



Letter of Explanation/Justification for Bloom Energy Fuel Cell Installation

December 12th, 2016

City of Pleasanton
Community Development Dept.
Planning Department
200 Old Bernal Avenue
Pleasanton, CA 94566

Subj: Bloom Energy Fuel Cell Generator proposed at 5840 Owens Drive (Kaiser Permanente)

To Whom It May Concern:

We are proposing to construct and install four (4) 300kw solid oxide fuel cell generators (a.k.a., "Bloom Energy Servers") and associated ancillary equipment at the Kaiser Data Center Building at 5840 Owens Drive in the city of Pleasanton. Our installation will be in an existing grassy area on the SW side of the building. The Energy Servers will be screened from view by matching existing screening materials that are already used on site.

The purpose of the generator is to provide clean base load power generated "at the site, for the site" as an alternative to solely pulling power from the existing energy grid. Bloom Energy generates clean, reliable power onsite with minimal environmental impact, making the Bloom Energy Server one of the most sustainable solutions on the market today. Compared to alternative sources, Bloom delivers enhanced sustainability benefits in many ways: high efficiency, greenhouse gas emissions reductions, avoided air pollutants, small physical footprint, and reduced water use. Much in the same way that computer and telephone technologies have been revolutionized (as they were once large, inefficient and clunky), our aim at Bloom is to be a leader in the environmentally friendly, 21st century energy revolution by creating highly customizable and adaptable, at-site energy solutions for our customers as opposed to the present energy grid-troubled by aging infrastructure, pollution and transmission loss over miles and miles of unsightly power lines. The Energy Server is able to work by converting fuel directly into electricity without the need of combustion as a conventional electrical generator would-the process is a quiet application involving a chemical reaction-natural gas and air, heating tiles to produce clean energy.

Proposed Use, Type, Location, Size, Purpose, Hours of Operation, Building Architecture/Design, etc.

Use. The use of the site itself will remain unchanged as our generators are accessory structures, detached from the building, incidental to the existing building use and, of course, not intended for human habitation.

Type. We will be installing four (4) of our popular Yuma model, ES-5, commonly used 300kw natural gas powered fuel cell generators at this site, for a total of 1,200kW.



Location. The proposed generators will be placed at the side of the Building in what is presently a grassy area. Due to constraints involving our need for proximity to the building itself and the placement of mechanical equipment existing at the site, we have no other area on the premises that would be sufficient for placement of our generator.

Size. Disturbed area 2200 square feet approx. Height 6-9”.

Purpose. Our fuel cell generators serve as a source of onsite power without having to take energy from the centralized power-grid which is primarily based on fossil-fuel generated energy, and thus dirty. The generators don't entirely displace the grid as the building remains connected to both the grid and the generators, but producing its own power “at the site, to the site” saves the customer (Kaiser) on utility cost as well as maintains a customer commitment to cleaner and more efficient energy solutions, powering the 21st century world.

Hours of Operation. The fuel cell runs 24/7. The Bloom Energy client (in this case, Kaiser), signs up for us to service the site via a regular maintenance established for these types of installations. 24/7 monitoring is done both at our corporate office in Silicon Valley (we are a California-based company) as well as our Asian offices in Bangalore, India. This is done through the use of an Ethernet connection installed at the generator source. It should be noted, the unit is designed to run continuously for optimal efficiency so we do not wish to start up-then stop on a frequent basis, in order to maximize the efficiency of the machine.

Building architecture/design. We intentionally designed our units to be installed in attractive modules that are essentially, self-screened as the working components. After meeting with Hacienda Owner's Association and Planning Dept staff, we have, additionally, added screening to screen equipment from street view.

Explanation of why this project is justified

Neither the project location, size, design nor operational characteristics will create unusual noise, traffic or other conditions or situations which would otherwise make the project objectionable, detrimental or incompatible with other permitted uses in the vicinity. Although we consider our equipment to be among the most attractive pieces of mechanical equipment on the market, it is located at the side of the building, with no visibility from Owens Drive. The pad and subsequent equipment itself is not terribly large. We are proposing to screen via a screening wall (to match existing materials on site) to block street view. In regards to noise, the generator has a very low hum to it which is hardly detectable even at close range.

Additionally, the project itself will not result in conditions or circumstances contrary to the public health, safety and general welfare. As stated, the generator is not a combustion engine (conventional) so environmental impact is significantly reduced and the promotion of these types of clean energy devices versus electrical energy grid power works toward cleaner air, reduced greenhouse gas emissions and a reduction in now precious water resources.

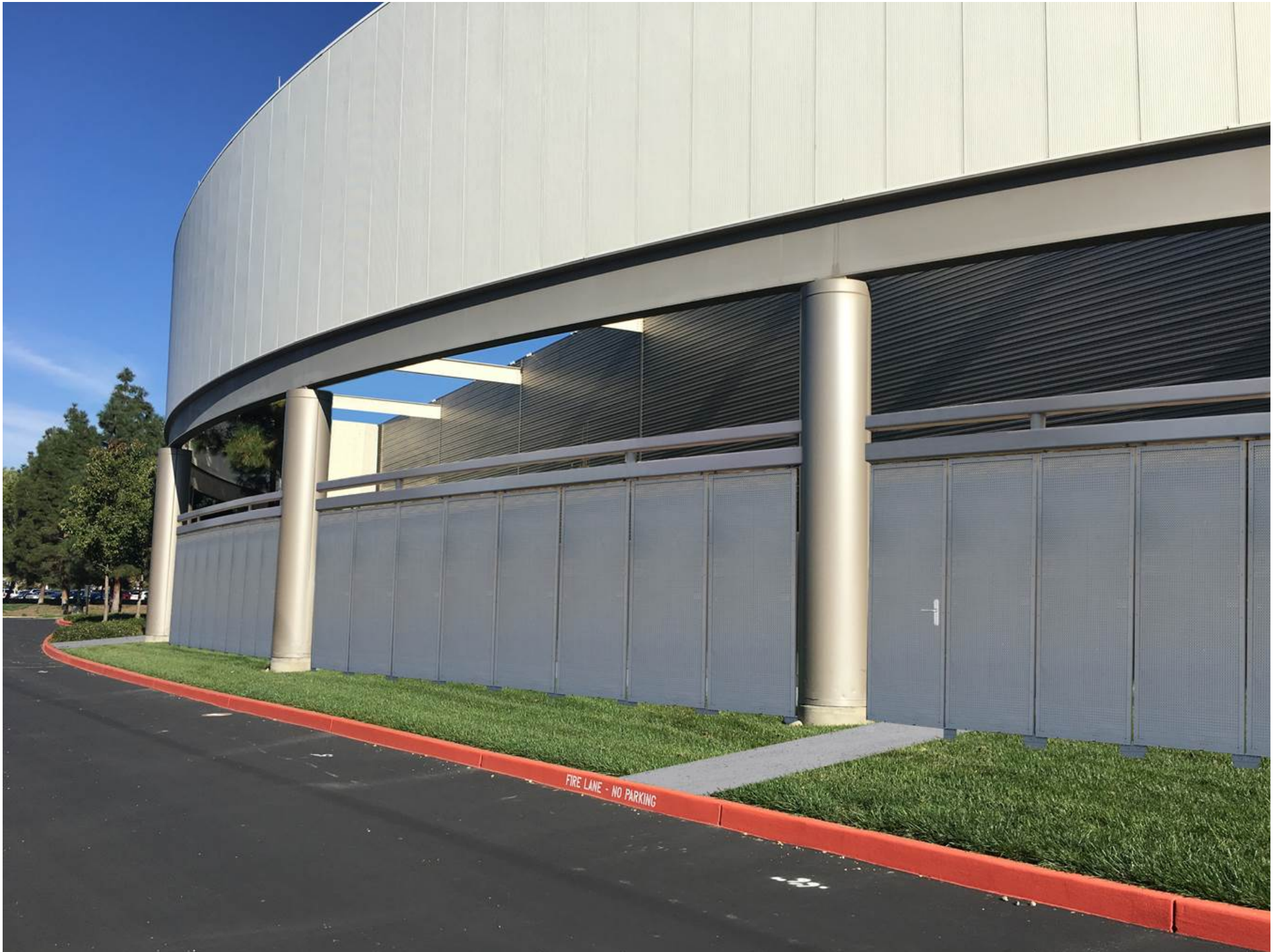


Existing tree to be removed

FIRE LANE - NO PARKING



CHILLER ROOM



FIRE LANE - NO PARKING



Energy Server 5

Clean, Reliable, Affordable Energy



CLEAN, RELIABLE POWER ON DEMAND

The Energy Server 5 delivers clean power that reduces emissions and energy costs. The modular architecture enables the installation to be tailored to the actual electricity demand, with a flexibility to add servers as the load increases. The Energy Server 5 actively communicates with Bloom Energy's network operations centers so system performance can be monitored 24 hours per day, 365 days per year.

INNOVATIVE TECHNOLOGY

Utilizing solid oxide fuel cell (SOFC) technology first developed for NASA's Mars program, the Energy Server 5 produces clean power at unprecedented efficiencies, meaning it consumes less fuel and produces less CO₂ than competing technologies. Additionally, no water is needed under normal operating conditions.

ALL-ELECTRIC POWER

The Energy Server 5, which operates at a very high electrical efficiency, eliminates the need for complicated and costly CHP systems. Combining the standard electrical and fuel connections along with a small footprint and sleek design, the Energy Server 5 is the most deployable fuel cell solution on the market.

CONTROLLED AND PREDICTABLE COST

By providing efficient on-site power generation, the economic and environmental benefits are central to the Energy Server 5 value proposition. Bloom Energy customers can lock in their long term energy costs and mitigate the risk of electricity rate increases. The Energy Server 5 has been designed in compliance with a variety of safety standards and is backed by a comprehensive warranty.

About Bloom Energy

Bloom Energy is making clean, reliable energy affordable. Our unique on-site power generation systems utilize an innovative fuel cell technology with roots in NASA's Mars program. By leveraging breakthrough advances in materials science, Bloom Energy systems are among the most efficient energy generators, providing for significantly reduced operating costs and dramatically lower greenhouse gas emissions. Bloom Energy Servers are currently producing power for many Fortune 500 companies including Apple, Google, NSA, Walmart, AT&T, eBay, Staples, as well as notable non-profit organizations such as Caltech and Kaiser Permanente.

Headquarters:

Sunnyvale, California

For More Information:

www.bloomenergy.com

Energy Server 5

Technical Highlights (ES5-YA1AAA)

Outputs

Nameplate power output (net AC)	300 kW
Base load output (net AC)	300 kW
Electrical connection	480 V, 3-phase, 60 Hz

Inputs

Fuels	Natural gas, directed biogas
Input fuel pressure	10-18 psig (15 psig nominal)
Water	None during normal operation

Efficiency

Cumulative electrical efficiency (LHV net AC)*	65-53%
Heat rate (HHV)	5,811-7,127 Btu/kWh

Emissions

NO _x	< 0.01 lbs/MWh
SO _x	Negligible
CO	< 0.05 lbs/MWh
VOCs	< 0.02 lbs/MWh
CO ₂ @ stated efficiency	679-833 lbs/MWh on natural gas; carbon neutral on directed biogas

Physical Attributes and Environment

Weight	13.6 tons
Dimensions (variable layouts)	14' 9" x 8' 8" x 7' 0" or 29' 4" x 4' 5" x 7' 5"
Temperature range	-20° to 45° C
Humidity	0% - 100%
Seismic vibration	IBC site class D
Location	Outdoor
Noise	< 70 dBA @ 6 feet

Codes and Standards

Complies with Rule 21 interconnection and IEEE1547 standards

Exempt from CA Air District permitting; meets stringent CARB 2007 emissions standards

An Energy Server is a Stationary Fuel Cell Power System. It is Listed by Underwriters Laboratories, Inc. (UL) as a 'Stationary Fuel Cell Power System' to ANSI/CSA FC1-2014 under UL Category IRGZ and UL File Number MH45102.

Additional Notes

Access to a secure website to monitor system performance & environmental benefits

Remotely managed and monitored by Bloom Energy

Capable of emergency stop based on input from the site

* 65% LHV efficiency verified by ASME PTC 50 Fuel Cell Power Systems Performance Test



Bloom Energy Corporation
1299 Orleans Drive
Sunnyvale CA 94089
T 408 543 1500
www.bloomenergy.com

EXTERIOR FUEL CELL INSTALLATION FOR KAISER PERMANENTE

#CN470H
5840 OWENS DRIVE
PLEASANTON, CA 94588



PRIOR TO COMMENCING ANY EXCAVATION OR DEMOLITION, THE CONTRACTOR SHALL CONTACT LOCAL UTILITIES, INCLUDING BUT NOT LIMITED TO ELECTRICAL, GAS, WATER, CABLE, AND TELEPHONE, REQUESTING A UTILITY MARK OUT AND AS NECESSARY RETAIN THE SERVICES OF A PRIVATE UTILITY MARK OUT COMPANY TO PERFORM SUCH MARK OUT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND VERIFY THE LOCATION OF UTILITIES, IRRIGATION, SITE LIGHTING, AND ELECTRICAL LINES IN THE VICINITY OF THE CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR ANY AND ALL UTILITIES DAMAGED BY THE CONTRACTOR'S OPERATION AT NO ADDITIONAL EXPENSE.



