

General Notes:

Provide feeders and receptacles for all new loads.

- Key Notes:
- New NEMA L15-20R receptacles on overhead bus fed with 3 #12 AWG plus 1 #12 AWG EG 3/4 IN.C from a 208V 3Ph, 20A circuit.
- 2 New NEMA L6-15R receptacles on overhead bus fed with 2 #12 AWG plus 1 #12 AWG EG 3/4 IN.C from a 208V 1Ph, 20A circuit.
- New NEMA 5-20R receptacle fed with 2 #12 AWG plus 1 #12 AWG EG, 3/4 IN.C from a 120V 1Ph, 20A circuit.
- New NEMA L6-30R receptacle on overhead bus fed with 2 #10 AWG plus 1 #12 AWG EG 3/4 IN.C from a 208V 1Ph, 30A circuit.
- 5 New NEMA L6-20R receptacle to replace existing receptacle.
- 6 Provide new SO cord for Pump 7. Coordinate length with user.

ELECTRICAL GENERAL NOTES

Provide all equipment and services necessary to install the complete systems described by the contract documents and specified below. The drawings illustrate the general design and extent of the performance required. All dimensions and locations shall be taken from the architectural drawings.

Comply with all state and local codes, utility company regulations, fire department requirements and the latest editions of the NFPA codes. Comply with NFPA 70 National Electrical Code (NEC), latest.

A Colorado State Electrical Permit is required.

Equipment and materials shall be new, UL-Listed for the use intended, and be free from damage or defect, and shall be installed per the manufacturer's instructions.

The contractor shall be responsible for the successful operation of the electrical systems for a period of one year from the date of final acceptance. Provide operating and maintenance instructions for all electrical systems.

Support conduit and equipment from the structure to prevent sagging, pocketing, swaying, and vibrations. Plastic anchors are prohibited.

Provide sleeves and inserts for all electrical conduit, seal all conduit penetrations passing through fire rated barriers and exterior walls with an approved material to maintain the fire rated integrity.

Provide complete systems of conductors and raceways using conduit appropriate to the function and location, and specifically approved by the NEC. Conductors must be derated per the NEC. Load balance the entire system to within 15% per phase. Provide a complete grounding system, including a ground wire in all power and lighting circuits, and in accordance with Article 250 of the NEC.

Minimum conduit size is 3/4-inch. Conduit fittings shall be set screw steel type in dry locations and raintight type in wet locations.

The following raceways are approved for use on this project, where approved by the NEC:

- 1. EMT: Electrical metallic tubing, galvanized.
- 2. PVC: Polyvinyl chloride conduit, schedule 40, underground only, transition to GRC before rising above grade.
- 3. GRC: Galvanized rigid conduit.

AC and MC cable assemblies may not be used.

Provide galvanized steel outlet and junction boxes, except where otherwise indicated. Boxes shall be a minimum of 4-inches square, or octagonal, with a minimum depth of 2_1/8 inches. Provide weather proof type cast boxes, with gasket and cast cover plates, for all wet locations. Through-the-wall boxes are not permitted. Provide plaster or tile rings for all flush outlets installed where required.

All conductors shall be copper, rated at 600 volts, stranded for No. 10 AWG and larger, with the following insulation ratings: THHN, THWN, XHHW. The conductors shall be applied using the 75 deg C rating table. Conductors shall be factory color coded (phase tape not permitted). Minimum size No. 12 AWG, and if distance exceeds 100 feet, they shall be No. 10 AWG. Phase colors are not permitted for switching. Plug-in type connectors are not allowed.

Provide a dedicated neutral for each single-phase conductor.

Provide specification grade, ivory, 20-amp rated devices throughout as manufactured by Hubbell, Arrow Hart or Leviton. Plates shall be ivory nylon with matching screws. Provide blank cover plate for unused boxes.

Cover plates for multi-gang applications shall be single piece and sized for the box it covers.

Label all wiring devices and junction boxes indicating the panel and circuit number. Use Brother P-Touch type TZ self-laminating labels.

