTRACTORS SHALL PROVIDE AND MAINTAIN THEIR OWN NECESSARY BARRICADES, FENCES, SIGNAL LIGHTS, ETC., REQUIRED BY ALL GOVERNING AUTHORITIES OR SHOWN ON THE DRAWINGS. WHEN NO LONGER NEEDED, THEY SHALL BE REMOVED BY THE CONTRACTOR.
5. TEMPORARY FIRE PROTECTION - THE ELECTRICAL AND LOW-VOLTAGE CONTRACTORS SHALL PROVIDE ALL NECESSARY FIRST AID HAND FIRE EXTINGUISHERS FOR CLASS A, B, C AND SPECIAL HAZARDS AS MAY EXIST IN HIS OWN WORK AREA ONLY IN ACCORDANCE WITH GOOD AND SAFE PRACTICE AND AS REQUIRED BY JURISDICTIONAL SAFETY AUTHORITY.

I. RECORD DOCUMENTS (AS-BUILT DRAWINGS)
1. SEE REQUIREMENTS REGARDING RECORD DOCUMENTS IN GENERAL DIVISION SPECIFICATION.
2. AT BEGINNING OF WORK, CONTRACTOR SHALL SET ASIDE ONE COMPLETE SET OF DRAWINGS WHICH SHALL BE MAINTAINED AS COMPLETE "AS-BUILT" SET. DRAWINGS SHALL BE UPDATED DAILY IN NEAT AND LEGIBLE MANNER AND SHALL NOT BE USED FOR ANY OTHER PURPOSE. DRAWINGS, SPECIFICATION, ADDENDA, CHANGE ORDERS, ETC. SHALL BE MAINTAINED AT JOB SITE AND AVAILABLE FOR REVIEW AT ANY TIME.
3. SHOW DIMENSIONED LOCATION AND ROUTING OF ALL ELECTRICAL WORK THAT WILL BECOME PERMANENTLY CONCEALED, CAST IN CONCRETE OR BURIED UNDERGROUND.
4. SHOW COMPLETE ROUTING AND SIZING OF ANY SIGNIFICANT REVISIONS TO SYSTEMS SHOWN.
5. SHOW PROVISIONS FOR FUTURE CONNECTION, REFERENCED TO BUILDING LINES OR APPROVED BENCH MARKS.
6. PROVIDE WIRING DIAGRAMS FOR ALL INDIVIDUAL COMMUNICATIONS SYSTEMS AS INSTALLED. IDENTIFY ALL COMPONENTS AND SHOW ALL WIRE AND TERMINAL NUMBERS AND CONNECTIONS.
7. AT COMPLETION OF PROJECT, DELIVER DRAWINGS TO ENGINEER FOR REVIEW.

J. WARRANTY
1. THE CONTRACTOR SHALL GUARANTEE THAT ALL MATERIALS AND LABOR INSTALLED ARE NEW AND OF FIRST QUALITY AND THAT ANY MATERIAL OR LABOR FOUND DEFECTIVE SHALL BE REPLACED WITHOUT COST TO THE OWNER WITHIN ONE (1) YEAR AFTER SUBSTANTIAL COMPLETION OF THE CONTRACT OR ONE (1) FULL SEASON OF HEATING AND COOLING OPERATION, WHICHEVER IS THE GREATER. THE GUARANTEE SHALL LIST THE DATE OF THE BEGINNING OF THE ONE (1) YEAR PERIOD, WHICH SHALL BE THE DATE THAT THE SUBSTANTIAL COMPLETION CERTIFICATE IS ISSUED.
2. ANY DAMAGE TO THE BUILDING, CAUSED BY DEFECTIVE WORK OR MATERIAL OF THE CONTRACTOR WITHIN THE ABOVE-MENTIONED PERIOD, SHALL BE SATISFACTORILY REPAIRED WITHOUT COST TO THE OWNER.
3. THE GUARANTEE DOES NOT INCLUDE MAINTENANCE OF EQUIPMENT. THE OWNER SHALL ACCEPT FULL RESPONSIBILITY FOR PROPER OPERATION AND MAINTENANCE OF EQUIPMENT IMMEDIATELY UPON SUBSTANTIAL COMPLETION AND OCCUPANCY OF THE BUILDING.
4. FINAL ACCEPTANCE BY THE OWNER WILL NOT OCCUR UNTIL ALL OPERATING INSTRUCTIONS ARE SUBMITTED IN EQUIPMENT ROOMS AND OPERATING PERSONNEL THOROUGHLY INDOCTRINATED IN THE OPERATION OF ALL ELECTRICAL EQUIPMENT BY THE CONTRACTOR.
5. NO EQUIPMENT INSTALLED AS PART OF THIS PROJECT SHALL BE USED FOR TEMPORARY HEAT DURING CONSTRUCTION.

K. MATERIALS AND EQUIPMENT
1. MANUFACTURER 'S TRADE NAMES AND CATALOG NUMBERS LISTED ARE INTENDED TO INDICATE THE QUALITY OF EQUIPMENT OR MATERIALS DESIRED. MANUFACTURERS NOT LISTED IN THE SPECIFICATION WILL BE CONSIDERED SUBSTITUTIONS AND MUST HAVE PRIOR APPROVAL.
2. SEE GENERAL DIVISION FOR SUBSTITUTIONS PROCEDURES. REQUESTS FOR SUBSTITUTION ARE TO BE SUBMITTED SUFFICIENTLY AHEAD OF THE DEADLINE, TO GIVE AMPLE TIME FOR EXAMINATION. PRIOR APPROVAL REQUEST FOR SUBSTITUTION MUST INDICATE THE SPECIFIC ITEM OR ITEMS TO BE FURNISHED IN LIEU OF THOSE SCHEDULED, TOGETHER WITH COMPLETE TECHNICAL AND COMPARATIVE DATA ON SCHEDULED ITEMS AND ITEMS PROPOSED FOR SUBSTITUTION.
3. IF THE ENGINEER APPROVES ANY PROPOSED SUBSTITUTION, THE APPROVED PRODUCT WILL BE LISTED IN AN ADDENDUM. BIDDERS SHALL NOT RELY ON APPROVAL MADE IN ANY OTHER MANNER.
4. ELECTRICAL EQUIPMENT MAY BE INSTALLED WITH MANUFACTURER 'S STANDARD FINISH AND COLOR EXCEPT WHERE SPECIFIC COLOR, FINISH OR CHOICE IS INDICATED. IF THE MANUFACTURER HAS NO STANDARD FINISH, EQUIPMENT SHALL HAVE A PRIME COAT AND TWO FINISH COATS OF GRAY ENAMEL.
5. HIGH ALTITUDE OPERATION: CAPACITY OF ALL EQUIPMENT IS TO BE SIZED AND MANUFACTURED TO PERFORM AT THE ELEVATION OF THE PROJECT SITE. IF NOT SPECIFICALLY INDICATED IN THE EQUIPMENT SCHEDULE OR IN THE SPECIFICATIONS PROVIDE ALL REQUIRED ACCESSORIES AND EQUIPMENT FOR PROPER OPERATION AT ELEVATION OF THE PROJECT SITE.
6. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR MATERIALS AND EQUIPMENT INSTALLED UNDER THIS CONTRACT. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE PROTECTION OF MATERIALS AND EQUIPMENT OF OTHERS FROM DAMAGE AS A RESULT OF HIS WORK.
7. MANUFACTURED MATERIAL AND EQUIPMENT SHALL BE APPLIED, INSTALLED, CONNECTED, ERECTED, USED, CLEANED AND CONDITIONED AS DIRECTED BY MANUFACTURER UNLESS HEREIN SPECIFIED TO THE CONTRARY.
8. THIS CONTRACTOR SHALL MAKE THE REQUIRED ARRANGEMENT WITH GENERAL CONTRACTOR OR CONSTRUCTION MANAGER FOR THE INTRODUCTION INTO THE BUILDING OF EQUIPMENT TOO LARGE TO PASS THROUGH FINISHED OPENINGS.
9. STORE MATERIALS AND EQUIPMENT INDOORS AT THE JOB SITE OR, IF THIS IS NOT POSSIBLE, STORE ON RAISED PLATFORMS AND PROTECT FROM THE WEATHER BY MEANS OF WATERPROOF COVERS. COVERINGS SHALL PERMIT CIRCULATION OF AIR AROUND THE MATERIALS TO PREVENT CONDENSATION OF MOISTURE. SCREEN OR CAP OPENINGS IN EQUIPMENT TO PREVENT THE ENTRY OF VERMIN.

L. SUBSTITUTION OF MATERIALS - WHERE SUBSTITUTED EQUIPMENT REQUIRES STRUCTURAL, ARCHITECTURAL, MECHANICAL, PLUMBING OR ELECTRICAL WORK THAT DIFFERS FROM BASIC DESIGN, COST OF ALL CHANGES, INCLUDING RE-DESIGN, SHALL BE RESPONSIBILITY OF CONTRACTOR USING SUBSTITUTION.
1. APPROVED MANUFACTURERS
   a. IN GENERAL, ONE PARTICULAR MANUFACTURER AND PART NUMBER OR SERIES IS LISTED TO DESCRIBE EQUIPMENT. EQUIVALENT EQUIPMENT OF OTHER MANUFACTURERS LISTED FOR THAT ITEM MAY BE SUBSTITUTED WITHOUT PRIOR APPROVAL. IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ITEM USED FOR BIDDING PURPOSES IS TRULY EQUIVALENT TO THAT SPECIFIED. IF IT IS NOT EQUIVALENT, IT WILL BE REJECTED AT SHOP DRAWING REVIEW AND CONTRACTOR SHALL SUPPLY SPECIFIED ITEM AT HIS OWN COST.
   b. IT IS UNDERSTOOD THAT MANUFACTURERS LISTED MAY NOT ACTUALLY HAVE EQUIVALENT PRODUCT TO THAT SPECIFIED. IF CONTRACTOR/DISTRIBUTOR HAS ANY QUESTIONS REGARDING DESIRED PRODUCT CHARACTERISTICS AND SUITABILITY OF PROPOSED SUBSTITUTION, HE IS ENCOURAGED TO SUBMIT FOR PRIOR APPROVAL. ALSO, ANY MANUFACTURER NOT LISTED SHALL BE SUBMITTED FOR PRIOR APPROVAL.
2. PRIOR APPROVALS
   a. MANUFACTURERS NOT LISTED IN SPECIFICATION OR ON SCHEDULE FOR A PARTICULAR ITEM ARE OPEN FOR SUBSTITUTION PRIOR TO BID OPENING ONLY.
   b. MANUFACTURERS DESIRING APPROVAL SHALL SUBMIT CATALOG CUTS THAT DEFINE QUALITY OF PRODUCT AND ABILITY TO PERFORM AS SPECIFIED. IT IS UNDERSTOOD THAT NO TWO MANUFACTURES USE IDENTICAL METHODS OR MAKE IDENTICAL PRODUCTS. ANY AND ALL DEVIATIONS FROM THAT SPECIFIED SHALL BE CLEARLY NOTED.
   c. SUBMITTALS SHALL ARRIVE AT ENGINEER AT LEAST TEN (10) DAYS PRIOR TO BID OPENING. ALL APPROVALS WILL BE LISTED IN LAST ADDENDUM AS BEING APPROVED TO BID. ITEMS SUBSTITUTED, BUT NOT LISTED IN CONTRACT DOCUMENTS, WILL NOT BE CONSIDERED IF SUBMITTED ON SHOP DRAWINGS.
   d. APPROVAL OF SUBSTITUTE EQUIPMENT IS ON BASIS OF QUALITY ONLY. MATERIALS SUPPLIER SHALL BE RESPONSIBLE FOR HIS QUOTATION REFLECTING PROPER SELECTION OF HIS PARTICULAR EQUIPMENT WITH REGARD TO PROPER CAPACITIES, PHYSICAL DIMENSIONS, REQUIREMENTS, INTENDED FUNCTION, FINISH, COLOR, ETC. ENGINEER WILL NOT GIVE APPROVAL TO SPECIFIC MODEL NUMBERS OR CHECK CAPACITIES, DIMENSIONS, OR REQUIREMENTS. EVALUATION WILL BE ON BASIS OF QUALITY AND EQUALITY TO SPECIFIED ITEMS.
   e. PRIOR APPROVAL SHALL BE OBTAINED FROM ENGINEER AND NO OTHER ENTITY (ARCHITECT, OWNER, ETC.) IS AUTHORIZED TO GIVE SUCH APPROVAL.
3. SAMPLES
   a. WHERE, IN ENGINEER/ARCHITECT'S OPINION, PRODUCT SAMPLE IS REQUIRED IN ORDER TO DETERMINE APPEARANCE, QUALITY, WORKMANSHIP OR OPERATION, CONTRACTOR SHALL SUBMIT ACTUAL PRODUCTION SAMPLES OF ITEM IN QUESTION.
   b. SAMPLES WILL BE RETURNED TO CONTRACTOR. APPROVED SAMPLES MAY BE USED.
   c. ALL COSTS INCURRED IN PROVIDING AND RETURNING SAMPLES WILL BE CONTRACTOR'S RESPONSIBILITY.