1299 ORLEANS DRIVE
SUNNYVALE, CA 94089

PROPRIETARY AND CONFIDENTIAL

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ENGINEER OF RECORD
FARMAN SHIR, P.E.
LICENSE # C63868



EXP: -09/30/2018 02/06/2017

CUSTOMER SITE
KAISER PERMANENTE
#CN470H
5840 OWENS DRIVE
PLEASANTON, CA 94588



REVISION HISTORY		
REV	REVISION ISSUE	DATE
0	RELEASED PER ION-10320	08/08/2016

DESIGNED BY BRIAN CURTIS	DATE 08/08/2016
DRAWN BY UMA GURUNATH	DATE 12/12/2016
REVIEWED BY PANTEHA BINER	DATE 02/06/2017
APPROVED BY FARMAN SHIRMOHAMMADI	DATE 02/06/2017

SHEET TITLE COVER SHEET	
DRAWING NUMBER G0.1	
BLOOM DOCUMENT DOC-1008145	
THIS DRAWING IS 24" X 36" AT FULL SIZE	
SITE ID: KSR023.0	SHEET 01 OF 14

SITE INFORMATION	PERMITTING INFORMATION	CODES	PROJECT DESCRIPTION	BLOOM ENERGY FAQ'S																																																				
<p>PARCEL INFORMATION PROPERTY OWNER KAISER PERMANENTE COUNTY ALAMEDA TAX MAP # 941-2778-4-1 & 941-2778-9</p> <p>PROPERTY DESCRIPTION PROPERTY TYPE HEALTHCARE PROVIDER PROPERTY AREA 1,801,206 S.F. DISTURBED AREA ±800 S.F.</p> <p>PARKING INFORMATION EXISTING PARKING* 160 REMOVED PARKING 0 ADDED PARKING 0 FINAL PARKING COUNT 160</p> <p>*BASED ON COSTAR PROPERTY LETTER DATED 07/06/2016</p>	<p>MUNICIPAL</p> <table border="0"> <tr> <td>AGENCY</td> <td>DEPARTMENT</td> <td>CONTACT INFO</td> </tr> <tr> <td>PLANNING</td> <td>CITY OF PLEASANTON</td> <td>(925) 931-5600</td> </tr> <tr> <td>BUILDING</td> <td>CITY OF PLEASANTON</td> <td>(925) 931-5300</td> </tr> <tr> <td>FIRE</td> <td>LIVEMORE - PLEASANTON FIRE DEPARTMENT</td> <td>(925) 454-2342</td> </tr> </table> <p>UTILITY</p> <table border="0"> <tr> <td>TYPE</td> <td>COMPANY</td> <td>CONTACT INFO</td> </tr> <tr> <td>NATURAL GAS</td> <td>PG & E</td> <td>(800) 734-5000</td> </tr> <tr> <td>ELECTRICAL</td> <td>PG & E</td> <td>(800) 734-5000</td> </tr> <tr> <td>WATER</td> <td>CITY OF PLEASANTON</td> <td>(925) 931-5425</td> </tr> </table>	AGENCY	DEPARTMENT	CONTACT INFO	PLANNING	CITY OF PLEASANTON	(925) 931-5600	BUILDING	CITY OF PLEASANTON	(925) 931-5300	FIRE	LIVEMORE - PLEASANTON FIRE DEPARTMENT	(925) 454-2342	TYPE	COMPANY	CONTACT INFO	NATURAL GAS	PG & E	(800) 734-5000	ELECTRICAL	PG & E	(800) 734-5000	WATER	CITY OF PLEASANTON	(925) 931-5425	<table border="0"> <tr> <td>BUILDING</td> <td>2013 CALIFORNIA BUILDING CODE (CBC)</td> </tr> <tr> <td>ENERGY</td> <td>2013 CALIFORNIA ENERGY CODE (CEC)</td> </tr> <tr> <td>PLUMBING</td> <td>2013 CALIFORNIA PLUMBING CODE (CPC)</td> </tr> <tr> <td>FUEL GAS</td> <td>2013 CALIFORNIA MECHANICAL CODE (CMC)</td> </tr> <tr> <td>ELECTRICAL</td> <td>2013 CALIFORNIA ELECTRICAL CODE (CEC)</td> </tr> </table> <p>PROJECT TEAM CONTACTS</p> <table border="0"> <tr> <td>FIRM</td> <td>ADDRESS</td> <td>CONTACT INFO</td> </tr> <tr> <td>MANUFACTURER BLOOM ENERGY</td> <td>1299 ORLEANS DR. SUNNYVALE, CA 94089</td> <td>(408) 543-1500</td> </tr> <tr> <td>CUSTOMER KAISER PERMANENTE</td> <td>5840 OWENS DRIVE PLEASANTON, CA 94588</td> <td>(925) 595-2904</td> </tr> <tr> <td>GREENBERGFARROW (MEP) ERIC WOLF, PE</td> <td>1430 W. PEACHTREE ST. SUITE 200 ATLANTA, GA 30309</td> <td>(404) 601-3938</td> </tr> <tr> <td>GREENBERGFARROW (CIVIL) FARMAN SHIRMOHAMMADI, PE</td> <td>19000 MACARTHUR BLVD. SUITE 250 IRVINE, CA 92612</td> <td>(949) 296-0430</td> </tr> <tr> <td>MOORE TWINING (GEOTECHNICAL CONSULTANT) READ ANDERSEN, RGE</td> <td>2527 FRESNO ST. FRESNO, CA 93721</td> <td>(559) 268-7021</td> </tr> </table>	BUILDING	2013 CALIFORNIA BUILDING CODE (CBC)	ENERGY	2013 CALIFORNIA ENERGY CODE (CEC)	PLUMBING	2013 CALIFORNIA PLUMBING CODE (CPC)	FUEL GAS	2013 CALIFORNIA MECHANICAL CODE (CMC)	ELECTRICAL	2013 CALIFORNIA ELECTRICAL CODE (CEC)	FIRM	ADDRESS	CONTACT INFO	MANUFACTURER BLOOM ENERGY	1299 ORLEANS DR. 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NEW TRENCH FROM BLOOM ENERGY SERVER TO BUILDING FOR GAS, WATER AND ELECTRICAL CONNECTIONS BETWEEN BLOOM ENERGY SERVER AND BUILDING. TRENCH TO BE BACKFILLED AND NEW CONCRETE COVER TO BE PROVIDED. NEW ENERGY SERVER CAST IN PLACE CONCRETE PAD, ANCILLARY CAST IN PLACE CONCRETE PAD AND AC DISCONNECT CAST IN PLACE CONCRETE PAD TO BE PLACED AT PREPARED SURFACE IN LANDSCAPE AREA. NEW CONCRETE SERVICE PAD TO BE FORMED AROUND THE ENERGY SERVERS AND ANCILLARY PAD. REMOVE TWO (2) EXISTING TREES. METAL SCREENING PANELS TO BE ADDED TO MATCH EXISTING. NEW CONCRETE SERVICE AREA TO BE PROVIDED. ELECTRICAL WORK <ul style="list-style-type: none"> NEW ELECTRICAL FEEDERS BETWEEN BLOOM ENERGY SERVER AND EXISTING MAIN SERVICE SWITCHBOARD. PLUMBING WORK <ul style="list-style-type: none"> NEW WATER CONNECTION FROM POTABLE WATER SOURCE IN FACILITY TO BLOOM ENERGY SERVER. NEW NATURAL GAS CONNECTION. NEW METER AND REGULATOR REQUIRED. 	<p>Q: WHAT IS A BLOOM ENERGY SERVER? A: THE BLOOM ENERGY SERVER IS A STATIONARY FUEL CELL POWER SYSTEM.</p> <p>Q: IS THE BLOOM PRODUCT LISTED OR CERTIFIED? A: YES. ES-5XXX SERIES: - THE FUEL CELL IS UL LISTED AS A "STATIONARY FUEL CELL POWER SYSTEM" TO ANSI/CSA AMERICA FC 1-2004. - IT IS UL LISTED UNDER UL CATEGORY IRGZ AND UL FILE NUMBER MH45102.</p> <p>ESS SERIES: - THE FUEL CELL IS UL LISTED AS A "STATIONARY FUEL CELL POWER SYSTEM" TO ANSI/CSA FC 1-2014. - IT IS UL LISTED UNDER UL CATEGORY IRGZ AND UL FILE NUMBER MH45102.</p> <p>Q: WHERE ARE FUEL CELLS COVERED IN THE NATIONAL ELECTRICAL CODE (NEC)? A: FUEL CELLS ARE COVERED IN ARTICLE 692 OF THE NEC (NFPA 70). FUEL CELLS HAVE BEEN INCORPORATED INTO THE NEC SINCE 2002.</p> <p>Q: WHAT IS THE MODEL NUMBER OF THIS PRODUCT? A: PLEASE SEE THE DATA SHEET PROVIDED WITH THIS FAQ.</p> <p>Q: WHAT IS THE NOISE LEVEL OF THE FUEL CELL SYSTEM? A: FOR SPECIFIC DB RANGES, PLEASE REFER TO THE DATA SHEET PROVIDED WITH THIS FAQ.</p> <p>Q: DO BLOOM FUEL CELL SYSTEMS PROVIDE LIFE SAFETY POWER? A: NO. WE ARE NOT LIFE SAFETY AND DO NOT PROVIDE LIFE SAFETY POWER, EVEN WHEN A UPM IS INSTALLED. WE ARE NOT ALTERING WHATEVER LIFE SAFETY IS CURRENTLY PRESENT AT THE FACILITY.</p> <p>Q: IS THE BLOOM FUEL CELL SYSTEM TAMPER-PROOF? A: YES. THE FUEL CELLS ARE SECURED IN PLACE AND DOORS ARE SECURED AND LOCKED. ONLY BLOOM SERVICE PERSONNEL HAVE THE KEYS AND CAN BE ON-SITE WITHIN 24 HOURS.</p> <p>Q: WHAT HAPPENS TO THE CUSTOMER FACILITY POWER IF THE FUEL CELLS SHUT DOWN? A: THE FUEL CELL SYSTEM IS OPERATED IN GRID-PARALLEL MODE. IF THE UTILITY GRID IS OPERATIONAL, THE CUSTOMER FACILITY WILL RECEIVE POWER FROM THE GRID AND NOTICE NO DIFFERENCE.</p> <p>Q: WHAT HAPPENS TO THE FUEL CELL SYSTEM WHEN THE UTILITY POWER SHUTS DOWN? A: IF UTILITY PROVIDED POWER IS LOST FOR ANY REASON, THE FUEL CELL SYSTEM WILL ALSO STOP PRODUCING POWER. THE FUEL CELL SYSTEM WILL REMAIN IN STAND-BY MODE UNTIL IT AUTOMATICALLY SENSES THE UTILITY GRID HAS BEEN RESTORED.</p> <p>Q: WHAT HAPPENS TO THE FUEL CELL SYSTEM WHEN THE UTILITY GAS SHUTS DOWN? A: IF THE UTILITY GAS IS INTERRUPTED, THE FUEL CELL SYSTEM WILL AUTOMATICALLY SHUT DOWN AS WELL.</p> <p>Q: CAN THE FUEL CELL SYSTEM BE SHUT DOWN LOCALLY IN CASE OF AN EMERGENCY? A: YES. IF THE FUEL CELL MUST BE SHUT DOWN RIGHT AWAY--FOR EXAMPLE, IN CASE OF A BUILDING FIRE OR ELECTRICAL HAZARD--TWO SHUTOFF CONTROLS ARE INSTALLED AT THE FACILITY EXTERNAL TO THE SYSTEM. THE LOCATIONS OF THESE TWO CONTROLS SHOULD BE KNOWN TO THE FACILITIES MANAGER BEFORE OPERATION AND SHOULD BE NOTED ON THE SITE DIAGRAM THAT IS CREATED FOR EACH SITE DURING INSTALLATION. THE TWO SHUTOFFS ARE: (1) THE ELECTRICAL DISCONNECT SWITCH AND (2) THE MANUAL NATURAL GAS SHUTOFF VALVE. A THIRD SHUTOFF, AN EMERGENCY POWER OFF (EPO) BUTTON, MAY BE PROVIDED ON-SITE.</p> <p>Q: DOES THE BLOOM FUEL CELL SYSTEM OPERATE 24/7? A: YES.</p> <p>Q: ARE THE BLOOM FUEL CELL SYSTEMS MONITORED? A: YES. BLOOM FUEL CELL SYSTEMS ARE CONTROLLED REMOTELY AND HAVE INTERNAL SENSORS THAT CONTINUOUSLY MONITOR SYSTEM OPERATION. IF SAFETY CIRCUITS DETECT A CONDITION OUTSIDE NORMAL OPERATING PARAMETERS, THE FUEL SUPPLY IS STOPPED AND INDIVIDUAL SYSTEM COMPONENTS ARE AUTOMATICALLY SHUT DOWN. A BLOOM ENERGY REMOTE OPERATOR CAN ALSO REMOTELY INITIATE ANY EMERGENCY SEQUENCE. AN EMERGENCY STOP ALARM INITIATES AN AUTOMATIC SHUTDOWN SEQUENCE THAT PUTS THE SYSTEM INTO "SAFE MODE" AND CAUSES IT TO STOP EXPORTING POWER. IF YOU HAVE QUESTIONS ABOUT ANY OF THESE SAFETY FEATURES, PLEASE CONTACT BLOOM ENERGY AT CUSTOMERCARE@BLOOMENERGY.COM.</p> <p>Q: WHAT ARE THE EMISSIONS GENERATED BY BLOOM FUEL CELL SYSTEMS? A: THE SPECIFIC PERCENTAGE OF CARBON EMISSION REDUCTIONS ARE DEPENDENT ON YOUR STATE'S GENERATION MIX, BUT BLOOM FUEL CELL SYSTEMS VIRTUALLY ELIMINATE NOX, SOX, AND OTHER CRITICAL AIR POLLUTANTS THAT ARE FOUND IN TRADITIONAL ELECTRICITY GENERATION METHODS. FOR SPECIFIC EMISSIONS RANGES, PLEASE REFER TO THE DATA SHEET PROVIDED WITH THIS FAQ.</p> <p>Q: WHAT IS THE SUSTAINABILITY IMPACT OF BLOOM FUEL CELL SYSTEMS? A: BLOOM FUEL CELL SYSTEMS GENERATE ELECTRICITY ON-SITE THROUGH AN EFFICIENT ELECTROCHEMICAL REACTION WITHOUT COMBUSTION. DUE TO THE HIGH EFFICIENCY (60%-53% COMPARED TO A COMBINED CYCLE NATURAL GAS PLANT WITH EFFICIENCY OF 40-45% OR COAL PLANTS AT 35%) BLOOM ENERGY SERVERS REDUCE CARBON EMISSIONS BY 20-50% COMPARED TO THE US GRID EMISSION RATES. THE VARIATION IN EMISSIONS REDUCTION IS DUE TO THE VARIATION IN HOW DIFFERENT STATES GENERATE ELECTRICITY. IN ADDITION, BLOOM FUEL CELL SYSTEMS USE NO WATER DURING NORMAL OPERATION.</p>
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<p>VICINITY MAP (NTS)</p>		<p>DRAWING INDEX</p> <table border="1"> <thead> <tr> <th>SHEET #</th> <th>DWG #</th> <th>SHEET TITLE</th> </tr> </thead> <tbody> <tr><td>01</td><td>G0.1</td><td>COVER SHEET</td></tr> <tr><td>02</td><td>G0.2</td><td>GENERAL CONSTRUCTION NOTES</td></tr> <tr><td>03</td><td>G1.1</td><td>OVERALL SITE PLAN</td></tr> <tr><td>04</td><td>G2.1</td><td>EQUIPMENT PAD DETAILS</td></tr> <tr><td>05</td><td>A1.1</td><td>SCREENING ELEVATION</td></tr> <tr><td>06</td><td>A1.2</td><td>SCREENING DETAILS</td></tr> <tr><td>07</td><td>C1.1</td><td>DETAILED SITE PLAN</td></tr> <tr><td>08</td><td>C2.1</td><td>DETAILS SHEET 1</td></tr> <tr><td>09</td><td>C2.2</td><td>DETAILS SHEET 2</td></tr> <tr><td>10</td><td>C2.3</td><td>DETAILS SHEET 3</td></tr> <tr><td>11</td><td>E0.1</td><td>ELECTRICAL SPECIFICATIONS</td></tr> <tr><td>12</td><td>E3.1</td><td>ELECTRICAL SINGLE LINE DIAGRAM</td></tr> <tr><td>13</td><td>M0.1</td><td>MECHANICAL SPECIFICATIONS</td></tr> <tr><td>14</td><td>M1.1</td><td>PLACARD PLAN</td></tr> </tbody> </table>			SHEET #	DWG #	SHEET TITLE	01	G0.1	COVER SHEET	02	G0.2	GENERAL CONSTRUCTION NOTES	03	G1.1	OVERALL SITE PLAN	04	G2.1	EQUIPMENT PAD DETAILS	05	A1.1	SCREENING ELEVATION	06	A1.2	SCREENING DETAILS	07	C1.1	DETAILED SITE PLAN	08	C2.1	DETAILS SHEET 1	09	C2.2	DETAILS SHEET 2	10	C2.3	DETAILS SHEET 3	11	E0.1	ELECTRICAL SPECIFICATIONS	12	E3.1	ELECTRICAL SINGLE LINE DIAGRAM	13	M0.1	MECHANICAL SPECIFICATIONS	14	M1.1	PLACARD PLAN							
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GENERAL CONSTRUCTION NOTES