Do not install exposed conduit in areas open to the public. Exposed raceways must be Wiremold where required and only where approved by the architect. Run exposed raceways parallel to and at right angles with the building lines. Paint exposed raceways to match adjacent surface.

Use steel flexible metallic conduit (6-feet maximum length) for connections to motors, fixtures, and/or other equipment where vibration is encountered. Provide Sealtite flexible metallic conduit in wet areas.

Provide circuit breaker type panelboards as scheduled on the drawings, hinged door-in-door, copper bus. Breakers shall be full width, thermal magnetic, bolt-on type. Provide multipole breakers with common trip and single operating handle. Provide separate ground bus. Provide a typed directory in a directory frame. Install trims and doors with the primer coats in finished areas. Provide one spare 3/4-inch conduit up or down to an accessible location for each three (3) unused poles in the panelboard. Panelboards shall be S-E Square D or equal. Panelboard directories shall be typed whether new or updated.

Provide heavy duty, enclosed, fusible and non-fusible, safety switches in enclosures rated for their use. Provide a label on all switches.

Provide branch circuits, feeders, junction boxes, disconnect switches, etc., as required for a complete system. Make power connections to motor s and controls for heating, ventilation, air conditioning, plumbing and owner furnished equipment as required.

Exterior lighting fixtures, raceways, ballasts, equipment, etc., shall be weatherproof and suitable for temperatures down to -20 deg F.

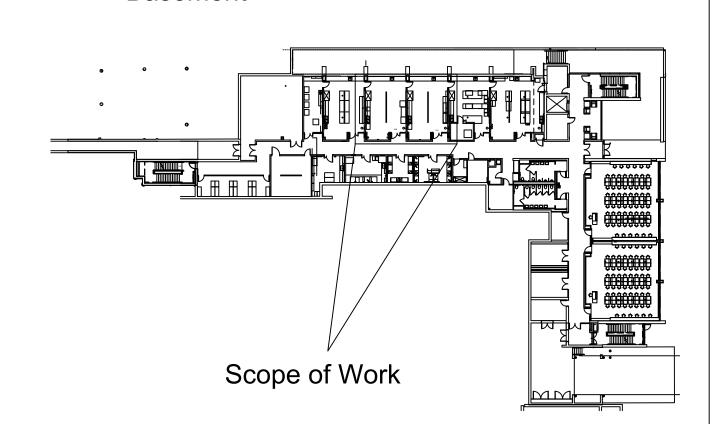
Data Cable: provide a complete system of raceways, pull boxes, outlet boxes and terminals. Conduit in the building shall be EMT (1-inch minimum) with plastic bushings on each end where they are not terminated in a box. Where flexible conduit is used it shall be one trade size larger than 1 inch. Provide a pull string in all empty conduits. Cable shall be by the Mines ITS data contractor with CAT-6A cable. Field verify all outlet locations with the architect or owner including the mounting height.

Provide a new typed panel directory for all new and existing panels and supply the mines FM electrical shop with a Word or Excel file of the directory. Directory shall meet the requirements of NEC 408.4 for all circuits. Provide an engraved phenolic label on all disconnects, panels and motor starters indicating the equipment name and its source of power per NEC 408.4 (b).

All new panelboards shall be labeled with the available fault current per NEC 110.2.4. Refer to one-line diagram for fault values.

Mines has right of first refusal prior to demolition.