M. PRODUCT AND SYSTEM SUBMITTALS
1. SUBMITTALS WILL BE REQUIRED FOR EACH PIECE OF EQUIPMENT, MATERIAL OR PRODUCT AS NOTED IN THE TABLE BELOW. ALL SUBMITTAL SHALL BE SUBMITTED, REVIEWED AND ALL DISCREPANCIES ADDRESSED PRIOR TO ORDERING EQUIPMENT OR STARTING WORK. ANY EQUIPMENT ORDERED WITHOUT HAVING FIRST COMPLETED THE SUBMITTAL PROCESS IS DONE AT THE RISK OF THE CONTRACTOR. ANY WORK PERFORMED PRIOR TO COMPLETING THE SUBMITTAL PROCESS IS DONE AT THE RISK OF THE CONTRACTOR.
2. SUBMITTAL DEFINITIONS
   a. PRODUCT DATA: PROVIDE MANUFACTURERS CUT SHEETS THAT INCLUDE GENERAL PRODUCT INFORMATION INCLUDING BUT NOT LIMITED TO: MODEL NUMBER, PHYSICAL DATA, NOMINAL CAPACITIES, ROUGH-IN REQUIREMENTS.
   b. PERFORMANCE DATA: PROVIDE DETAILED PERFORMANCE AND CAPACITIES BASED ON PROJECT SPECIFIC REQUIREMENTS INCLUDING BUT NOT LIMITED TO: VOLTAGE, PHASE, AMPERAGE, OVERCURRENT PROTECTION, CONDUCTOR SIZE, CONDUCTOR MATERIAL, CONDUIT SIZE, COLOR TEMPERATURE, COLOR RENDERING INDEX, LIFE EXPECTANCE, EFFICACY, EFFICIENCY, IP RATINGS, LIGHT DISTRIBUTION TYPES AND LIGHTING CONTROL.
   c. SHOP DRAWINGS: PROVIDE DETAILED DRAWINGS OF THE EQUIPMENT SHOWING OVERALL DIMENSIONS, LOCATION OF ELECTRICAL CONNECTION, LOCATION OF ANCHORAGE POINTS, LOCATION OF ELECTRICAL AND CONTROL PANELS, AND CLEAR OPERATING, SERVICE AND MAINTENANCE CLEARANCES.
   d. DELEGATED DESIGN: PROVIDE DETAILED DRAWINGS PREPARED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER THAT DETAIL PERTINENT DESIGN CRITERIAL, THE MATERIALS AND PRODUCTS TO BE INSTALLED AND THE REQUIRED INSTALLATION LOCATIONS.
   e. WIRING DIAGRAM: PROVIDE DIAGRAMS THAT IDENTIFY AND DETAIL REQUIRED FIELD WIRING.
   f. COLOR CHART: PROVIDE A PHYSICAL COLOR CHART OF MATERIAL SAMPLES REQUIRED FOR SELECTION OF EQUIPMENT COLORS.
   g. SUSTAINABILITY COMPLIANCE: PROVIDE LITERATURE THAT INDICATED A PRODUCTS COMPLIANCE WITH LEED OR GREEN GLOBES. SEE DIVISION 01 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
3. SUBMITTAL FORMATS
   a. INCLUDE THE FOLLOWING INFORMATION WITH EACH SUBMITTAL:
      - PROJECT NAME
      - SUBMITTAL DATE
      - NAME OF ARCHITECT
      - NAME OF ENGINEER
      - NAME OF GENERAL CONTRACTOR OR CONSTRUCTION MANAGER
      - NAME OF SUB-CONTRACTOR
      - NAME OF FIRM OR ENTITY THAT PREPARED THE SUBMITTAL
      - UNIQUE SUBMITTAL NUMBER
      - TYPE OF SUBMITTAL
      - SPECIFICATION SECTION
      - NAME OR MARK OF EQUIPMENT OR MATERIAL AND DETAIL OR DRAWINGS REFERENCE.
   b. ALL SUBMITTAL WITH THE EXCEPTION OF COLOR CHARTS OR MATERIAL SAMPLES SHALL BE ELECTRONICALLY TRANSMITTED PDF'S. ALL SUBMITTALS OVER 8 MB SHALL BE SETUP ON A SHARE FILE SITE AND ACCES

GENERAL REQUIREMENTS OF ELECTRICAL (CONT'D)

4. SUBMITTAL REQUIREMENTS
   a. SUBMITTALS SHALL BE SUBMITTED AS A COMPLETE SPECIFICATION SECTION. THE SUBMITTAL MUST INCLUDE ALL MATERIALS AND EQUIPMENT FOR THAT SPECIFICATION SECTION. SUBMITTALS FOR INDIVIDUAL MATERIALS OF EQUIPMENT WILL BE REJECTED WITHOUT REVIEW.
   b. SUBMITTALS SHALL BE COMPLETE, CLEARLY SHOW ITEM USED, SIZE, DIMENSIONS, CAPACITY, ROUGH IN, ETC., AS REQUIRED FOR COMPLETE CHECK AND INSTALLATION. MANUFACTURER 'S LITERATURE SHOWING MORE THAN ONE ITEM SHALL BE CLEARLY MARKED AS TO WHICH ITEM IS BEING FURNISHED OR IT WILL BE REJECTED AND RETURNED WITHOUT REVIEW.
   c. EACH SUBMITTAL SHALL BE THOROUGHLY CHECKED BY THE CONTRACTOR FOR COMPLIANCE WITH THE CONTRACT DOCUMENT REQUIREMENTS, ACCURACY OF DIMENSIONS, RELATIONSHIP TO THE WORK OF OTHER TRADES, AND CONFORMANCE WITH SOUND, SAFE PRACTICES AS TO ERECTION AND INSTALLATION. EACH SUBMITTAL SHALL THEN BEAR A STAMP EVIDENCING SUCH CHECKING AND SHALL SHOW CORRECTIONS MADE, IF ANY. SUBMITTALS REQUIRING EXTENSIVE CORRECTIONS SHALL BE REVISED BEFORE SUBMISSION. EACH SUBMITTAL NOT STAMPED AND SIGNED BY THE GENERAL AND ELECTRICAL CONTRACTORS EVIDENCING SUCH CHECKING WILL BE REJECTED AND RETURNED WITHOUT REVIEW.
   d. ON EACH SUBMITTAL, CLEARLY INDICATE DEVIATIONS FROM REQUIREMENTS IN THE CONTRACT DOCUMENTS, INCLUDING MINOR VARIATIONS AND LIMITATIONS; INCLUDE RELEVANT ADDITIONAL INFORMATION AND REVISIONS, OTHER THAN THOSE REQUESTED ON PREVIOUS SUBMITTALS. INDICATE BY HIGHLIGHTING ON EACH SUBMITTAL OR NOTING ON ATTACHED SEPARATE SHEET.
   e. REVIEW OF THE SHOP DRAWINGS AND LITERATURE BY THE ENGINEER SHALL NOT RELIEVE THE CONTRACTOR FOR RESPONSIBILITY FOR DEVIATIONS FOR THE DRAWINGS OR SPECIFICATIONS, NOR SHALL IT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS IN THE SHOP DRAWINGS OR LITERATURE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE MATERIALS AND EQUIPMENT WHICH MEET THE SPECIFICATIONS AND JOB REQUIREMENTS.
   f. LUMINAIRES SUBMITTALS SHALL INCLUDE DIMENSIONS, QUALITY, DISTRIBUTION, COLOR RENDERING INDEX, COLOR TEMPERATURE, OPTICS, PHOTOMETRICS, ALL LISTINGS (UL, DLC, ENERGY STAR, MADE IN AMERICA, ETC.), IP RATINGS, VOLTAGE, WATTAGE, WARRANTY, INSTALLATION METHODS, CONTROL METHODS, EFFICACY, EFFICIENCY, DIFFUSER OPTIONS, EMERGENCY OPERATION AND ANY REQUIRED ACCESSORIES. PROVIDE IES AND REVIT FILES UPON REQUEST.
5. ENGINEER'S REVIEW - SUBMITTAL REVIEW IS FOR GENERAL DESIGN AND ARRANGEMENT ONLY AND DOES NOT RELIEVE CONTRACTOR FROM ANY REQUIREMENTS OF CONTRACT DOCUMENTS. SUBMITTALS WILL NOT BE CHECKED FOR QUANTITY, DIMENSION, FIT OR PROPER TECHNICAL DESIGN OF MANUFACTURED EQUIPMENT. WHERE PRODUCT OR SYSTEM PERFORMANCE DEVIATIONS HAVE NOT BEEN SPECIFICALLY NOTED IN SUBMITTAL BY CONTRACTOR, ENGINEER'S REVIEW WILL NOT RELIEVE CONTRACTOR'S RESPONSIBILITY TO PROVIDE COMPLETE AND SATISFACTORY WORKING INSTALLATION OF EQUAL QUALITY AND PERFORMANCE TO SPECIFIED SYSTEM. ORDERING, MANUFACTURE, SHIPMENT OR INSTALLATION OF EQUIPMENT PRIOR TO RECEIPT OF ENGINEER'S WRITTEN REVIEW IS STRICTLY AT CONTRACTOR'S RISK AND ALL COSTS ASSOCIATED WITH SHIPPING, CHANGES, REPLACEMENT OR RESTOCKING SHALL BE CONTRACTOR'S RESPONSIBILITY.

N. SUB-CONTRACTORS - WITH SHOP DRAWING SUBMITTALS, CONTRACTOR SHALL SUBMIT LIST OF ALL SUB-CONTRACTORS TO BE USED FOR THE PROJECT.

O. OPERATION AND MAINTENANCE MANUALS
1. OPERATION AND MAINTENANCE MANUALS (O&M MANUALS) SHALL CONTAIN:
   a. NAMES AND CONTACT INFORMATION FOR THE PROJECT ARCHITECT, PROJECT ENGINEER.
   b. NAMES AND CONTACT INFORMATION FOR THE GENERAL CONTRACTOR OR CONSTRUCTION MANAGER.
   c. NAMES AND CONTACT INFORMATION FOR SUB-CONTRACTORS.
   d. INSTALLATION, MAINTENANCE AND OPERATING INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT.
   e. PARTS LISTS
   f. WIRING DIAGRAMS
   g. EQUIPMENT START-UP AND INSPECTION CERTIFICATES
   h. TEST AND BALANCE REPORTS
   i. COMMISSIONING REPORTS
   j. COPIES OF EQUIPMENT WARRANTIES
   k. COPIES OF SUBMITTALS
   l. RECORD DRAWINGS.
   m. TRAINING DVD'S
2. PRIOR TO SUBSTANTIAL COMPLETION SUBMIT AN ELECTRONIC COPY OF THE O&M MANUAL IN PDF FORMAT TO THE ARCHITECT, ENGINEER AND OWNER FOR REVIEW AND APPROVAL. THE PDF SHALL BE ONE FILE WITH AN INDEX AND HYPERLINKS TO EACH SECTION. INDIVIDUAL BOUND PDFS WITHOUT AUTOMATED NAVIGATION WILL BE REJECTED. ALL O&M DATA SHALL BE GROUPED BY THE EQUIPMENT TYPE AND ORDERED BY THE SPECIFICATION NUMBERING.
3. PRIOR TO FINAL PAYMENT A FINAL ELECTRONIC COPY OF THE O&M MANUAL ON AN ARCHIVAL QUALITY DVD AS WELL AS TWO PRINTED COPIES SHALL BE FURNISHED TO THE OWNER. PRINTED COPIES SHALL HAVE COMMERCIAL QUALITY 8-1/2" X 11" 3-RING BINDERS WITH TABBED DIVIDERS FOR EACH SECTION.

P. SITE EXAMINATION
1. PRIOR TO SUBMITTING BID, CONTRACTOR SHOULD VISIT SITE OF PROPOSED WORK AND FAMILIARIZE HIMSELF WITH CONDITIONS AFFECTING WORK. ALLOWANCE SHALL BE MADE IN BID FOR THESE CONDITIONS AND NO ADDITIONAL ALLOWANCE SHALL BE GRANTED BECAUSE OF LACK OF KNOWLEDGE OF SUCH CONDITIONS.
2. CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AT BUILDING SITE.

Q. CUTTING AND PATCHING
1. OBTAIN WRITTEN PERMISSION OF ARCHITECT/ENGINEER BEFORE CUTTING OR PIERCING STRUCTURAL MEMBERS.
2. SLEEVES THROUGH FLOORS AND WALLS SHALL BE BLACK IRON PIPE, FLUSH WITH WALLS, CEILINGS OR FINISHED FLOORS, SIZED TO ACCOMMODATE RACEWAY. GROUT ALL PENETRATIONS THROUGH CONCRETE WALLS OR FLOORS. HOLES THROUGH EXISTING CONCRETE AND CONCRETE BLOCK (CMU) SHALL BE CORE DRILLED.

R. CLEAN-UP AND COMMISSIONING
1. DURING CONSTRUCTION - THROUGHOUT CONSTRUCTION, KEEP WORK AREA REASONABLY NEAT AND ORDERLY BY PERIODIC CLEAN-UPS.
2. COMMISSIONING - AS INDEPENDENT PARTS OF CONSTRUCTION ARE COMPLETED, THEY MAY BE COMMISSIONED AND UTILIZED DURING CONSTRUCTION. SEE VARIOUS SECTIONS FOR RESTRICTIONS.
3. AT COMPLETION OF WORK
   a. CLEAN EQUIPMENT OF DIRT AND DEBRIS, INCLUDING INTERIOR OF PANELS, OUTLET BOXES, ETC. REMOVE LABELS FROM AND CLEAN ALL FIXTURE LENSES.
   b. REMOVE MATERIALS, SCRAPS, ETC., RELATIVE TO THIS WORK AND LEAVE PREMISES IN CLEAN AND ORDERLY CONDITION. THIS INCLUDES ALL TUNNELS, ATTICS, CEILING AND CRAWL SPACES.
   c. REMOVE ALL TEMPORARY FACILITIES AND RESTORE TO CONDITIONS PRESENT PRIOR TO WORK.