- IN THE EVENT OF DISCREPANCIES BETWEEN THE DRAWINGS, SPECIFICATIONS, OR SCOPE OF WORK SUMMARY IN THIS PACKAGE, NOTIFY BLOOM ENERGY IMMEDIATELY.
- THE EXISTING SITE PLAN FEATURES ARE BASED ON DESIGN DRAWINGS, AS-BUILT PLANS, AERIAL PHOTOGRAPHS AND FIELD MEASUREMENTS UNLESS OTHERWISE NOTED. THE LOCATIONS OF ALL FEATURES AND STRUCTURES ON THE PLANS ARE APPROXIMATE.
- THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL WORK IS DONE IN ACCORDANCE WITH CURRENT APPLICABLE NATIONAL, STATE AND LOCAL CODES, ORDINANCES AND REQUIREMENTS AT A MINIMUM; EVEN IF NOT SPECIFICALLY REFERENCED IN THESE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS. MORE STRINGENT REQUIREMENTS MAY BE SPECIFIED. IN SITUATIONS WHERE THERE IS A CONFLICT BETWEEN THE MINIMUM REGULATORY REQUIREMENTS AND INFORMATION PROVIDED IN THESE DRAWINGS OR SPECIFICATIONS CONSULT BLOOM ENERGY FOR RESOLUTION BEFORE COMMENCING WORK.
- THE CONTRACTOR SHALL PROTECT ALL EXISTING ITEMS AND FACILITIES TO REMAIN THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL REPAIR AND/OR REPLACE, AT CONTRACTOR'S EXPENSE, ANY EXISTING ITEMS AND FACILITIES TO REMAIN THAT ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS, TO THE SATISFACTION OF PROPERTY OWNER AND BLOOM ENERGY.
- UNLESS DELIVERY IS SPECIFIED BY BLOOM ENERGY TO THE JOB SITE, CONTRACTOR SHALL DELIVER ALL EQUIPMENT, DAMAGE-FREE TO THE JOB SITE.
- PRIOR TO COMMENCING ANY EXCAVATION OR DEMOLITION, THE CONTRACTOR SHALL CONTACT LOCAL UTILITIES, INCLUDING BUT NOT LIMITED TO, ELECTRICAL, GAS, WATER, CABLE, AND TELEPHONE. CONTRACTOR SHALL REQUEST A UTILITY MARK OUT AND AS NECESSARY RETAIN THE SERVICES OF A PRIVATE UTILITY MARK OUT COMPANY TO PERFORM SUCH MARK OUT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND VERIFY THE LOCATION OF UTILITIES, IRRIGATION, SITE LIGHTING, AND ELECTRICAL LINES IN THE VICINITY OF THE CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ANY AND ALL UTILITIES DAMAGED BY THE CONTRACTOR'S OPERATION AT NO ADDITIONAL EXPENSE.
- BLOOM ENERGY WILL PROVIDE THE CONTRACTOR WITH COPIES OF ALL PERMITS AND PROVIDE THE CONTRACTOR ANY CONDITIONS OF APPROVAL BY THE PLANNING DEPARTMENT.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING JURISDICTIONS AS REQUIRED FOR INSPECTIONS.
- THE CONTRACTOR SHALL PROVIDE BLOOM ENERGY WITH
 - A CONSTRUCTION SCHEDULE PRIOR TO STARTING THE WORK
 - A QUALIFIED JOB SUPERINTENDENT THROUGHOUT THE WORK
 - PHOTOS SHOWING TRENCHES PRIOR TO BACKFILL, SLOPE OF STEEL OR PRECAST PADS
 - FINAL AS BUILT DRAWINGS OF ALL UNDERGROUND CONSTRUCTION.
- THE CONTRACTOR SHALL PROVIDE BARRICADES AND SAFETY SIGNS PER OSHA REQUIREMENTS.
- THE CONTRACTOR IS RESPONSIBLE FOR OVERALL CONSTRUCTION SITE CLEANLINESS, INCLUDING PROVISIONS OF A DEBRIS BOX WITH WEEKLY SERVICING, REMOVAL OF ALL CONTRACTOR/SUBCONTRACTOR REFUSE AND DEBRIS, AND SWEEPING OF THE ENTIRE YARD AREA AT THE COMPLETION OF THE WORK.
- UNLESS STATED OTHERWISE IN THE SCOPE OF WORK SUMMARY, ALL OTHER PROCEDURES, TESTING, MATERIALS AND EQUIPMENT SHOWN ON THE PLANS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
- THE PLAN VIEW DRAWINGS PROVIDED IN THIS SET INCLUDE A ROUGH SCALE REPRESENTATION OF EXISTING AND PROPOSED CONDITIONS AND SHOULD NOT BE SCALED. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS ON SITE. ALL DRAWINGS MARKED "NTS" HAVE NO RELATIVE SCALE AND ONLY LISTED DIMENSIONS SHOULD BE USED.
- EACH CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF DAMAGE TO THE WORK OF OTHER TRADES CAUSED BY THEIR OPERATIONS. ALL REPAIRS SHALL BE PERFORMED AT THE COST OF THE CONTRACTOR RESPONSIBLE FOR THE DAMAGES. WORK SHALL ONLY BE PERFORMED AFTER APPROVAL OF A REPRESENTATIVE OF THE TRADE WHOSE WORK WAS DAMAGED.
- THE CONTRACTOR SHALL NOTIFY BLOOM ENERGY IF SITE CONDITIONS OR DIMENSIONS DISAGREE WITH INFORMATION SHOWN ON THE DRAWINGS. WORK IS NOT TO PROCEED UNTIL SUCH DIFFERENCES ARE RESOLVED.
- THE CONTRACTOR SHALL EXAMINE THE SITE AND FAMILIARIZE THEMSELVES WITH ALL EXISTING CONDITIONS, AND BE PREPARED TO PERFORM THE WORK WITHIN THE EXISTING CONDITIONS.
- THE CONTRACTOR AND EACH SUBCONTRACTOR SHALL INSPECT WORK PREVIOUSLY PREPARED OR INSTALLED BY OTHERS BEFORE APPLYING SUBSEQUENT MATERIALS OR FINISHES. IF UNSATISFACTORY, NOTIFY BLOOM ENERGY. DO NOT PROCEED UNTIL THE DEFECTIVE WORK HAS BEEN CORRECTED.
- THE CONTRACTOR REMAINS RESPONSIBLE FOR FAULTY MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER FINAL PROJECT PAYMENT IS MADE. ANY DEFECT OR DAMAGE FOUND EVEN AFTER THE FINAL ACCEPTANCE, CERTIFICATION AND PAYMENT FOR THIS PROJECT WILL BE REMEDIATED AT THE CONTRACTOR'S EXPENSE. REPAIRS OR REPLACEMENTS REQUIRED WILL SUBSEQUENTLY BE WARRANTED FOR ONE YEAR AFTER WORK COMPLETION AND ACCEPTANCE.
- IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES AND OSHA REQUIREMENTS, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND WILL NOT BE LIMITED TO NORMAL WORKING HOURS.
- THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ANY LANDSCAPED AREAS TO PRE-CONSTRUCTION CONDITION AS ASSESSED BY THE PROPERTY OWNER OR CUSTOMER. CUSTOMER APPROVAL OF AN ACCEPTABLE STATE IS REQUIRED TO CONFIRM COMPLETION OF WORK. THE CONTRACTOR SHALL SCHEDULE A POST CONSTRUCTION WALK TO EVALUATE THE LANDSCAPING FUNCTIONALITY WITH THE HOME DEPOT LANDSCAPER.
- GENERAL HOUSEKEEPING OF THE SITE, INCLUDING SWEEPING AND CONTROL OF SEDIMENT, TRASH, AND DEBRIS SHALL BE PERFORMED DAILY OR IMMEDIATELY UPON THE OCCURRENCE.
- DURING CONSTRUCTION ALL EXITS AND DOORWAYS MUST REMAIN UNOBSTRUCTED.
- THE TYPES, LOCATION, SIZES, AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE AND WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENTS, SIZES, LOCATIONS AND DEPTHS OF SUCH GROUND UTILITIES. THE CONTRACTOR SHALL NOTIFY BLOOM ENERGY IF WORK CANNOT PROCEED AS PROPOSED.