Marquez Hall 1600 Arapahoe st. Golden, CO 80401 Basement



COLORADO SCHOOL OF MINES EARTH

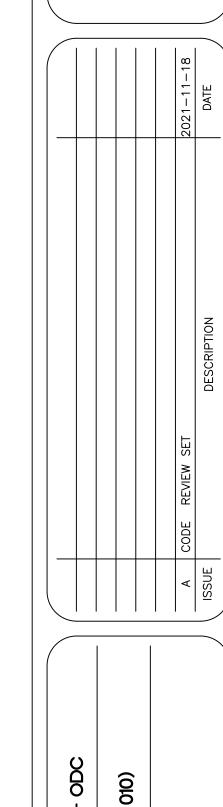
EARTH

EARTH

EARTH

OFFICE OF DESIGN AND CONSTRUCTION 1801 MOLY ROAD, GOLDEN, CO 80401





COLORAE

DESIGNER: JGE

DRAFTER: DRAWN

CHECKER: DPF

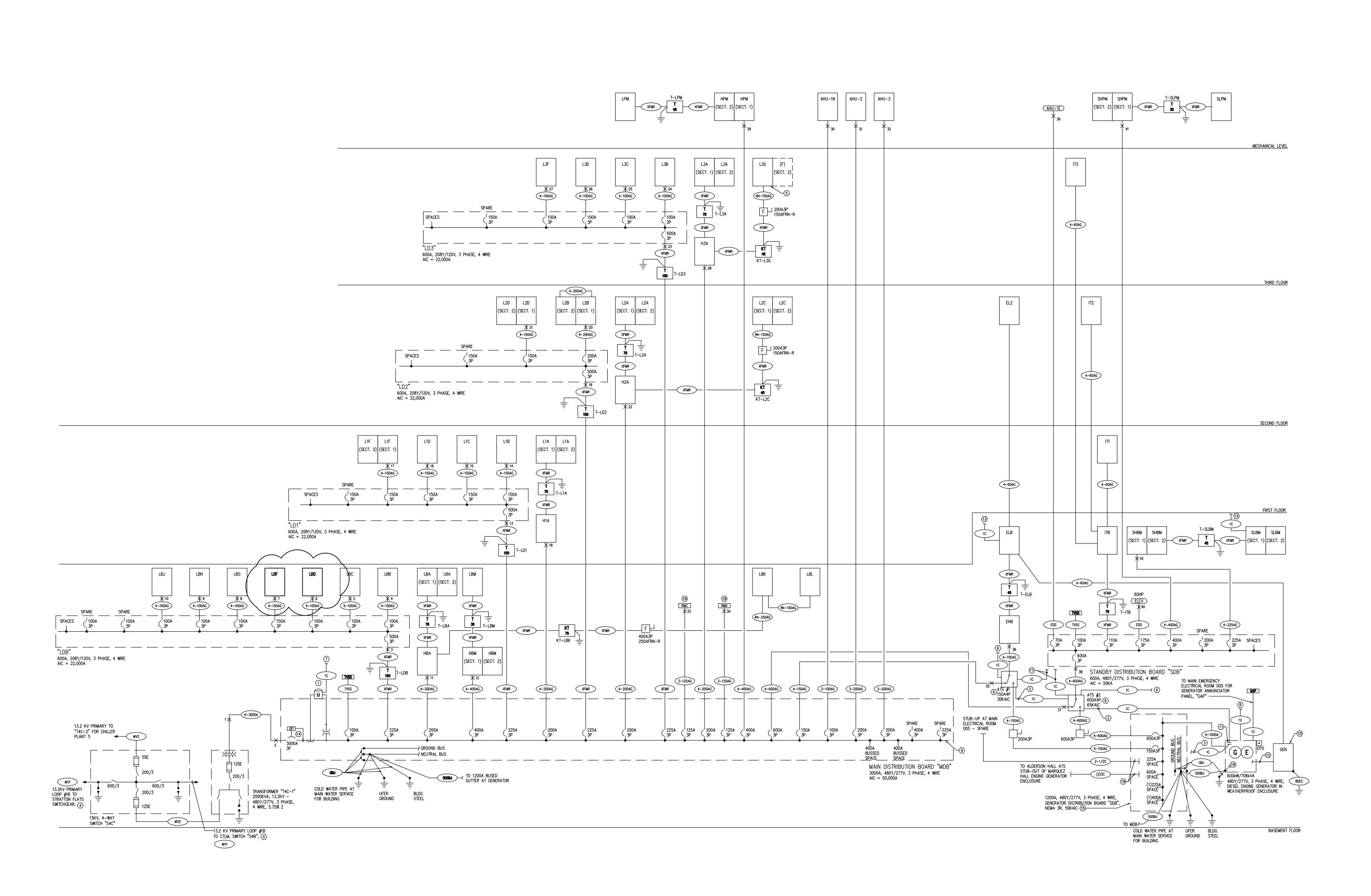
PROJECT: IH21-076

CAD FILE: IH21-076_ELEC

DRAWING NO.