S. PROJECT COMPLETION AND DEMONSTRATION
1. TESTING
   a. PRIOR TO FINAL TEST, ALL SWITCHES, PANELBOARDS, DEVICES, AND FIXTURES SHALL BE IN PLACE.
   b. AT COMPLETION OF WORK, OR UPON REQUEST FROM ARCHITECT/ENGINEER, PLACE ENTIRE ELECTRICAL INSTALLATION, AND/OR ANY PORTION THEREOF, IN OPERATION TO DEMONSTRATE SATISFACTORY OPERATION.
   c. ALL ELECTRICAL SYSTEMS SHALL BE FREE FROM SHORT CIRCUITS AND UNINTENTIONAL GROUNDS.
   d. FURNISH ONE (1) COPY OF CERTIFIED TEST RESULTS TO ARCHITECT/ENGINEER PRIOR TO FINAL INSPECTION AND INCLUDE ONE (1) COPY IN EACH BROCHURE OF EQUIPMENT.
2. ADJUSTMENTS
   a. MAKE ALL CHANGES NECESSARY TO BALANCE CONNECTED ELECTRICAL LOADS ON COMPLETE SYSTEM. ARRANGE FOR BALANCED CONDITIONS OF CIRCUITS UNDER CONNECTED LOAD DEMANDS, AS CONTEMPLATED BY NORMAL WORKING CONDITIONS. FINAL LOAD AND BALANCE TEST SHALL BE DEMONSTRATED IN PRESENCE OF ARCHITECT/ENGINEER.
   b. IMMEDIATELY CORRECT ALL DEFICIENCIES WHICH ARE EVIDENCED DURING TESTS AND REPEAT TESTS UNTIL SYSTEM IS APPROVED. DO NOT COVER OR CONCEAL ELECTRICAL INSTALLATIONS UNTIL SATISFACTORY TESTS ARE MADE AND APPROVED.
3. FINAL WALK-THRU
   a. CONDUCT OPERATING TESTS DURING FINAL INSPECTION. DEMONSTRATE INSTALLATION TO OPERATE SATISFACTORILY IN ACCORDANCE WITH REQUIREMENTS OF CONTRACT DOCUMENTS. SHOULD ANY PORTION OF INSTALLATION FAIL TO MEET REQUIREMENTS OF CONTRACT DOCUMENTS, REPAIR OR REPLACE ITEMS FAILING TO MEET REQUIREMENTS UNTIL ITEMS CAN BE DEMONSTRATED TO COMPLY.
   b. HAVE INSTRUMENTS AVAILABLE FOR MEASURING LIGHT INTENSITIES, VOLTAGE AND CURRENT VALUES AND FOR DEMONSTRATION OF CONTINUITY, GROUNDS, OR OPEN CIRCUIT CONDITIONS.
   c. FURNISH PERSONNEL TO ASSIST IN TAKING MEASUREMENTS AND MAKING TESTS. IN EVENT THAT SYSTEMS ARE NOT COMPLETE AND FULLY OPERATIONAL AT TIME OF FINAL INSPECTION, ALL COSTS OF ANY SUBSEQUENT INSPECTIONS SHALL BE BORNE BY CONTRACTOR AT NO ADDITIONAL COST TO OWNER.

T. OWNER ORIENTATION AND TRAINING
1. GENERAL
   a. THE SYSTEM TRAINING IS INTENDED TO FAMILIARIZE THE OWNER 'S OPERATING AND MAINTENANCE STAFF WITH ALL SYSTEMS REQUIRING MAINTENANCE. TRAINING IS TO BE PROVIDED AFTER THE SYSTEMS ARE IN PLACE AND OPERATIONAL, AFTER ISSUES NOTED DURING COMMISSIONING HAVE BEEN RESOLVED, AND BEFORE FINAL ACCEPTANCE.
   b. PROVIDE SECOND SET OF TRAINING SESSIONS FOR AUTOMATIC CONTROL SYSTEMS ABOUT 6-9 MONTHS AFTER THE FIRST SESSIONS.
   c. ALL TRAINING SHALL BE VIDEO TAPED, REPRODUCED ON DVD 'S AND GIVEN TO THE OWNER. PROVIDE A COPY FOR EACH O&M MANUAL PRODUCED.
   d. SEE INDIVIDUAL SPECIFICATION SECTIONS FOR ADDITIONAL TRAINING REQUIREMENTS.
2. ATTENDANCE - TRAINING IS TO BE PROVIDED BY CONTRACTOR 'S REPRESENTATIVES THAT ARE FAMILIAR WITH THE SYSTEM 'S OPERATION AND MAINTENANCE REQUIREMENTS. INDIVIDUAL TRAINING SESSIONS (MODULES) ARE TO PROVIDED FOR EACH TYPE OR GROUP OF SYSTEMS, SEPARATED ROUGHLY BY TRADE GROUP THAT WILL BE PERFORMING MAINTENANCE ON THE SYSTEM.
3. SCHEDULE - DUPLICATE TRAINING SESSIONS ARE TO BE PROVIDED FOR EACH TRAINING MODULE, SO THAT OWNER 'S OPERATING PERSONNEL CAN BE SPLIT INTO TWO GROUPS DURING TRAINING. DUPLICATE TRAINING SESSIONS TO BE SCHEDULED ON DIFFERENT DAYS. LENGTH OF TRAINING SESSIONS WILL BE DETERMINED BY SCOPE OF TRAINING INDICATED BELOW, AND AS COORDINATED WITH OWNER AFTER DRAFT COPY OF TRAINING DOCUMENTS HAVE BEEN REVIEWED.
4. TRAINING DOCUMENTATION
   a. CONTRACTOR TO SUBMIT DRAFT COPY OF AGENDA AND TRAINING DOCUMENTS TO OWNER FOR REVIEW AT LEAST TWO WEEKS PRIOR TO TRAINING DATE.
   b. PROVIDE A COPY OF THE FOLLOWING ITEMS FOR EACH PERSON THAT WILL BE ATTENDING THE TRAINING SESSIONS. COORDINATE REQUIRED NUMBER WITH THE OWNER.
      - TRAINING AGENDA.
      - SUMMARY OF NEW SYSTEMS AND EXISTING SYSTEMS AFFECTED BY THIS PROJECT.
      - SUMMARY OF WORK PERFORMED UNDER THIS PROJECT.
      - CONTROL SYSTEM DRAWINGS AND SEQUENCES OF OPERATION.
      - LIST OF IMPORTANT MAINTENANCE AND TROUBLE-SHOOTING OPERATIONS FOR ALL SYSTEMS.
   c. PROVIDE MINIMUM OF 2 COPIES OF CONTRACT DOCUMENTS INCLUDING ALL DRAWINGS, SPECIFICATIONS, ADDENDUMS, AND CHANGE ORDERS.
5. TRAINING SESSIONS
   a. ASSEMBLE AT LOCATION TO BE DETERMINED BY THE OWNER.
   b. DISTRIBUTE TRAINING DOCUMENTATION AS INDICATED ABOVE.
   c. PROVIDE CLASSROOM STYLE TRAINING IF REQUIRED FOR ORIENTATION, DISCUSSION OF NEW SYSTEMS AND EXISTING SYSTEMS AFFECTED BY THIS PROJECT, AND OTHER ISSUES APPROPRIATE FOR A CLASSROOM FORMAT.
   d. VISIT SITE AND REVIEW LOCATIONS, AND PERFORM DETAILED REVIEW OF OPERATION AND MAINTENANCE REQUIREMENTS FOR CURRENT SYSTEMS.
   e. ALL TRAINING SESSION SHALL BE VIDEO RECORDED AND DISTRIBUTED TO THE OWNER UPON COMPLETION IN DVD FORMAT, OR OWNER DESIRED FORMAT. INCLUDE ALL TRAINING VIDEOS IN THE O&M MANUAL.

SELECTIVE DEMOLITION OF ELECTRICAL SYSTEMS

A. NOT ALL REMOVAL AND REVISION WORK REQUIRED AS PART OF THE DEMOLITION WORK IS SHOWN ON THE PLANS. THE PLANS ARE INTENDED TO INDICATE AREAS WHERE DEMOLITION WILL OCCUR AND TO ESTABLISH THE INTENT OF THE DEMOLITION WORK. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE ALL EXISTING ELECTRICAL RACEWAYS, WIRES, DEVICES AND EQUIPMENT THAT FALL WITHIN THE AREA AFFECTED BY DEMOLITION OF THE STRUCTURE.

B. THE CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH WORK AND LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. USING ORIGINAL DESIGN DRAWINGS AND WALK-THROUGH INSPECTIONS, A CONCERTED EFFORT WAS MADE TO PLACE PERTINENT INFORMATION ON THE CONTRACT DRAWINGS. HOWEVER, DUE TO THE NATURE OF DEMO/REMODEL WORK, THE CONTRACTOR MUST BEAR IN MIND THAT UNFORESEEN CONDITIONS MAY EXIST, AND SHALL THOROUGHLY INSPECT THE WORK AREA PRIOR TO HIS BID. THE CONTRACTOR SHALL INCLUDE IN HIS BID ANY/ALL INCIDENTAL ITEMS WHICH MAY BE REQUIRED TO PROVIDE COMPLETE DEMOLITION AND REWORK ASSOCIATED SYSTEMS IN ADJACENT AREAS WHERE NO DEMOLITION IS OCCURRING.

C. PROVIDE TEMPORARY WIRING AND CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION. WHEN WORK MUST BE PERFORMED ON ENERGIZED EQUIPMENT OR CIRCUITS, USE PERSONNEL EXPERIENCED IN SUCH OPERATIONS AND FOLLOW THE SAFE WORKING PRACTICE REQUIREMENTS OF NFPA 70E.

D. INVENTORY AND RECORD, BY USE OF PRECONSTRUCTION PHOTOGRAPHS OR VIDEO, THE CONDITION OF ITEMS TO BE REMOVED AND SALVAGED. PROVIDE PHOTOGRAPHS OR VIDEO OF CONDITIONS THAT MIGHT BE MISCONSTRUED AS DAMAGE CAUSED BY SALVAGE OPERATIONS.

E. MAKE PROVISIONS TO MAINTAIN EXISTING ELECTRICAL SERVICE ENERGIZED UNTIL NEW SYSTEM IS COMPLETE AND READY FOR USE. OBTAIN PERMISSION FROM THE OWNER AND THE ARCHITECT/ENGINEER AT LEAST [48] HOURS PRIOR TO PARTIALLY OR COMPLETELY DISABLING THE SYSTEM. MINIMIZE THE DURATION OF ANY OUTAGES. IF REQUIRED, MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO THE DEMOLITION WORK AREA.

F. REMOVE ALL ELECTRICAL DEVICES FROM WALLS, FLOORS AND CEILINGS THAT ARE TO BE DEMOLISHED OR MOVED. REMOVE ABANDONED OUTLETS IF CONDUIT AND WIRING SERVICING THEM IS ABANDONED AND REMOVED. PROVIDE BLANK COVER FOR ANY ABANDONED BOXES WHICH ARE NOTED ON THE PLANS AS NOT REMOVED. REMOVE CONDUIT TO POINT WHERE IT NO LONGER INTERFERES WITH CONSTRUCTION AND IS CONCEALED. FOR CONDUIT BURIED IN CONCRETE OR CMU WALLS, CUT CONDUIT OFF FLUSH WITH FLOOR AND PLUG CONDUIT. REMOVE ALL CONDUCTORS BACK TO SOURCE (PANELBOARD OR LAST LIVE DEVICE).

G. MAINTAIN ACCESS TO EXISTING ELECTRICAL INSTALLATIONS THAT REMAIN ACTIVE. MODIFY INSTALLATION OR PROVIDE ACCESS PANEL AS REQUIRED.

H. PROVIDE REVISED TYPED CIRCUIT DIRECTORY IN PANELBOARDS THAT HAVE CIRCUITS REMOVED.

I. REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION AND EXTENSION WORK.

J. EQUIPMENT TO BE RELOCATED SHALL BE SERVICED, MODIFIED AND REPAIRED AS NECESSARY TO PLACE IT IN GOOD WORKING ORDER AND TO THE SATISFACTION OF ARCHITECT/ENGINEER. PROTECT ITEMS FROM DAMAGE DURING TRANSPORT AND STORAGE. ANY LOST, STOLEN OR DAMAGED ITEMS ARE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPLACED WITH NEW ITEMS THAT MATCH THE ORIGINAL. REINSTALL ITEMS IN LOCATIONS INDICATED. COMPLY WITH INSTALLATION REQUIREMENTS FOR NEW MATERIALS AND EQUIPMENT. PROVIDE CONNECTIONS, SUPPORTS, AND MISCELLANEOUS MATERIALS NECESSARY TO MAKE THE ITEM FUNCTIONAL FOR USE AT THE NEW LOCATION. EQUIPMENT SHALL BE TESTED IN THE NEW LOCATION AND PROPER FUNCTION DEMONSTRATED.

K. EXCEPT FOR ITEMS OR MATERIALS INDICATED TO BE RECYCLED, REUSED, SALVAGED, REINSTALLED, OR OTHERWISE INDICATED TO REMAIN OWNER'S PROPERTY, REMOVE DEMOLISHED MATERIALS FROM PROJECT SITE AND LEGALLY DISPOSE OF THEM IN AN EPA-APPROVED LANDFILL. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT WILL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.

L. HANDLING OF BALLASTS WITH PCBS - GENERALLY, ALL HIGH POWER FACTOR FLUORESCENT LIGHTING BALLASTS, AND SOME HID BALLASTS, THAT WERE MANUFACTURED BEFORE 1978 CONTAIN POLYCHLORINATED BIPHENYL (PCB) COMPOUNDS IN THEIR CAPACITORS. FOR BALLASTS OF THIS VINTAGE, IF THE PCB CONTENT IS NOT STATED ON THE BALLAST LABEL, THE BALLAST SHALL BE HANDLED AS A PCB BALLAST. SUCH BALLASTS SHALL BE HANDLED PER EPA AND DNR PCB REGULATIONS.

M. MAINTAIN EXISTING FIRE ALARM SYSTEM IN SERVICE UNTIL NEW SYSTEM IS TESTED, CERTIFIED AND ACCEPTED. OBTAIN PERMISSION FROM THE OWNER AND THE ARCHITECT/ENGINEER AT LEAST [48] HOURS PRIOR TO PARTIALLY OR COMPLETELY DISABLING THE FIRE ALARM SYSTEM. MINIMIZE THE DURATION OF ANY OUTAGES AND MAINTAIN A FIRE WATCH THROUGHOUT THE OUTAGE DURATION. IF REQUIRED, MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO THE DEMOLITION WORK AREA.