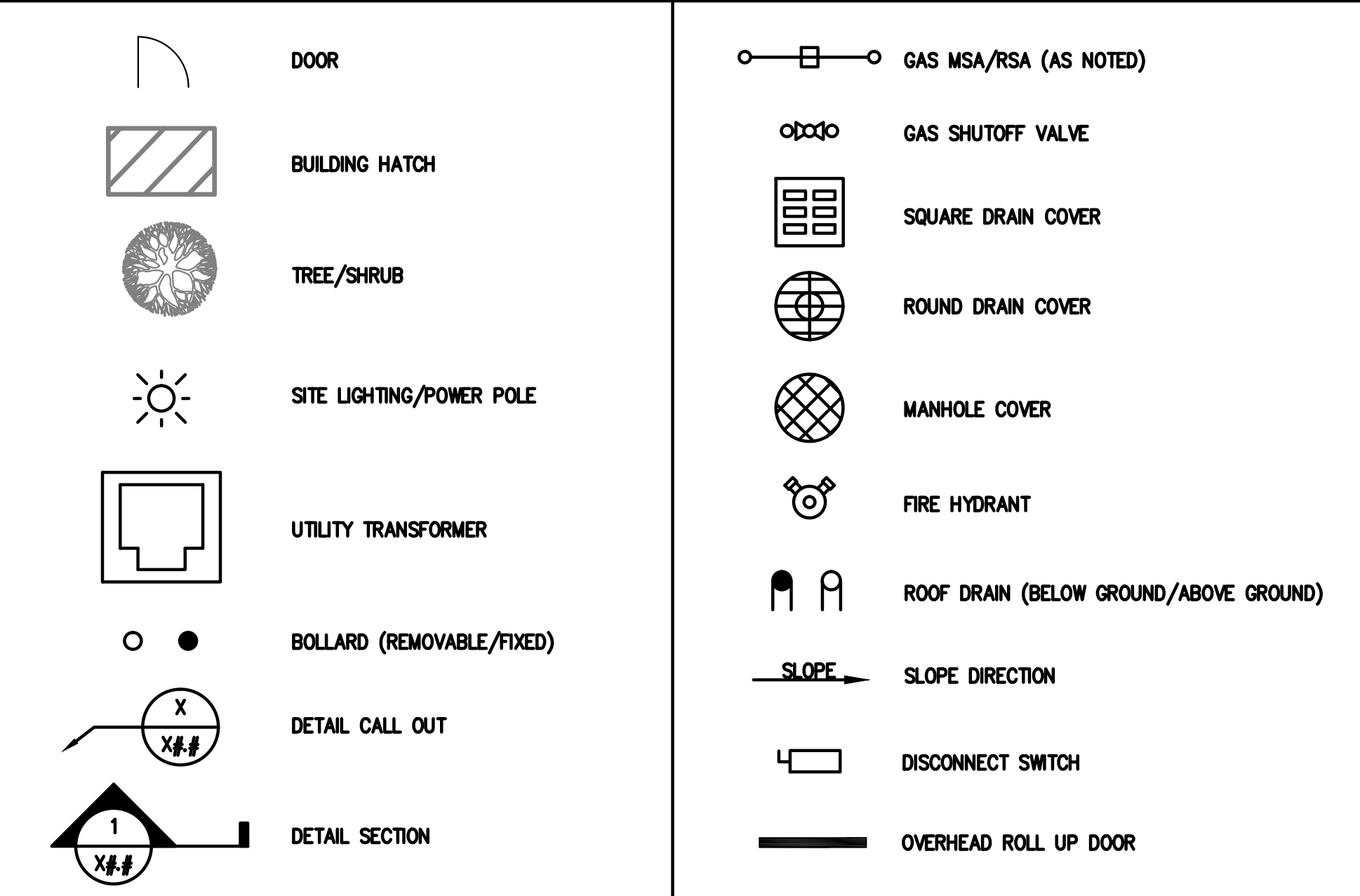
SITE SPECIFIC CONSTRUCTION NOTES

- CONSTRUCTION SUPERINTENDENT SHALL CONTACT THE CUSTOMER REPRESENTATIVE FOR A PRE-CONSTRUCTION CONFERENCE TWO WEEKS PRIOR TO THE START OF THE WORK. THE SCOPE OF WORK AND TIMELINE SHALL BE DISCUSSED WITH RESPECT TO ANY COORDINATION ISSUES WHICH SHALL DISRUPT THE FACILITY OPERATIONS. THE SUPERINTENDENT SHALL SUBMIT A WEEKLY STATUS REPORT TO THE CUSTOMER, WITH PICTURES, VIA EMAIL TO THE CUSTOMER REPRESENTATIVE. THIS INCLUDES ANY FACILITY EQUIPMENT WHICH ARE IN CLOSE PROXIMITY TO THE CONSTRUCTION WORK WHICH WILL BE MOVED BY THE FACILITY REPRESENTATIVES.
- TRENCHING:
 - UTILITY TRENCH WORK IN DRIVEWAY SHALL BE DONE AT NIGHT BETWEEN 10PM AND 6 AM.
 - TRENCHING SHOULD BE DONE IN STAGES, TO ENSURE CUSTOMER TRAFFIC FLOW IS NOT IMPEDED.
 - WHEN THE TRENCH IS OPEN, IT SHALL BE COVERED DURING THE DAY (6 AM - 10 PM) WITH PLATES THAT ARE CAPABLE OF SUPPORTING THE WEIGHT OF DELIVERY TRUCKS.
- UTILITY CONNECTIONS THAT REQUIRE TAPPING ON LIVE LINES SHALL BE PERFORMED AT NIGHT AND BE COORDINATED WITH AND APPROVED BY THE CUSTOMER PRIOR TO MAKING UTILITY CONNECTIONS. ANY PRECAUTIONARY MEASURES REQUIRED DUE TO UTILITY SHUT-OFF NEED TO BE COMPLETED BY CONTRACTOR.
- ONLY HALF OF DRIVE AISLES MAY BE CLOSED IN ACTIVE CONSTRUCTION AREAS. OTHER VEHICLES OR MATERIALS SHALL BE KEPT AWAY FROM THE AREA SO AS TO NOT HINDER TRAFFIC FLOW. COORDINATE THE LOCATION OF ON-SITE PARKING AND/OR TEMPORARY STORAGE WITH CUSTOMER REPRESENTATIVES.
- MAINTAIN MINIMUM 20' FIRE LANE ACCESS DURING CONSTRUCTION AND STAGE TRENCHING TO ACCOMPLISH REQUIRED FIRE ACCESS AS NECESSARY.
- STABILIZATION:
 - SEDIMENT, EROSION AND TRASH CONTROL SHALL BE PERFORMED AT ALL TIMES. BEST MANAGEMENT PRACTICES (BMPs) SHALL BE INSTALLED PRIOR TO WORK START AND REMOVED ONLY WHEN THE SITE IS FULLY STABILIZED.
 - THE SITE SHALL BE CONSIDERED "FULLY STABILIZED" WHEN THE CUSTOMER REPRESENTATIVES HAS REVIEWED SUBMITTED PICTURES AND ACCEPT THE STABILIZATION.
- ALL SITE RELATED IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO PAVEMENT RESTORATION, CURB INSTALLATION, AND TURF RESTORATION SHALL BE IN CONFORMANCE TO THE AHJ SITE DEVELOPMENT STANDARDS, SPECIFICATIONS, AND DETAILS, UNLESS MORE STRINGENTLY SPECIFIED HEREIN.

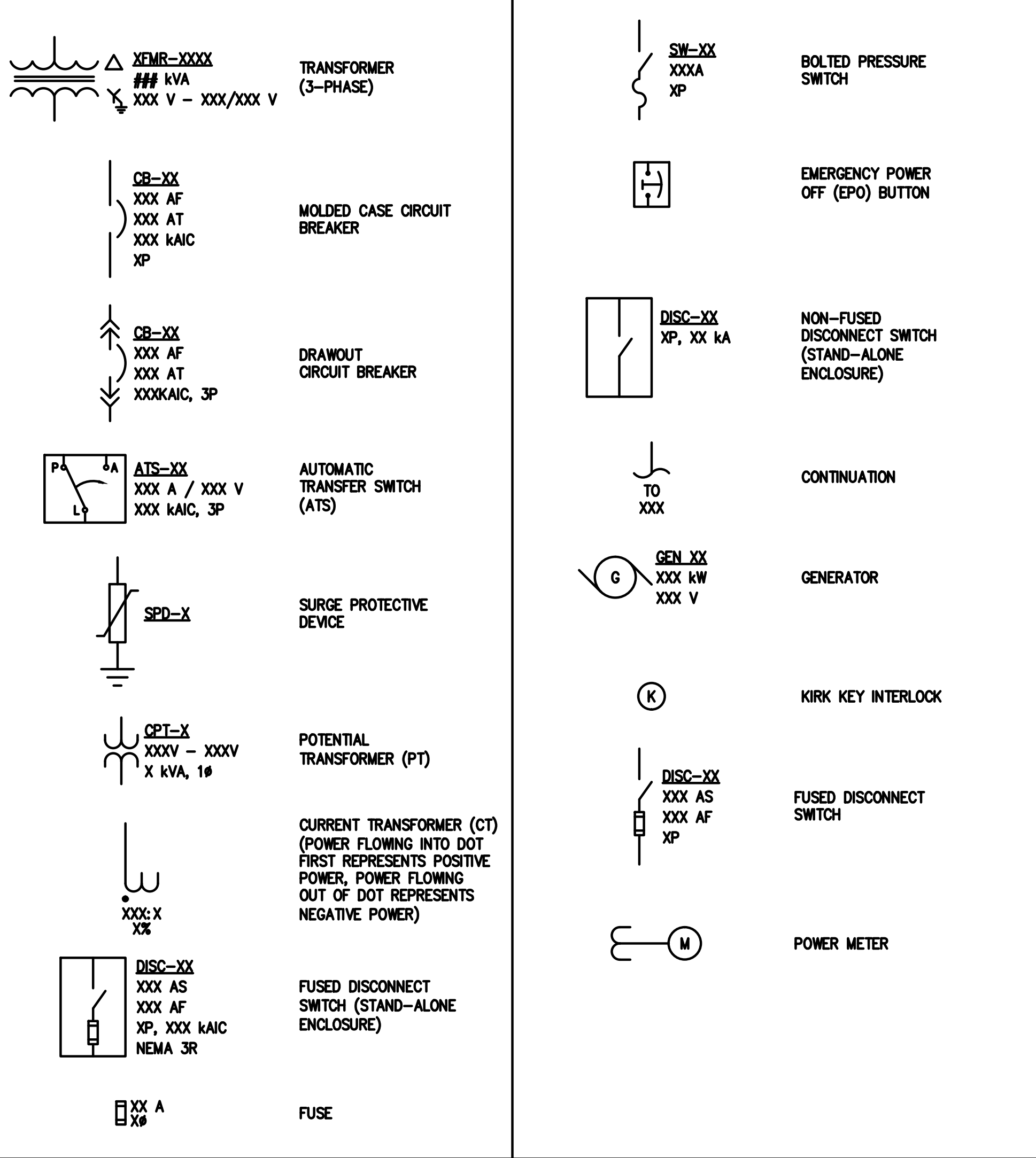
ABBREVIATIONS

°C	DEGREES CELSIUS
°F	DEGREES FAHRENHEIT
A	AMPS
AC	ALTERNATING CURRENT, ASPHALT CONCRETE
ACS	ESS AC POWER SECTION
AHJ	AUTHORITIES HAVING JURISDICTION
AL	ALUMINUM
ASTM	AMERICAN SOCIETY OF THE INTERNATIONAL ASSOCIATION FOR TESTING AND MATERIALS
ATM	ATMOSPHERE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BC	BASE COURSE
BMPs	BEST MANAGEMENT PRACTICES
C	CONDUIT
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CL	CENTER LINE
CLR	CLEAR
CONC	CONCRETE
CMU	CONCRETE MASONRY UNIT
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CJ	COPPER
DC	DIRECT CURRENT
DI	DEIONIZED
ECM	ELECTRICAL COMBINATION MODULE
EDM	ELECTRICAL DISTRIBUTION MODULE
EJ	EXPANSION JOINT
ELEV	ELEVATION
EMT	ELECTRICAL METAL TUBING
EPO	EMERGENCY POWER OFF
ES	ENERGY SERVER
FH	FIRE HYDRANT
FNPT	FEMALE NATIONAL PIPE THREAD
FP5	ESS FUEL PROCESSING MODULE
FPM	FUEL CELL POWER MODULE
G	GROUND
GAL	GALLON
GF	GROUND FAULT
GFEP	GROUND FAULT EQUIPMENT PROTECTION
GND	GROUND
HDD	HORIZONTAL DIRECTIONAL DRILLING
HDPE	HIGH DENSITY POLYETHYLENE
HR	HOUR
HZ	HERTZ
ID	INNER DIAMETER
IEEE	INSTITUTE FOR ELECTRICAL & ELECTRONIC ENGR.
IOM	INPUT OUTPUT MODULE
ISS	SHORT CIRCUIT CURRENT
ISC	INTEGRATED STEEL SKID
K	KILO
KA	KILOAMPERE
KAIC	KILOAMPERE INTERRUPTING CAPACITY
KVA	KILOVOLT-AMPS
KW	KILOWATTS
LBS	POUNDS
MA	MILLIAMPERES
MDPE	MEDIUM DENSITY POLYETHYLENE
MIN	MINUTE/MINIMUM
MMBTU	MILLION BRITISH THERMAL UNITS
MNPT	MALE NATIONAL PIPE THREAD
MSA	METER SET ASSEMBLY
MTS	MANUAL TRANSFER SWITCH
MW	MEGAWATTS
N	NEW
NEC	NATIONAL ELECTRIC CODE
NFPA	NATIONAL FIRE PROTECTION AGENCY
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTER DIAMETER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMIN.
P	POLE
PEX	CROSS-LINED POLYETHYLENE
PDS	POWER DISTRIBUTION SECTION
PH	PHASE
PMS	ESS POWER MODULE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAGE
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
PWM	POWER MODULE
QDC	QUICK DISCONNECT
RSA	REGULATOR SET ASSEMBLY
RMC	RIGID METAL CONDUIT
SD	STORM DRAIN
SF	SQUARE FEET
SPD	SURGE PROTECTIVE DEVICE

SITE PLAN SYMBOLS



ELECTRICAL SINGLE LINE SYMBOLS



ABBREVIATIONS (CONTINUED)

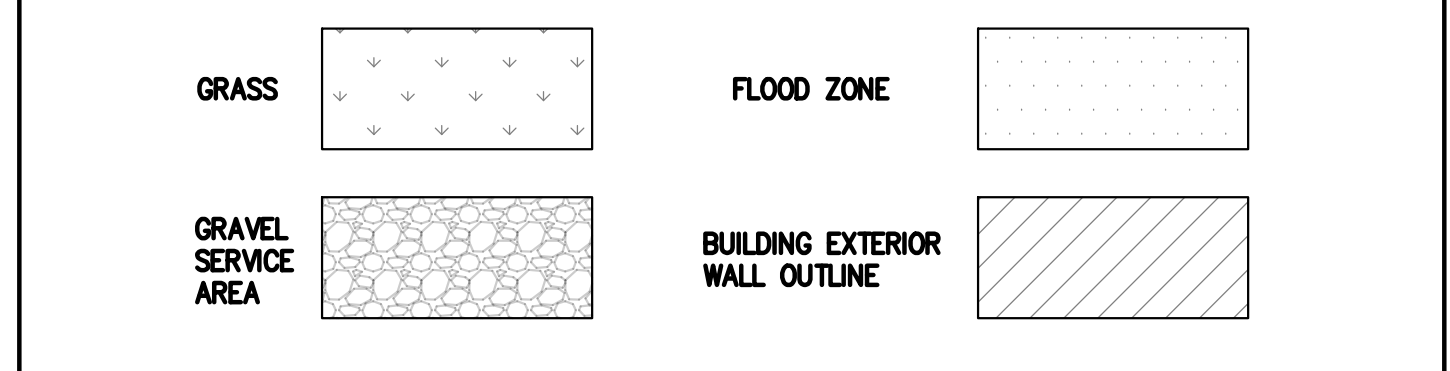
SS	STAINLESS STEEL, SANITARY SEWER
TBD	TO BE DETERMINED
TC	TELEMETRY CABINET
TM#	TAX MAP NUMBER
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UL	UNDERWRITER'S LABORATORY
UPM	UNINTERRUPTIBLE POWER MODULE
V	VOLTS
VAC	VOLTS (AC)
VDC	VOLTS (DC)

ABBREVIATIONS (CONTINUED)