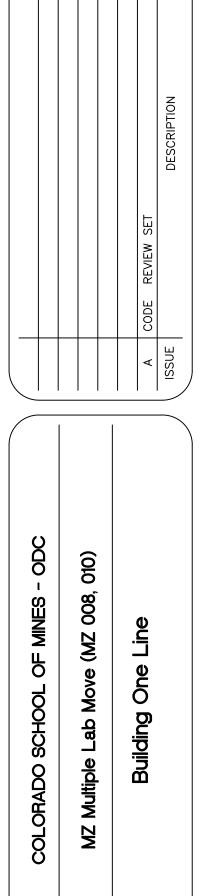
E100

ISSUE A



COLORADO SCHOOL OF MINES EARTH ♥ ENERGY ♥ ENVIRONMENT OFFICE OF DESIGN AND CONSTRUCTION 1801 MOLY ROAD, GOLDEN, CO 80401





DESIGNER: JGE

DRAFTER: DRAWN

CHECKER: DPF

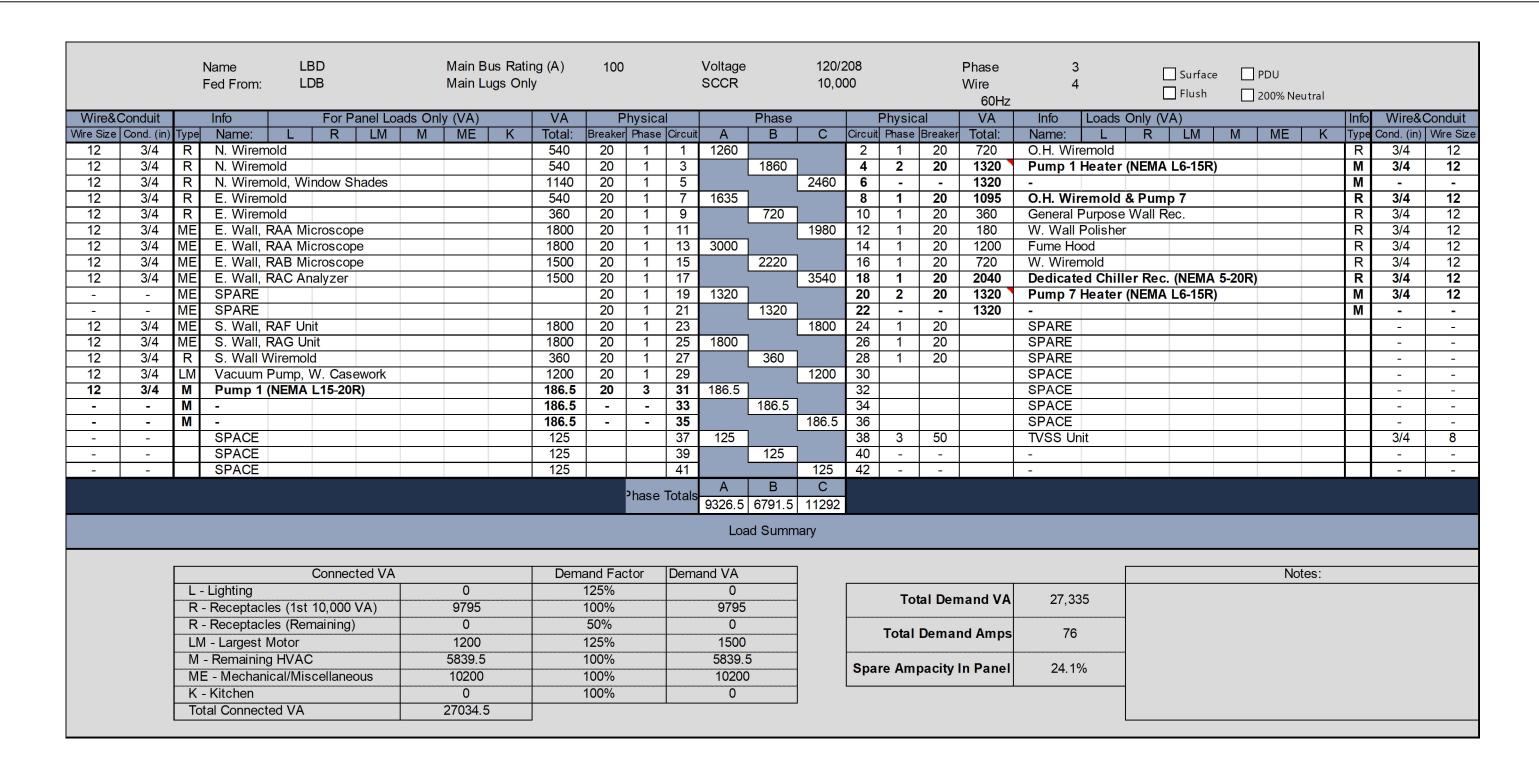
PROJECT: IH21-076

CAD FILE: IH21-076_ELEC

DRAWING NO.

E200

Marquez One Line
Not to Scale



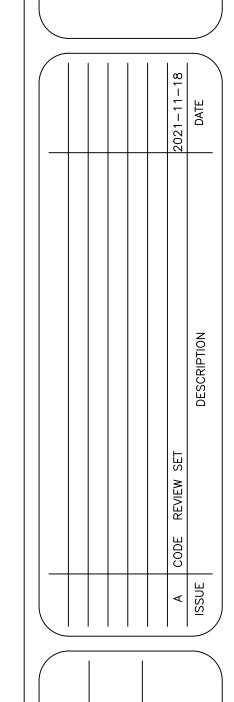
Service Loa	d Justification							
Marquez								
Service Size (kVA): 2000 Service Size (A): 2407 Voltage: 277 / 480 Billed Peak (kW): 167.4 12/2017-09/2021 on 11/2018 Corrected Power (kVA) NEC 220.87 Adjusted Peak (kVA)	Phase: 3 Power Factor: 0.9 167.4 kW / 0.9 = 186 kVA x 125% =	(Campus Avg 186.0 232.5	g = 0.93)					
		kVA	Amps					
Existing building demand		232.50	279.7					
Load added to electrical service as a result of t	his project							
Hi Pressure Oven		5.72	6.8					
Recombination Apparatus		4.56	5.4					
Pumps 1,3,7		9.44	11.3					
Chiller		2.04	2.4					
New Ampacity			305.9					
Existing electrical service size			2,407.0					
Spare ampacity on electrical service (A)	87%		2,101.0					