N. COORDINATE WITH FACILITY IT PERSONNEL AND REMOVE ALL ABANDONED COMMUNICATIONS AND SECURITY SYSTEMS CABLE FROM ORIGIN TO DESTINATION IN ACCORDANCE WITH NEC 800.25. DO NOT ABANDON IN PLACE UNLESS SPECIFICALLY NOTE AS BEING LEFT FOR FUTURE USE. IDENTIFY FOR FUTURE USE IN ACCORDANCE WITH NEC 800.25

GROUNDING AND BONDING

A. GROUNDING ELECTRODE CONDUCTOR: BARE COPPER, SIZED PER NEC 250.66.
B. BONDING CONDUCTOR: BARE COPPER FOR LENGTHS OF 6 FEET OR LESS, COPPER WITH INSULATION IN PVC CONDUIT (METALLIC CONDUIT IN AIR PLENUM) WHERE LONGER THAN 6 FEET IN LENGTH. IF METALLIC CONDUIT IS USED, PROVIDE BONDING BUSHING AT EACH END. SIZE PER NEC 250.102.
C. EQUIPMENT GROUND CONDUCTOR: COPPER WITH GREEN INSULATION (LARGER WIRES MAY BE PERMANENTLY MARKED WITH GREEN), SIZED PER NEC 250.122. DO NOT RELY ON CONDUIT FOR THE GROUNDING PATH.
D. GROUNDING BUS: RECTANGULAR COPPER BAR, 1/4" X 4 " X 12" WITH 9/32" HOLES SPACED 1-1/8" APART. WALL-MOUNT WITH STAND-OFF INSULATORS.
E. UFER GROUND (CONCRETE-ENCASED GROUNDING ELECTRODE): FABRICATE ACCORDING TO NFPA 70. USE A MINIMUM OF 20 FEET OF BARE COPPER CONDUCTOR NOT SMALLER THAN #4 AWG. IF CONCRETE FOUNDATION IS LESS THAN 20 FEET LONG, COIL EXCESS CONDUCTOR WITHIN BASE OF FOUNDATION. BOND GROUNDING CONDUCTOR TO REINFORCING STEEL IN AT LEAST FOUR LOCATIONS AND TO ANCHOR BOLTS. EXTEND GROUNDING CONDUCTOR BELOW GRADE AND CONNECT TO BUILDING'S GROUNDING GRID OR TO GROUNDING ELECTRODE EXTERNAL TO CONCRETE.
F. GROUND RODS: COPPER-CLAD STEEL; 3/4 INCH BY 10 FEET. DRIVE RODS UNTIL TOPS ARE 2 INCHES BELOW FINISHED FLOOR OR FINAL GRADE. INSTALL AT LEAST 2 GROUND RODS, SPACED AT LEAST 8 FEET FROM EACH OTHER AND LOCATED AT LEAST THE SAME DISTANCE FROM OTHER GROUNDING ELECTRODES.
G. GROUND ROD CLAMPS: MECHANICAL TYPE, COPPER OR COPPER ALLOY, TERMINAL WITH HEX HEAD BOLT.
H. PIPE CONNECTORS: COPPER OR COPPER ALLOY, PRESSURE TYPE CLAMP, SIZED FOR PIPE, SECURED WITH AT LEAST TWO BOLTS. BOND EACH ABOVEGROUND PORTION OF GAS PIPING SYSTEM DOWNSTREAM FROM EQUIPMENT SHUTOFF VALVE.
I. WATER PIPE CONNECTORS: MECHANICAL TYPE, TWO-PIECE, DIE-CAST ZINC ALLOY WITH ZINC-PLATED BOLTS. LISTED FOR DIRECT BURIAL. WHERE A DIELECTRIC MAIN WATER FITTING IS INSTALLED, CONNECT GROUNDING CONDUCTOR ON STREET SIDE OF FITTING. BOND METAL GROUNDING CONDUCTOR CONDUIT OR SLEEVE TO CONDUCTOR AT EACH END. USE BRAIDED-TYPE BONDING JUMPERS TO ELECTRICALLY BYPASS WATER METERS. CONNECT TO PIPE WITH A BOLTED CONNECTOR.
J. WELDED CONNECTORS: EXOTHERMIC-WELDING KITS OF TYPES RECOMMENDED BY KIT MANUFACTURER FOR MATERIALS BEING JOINED AND INSTALLATION CONDITIONS.
K. BUS-BAR CONNECTORS: MECHANICAL TYPE, CAST SILICON BRONZE, SOLDERLESS COMPRESSION-TYPE WIRE TERMINALS, AND LONG-BARREL, TWO-BOLT CONNECTION TO GROUND BUS BAR.
L. BEAM CLAMPS: WHEN AVAILABLE, BOND STRUCTURAL STEEL TO GROUNDING ELECTRODE SYSTEM WITH MECHANICAL TYPE CLAMP TERMINAL WITH GROUND WIRE ACCESS FROM FOUR DIRECTIONS, AND DUAL, TIN-PLATED OR SILICON BRONZE BOLTS.
M. UNDERGROUND GROUNDING CONDUCTORS: INSTALL BARE TINNED-COPPER CONDUCTOR, NO. 2/0 AWG MINIMUM. BURY AT LEAST 24 INCHES BELOW GRADE.
N. BONDING INTERIOR METAL DUCTS: BOND METAL AIR DUCTS TO EQUIPMENT GROUNDING CONDUCTORS OF ASSOCIATED FANS, BLOWERS, ELECTRIC HEATERS, AND AIR CLEANERS. INSTALL BONDING JUMPER TO BOND ACROSS FLEXIBLE DUCT CONNECTIONS TO ACHIEVE CONTINUITY. SIZE BONDING CONDUCTORS AND JUMPERS IN ACCORDANCE WITH NEC 250.122, USING THE RATING OF THE CIRCUIT THAT IS LIKELY TO ENERGIZE THE DUCTS.
O. POLES SUPPORTING OUTDOOR LIGHTING FIXTURES: DO NOT INSTALL A GROUNDING ELECTRODE AT THESE LOCATIONS. BOND THE EQUIPMENT GROUNDING CONDUCTOR INSTALLED WITH BRANCH-CIRCUIT CONDUCTORS TO THE GROUNDING TERMINAL AT THE POLE BASE.

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

A. MINIMUM RACEWAY SIZE: 1 INCH TRADE SIZE FOR TELECOM/DATA AND 3/4 INCH TRADE SIZE FOR ALL OTHER APPLICATIONS.
B. INSTALL NONMETALLIC CONDUIT OR TUBING FOR PROTECTING BARE GROUNDING CONDUCTORS.
C. DO NOT INSTALL RACEWAYS OR ELECTRICAL ITEMS ON ANY "EXPLOSION-RELIEF" WALLS OR ROTATING EQUIPMENT.
D. DO NOT FASTEN CONDUITS ONTO THE BOTTOM SIDE OF A METAL DECK ROOF.
E. 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.
F. ARRANGE STUB-UPS SO CURVED PORTIONS OF BENDS ARE NOT VISIBLE ABOVE FINISHED SLAB.
G. INSTALL NO MORE THAN THE EQUIVALENT OF THREE 90-DEGREE BENDS IN ANY CONDUIT RUN EXCEPT FOR CONTROL WIRING CONDUITS, FOR WHICH FEWER BENDS ARE ALLOWED. SUPPORT WITHIN 12 INCHES OF CHANGES IN DIRECTION. SUPPORT CONDUIT WITHIN 12 INCHES OF ENCLOSURES TO WHICH IT IS ATTACHED.
H. UNLESS BURIED, INSTALL ALL CONDUITS PARALLEL OR PERPENDICULAR TO BUILDING LINES.
I. INSTALL RACEWAYS SQUARE TO THE ENCLOSURE AND TERMINATE AT ENCLOSURES WITH LOCKNUTS. INSTALL LOCKNUTS HAND TIGHT PLUS 1/4 TURN MORE. DO NOT RELY ON LOCKNUTS TO PENETRATE NONCONDUCTIVE COATINGS ON ENCLOSURES. REMOVE COATINGS IN THE LOCKNUT AREA PRIOR TO ASSEMBLING CONDUIT TO ENCLOSURE TO ENSURE A CONTINUOUS GROUND PATH.
J. RACEWAYS MAY BE INSTALLED UNDER THE CONCRETE SLAB, BUT NO CONDUITS SHALL BE EMBEDDED WITHIN THE SLAB. DIRECT-BURIED CONDUIT - INSTALL MANUFACTURED RIGID STEEL CONDUIT ELBOWS FOR STUB-UPS AT POLES AND EQUIPMENT AND AT BUILDING ENTRANCES THROUGH FLOOR. ANY METALLIC CONDUIT THAT DOES OR MAY COME INTO CONTACT WITH SOIL SHALL BE COATED WITH TWO COATS OF BITUMASTIC OR TWO LAYERS OF 10 MIL. CORROSION PROTECTION TAPE.
K. INSTALL FIRESTOPPING AT PENETRATIONS OF FIRE-RATED FLOOR AND WALL ASSEMBLIES.
L. INSTALL SLEEVES AND SLEEVE SEALS AT PENETRATIONS OF EXTERIOR FLOOR AND WALL ASSEMBLIES. INCLUDE CAST-IRON PIPE SLEEVES SIZED TO ALLOW FOR 1-INCH ANNULAR CLEAR SPACE BETWEEN RACEWAY OR CABLE AND SLEEVE FOR INSTALLING SLEEVE-SEAL SYSTEM WHICH INCLUDES MANUFACTURED EPDM RUBBER INTERLOCKING LINKS SHAPED TO FIT SURFACE OF PIPE AND WITH NUMBER REQUIRED FOR PIPE MATERIAL AND SIZE OF PIPE. INCLUDE STAINLESS STEEL PRESSURE PLATES AND CONNECTING BOLTS AND NUTS.
M. INDOOR RACEWAYS:
1. EXPOSED, NOT SUBJECT TO PHYSICAL DAMAGE: EMT.
2. EXPOSED AND SUBJECT TO SEVERE PHYSICAL DAMAGE: RIGID STEEL CONDUIT.
3. CONCEALED IN NEW CEILINGS AND INTERIOR WALLS AND PARTITIONS: EMT.
4. CONNECTION TO VIBRATING EQUIPMENT (INCLUDING TRANSFORMERS AND HYDRAULIC, PNEUMATIC, ELECTRIC SOLENOID, OR MOTOR-DRIVEN EQUIPMENT): FMC, EXCEPT USE LFMC IN DAMP OR WET LOCATIONS.
5. DAMP OR WET LOCATIONS: RIGID STEEL CONDUIT.
6. BOXES AND ENCLOSURES: NEMA 250, TYPE 1, EXCEPT USE NEMA 250, TYPE 3R NONMETALLIC IN DAMP OR WET LOCATIONS.

CONSTRUCTION DRAWINGS
APRIL 2023

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

PLOTTED BY:KENT KUEHN ON Jun/30/2023

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer MICHAEL W. BRANDT 11219 Date 6/30/2023 WYOMING

DRAWN BY: KDK
DSGN. BY: MWB
APPR. BY: MWB
DATE: 04/2023
Q.C. REVIEW BY: BCL
DATE: 06/2023

CASPER
CASPER COLLEGE
GATEWAY BUILDING GENERATOR
WYOMING
GENERAL ELECTRICAL NOTES

PROJECT NUMBER 6002.013
SHEET NUMBER 3
DRAWING NUMBER G-3

W:\6002 CASPER COLLEGE\2013 GATEWAY BLDG GENERATOR\CAD\CIVIL\SHEETS\GENERAL\GENERAL ELECTRICAL NOTES.DWG

7. RACEWAY FITTINGS: COMPATIBLE WITH RACEWAYS AND SUITABLE FOR USE AND LOCATION.
8. RIGID AND INTERMEDIATE STEEL CONDUIT: USE THREADED RIGID STEEL CONDUIT FITTINGS, UNLESS NOTED OTHERWISE.
9. INSTALL SURFACE RACEWAYS ONLY WHERE SPECIFICALLY INDICATED ON DRAWINGS. INSTALL SURFACE RACEWAY WITH A MINIMUM 2-INCH RADIUS CONTROL AT BEND POINTS.
10. FLEXIBLE CONDUIT CONNECTIONS: MAXIMUM OF 72 INCHES OF FLEXIBLE CONDUIT FOR RECESSED AND SEMI-RECESSED LUMINAIRES, EQUIPMENT SUBJECT TO VIBRATION, NOISE TRANSMISSION, OR MOVEMENT; AND FOR TRANSFORMERS AND MOTORS. USE LFMC IN DAMP OR WET LOCATIONS SUBJECT TO SEVERE PHYSICAL DAMAGE. USE LFMC OR LFNC IN DAMP OR WET LOCATIONS NOT SUBJECT TO SEVERE PHYSICAL DAMAGE.

N. OUTDOOR RACEWAYS:
1. EXPOSED CONDUIT: RIGID STEEL CONDUIT.
2. CONCEALED CONDUIT, ABOVE GROUND: EMT.
3. UNDERGROUND CONDUIT: RNC, TYPE EPC-40-PVC, DIRECT BURIED. USE TYPE EPC-80-PVC UNDER PAVED SURFACES.
4. CONNECTION TO VIBRATING EQUIPMENT (INCLUDING TRANSFORMERS AND HYDRAULIC, PNEUMATIC, ELECTRIC SOLENOID, OR MOTOR-DRIVEN EQUIPMENT): LFNC.
5. BOXES AND ENCLOSURES, ABOVE GROUND: NEMA250, TYPE 3R.