VIF	VERIFY IN FIELD
W	WIRE
WDM	WATER DISTRIBUTION MODULE
XFMR	TRANSFORMER

LINETYPES

		NEW	EXISTING	DEMOLISH
UTILITY	UNKNOWN UTILITY - UNDERGROUND	---UTL---	---UTL---	---UTL-X---
	COMMUNICATIONS UTILITY - OVERHEAD	---OCU---	---OCU---	---OCU-X---
	COMMUNICATIONS UTILITY - UNDERGROUND	---UCU---	---UCU---	---UCU-X---
	ELECTRICAL UTILITY - OVERHEAD	---OEU---	---OEU---	---OEU-X---
	ELECTRICAL UTILITY - UNDERGROUND	---UEU---	---UEU---	---UEU-X---
	GAS UTILITY - UNDERGROUND	---UGU---	---UGU---	---UGU-X---
	WATER UTILITY - UNDERGROUND	---UWU---	---UWU---	---UWU-X---
ELECTRICAL	COMMUNICATIONS FEEDER - ABOVE GROUND	---C---	---C---	---C-X---
	COMMUNICATIONS FEEDER - OVERHEAD	---OC---	---OC---	---OC-X---
	ELECTRICAL FEEDER - ABOVE GROUND	---E---	---E---	---E-X---
	ELECTRICAL FEEDER - OVERHEAD	---OE---	---OE---	---OE-X---
PLUMBING	GAS PIPING - ABOVE GROUND	---G---	---G---	---G-X---
	GAS PIPING - UNDERGROUND	---UG---	---UG---	---UG-X---
	WATER PIPING - ABOVE GROUND	---W---	---W---	---W-X---
	WATER PIPING - UNDERGROUND	---UW---	---UW---	---UW-X---
SITE	CURBS	---	---	---
	FENCING	---	---	---
	PARKING	---	---	---
	EASEMENT BOUNDARY	---	---	---
	PROPERTY LINE	---	---	---
	TRENCHING BOUNDARY	---	---	---
HATCH	GRASS	---	---	---
	GRAVEL SERVICE AREA	---	---	---
	FLOOD ZONE	---	---	---



ES5-YA8AA0 (x4) ENERGY SERVER SYSTEM

	300 kW	TOTAL SYSTEM WEIGHT (LESS PAD)	27,192 LBS
GROSS OUTPUT POWER	300 kW		
NET OUTPUT POWER	300 kW	WEIGHT - POWER MODULE PM5	3,577 LBS
VOLTAGE	480 VAC	WEIGHT - AC MODULE ACS	3,161 LBS
MAXIMUM OUTPUT CURRENT	361 Amps	WEIGHT - FUEL PROCESSING MODULE FP5	2,569 LBS
FREQUENCY	60 Hz	WEIGHT - ANCILLARY EQUIPMENT (WDM, PDS, & TC) (LESS PAD)	3,130 LBS
		WEIGHT - CAST IN PLACE LINEAR-Q	SEE STRUCTURAL DRAWINGS
		WEIGHT - CAST IN PLACE ANCILLARY PAD	SEE STRUCTURAL DRAWINGS

FUEL REQUIREMENTS

CONNECTION	2" FLANGE	PRESSURE	15 (+3/-5) psig
FUEL TYPE	NATURAL GAS	AVERAGE CONSUMPTION RATE (60°F, 1 atm)	8.092 MMBtu/hr
PIPE SIZE - SUPPLY	SIZE SITE DEPENDENT	MAX CONSUMPTION RATE (60°F, 1 atm)	8.980 MMBtu/hr

WATER REQUIREMENTS

CONNECTION	1/2" MNPT	FLOW - STARTUP	0.8 gal/min MAXIMUM
WATER TYPE	MUNICIPAL GRADE	FLOW - CONTINUOUS	0 gal/min
MINIMUM PRESSURE	35 psi	WATER DISCHARGE	0 gal/min
MAXIMUM PRESSURE	150 psi	PIPE SIZE - SUPPLY	SIZE SITE DEPENDENT, USE STAINLESS STEEL OR PVC

Bloomenergy

1299 ORLEANS DRIVE
SUNNYVALE, CA 94089
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ENGINEER OF RECORD
FARMAN SHIR, P.E.
LICENSE # C13... ..

EXP: -09/30/2018 02/06/2017

CUSTOMER SITE
KAISER PERMANENTE
#CN470H
5840 OWENS DRIVE
PLEASANTON, CA 94588

REVISION HISTORY

REV	REVISION ISSUE	DATE
0	RELEASED PER IGN-10320	08/08/2016

DESIGNED BY	DATE
BRIAN CURTIS	08/08/2016
DRAWN BY	DATE
UMA GURUNATH	12/12/2016
REVIEWED BY	DATE
PANTEHA BINER	02/06/2017
APPROVED BY	DATE
FARMAN SHIRMOHAMMADI	02/06/2017

SHEET TITLE
GENERAL CONSTRUCTION NOTES
DRAWING NUMBER
G0.2
BLOOM DOCUMENT
DOC-1008145
THIS DRAWING IS 24" X 36" AT FULL SIZE
SITE ID: KSR023.0 SHEET 02 OF 14



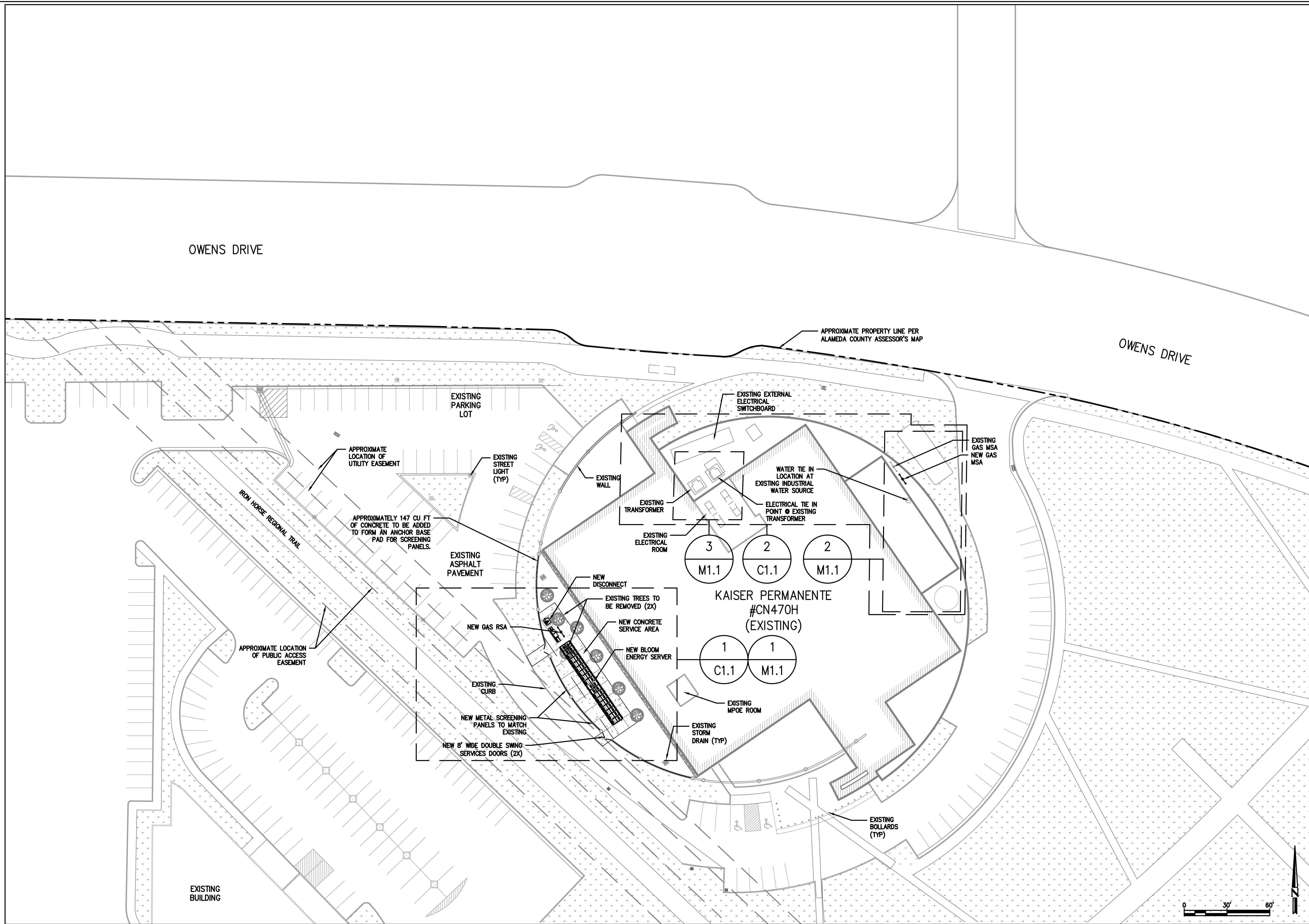
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REVISION HISTORY		
REV	REVISION ISSUE	DATE
0	RELEASED PER ICN-10320	08/08/2016

DESIGNED BY BRIAN CURTIS	DATE 08/08/2016
DRAWN BY UMA GURUNATH	DATE 12/12/2016
REVIEWED BY PANTEHA BINER	DATE 02/06/2017
APPROVED BY FARMAN SHIRMOHAMMADI	DATE 02/06/2017

SHEET TITLE OVERALL SITE PLAN	
DRAWING NUMBER G1.1	
BLOOM DOCUMENT DOC-1008145	
THIS DRAWING IS 24" X 36" AT FULL SIZE	
SITE ID: KSR023.0	SHEET 03 OF 14



OVERALL SITE PLAN

SCALE: 1" = 30'

1
G1.1

GENERAL NOTES

DESIGN:

BUILDING CODE: 2013 CALIFORNIA BUILDING CODE

- DESIGN GRAVITY LOADS
 - DEAD LOADS
 - 6" CONCRETE PAD = 75 PSF
 - 12" CONCRETE PAD = 150 PSF
 - LIVE LOADS
 - GROUND SNOW LOAD (PF) = 0 PSF
 - SLAB LIVE LOAD = 250 PSF
- DESIGN WIND LOADS
 - BASIC WIND SPEED (3 SECOND GUST) = 85 MPH (NOM)
 - ULTIMATE WIND SPEED = 115 MPH (ULT)
 - EXPOSURE = C
- SEISMIC DESIGN

$S_s = 1.937$	$S_{D5} = 1.291$
$S_1 = 0.730$	$S_{D1} = 0.730$

SEISMIC IMPORTANCE FACTOR (I_e) = 1.5
 SEISMIC SITE CLASS = D (ASSUMED)
 SEISMIC DESIGN CATEGORY = D
 MECHANICAL EQUIPMENT SEISMIC FORCE (F_p) = 0.581 x W

FOUNDATIONS - GENERAL:

- SERVER, ANCILLARY, & AC DISCONNECT PADS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REVIEW BY WHITESTONE ASSOCIATES, INC. DATED NOVEMBER 8, 2016.
- SOIL BEARING CAPACITY ASSUMED AT 1500 p.s.f. (TO BE VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION. CONTRACTOR TO COORDINATE)
- ALL BEARING MATERIAL SHALL BE INSPECTED BY THE INDEPENDENT TESTING AGENCY PRIOR TO CONCRETE PLACEMENT. THE INDEPENDENT TESTING AGENCY SHALL BE THE SOLE JUDGE AS TO THE SUITABILITY OF THE BEARING MATERIAL. FOOTING ELEVATIONS SHALL BE ADJUSTED AS REQUIRED.

CONCRETE AND REINFORCING STEEL:

- CONCRETE SHALL CONFORM TO ACI BUILDING CODE (318R-11) AND SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH AND DENSITY, IN ACCORDANCE WITH THE FOLLOWING:

	STRENGTH PSI	DENSITY PCF	MAX W/C RATIO
EXTERIOR SLAB/PAD	2500	145	0.45
- REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
- MINIMUM CONCRETE COVER, UNLESS NOTED OTHERWISE:

UNFORMED SURFACE IN CONTACT WITH THE GROUND.	3 IN.
FORMED SURFACES EXPOSED TO EARTH OR WEATHER.	
#6 BARS AND LARGER	2 IN.
#5 BARS AND SMALLER	1-1/2 IN.
FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER:	
BEAMS, GIRDERS, AND COLUMNS	1-1/2 IN.
SLABS, WALLS, AND JOISTS	
#11 BARS AND SMALLER	3/4 IN.
#14 AND #18 BARS	1-1/2 IN.

- LAP SPLICES SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE, UNLESS NOTED OTHERWISE. WHERE CLASSES ARE NOT CALLED OUT ON DRAWINGS, USE CLASS "B" SPLICES. SPLICES SHALL BE STAGGERED AT LEAST 24 INCHES.

BAR SIZE	TENSION SPLICES (INCHES)		COMPRESSION SPLICES (INCHES)		
	A	B	A	B	
#3	16	21	12	16	12
#4	21	28	16	21	15
#5	27	35	21	27	19
#6	35	46	27	35	23
#7	48	62	37	48	26
#8	63	82	48	63	30
#9	80	104	61	80	34
#10	101	131	78	101	38
#11	125	162	96	125	42

COMPRESSION DOWEL EMBEDMENT: 22 BAR DIAMETERS
 LAP WELDED WIRE FABRIC ONE SPACING OF CROSS WIRES PLUS 2".

- BASE PLATES, ANCHOR BOLTS, SUPPORT ANGLES, ETC., BELOW GRADE SHALL BE COVERED WITH A MINIMUM OF 3" OF CONCRETE.