			Name Fed From:	LBF LDB			ľ	Main Lu	us Ratir ugs Only	1	150			Voltage SCCR		120/2 10,0	00			Phase Wire 60Hz	3	4		Surface Flush		PDU 200% Neut			
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12	3/4	R	N. Wiremold			_				540	20	1	3		1860		4	2	20	1320	Pump 3	Heater	r (NEMA	L6-15R)			М	3/4	12
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			Kitchen					0			100%			0															
		To	tal Connected	VA)	33751																					

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	Conduit					oads On			VA		hysica			Phase			Physica		VA	Info	Loads C						Wire&Cond		
/ire Size	Cond. (in)	Name:	L	R	LM	M	ME	K		Breaker	Phase	Circuit		В	С	Circuit	Phase	Breaker	Total:	Name:	L	R	LM	М	ME	K	Cond. (in)) Wire s	
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EARTH • ENERGY • ENVIRONMENT
FICE OF DESIGN AND CONSTRUCTION
1801 MOLY ROAD, GOLDEN, CO 80401





COLORADO SCHOOL OF MINES - ODC	MZ Multiple Lab Move (MZ 008, 010)	Panel Schedules and Load Justification
CLIENT NAME:	PROJECT NAME:	DRAWING TITLE:
DESIGN	NER:	JGE

PROJECT: IH21-076

CAD FILE: IH21-076_ELEC

DRAWING NO.

DRAWING NO.

E300