O. ENCLOSURES – BOXES AND ENCLOSURES FOR PANELBOARD, DISCONNECT SWITCH AND MOTOR CONTROL UNITS, ETC. BASED ON THE INSTALLATION LOCATIONS/ENVIRONMENTS.
1. INDOOR, DRY AND CLEAN LOCATIONS: NEMA 250, TYPE 1.
2. OUTDOOR LOCATIONS: NEMA 250, TYPE 3R.
3. KITCHEN/WASH-DOWN AREAS: NEMA 250, TYPE 4X, STAINLESS STEEL.
4. OTHER WET OR DAMP, INDOOR LOCATIONS: NEMA 250, TYPE 4.
5. INDOOR LOCATIONS SUBJECT TO DUST, FALLING DIRT, AND DRIPPING NONCORROSIVE LIQUIDS: NEMA 250, TYPE 12.
6. HAZARDOUS AREAS INDICATED ON DRAWINGS: NEMA 250, TYPE 7/TYPE 9 WITH COVER ATTACHED BY TYPE 316 STAINLESS STEEL BOLTS.

P. GENERAL BOX MOUNTING
1. MOUNT BOXES AT HEIGHTS INDICATED ON DRAWINGS. IF MOUNTING HEIGHTS OF BOXES ARE NOT INDIVIDUALLY INDICATED, GIVE PRIORITY TO ADA REQUIREMENTS. INSTALL BOXES WITH HEIGHT MEASURED TO CENTER OF BOX UNLESS OTHERWISE INDICATED.
2. HORIZONTALLY SEPARATE BOXES MOUNTED ON OPPOSITE SIDES OF WALL SO THEY ARE NOT IN THE SAME VERTICAL CHANNEL.
3. LOCATE BOXES SO THAT COVER OR PLATE WILL NOT SPAN DIFFERENT BUILDING FINISHES.
4. FASTEN JUNCTION AND PULL BOXES TO OR SUPPORT FROM BUILDING STRUCTURE. DO NOT SUPPORT BOXES BY CONDUITS.
5. SET METAL FLOOR BOXES LEVEL AND FLUSH WITH FINISHED FLOOR SURFACE.

Q. HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING
1. POLYMER-CONCRETE HANDHOLES AND BOXES WITH POLYMER-CONCRETE COVER: MOLDED OF SAND AND AGGREGATE, BOUND TOGETHER WITH POLYMER RESIN, AND REINFORCED WITH STEEL, FIBERGLASS, OR A COMBINATION OF THE TWO. DESIGNED FOR FLUSH BURIAL WITH OPEN BOTTOM UNO. INCLUDE WEATHERPROOF, NONSKID COVER SECURED BY TAMPER-RESISTANT LOCKING DEVICES LABELED WITH "ELECTRIC" OR "COM" AS INDICATED ON DRAWINGS.
2. COMPLY WITH ANSI/SCTE 77 WITH LOAD RATINGS AS FOLLOWS:
   a. TIER 8 FOR NON-TRAFFIC AREAS AND SIDEWALK APPLICATIONS WITH A SAFETY FACTOR FOR OCCASIONAL NON-DELIBERATE VEHICULAR TRAFFIC.
   b. TIER 22 FOR DRIVEWAY, PARKING LOT, AND OFF-ROAD APPLICATIONS SUBJECT TO OCCASIONAL NON-DELIBERATE HEAVY VEHICULAR TRAFFIC.
   c. AASHTO H-20 FOR ROADWAYS AND OTHER DELIBERATE VEHICULAR TRAFFIC APPLICATIONS.
3. INSTALL HANDHOLES AND BOXES LEVEL AND PLUMB AND WITH ORIENTATION AND DEPTH COORDINATED WITH CONNECTING CONDUITS TO MINIMIZE BENDS AND DEFLECTIONS REQUIRED FOR PROPER ENTRANCES. SUPPORT ON A LEVEL BED OF CRUSHED STONE OR GRAVEL, GRADED FROM 1/2-INCH SIEVE TO NO. 4 SIEVE AND COMPACTED TO SAME DENSITY AS ADJACENT UNDISTURBED EARTH.
4. IN PAVED AREAS, SET SO COVER SURFACE WILL BE FLUSH WITH FINISHED GRADE. SET COVERS OF OTHER ENCLOSURES 1 INCH (25 MM) ABOVE FINISHED GRADE.

SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

A. IN GENERAL, ALL ELECTRICAL EQUIPMENT SHALL BE DESIGNED AND INSTALLED TO WITHSTAND A SEISMIC EVENT. THE TERM "WITHSTAND" MEANS "THE EQUIPMENT WILL REMAIN IN PLACE WITHOUT SEPARATION OF ANY PARTS WHEN SUBJECTED TO THE SEISMIC FORCES SPECIFIED AND THE UNIT WILL BE FULLY OPERATIONAL AFTER THE SEISMIC EVENT."
B. FOR EQUIPMENT, COMPONENTS, CHANNEL BRACINGS, RESTRAINT CABLES, ANCHOR BOLTS, ETC. SEISMIC-RESTRAINT LOADING SHALL COMPLY WITH DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS, S_{DS}= 0.292
C. COMPONENT IMPORTANCE FACTOR, I_p = 1.0 FOR ELECTRICAL EQUIPMENT EXCEPT FOR COMPONENTS REQUIRED FOR LIFE-SAFETY PURPOSES AFTER AN EARTHQUAKE SUCH AS EGRESS LIGHTING AND FIRE ALARM CONTROL PANEL WHERE I_p = 1.5.
D. COMPONENT RESPONSE MODIFICATION FACTOR, R_p SEE TABLE 13.6-1 OF ASCE 7-10.
E. COMPONENT AMPLIFICATION FACTOR, A_p SEE TABLE 13.6-1 OF ASCE 7-10.

IDENTIFICATION FOR ELECTRICAL SYSTEMS

A. RACEWAYS AND CABLES CARRYING CIRCUITS WITHIN BUILDINGS. IDENTIFY THE COVERS OF EACH JUNCTION AND PULL BOX OF THE FOLLOWING SYSTEMS WITH PAINT AS FOLLOWS:
1. BATTERY OR GENERATOR BACKED UP EMERGENCY SYSTEM: ORANGE
2. FIRE DETECTION AND ALARM SYSTEM: RED
3. SYSTEMS WITH VOLTAGE GREATER THAN 600V: YELLOW
4. DIRECT CURRENT SYSTEMS (SOLAR PV SYSTEM): GREEN

B. CONDUCTOR COLOR-CODING:
1. 120/240V: PHASE A - BLACK, PHASE B - RED, NEUTRAL - WHITE.
2. 208Y/120V: PHASE A - BLACK, PHASE B - RED, PHASE C - BLUE, NEUTRAL - WHITE.
3. 480Y/277V: PHASE A - BROWN, PHASE B - ORANGE, PHASE C - YELLOW, NEUTRAL - GRAY.
4. 240/120V (CENTER-TAPPED DELTA): PHASE A - BLACK, PHASE B - RED, WILD LEG - ORANGE, NEUTRAL - WHITE.
5. GROUNDS: BARE COPPER OR GREEN.

C. ALL EQUIPMENT SHALL HAVE AN IDENTIFICATION LABEL, BLACK LETTERS ON A WHITE FIELD. LABEL INCLUDES UNIT NAME AND CIRCUIT THAT FEEDS IT.
1. 1" MINIMUM HEIGHT LETTERS FOR SERVICE DISCONNECT AND EMERGENCY SHUT-OFF SWITCHES.
2. 1/2" MINIMUM HEIGHT LETTERS FOR PANELBOARDS, SWITCHBOARDS, RELAY ENCLOSURES AND TRANSFORMERS.
3. 1/4" MINIMUM HEIGHT LETTERS FOR DISCONNECT SWITCHES AND MOTOR STARTERS.
4. 1/8" MINIMUM HEIGHT LETTERS FOR DEVICE COVERPLATES.

CONSTRUCTION DRAWINGS
APRIL 2023

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

PLOTTED BY:KENT KUEHN ON Jun/30/2023

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer
MICHAEL W. BRANDT
11219
Date 6/30/2023
WYOMING

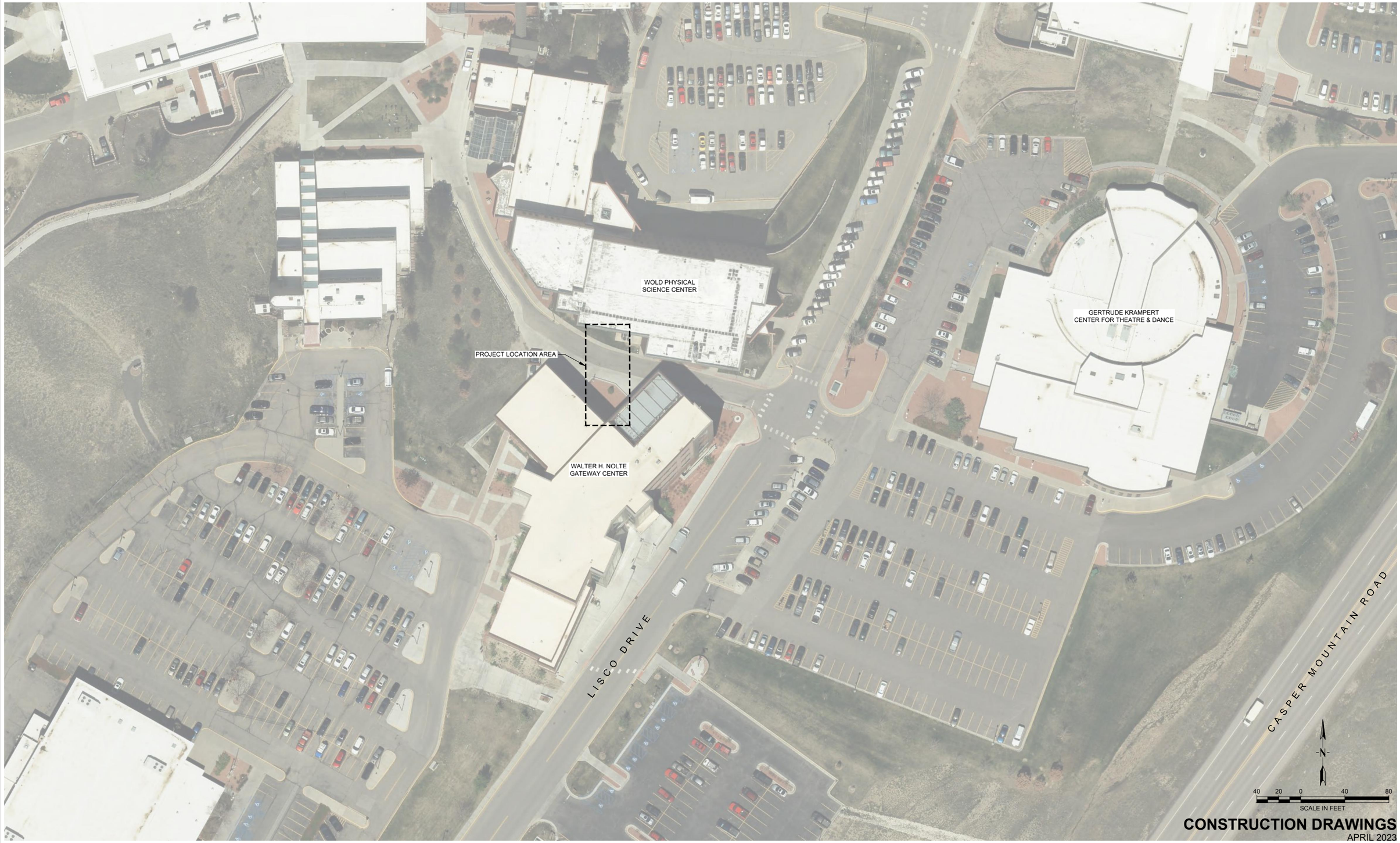
DRAWN BY: KDK
DSGN. BY: MWB
APPR. BY: MWB
DATE: 04/2023
Q.C. REVIEW BY: BCL
DATE: 06/2023

CASPER COLLEGE
GATEWAY BUILDING GENERATOR
CASPER WYOMING

GENERAL ELECTRICAL NOTES

PROJECT NUMBER 6002.013
SHEET NUMBER 4
DRAWING NUMBER G-4

W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\GENERAL ELECTRICAL NOTES.DWG



CONSTRUCTION DRAWINGS

APRIL 2023

W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\013_C1-EXISTING SITE PLAN.DWG

VERIFY SCALE!

THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.

MODIFY SCALE ACCORDINGLY!

PLOTTED BY:KENT KUEHN ON Jun/30/2023

REVISIONS

NO.	DESCRIPTION	BY	DATE

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists

152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer (Civil) ZANE A. GREEN 12927 Date 6-30-23 WYOMING

DRAWN BY: KRL
DSGN. BY: ZAG
APPR. BY: ZAG
DATE: 04/2023

Q.C. REVIEW
BY:
DATE: 06/2023

CASPER COLLEGE
GATEWAY BUILDING GENERATOR

CASPER WYOMING

PROJECT LOCATION MAP

PROJECT NUMBER
6002.013

SHEET NUMBER
2

DRAWING NUMBER
C-1

CONSTRUCTION DRAWINGS
APRIL 2023

W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\013_C2-DEMO PLAN.DWG

VERIFY SCALE!

THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.

MODIFY SCALE ACCORDINGLY!