ANCHORING SYSTEM:

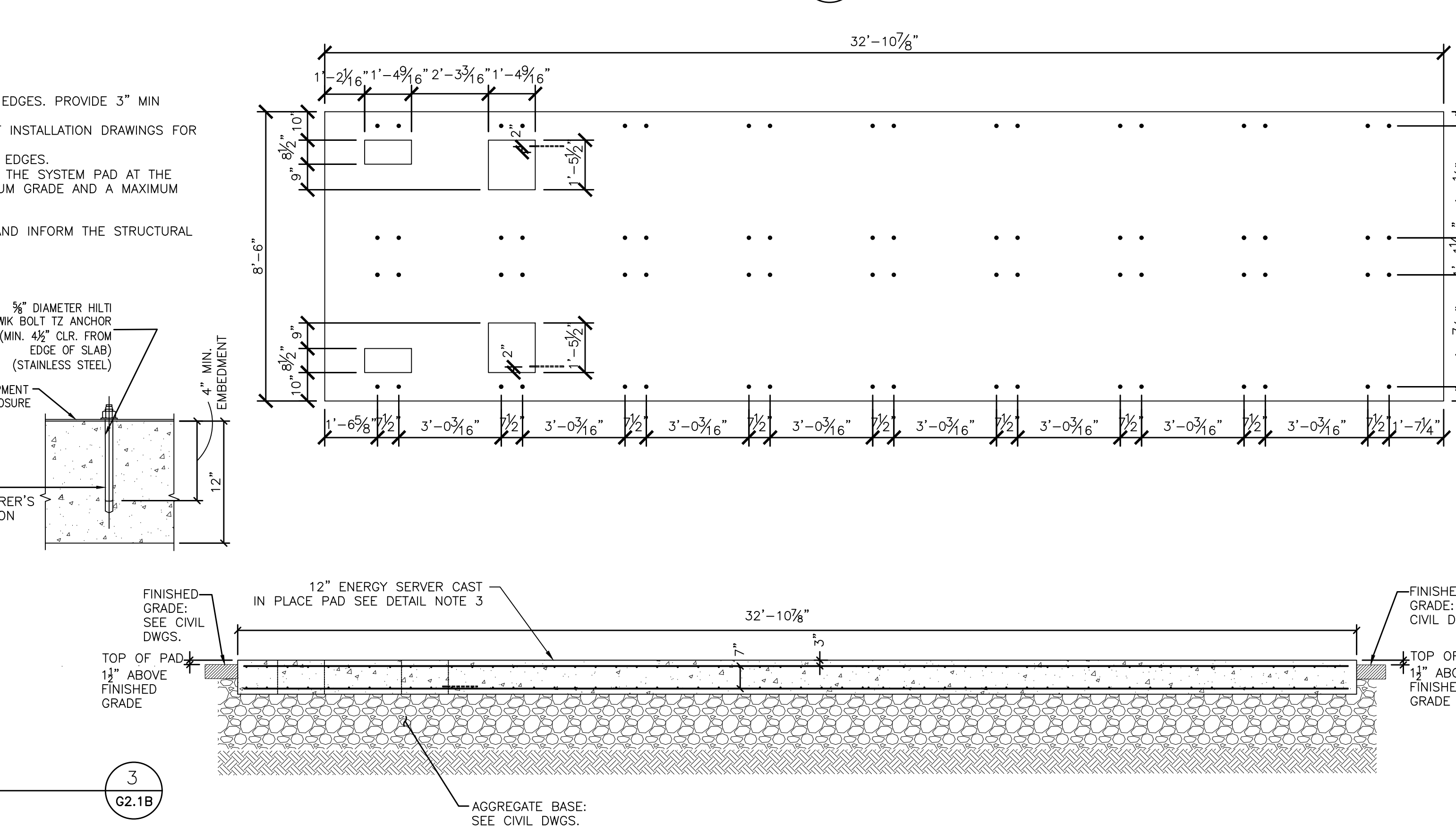
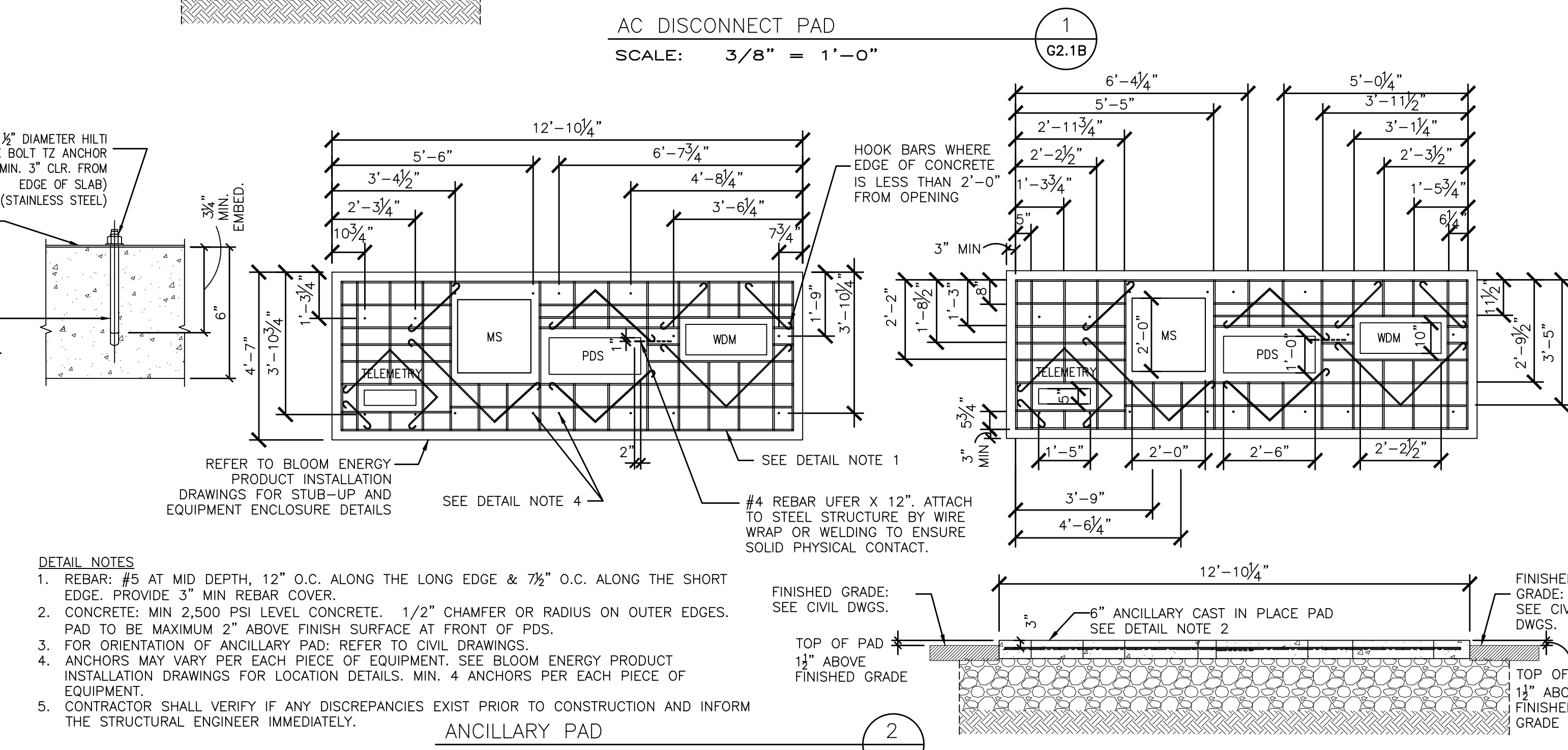
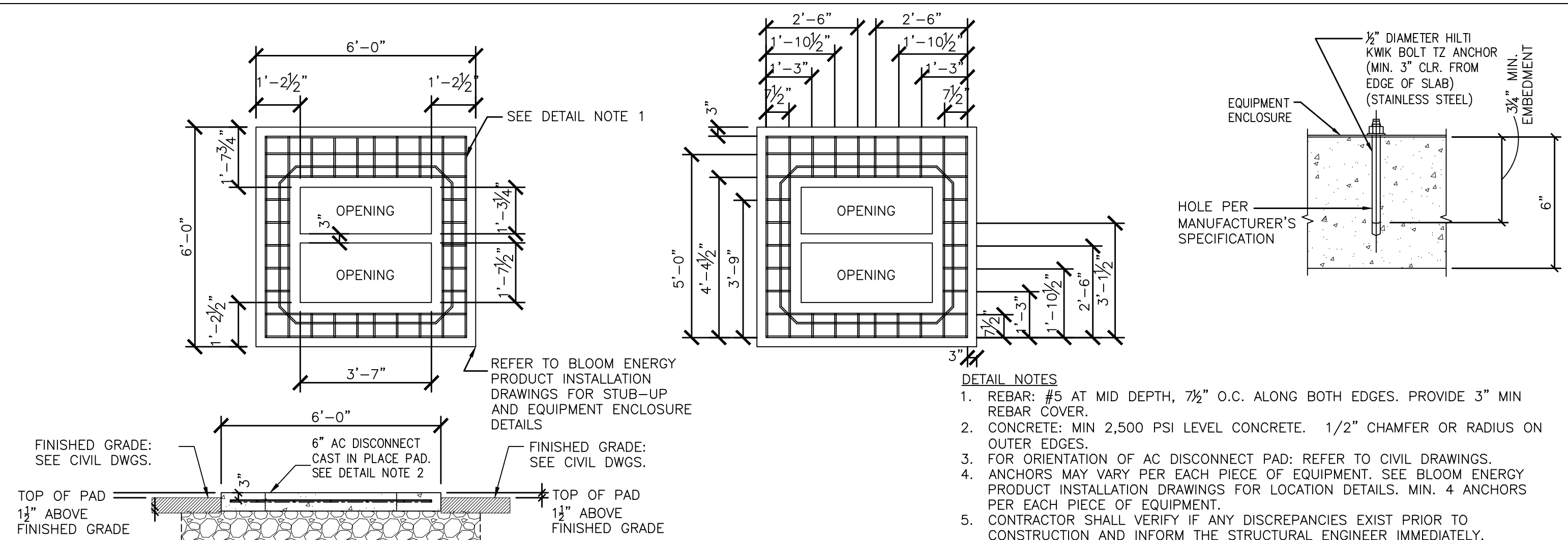
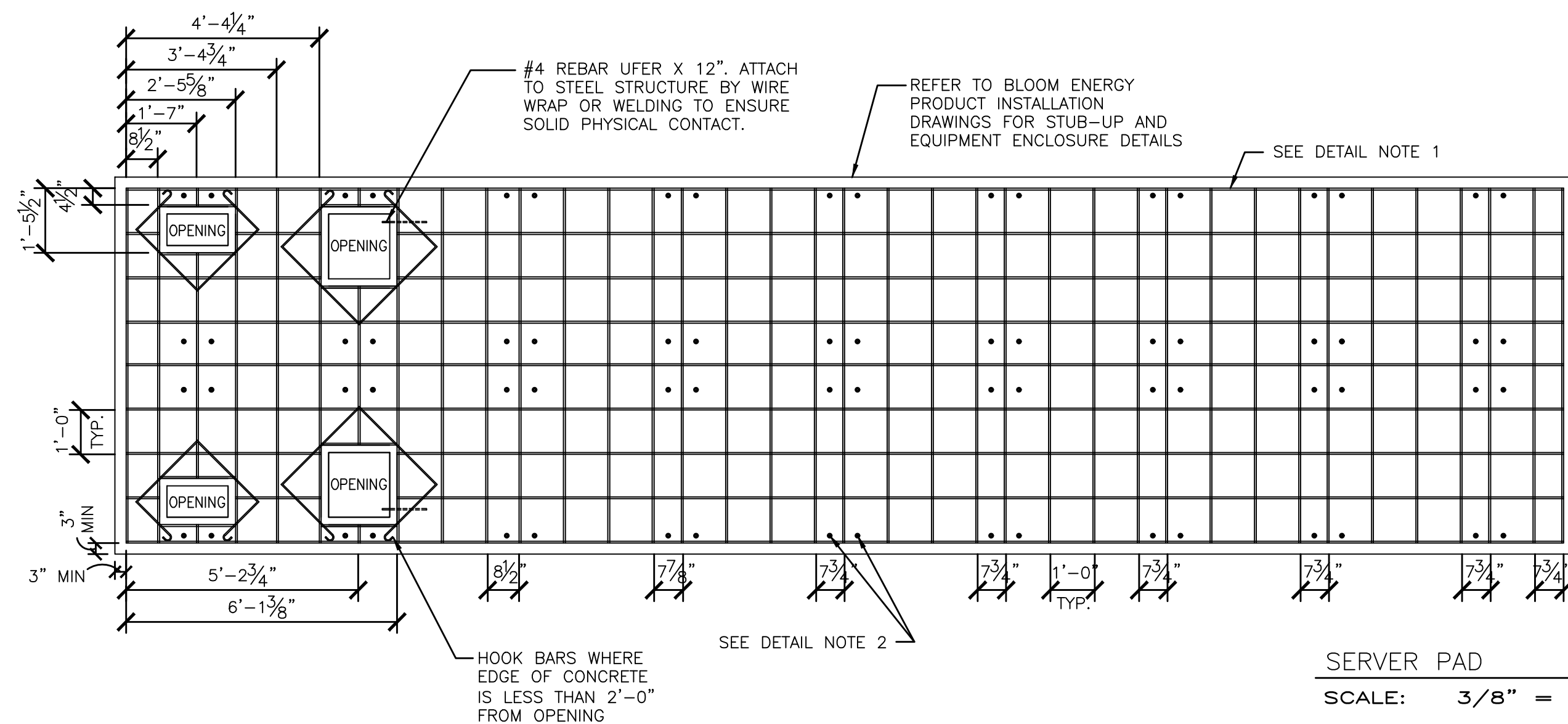
- UNLESS NOTED, ALL ANCHORS IN CONCRETE SHALL BE STAINLESS STEEL HILTI KWIK BOLT TZ. UNLESS NOTED, EMBEDMENT (E) FOR HILTI KWIK BOLT TZ SHALL BE AS FOLLOWS: 1/2"φ - 3 1/4", 5/8"φ - 4"
- UNLESS NOTED, ANCHOR SPACING (AS) AND ANCHOR EDGE DISTANCE (ED) SHALL BE AS PUBLISHED BY THE MOST CURRENT APPROVED HILTI REPORT IN ORDER TO DEVELOP MAXIMUM WORKING LOAD.
- ALL ANCHORS SHALL BE INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS AND UNDER MANUFACTURER'S SUPERVISION IN ORDER TO DEVELOP THE PUBLISHED WORKING LOADS. NO REINFORCING SHALL BE CUT OR DAMAGED UPON INSTALLATION OF ANY ANCHORS. SPECIAL INSPECTION IS REQUIRED.
- MINIMUM CONCRETE COMPRESSIVE STRENGTH REQUIRED AT TIME OF INSTALLATION OF ANY ANCHORS SHALL BE 2500 PSI.
- SPECIAL INSPECTION SHALL BE PROVIDED IN ACCORDANCE WITH BUILDING CODE AND IN ACCORDANCE WITH THE SPECIFIC SPECIAL INSPECTION REQUIREMENTS SET FORTH IN THE CURRENT ESR REPORT.

MISCELLANEOUS:

- THESE GENERAL NOTES SUPPLEMENT THE PROJECT SPECIFICATIONS. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- STRUCTURAL DRAWINGS ARE INTENDED TO BE USED WITH MECHANICAL, ELECTRICAL, AND CIVIL DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING SUCH REQUIREMENTS INTO THEIR SHOP DRAWINGS AND CONSTRUCTION. CONTRACTOR SHALL VERIFY IF ANY DISCREPANCIES EXIST PRIOR TO CONSTRUCTION AND INFORM THE STRUCTURAL ENGINEER IMMEDIATELY.
- NO OPENINGS SHALL BE MADE IN ANY STRUCTURAL MEMBER WITHOUT THE WRITTEN APPROVAL OF THE PROFESSIONAL OF RECORD.
- NO CHANGE IN SIZE, MATERIAL OR DIMENSION OF STRUCTURAL MEMBERS SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE PROFESSIONAL OF RECORD.
- THE CONTRACTOR IS RESPONSIBLE FOR LIMITING THE AMOUNT OF CONSTRUCTION LOAD IMPOSED UPON STRUCTURAL FRAMING. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN CAPACITY OF THE FRAMING AT THE TIME THE LOADS ARE IMPOSED.
- THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.
- DO NOT SCALE THESE DRAWINGS, USE DIMENSIONS.
- CONTRACTOR'S CONSTRUCTION AND/OR ERECTION SEQUENCES SHALL RECOGNIZE AND CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PERIOD.
- THE CONTRACTOR SHALL INFORM THE PROFESSIONAL OF RECORD IN WRITING OF ANY DEVIATION FROM THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOT BE RELIEVED OF THE RESPONSIBILITY OF SUCH DEVIATION BY THE PROFESSIONAL OF RECORD REVIEW OF SHOP DRAWINGS, PRODUCT DATA, ETC., UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE PROFESSIONAL OF RECORD OF SUCH DEVIATION AT THE TIME OF SUBMISSION, AND THE PROFESSIONAL OF RECORD HAS GIVEN WRITTEN APPROVAL TO THE SPECIFIC DEVIATION.
- CONNECTIONS OF ALL ITEMS SUPPORTED BY THE STRUCTURE ARE THE RESPONSIBILITY OF THE DISCIPLINES WHO ARE MAKING THESE ATTACHMENTS. THESE ATTACHMENTS SHALL BE DESIGNED TO RESIST ALL GRAVITY, WIND, WIND UPLIFT, SEISMIC, THERMAL LOADS, ETC.
- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS.
- UNLESS NOTED, SUBMIT SHOP DRAWINGS OF ALL FABRICATED MATERIALS FOR REVIEW. DESIGN DRAWINGS SHALL NOT BE REPRODUCED FOR USE AS SHOP DRAWINGS. SHOP DRAWINGS WILL NOT BE REVIEWED UNLESS THEY WERE CHECKED, BEAR THE INITIAL OF THE CHECKER AND ARE STAMPED "APPROVED" BY THE GENERAL CONTRACTOR.

DETAIL NOTES

- REBAR: #5 IN TWO COURSES WITH 7" VERTICAL SEPARATION, 12" O.C. ALONG BOTH EDGES. PROVIDE 3" MIN REBAR COVER.
- ANCHORS MAY VARY PER EACH PIECE OF EQUIPMENT. SEE BLOOM ENERGY PRODUCT INSTALLATION DRAWINGS FOR LOCATION DETAILS. MIN. 4 ANCHORS PER EACH PIECE OF EQUIPMENT.
- CONCRETE: MIN 2,500 PSI LEVEL CONCRETE. 1/2" CHAMFER OR RADIUS ON OUTER EDGES.
- ENERGY SERVER SYSTEM PAD SHALL BE SLOPED SUCH THAT WATER DRAINAGE EXISTS THE SYSTEM PAD AT THE OPPOSITE END FROM ANCILLARY PAD. SYSTEM PAD SLOPE SHALL HAVE A 0.5% MINIMUM GRADE AND A MAXIMUM 2% GRADE.
- FOR ORIENTATION OF ENERGY SERVER PAD: REFER TO CIVIL DRAWINGS.
- CONTRACTOR SHALL VERIFY IF ANY DISCREPANCIES EXIST PRIOR TO CONSTRUCTION AND INFORM THE STRUCTURAL ENGINEER IMMEDIATELY.



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12/21/2016

CUSTOMER SITE

KAISER PERMANENTE
#CN470H
5840 OWENS DRIVE
PLEASANTON, CA 94588



REVISION HISTORY

REV	REVISION ISSUE	DATE
0	RELEASED PER ICN-10320	08/08/2016

DESIGNED BY	DATE
BRIAN CURTIS	08/08/2016
DRAWN BY	DATE
BRANDON HUMESTON	12/12/2016
REVIEWED BY	DATE
ERICH AXSOM	12/21/2016
APPROVED BY	DATE
ERICH AXSOM	12/21/2016

SHEET TITLE

EQUIPMENT PAD
DETAILS

DRAWING NUMBER

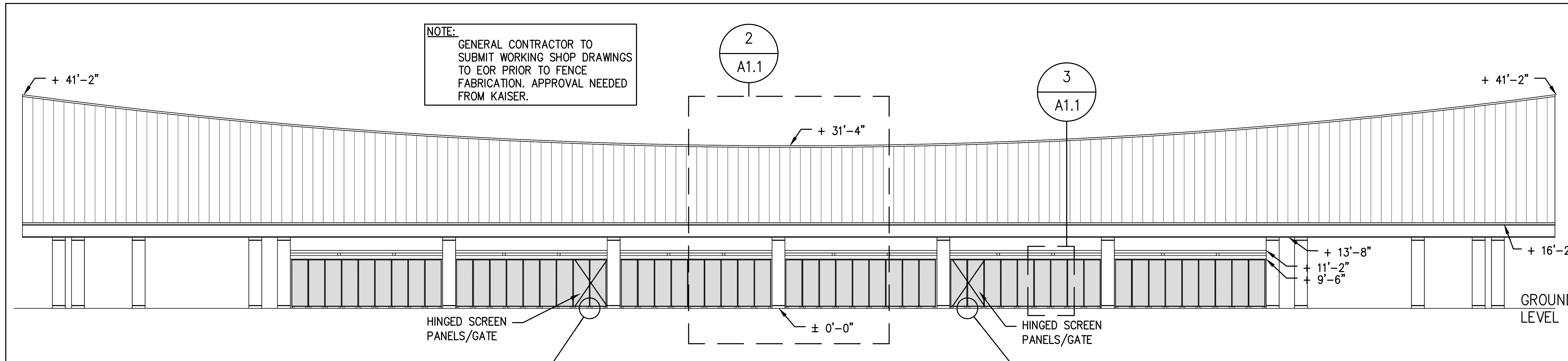
G2.1

BLOOM DOCUMENT

DOC-1008145

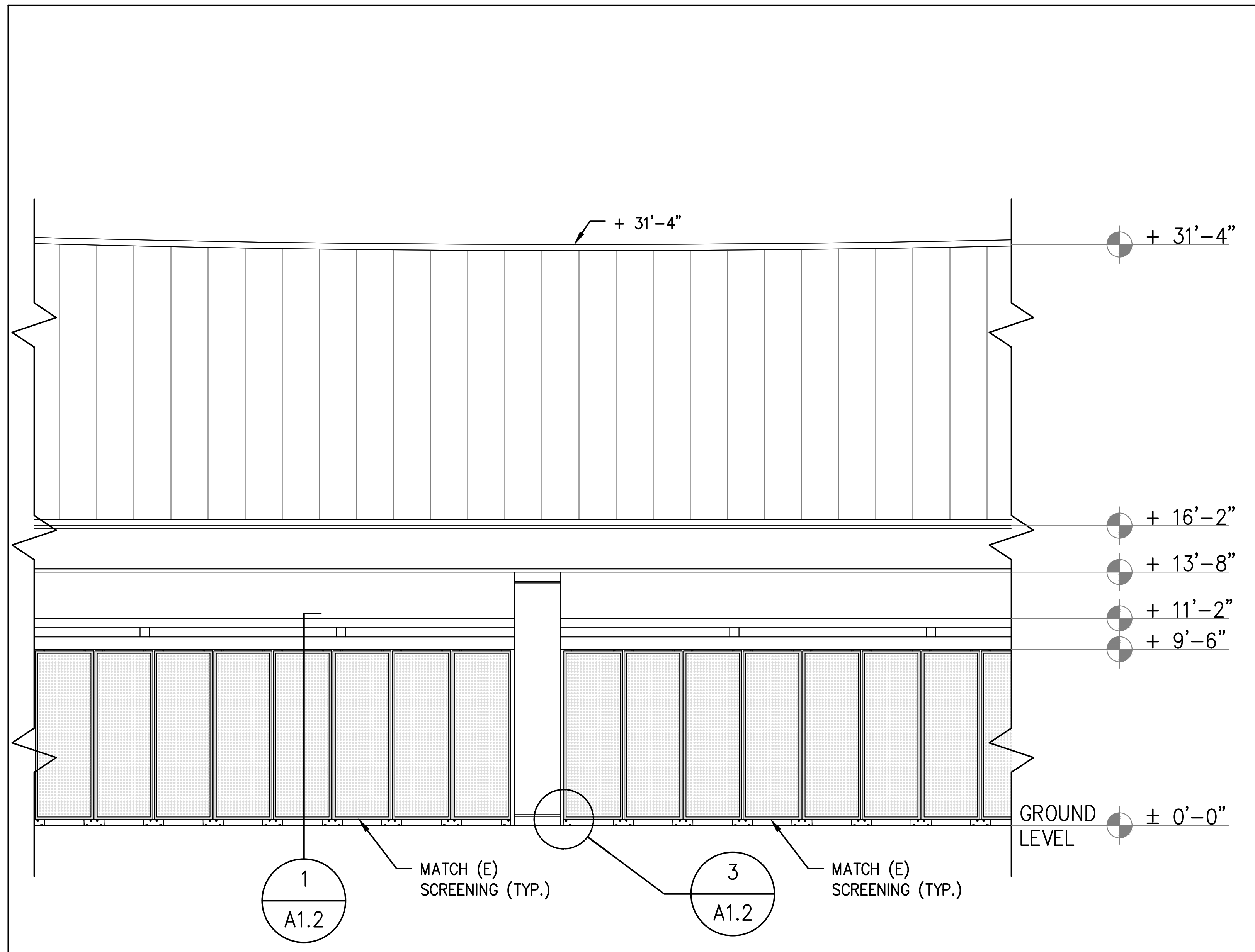
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SITE ID: KSR023.0 SHEET 04 OF 14

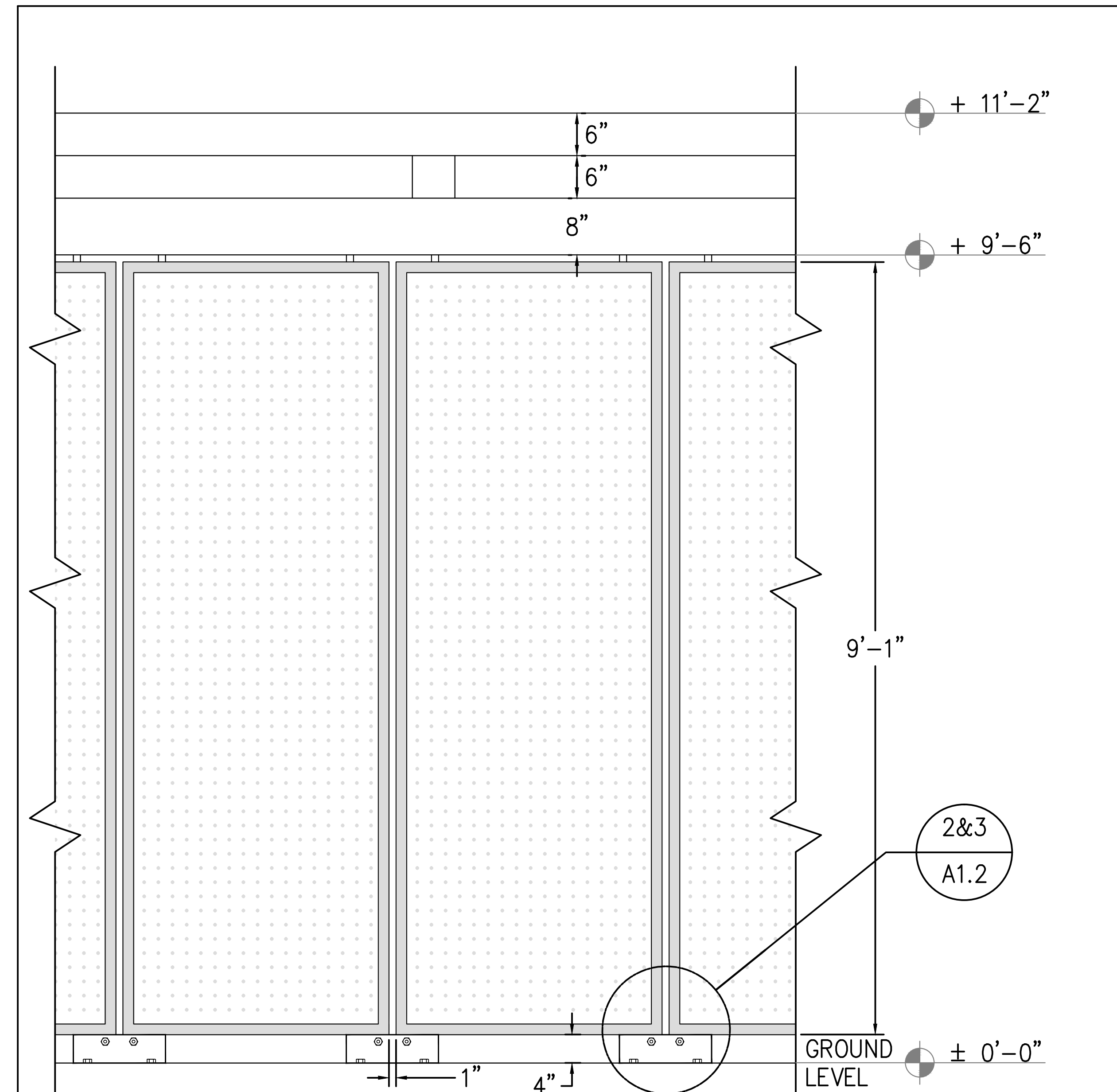


NOTE:
GENERAL CONTRACTOR TO
SUBMIT WORKING SHOP DRAWINGS
TO EOR PRIOR TO FENCE
FABRICATION. APPROVAL NEEDED
FROM KAISER.