PLOTTED BY:KENT KUEHN ON Jun/30/2023

REVISIONS

NO.	DESCRIPTION	BY	DATE

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer (Civil) ZANE A. GREEN 12927 Date 6-30-23 WYOMING

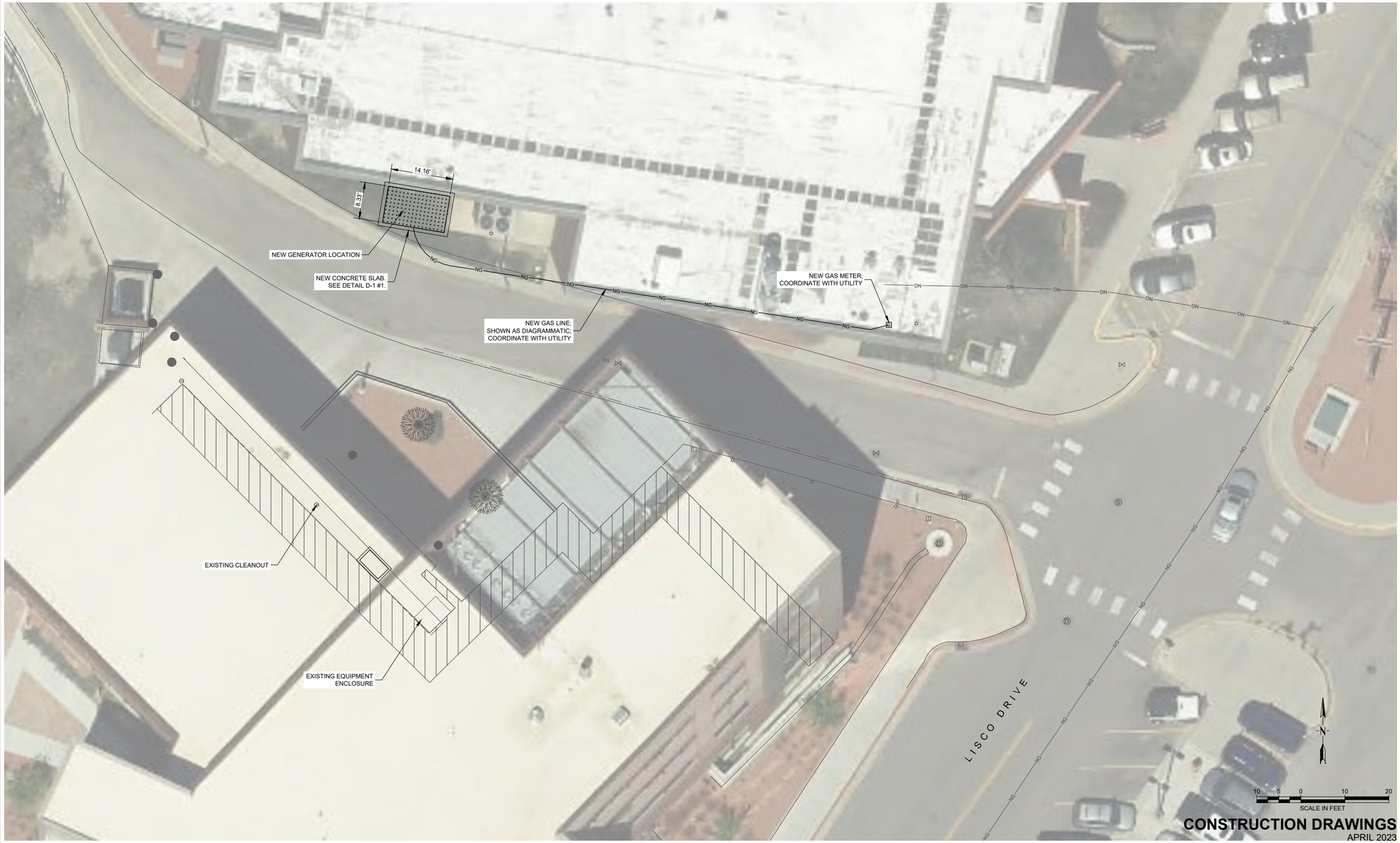
DRAWN BY: KRL
DSGN. BY: ZAG
APPR. BY: ZAG
DATE: 04/2023

Q.C. REVIEW
BY:
DATE: 06/2023

CASPER COLLEGE
GATEWAY BUILDING GENERATOR
CASPER WYOMING

DEMOLITION PLAN

PROJECT NUMBER 6002.013
SHEET NUMBER 3
DRAWING NUMBER C-2



CONSTRUCTION DRAWINGS
APRIL 2023

W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\013_C2-CIVIL SITE PLAN.DWG

VERIFY SCALE!

THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.

MODIFY SCALE ACCORDINGLY!

PLOTTED BY:KENT KUEHN ON Jun/30/2023

REVISIONS

NO.	DESCRIPTION	BY	DATE

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer (Civil) ZANE A. GREEN 12927 Date 6-30-23 WYOMING

DRAWN BY: KRL
DSGN. BY: ZAG
APPR. BY: ZAG
DATE: 04/2023

Q.C. REVIEW
BY:
DATE: 06/2023

CASPER COLLEGE
GATEWAY BUILDING GENERATOR
CASPER WYOMING

CIVIL SITE PLAN

PROJECT NUMBER 6002.013
SHEET NUMBER 4
DRAWING NUMBER C-3

X 20A 3P OR X 100AF 80AT 3P — LOW – VOLTAGE CIRCUIT BREAKER (CB). RATINGS AND NO. OF POLES AS SHOWN. WHEN SPECIFIC TYPE IS REQUIRED, X INDICATES TYPE.

TYPES:
MCCB – MOLDED CASE
ICCB – INSULATED CASE
LVP – LOW – VOLTAGE POWER
MCP – MOTOR CIRCUIT PROTECTOR (RATING PER CONNECTED LOAD)

CB — SEPARATELY MOUNTED CIRCUIT BREAKER; SEE ELECTRICAL ONE – LINE DIAGRAM OR SCHEDULE FOR DESCRIPTION

GFP — GROUND FAULT PROTECTION

52 — MEDIUM – VOLTAGE CIRCUIT BREAKER

FUSE, SIZE, AND NUMBER OF FUSES AS NOTED

FUSED CUTOUT, CURRENT RATING, FUSE SIZE, AND NUMBER OF POLES AS NOTED

FUSIBLE SWITCH, CURRENT RATING, FUSE SIZE, AND QUANTITY AS NOTED

NON–FUSED SWITCH, CURRENT RATING, AND NUMBER OF POLES AS NOTED

DISCONNECT OR DRAWOUT CONNECTION

A C B & A C B — MAGNETIC MOTOR STARTER AND SEPARATELY MOUNTED COMBINATION MAGNETIC MOTOR STARTER

D C & D C — MOTOR CONTROLLER AND SEPARATELY MOUNTED MOTOR CONTROLLER WITH SHORT CIRCUIT PROTECTION AND DISCONNECT

MOTOR STARTER AND CONTROLLER SUBSCRIPTS:

A – MAGNETIC STARTER NEMA SIZE

B – STARTER TYPE
NONE – FULL VOLTAGE NON–REVERSING (FVNR)
FVR – FULL VOLTAGE REVERSING
2S – TWO SPEED
RVAT – REDUCED VOLTAGE AUTO TRANSFORMER

C – CONTROL DIAGRAM OR CONTROLS SCHEDULE NUMBER (IF REQUIRED)

D – CONTROLLER TYPE
VFD – VARIABLE FREQUENCY DRIVE
SS – SOLID STATE

SEPARATELY MOUNTED COMBINATION MOTOR STARTER OR CONTROLLER; SEE ELECTRICAL ONE – LINE DIAGRAM OR SCHEDULE FOR DESCRIPTION

THERMAL OVERLOAD ELEMENT

OL — THERMAL OVERLOAD RELAY CONTACT

DISCONNECT OR SAFETY SWITCH, 30A, 3P, NON–FUSED UNLESS OTHERWISE NOTED

7 1/2 OR HP — MOTOR WITH DESIGN HORSEPOWER (WHEN INDICATED)

G — GENERATOR

ATS — TRANSFER SWITCH, CURRENT RATING, AND NUMBER OF POLES AS NOTED

ATS – AUTOMATIC
MTS – MANUAL

TRANSFORMER

Δ 3–PHASE, 3–WIRE DELTA CONNECTION

3–PHASE, 4–WIRE GROUNDED WYE CONNECTION

LP100 208V/120V 3Ø, 4W — SWITCHBOARD OR PANELBOARD; NAME, VOLTAGE, PHASE, NUMBER OF WIRES WHEN INDICATED

100 KVA — NON–MOTOR LOAD WITH DESIGN KVA, KW, OR AMP

CPT — CONTROL POWER TRANSFORMER (CPT)

VOLTAGE TRANSFORMER (VT OR PT)

CURRENT TRANSFORMER (CT)

WH — UTILITY WATT–HOUR METER PER UTILITY REQUIREMENTS

DMP — DIGITAL METERING PACKAGE

ETM — ELAPSED TIME METER

GROUND

LIGHTNING ARRESTER

SPD — LOW VOLTAGE SURGE PROTECTIVE DEVICE

ELECTRICAL CONNECTION

OR OR — NO ELECTRICAL CONNECTION

SV OR — SOLENOID VALVE

X Y — CONTROL/RELAY COIL; X INDICATES TYPE, Y INDICATES LOOP NO. WHEN USED

TYPES:
CR – CONTROL RELAY
DP – DEFINITE PURPOSE RELAY
LC – LIGHTING CONTACTOR
M – MOTOR STARTER
PC – PHOTO CELL
TC – TIME CLOCK
TR – TIMING RELAY

NORMALLY OPEN CONTACT (N.O.)

NORMALLY CLOSED CONTACT (N.C.)

NORMALLY OPEN TIME DELAY RELAY CONTACT WITH TIME DELAY ON CLOSING AFTER COIL IS ENERGIZED

NORMALLY CLOSED TIME DELAY RELAY CONTACT WITH TIME DELAY ON OPENING AFTER COIL IS ENERGIZED

NORMALLY OPEN TIME DELAY RELAY CONTACT WITH TIME DELAY ON OPENING AFTER COIL IS DE–ENERGIZED

NORMALLY CLOSED TIME DELAY RELAY CONTACT WITH TIME DELAY ON CLOSING AFTER COIL IS DE–ENERGIZED

NORMALLY OPEN TEMPERATURE SWITCH; CLOSE ON RISING TEMPERATURE

NORMALLY CLOSED TEMPERATURE SWITCH; OPEN ON RISING TEMPERATURE

NORMALLY OPEN FLOW SWITCH; CLOSE ON INCREASING FLOW

NORMALLY CLOSED FLOW SWITCH; OPEN ON INCREASING FLOW

NORMALLY OPEN LEVEL SWITCH, CLOSE ON RISING LEVEL

NORMALLY CLOSED LEVEL SWITCH, OPEN ON RISING LEVEL

NORMALLY OPEN PRESSURE SWITCH, CLOSE ON INCREASING PRESSURE

NORMALLY CLOSED PRESSURE SWITCH, OPEN ON INCREASING PRESSURE

NORMALLY CLOSED PRESSURE SWITCH, OPEN ON INCREASING PRESSURE

NORMALLY OPEN LIMIT SWITCH, CLOSE ON REACHING LIMIT

NORMALLY CLOSED LIMIT SWITCH, OPEN ON REACHING LIMIT

FIELD WIRING EXTERNAL TO CONTROL PANEL

X — INTERLOCK; X INDICATES TYPE

TYPES:
E – ELECTRICAL
M – MECHANICAL
K – KEY

OFF HAND AUTO XOO OOX — 3 POSITION SELECTOR SWITCH, MAINTAINED CONTACTS; UNLESS OTHERWISE NOTED, 2–POSITION SIMILAR

NORMALLY OPEN PUSHBUTTON, MOMENTARY CONTACT UNLESS OTHERWISE NOTED

NORMALLY CLOSED PUSHBUTTON, MOMENTARY CONTACT UNLESS OTHERWISE NOTED

X — INDICATING LIGHT, X INDICATES LENS COLOR

X — PUSH TO TEST INDICATING LIGHT, X INDICATES LENS COLOR

LENS COLORS:
R – RED
G – GREEN
B – BLUE
Y – YELLOW
W – WHITE
A – AMBER

T — TRANSFORMER

SS — SELECTOR SWITCH

PB — PUSHBUTTON

IC — INSTRUMENTATION/CONTROL DEVICE

CONTROL PANEL INTEGRAL OR PROVIDED WITH ASSOCIATED EQUIPMENT

CONTROL PANEL WITH DISCONNECT SWITCH INTEGRAL OR PROVIDED WITH ASSOCIATED EQUIPMENT

J — JUNCTION OR PULL BOX

PANELBOARD (250V TO 600V)

PANELBOARD (LESS THAN 250V)

ELECTRICAL EQUIPMENT ENCLOSURE: SWITCHBOARD, MOTOR CONTROL CENTER, CONTROL PANEL, OR OTHER EQUIPMENT AS INDICATED

D — MOTION DETECTOR, PROVIDE POWER PACK AS NEEDED

PC — PHOTOCELL

X Y z — CEILING/PENDANT–MOUNTED LUMINAIRE – HID, COMPACT FLUORESCENT, OR INCANDESCENT

X Y z — WALL–MOUNTED LUMINAIRE – HID, COMPACT FLUORESCENT, OR INCANDESCENT

X Y z — CEILING/PENDANT–MOUNTED FLUORESCENT FIXTURE

X Y z — WALL–MOUNTED FLUORESCENT FIXTURE

X Y z — CEILING/PENDANT–MOUNTED FLUORESCENT FIXTURE NORMAL/EMERGENCY

X Y z — WALL–MOUNTED FLUORESCENT FIXTURE NORMAL/EMERGENCY

X Y — EMERGENCY LIGHT FIXTURE, 2 ATTACHED HEADS AS SHOWN

X Y — EMERGENCY LIGHT, REMOTE MOUNTED HEAD

X Y X Y — DOUBLE–FACED CEILING OR WALL–MOUNTED EXIT LIGHT; DIRECTIONAL ARROWS (IF REQUIRED) AS INDICATED ON PLANS

X Y X Y — SINGLE–FACED CEILING OR WALL–MOUNTED EXIT LIGHT; DIRECTIONAL ARROWS (IF REQUIRED) AS INDICATED ON PLANS

X Y — AREA OR ROADWAY LIGHT – POLE–MOUNTED

LIGHTING FIXTURE SUBSCRIPTS:
X – INDICATES FIXTURE TYPE PER LIGHTING FIXTURE SCHEDULE
Y – INDICATES CIRCUIT NUMBER FROM PANELBOARD
z – INDICATES CONTROLLING SWITCH (IF REQUIRED)

Sm — MANUAL MOTOR STARTER

SX Y — TOGGLE SWITCH

SUBSCRIPTS:
X – INDICATES TYPE
NONE – SINGLE POLE
3 – THREE–WAY
4 – FOUR–WAY
HP – TOGGLE SWITCH, HORSEPOWER RATED
K – KEY SWITCH
TE – MANUAL MOTOR STARTER WITH THERMAL ELEMENT
P – PILOT LIGHT
L – LIGHTED HANDLE
Y – SWITCH NAME/DESIGNATION

SPECIAL–PURPOSE RECEPTACLE AS DEFINED ON PLANS

PLUG–IN RECEPTACLE STRIP, QUANTITY AND SPACING OF RECEPTACLES AS NOTED OR SPECIFIED

TELECOMMUNICATIONS OUTLET JUNCTION BOX

X Y — QUAD–DUPLEX RECEPTACLE, TWO NEMA 5–20R UNDER COMMON COVER PLATE

X Y — DUPLEX RECEPTACLE, NEMA 5–20R

X Y — SIMPLEX RECEPTACLE, NEMA 5–20R

SUBSCRIPTS:
X – INDICATES TYPE
GFCI – GROUND FAULT CIRCUIT INTERRUPTER
Y – INDICATES CIRCUIT NUMBER FROM PANELBOARD

CONDUIT TURNING UP

CONDUIT TURNING DOWN

HOME RUN TO PANEL, 2 #12, 1 #12G IN 3/4"C UNLESS OTHERWISE NOTED

HOME RUN WITH CONDUIT SEAL–OFF

CIRCUIT RUN BETWEEN DEVICES EXPOSED IN NON–ARCHITECTURALLY FINISHED AREAS; CONCEALED IN ARCHITECTURALLY FINISHED AREAS. CONDUIT AND CONDUCTOR SIZES SHALL BE THE SAME AS THE HOMERUN FOR THE CIRCUIT.

CONDUIT RUN BETWEEN DEVICES CONCEALED IN NON–ARCHITECTURALLY FINISHED AREAS OR UNDER FLOOR SLAB. CONDUIT AND CONDUCTOR SIZES SHALL BE THE SAME AS THE HOMERUN FOR THE CIRCUIT.

CIRCUIT HASH MARKS (WHEN INDICATED); LONG, SHORT, SINGLE DOT, AND DOUBLE DOT REPRESENT PHASE, NEUTRAL, EQUIPMENT GROUND, AND ISOLATED EQUIPMENT GROUND, RESPECTIVELY. #12 IN 3/4" CONDUIT UNLESS OTHERWISE INDICATED.

CIRCUIT CONTINUATION

CONDUIT STUBBED OUT AND CAPPED

XXX — CONDUIT TAG OR CIRCUIT NUMBER – WIRE AND CONDUIT SIZE AS SPECIFIED IN CIRCUIT SCHEDULE ON THE SHEETS

GROUND CABLE

GROUND ROD

FAA — FIRE ALARM ANNUNCIATOR

FACP — FIRE ALARM CONTROL PANEL

F — FIRE ALARM MANUAL PULL STATION

CR — FIRE ALARM CONTROL RELAY

FS — FIRE ALARM CONTACT, FLOW SWITCH

TS — FIRE ALARM CONTACT, TAMPER SWITCH

PS — FIRE ALARM CONTACT, PRESSURE SWITCH

X AND X — SMOKE AND DUCT DETECTOR

SUBSCRIPT:
I – IONIZATION TYPE
P – PHOTOELECTRIC TYPE

X — HEAT DETECTOR

SUBSCRIPT:
R/C – RATE COMPENSATION
R/F – COMBINATION RATE OF RISE AND FIXED TEMP
R – RATE OF RISE
F – FIXED

X — ALARM BELL

X — ALARM HORN

X — ALARM FLASHING LIGHT

X — ALARM BELL AND FLASHING LIGHT COMBINATION UNIT

X — ALARM HORN AND FLASHING LIGHT COMBINATION UNIT

SUBSCRIPT:
NONE – GENERAL ALARM DEVICE
F – FIRE ALARM DEVICE

ABBREVIATIONS:

A or AMP	AMPERES
AC	ALTERNATING CURRENT
ATS	AUTOMATIC TRANSFER SWITCH
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CU	COPPER
EF	EXHAUST FAN
ELEC	ELECTRIC
EMT	ELECTRICAL METALLIC TUBING
EXP	EXPLOSION PROOF
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
HOA	HAND–OFF–AUTOMATIC
HP	HORSEPOWER
HVAC	HEATING, VENTILATING & AIR CONDITIONING
HZ	HERTZ
J–BOX	JUNCTION BOX
kW	KILOWATTS
kVA	KILOVOLT AMPERES
LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
MAN	MANUAL
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NO	NORMALLY OPEN
#	NUMBER
PB	PUSHBUTTON
PH	PHASE
PNL	PANEL
PVC	POLYVINYL CHLORIDE CONDUIT
PWR	POWER
RECPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
SV	SOLENOID VALVE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
T	THERMOSTAT
TD	TIME DELAY
TEL	TELEPHONE
TV	TELEVISION
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORY
V	VOLT
VA	VOLT AMPERES
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
Y	WYE CONNECTED
Δ	DELTA CONNECTED
Ø	PHASE

GENERAL NOTES:

1. THIS IS A STANDARD ELECTRICAL SYMBOLOGY SHEET. NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT.
2. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE–EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.
3. REFERENCES OTHER LEGEND SHEETS FOR PROJECT–SPECIFIC EQUIPMENT SYMBOLS, EQUIPMENT ABBREVIATIONS, AND PIPING SYSTEM ABBREVIATIONS.

CONSTRUCTION DRAWINGS

APRIL 2023

W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\ELECTRICAL LEGENDS AND SYMBOLS.DWG

VERIFY SCALE!

THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.

MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

PLOTTED BY:KENT KUEHN ON Jun/30/2023

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer MICHAEL W. BRANDT 11219 Date 6-30-23 WYOMING

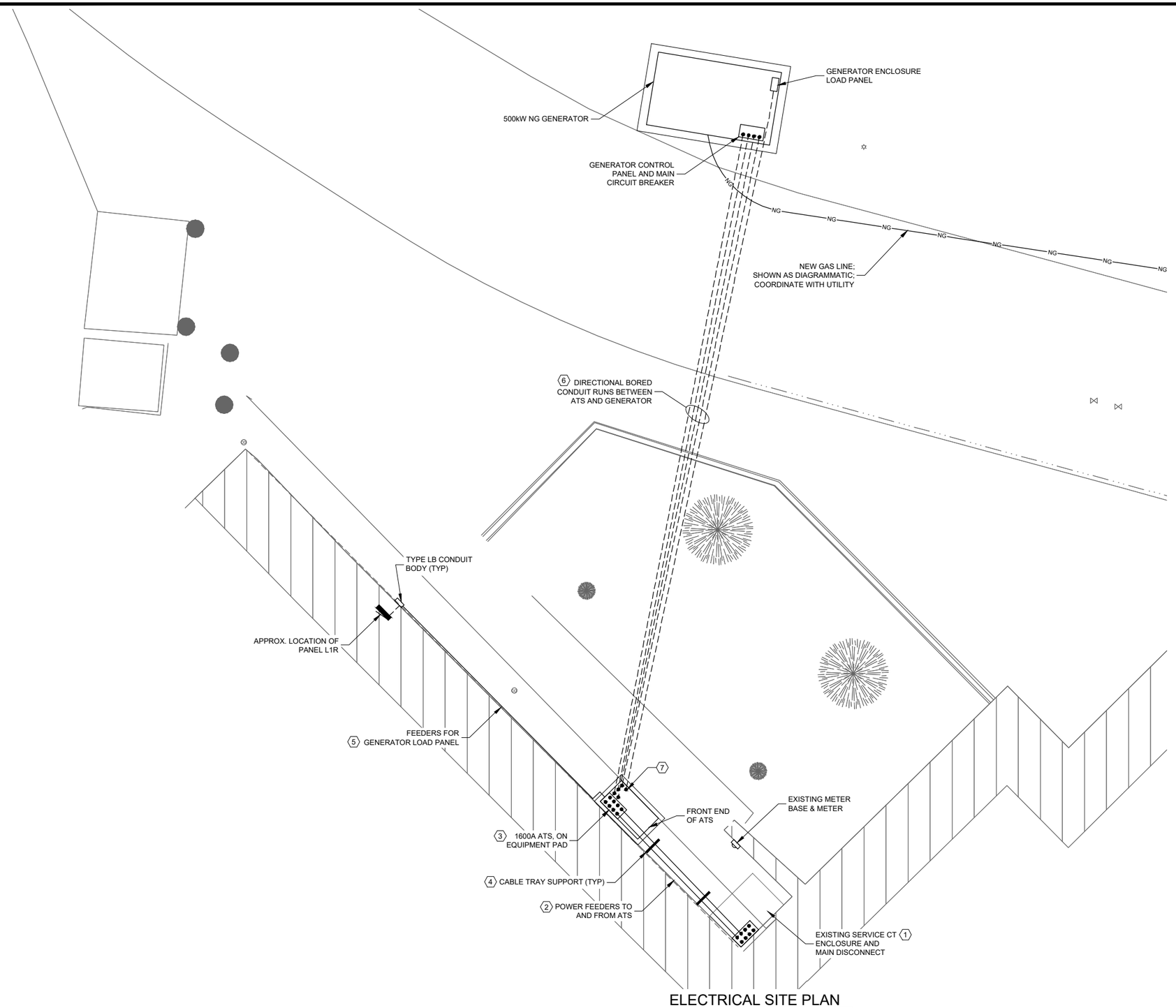
DRAWN BY: KDK
DSGN. BY: ZAG
APPR. BY: ZAG
DATE: 04/2023

Q.C. REVIEW BY: BCL
DATE: 06/2023

CASPER COLLEGE
GATEWAY BUILDING GENERATOR
CASPER WYOMING

ELECTRICAL LEGENDS AND SYMBOLS

PROJECT NUMBER 6002.013
SHEET NUMBER 5
DRAWING NUMBER E-0



ELECTRICAL SITE PLAN

SCALE: 1" = 5'

GENERAL ELECTRICAL NOTES:
(APPLIES TO ALL ELECTRICAL SHEETS)

A. THE COMPLETED INSTALLATION SHALL CONFORM TO THE 2020 NATIONAL ELECTRIC CODE. CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES. ALL WORK SHALL BE DONE IN A NEAT, WORKMANLIKE, FINISHED, AND SAFE MANNER, ACCORDING TO THE LATEST PUBLISHED N.E.C.A. STANDARDS OF INSTALLATION, UNDER COMPETENT SUPERVISION.

B. THIS PROJECT CONSISTS OF NEW AND REWORKED AREAS OF THE GATEWAY BUILDING AT CASPER COLLEGE, CASPER, WYOMING. VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND ALL FACTORS/INCIDENTAL WORK WHICH MAY AFFECT THE EXECUTION OF THIS WORK.

C. ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, U.L., OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURERS NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS AND BID PRICE. PROPOSED SUBSTITUTIONS SHALL BE SUBMITTED DURING THE SUBMITTAL PROCESS IN WRITING AND REVIEWED BY THE ENGINEER PRIOR TO ORDERING THE EQUIPMENT.

D. PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED UNDER THIS DIVISION AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS, OR ANY OTHER CAUSES. EQUIPMENT FOUND DAMAGED OR IN OTHER THAN NEW CONDITION WILL BE REJECTED AS DEFECTIVE.

E. LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT, AND FOREIGN MATERIALS, LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK. PRIME AND REPAINT ALL STRUCTURAL SURFACES THAT HAVE BEEN DRILLED OR WELDED.

F. THERE SHALL NOT BE MORE THAN THE EQUIPMENT OF THREE QUARTER BENDS (270 DEGREES TOTAL) BETWEEN PULL POINTS, FOR EXAMPLE CONDUIT BODIES, JUNCTION BOXES (ABOVE GRADE WIRING), OR HAND HOLES (UNDERGROUND WIRING). SEE DETAIL ON E-3 IF PULL BOX IS REQUIRED BASED ON THIS NOTE.

G. ELECTRICAL CONTRACTOR TO COORDINATE ALL WORK SITES WITH GENERAL CONTRACTOR. NOT ALL WORK IS SHOWN IN THE ELECTRICAL SHEETS. COORDINATE WITH GENERAL CONTRACTOR AND OTHER TRADES.

H. ALL DEMOLITION OF EXISTING ELECTRICAL ITEMS IS CONSIDERED INCIDENTAL TO THE NEW GENERATOR SYSTEM.

KEY NOTES

1. ROUTE CONDUCTORS OUT THE TOP OF THE EXISTING SWITCHBOARD. ROUTE CONDUCTORS IN THE REAR OF THE UNIT AND BEHIND THE BUSSING TO THE BOTTOM OF THE STRUCTURE FOR CONNECTION TO THE MAIN CIRCUIT BREAKER AND EXISTING CONDUCTORS. MOUNT A TRANSITION JUNCTION BOX ON TOP OF THE UNIT TO ATTACH THE CABLE TRAY.
2. ROUTE CABLE TRAY OVERHEAD AND ON SUPPORTS SEPARATE FROM THE HVAC DUCTING. SUPPORT DISTANCES PER THE NEC. SEE SUPPORT DETAIL 4, ON DRAWING D-1. PROVIDE CABLE TRAY COVER FOR EXTERIOR LOCATIONS. PROVIDE STANDARD COVER CLAMPS FOR COVER.
3. MOUNT A TRANSITION JUNCTION BOX ON TOP OF ATS TO ATTACH THE CABLE TRAY ROUTE CONDUCTORS DOWN THE REAR OF THE UNIT. VERIFY LOCATION WITH THE UNIT PROVIDED BY THE OWNER. ATS TO BE PLACED ON A PAD, 4" ABOVE EXISTING SIDEWALK, SIMILAR TO GENERATOR PAD, DETAIL 1, DWG D-1.
4. ROUTE CONDUIT OVERHEAD AND PROVIDE SUPPORTS SIMILAR TO DETAIL 4, DWG D-1.
5. ROUTE FEEDER THROUGH ATS ENCLOSURE AND UNDERGROUND TO GENERATOR.
6. SEE ONE-LINE FOR THE GENERATOR OUTPUT FEEDER AND LOAD PANEL FEEDER SIZING. PROVIDE (1#16 TSP, 1*C) FOR GENERATOR CALL SIGNAL.
7. STUB CONDUITS TO THE GENERATOR OUT OF THE BOTTOM OF THE ATS ENCLOSURE. CONDUIT ENTRY IS TOWARDS THE BACK OF THE ENCLOSURE. ANY REMOVED CONCRETE THAT IS EXPOSED OUTSIDE EQUIPMENT SHALL BE CUT TO EXISTING JOINTS AND REPLACED.

N

6 3 0 6 12
SCALE IN FEET

CONSTRUCTION DRAWINGS
APRIL 2023

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS			
NO.	DESCRIPTION	BY	DATE

PLOTTED BY:KENT KUEHN ON Jun/30/2023

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer
MICHAEL W. BRANDT
11219
Date 6-30-23
WYOMING

DRAWN BY: KRL
DSGN. BY: ZAG
APPR. BY: ZAG
DATE: 04/2023
Q.C. REVIEW
BY: BCL
DATE: 06/2023

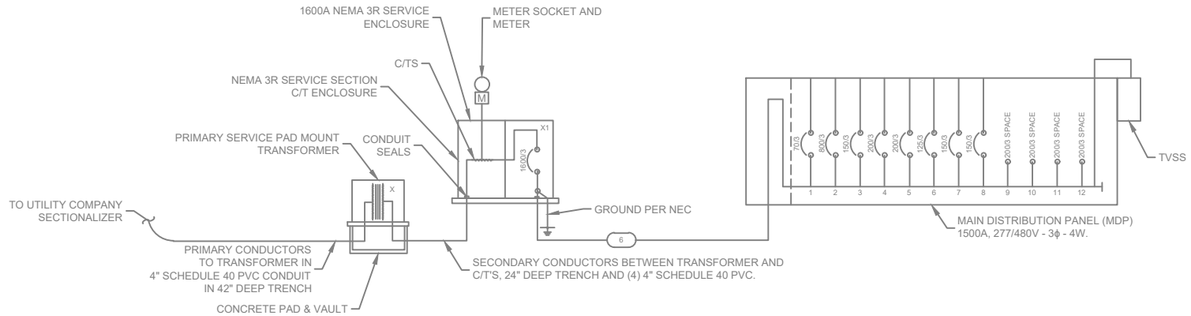
CASPER COLLEGE
GATEWAY BUILDING GENERATOR
CASPER WYOMING
ELECTRICAL SITE PLAN

PROJECT NUMBER 6002.013
SHEET NUMBER 6
DRAWING NUMBER E-1

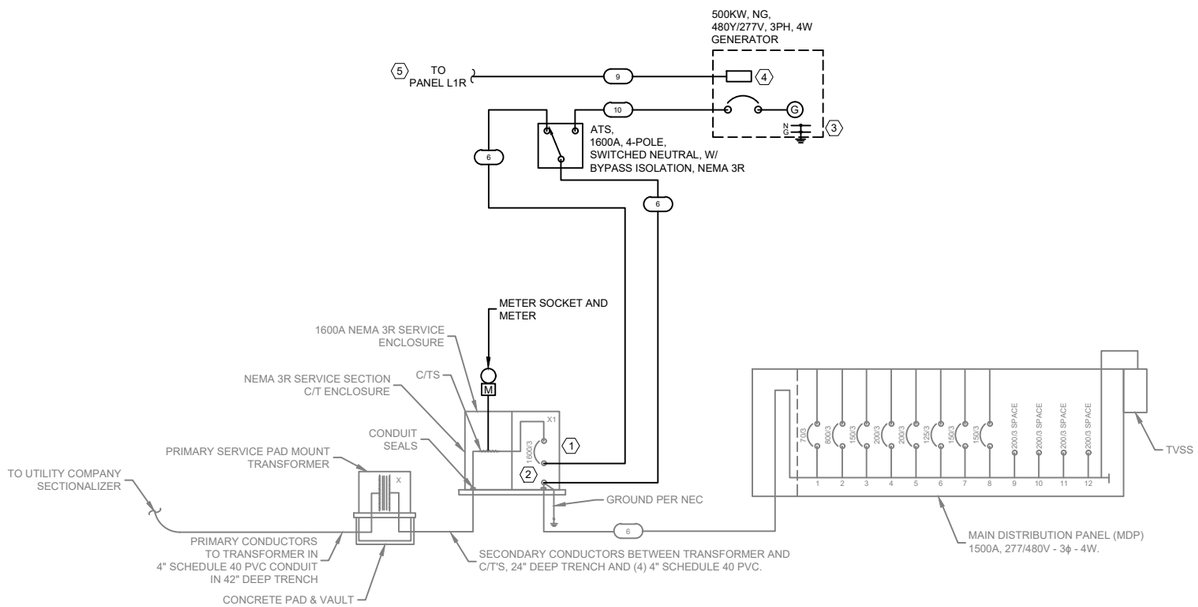
W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\CAD\CIVIL\SHEETS\GENERAL\013_E1 ELECTRICAL SITE PLAN.DWG

KEY NOTES

1. DISCONNECT EXISTING CONDUCTORS FROM MAIN CIRCUIT BREAKER. PROVIDE NEW NO. 6 FEEDER CONDUIT + CONDUCTORS FROM SCHEDULE FROM THE MAIN CIRCUIT BREAKER TO THE ATS "NORMAL" CONNECTION
2. PROVIDE NEW NO. 6 FEEDER CONDUIT + CONDUCTORS FROM ATS "LOAD" CONNECTION BACK TO EXISTING CONDUCTORS IN MAIN DISCONNECT SWITCHBOARD. SPLICE TO EXISTING CONDUCTORS WITH POLARIS IPLDH750-8 OR EQUAL CONNECTORS.
3. CONNECT NEUTRAL TO GROUND AT THE GENERATOR.
4. EXISTING 120/240V LOAD PANEL INSIDE GENERATOR ENCLOSURE FOR BLOCK HEATER, BATTERY CHARGER, LIGHTS + RECEPTACLE.
5. PROVIDE A 60A, 2-POLE CIRCUIT BREAKER IN CKTS. 39-41 OF PANELBOARD L1R TO FEED LOAD PANEL INSIDE GENERATOR ENCLOSURE.



1 E-2 PARTIAL EXISTING ONE-LINE DIAGRAM
NOT TO SCALE



2 E-2 PARTIAL NEW ONE-LINE DIAGRAM
NOT TO SCALE

FAULT CURRENT SCHEDULE

ASSUME INFINITE AVAILABLE FAULT CURRENT FROM UTILITY CO.
1000KVA SERVICE TRANSFORMER, 5.5% IMPENDENCE (BY RMP)

LOCATION	FAULT CURRENT AVAILABLE
X (UTILITY XFMR)	25,776 A
X1 (MAIN)	23,621 A
X2 (MDP)	21,953 A
X3 (ELEV)	5,890 A
X4 (AHU-1)	19,573 A
X5 (HM)	19,069 A
X6 (H1)	14,575 A
X7 (H1R)	8,231 A
X8 (H2)	15,913 A
X9 (H3)	14,913 A
X10 (H4)	8,039 A

* VALUES FROM BUILDING RECORD DRAWINGS

FEEDER SCHEDULE

NO.	RACEWAY AND CONDUCTORS
6	(4 SETS) 4"C - 4 - #600 KCMIL CU + #2/0 GND **
9	1-1/4" C - 3#4 + #8 GND
10	(3 SETS) 2-1/2" C - 4 #300 KCMIL + 1/0 GND

** ROUTED IN CABLE TRAY

CONSTRUCTION DRAWINGS
APRIL 2023

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

PLOTTED BY:KENT KUEHN ON Jun/30/2023

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer MICHAEL W. BRANDT 11219 Date 6-30-23 WYOMING

DRAWN BY: KRL
DSGN. BY: ZAG
APPR. BY: ZAG
DATE: 04/2023
Q.C. REVIEW BY: BCL
DATE: 06/2023

CASPER COLLEGE
GATEWAY BUILDING GENERATOR
CASPER WYOMING

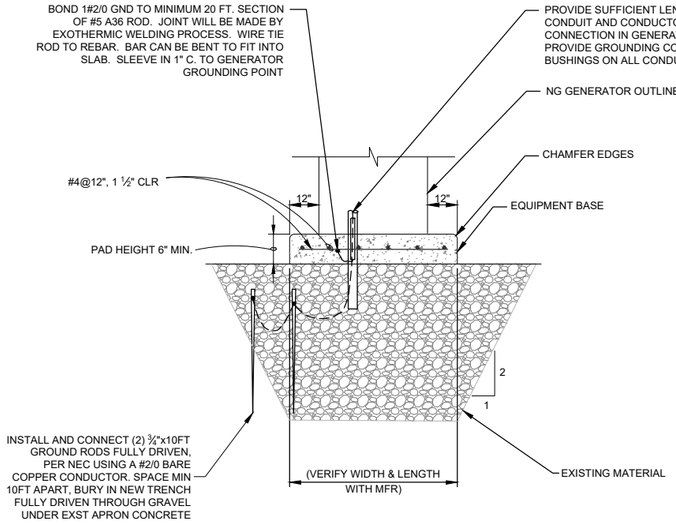
ONE-LINE DIAGRAM

PROJECT NUMBER 6002.013
SHEET NUMBER 7
DRAWING NUMBER E-2

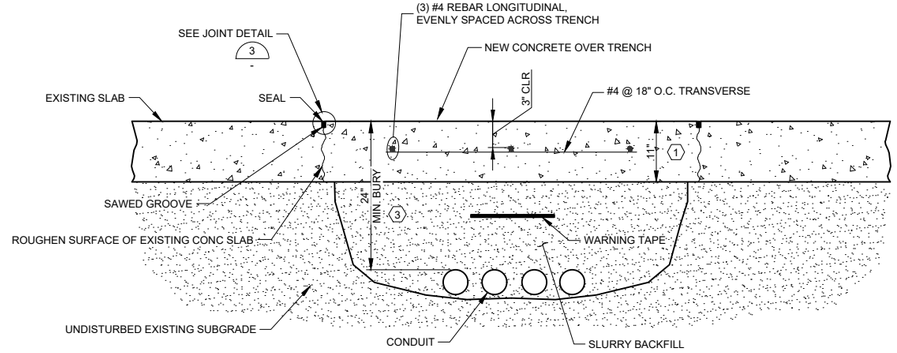
W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\013_ONE-LINE DIAGRAM.DWG

KEY NOTES:

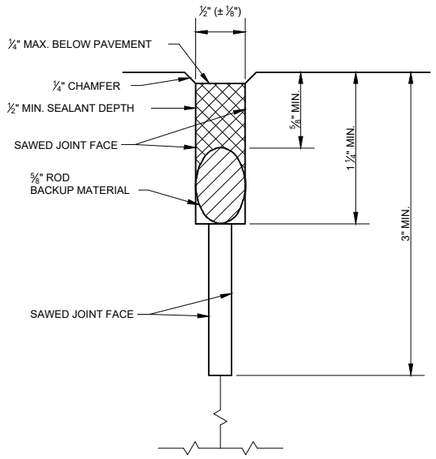
1. DEPTH OF SLAB SHALL BE 6". REPAIRS TO ANY EXISTING CONCRETE SHALL MATCH EXISTING DEPTHS.
2. NEW PAD FOR ATS WILL BE THE SAME CONSTRUCTION AS GENERATOR PAD. ADJUST CONDUITS, PAD SIZE, ETC. FOR ATS PROVIDED.
3. MATCH EXISTING CONDUIT DEPTH. MINIMUM OF 24" BURIAL DEPTH REQUIRED.
4. ALL CONCRETE SHALL MEET CITY OF CASPER STANDARD CONSTRUCTION SPECIFICATIONS.



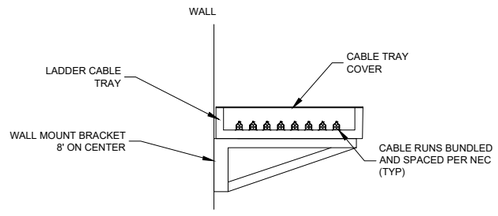
1 GENERATOR PAD DETAIL WITH GROUNDING ⟨2⟩
NOT TO SCALE



2 CONDUIT TRENCH FILL DETAIL
NOT TO SCALE



3 JOINT DETAIL
NOT TO SCALE



4 CABLE TRAY DETAIL (NEAR WALL)
NOT TO SCALE

CONSTRUCTION DRAWINGS
APRIL 2023

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS			
NO.	DESCRIPTION	BY	DATE

PLOTTED BY:KENT KUEHN ON Jun/30/2023

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
152 N. Durbin St., Suite 440
Casper, WY 82601
307.577.0450
www.m-m.net

Professional Engineer MICHAEL W. BRANDT 11219 WYOMING Date 6-30-23

DRAWN BY: KRL
DSGN. BY: ZAG
APPR. BY: ZAG
DATE: 04/2023
Q.C. REVIEW BY: BCL
DATE: 06/2023

CASPER COLLEGE
GATEWAY BUILDING GENERATOR
CASPER WYOMING

DETAILS

PROJECT NUMBER 6002.013
SHEET NUMBER 8
DRAWING NUMBER D-1

W:\6002 CASPER COLLEGE\013 GATEWAY BLDG GENERATOR\ACAD\CIVIL\SHEETS\GENERAL\CIVIL DETAILS.DWG