SOUTH ELEVATION
SCALE: 1" = 10'



DETAILED VIEW
SCALE: 1" = 4'



DETAILED VIEW
SCALE: 1" = 1'



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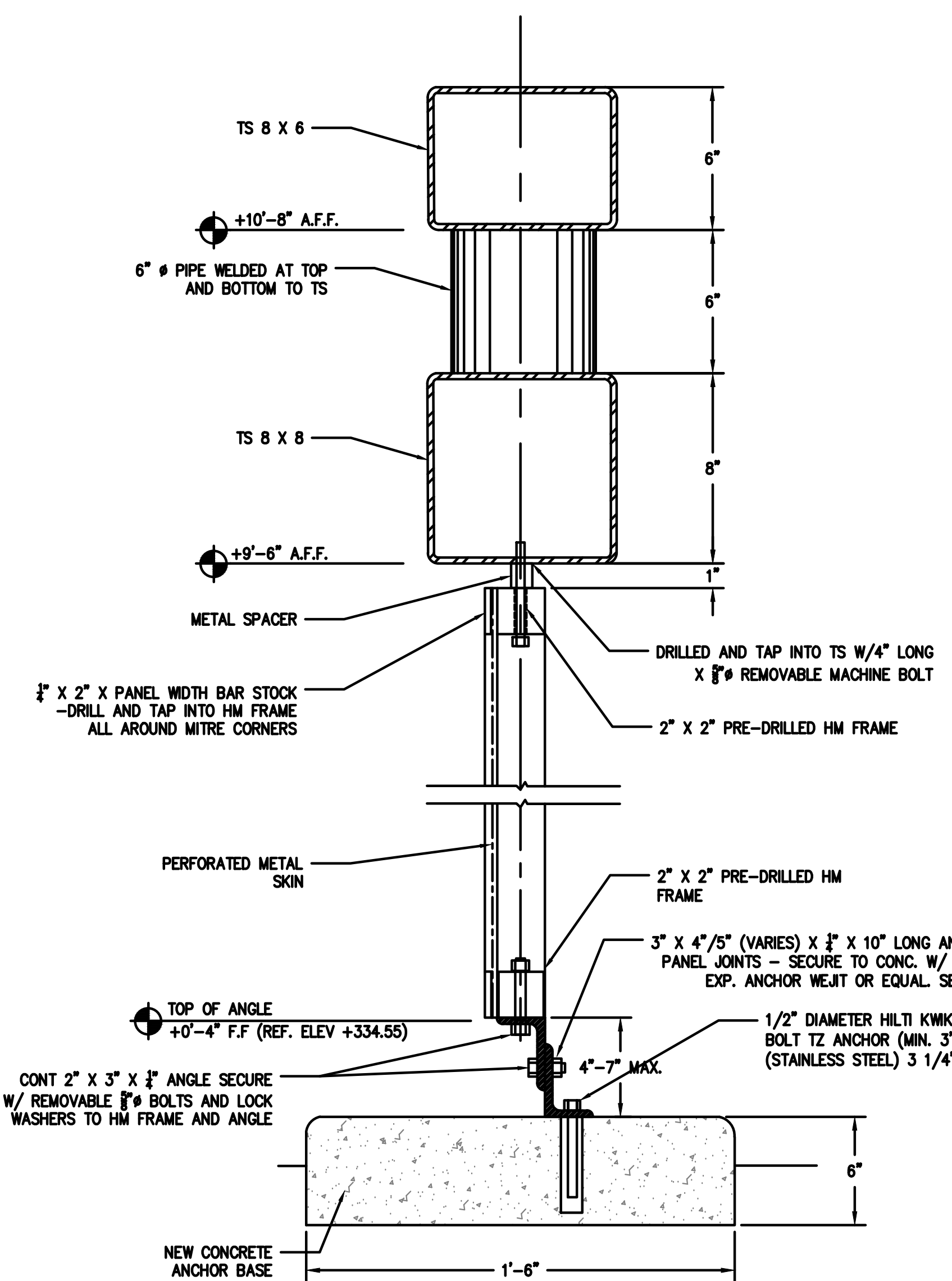
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REV	REVISION ISSUE	DATE
0	RELEASED PER ICN-10320	08/08/2016

DESIGNED BY BRIAN CURTIS	DATE 08/08/2016
DRAWN BY UMA GURUNATH	DATE 12/12/2016
REVIEWED BY PANTEHA BINER	DATE 02/06/2017
APPROVED BY FARMAN SHIRMOHAMMADI	DATE 02/06/2017

SHEET TITLE
SCREENING ELEVATION

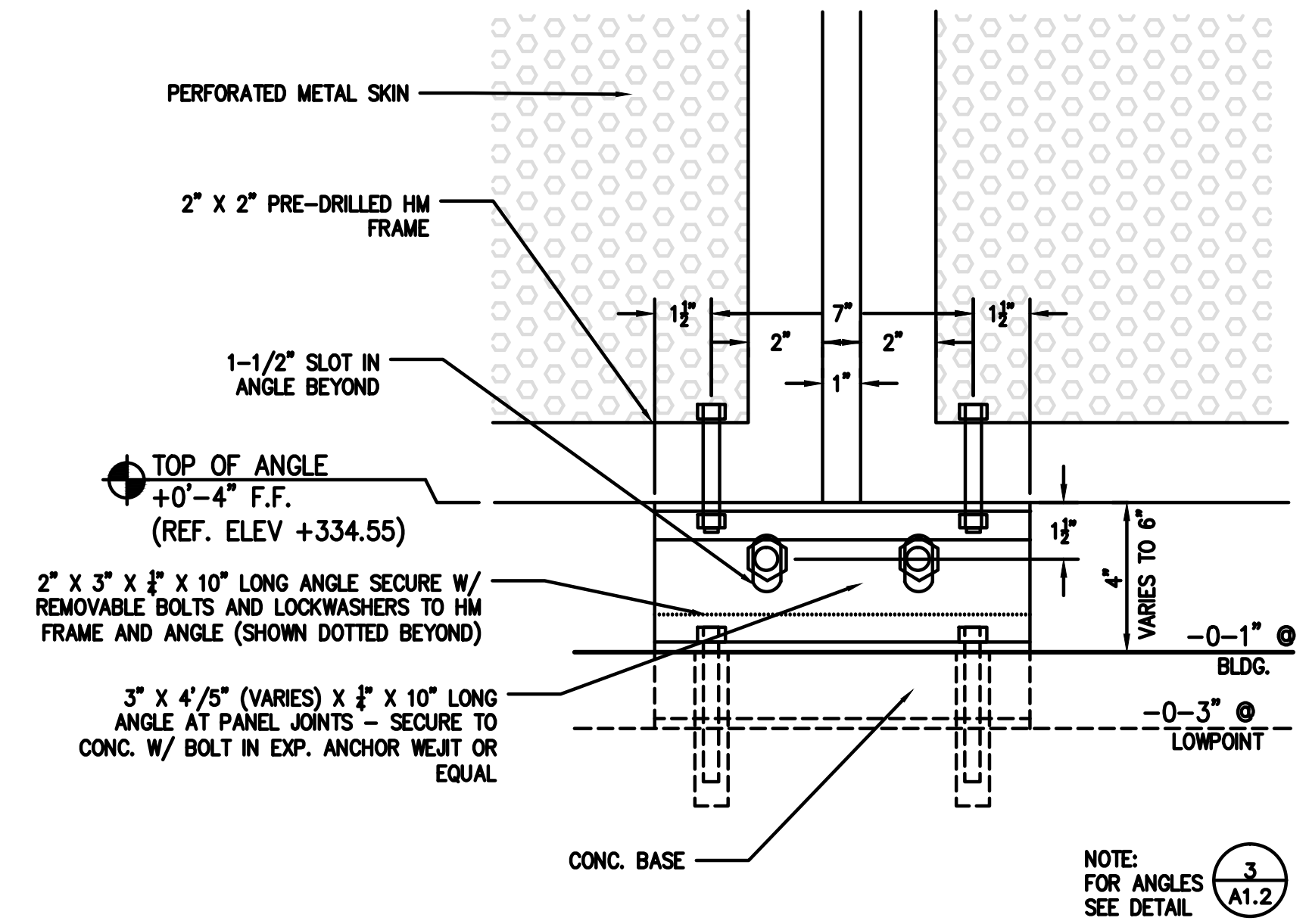
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A1.1

BLOOM DOCUMENT
DOC-1008145



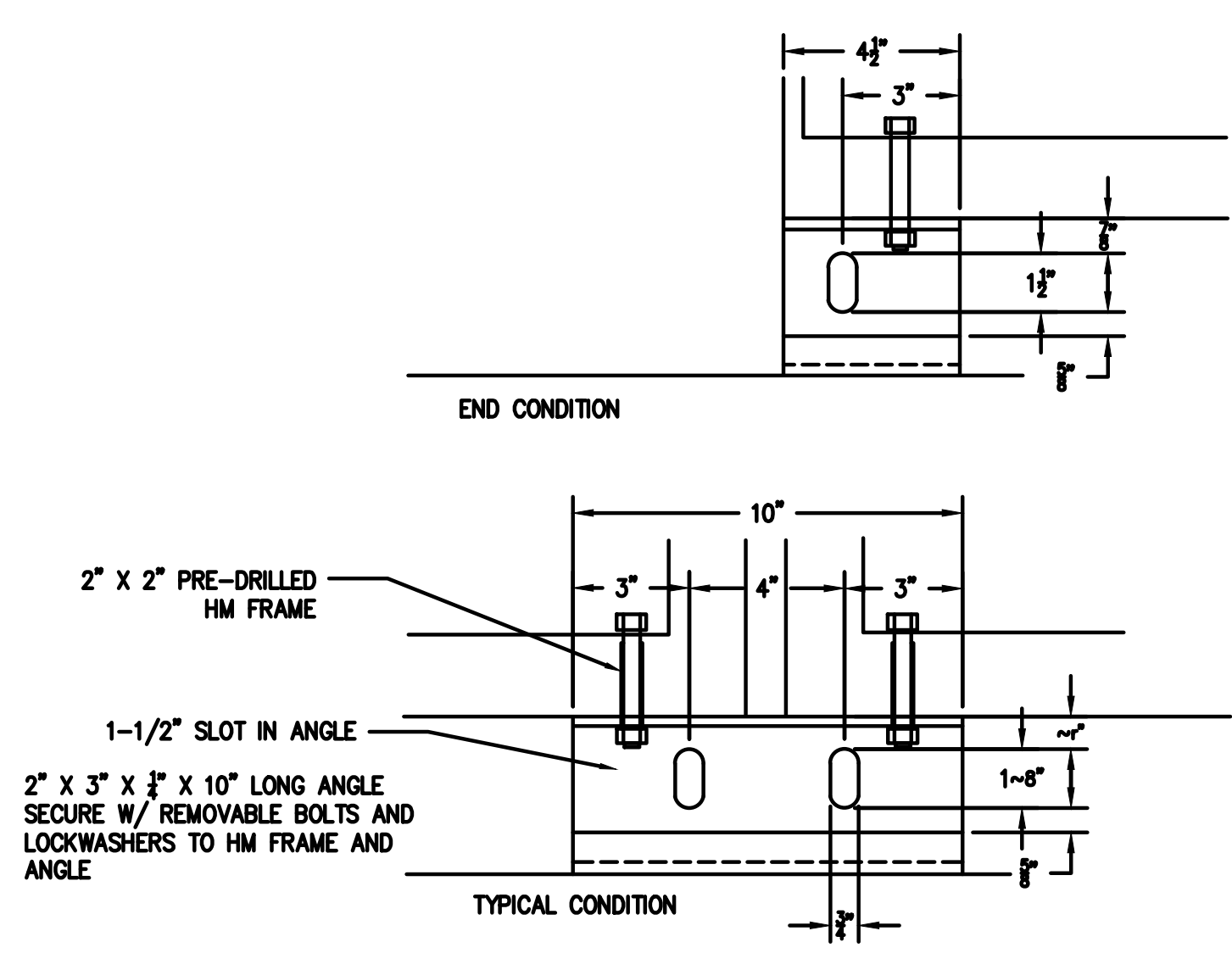
SECTION THROUGH SCREEN PANEL
SCALE: NTS

1
A1.2



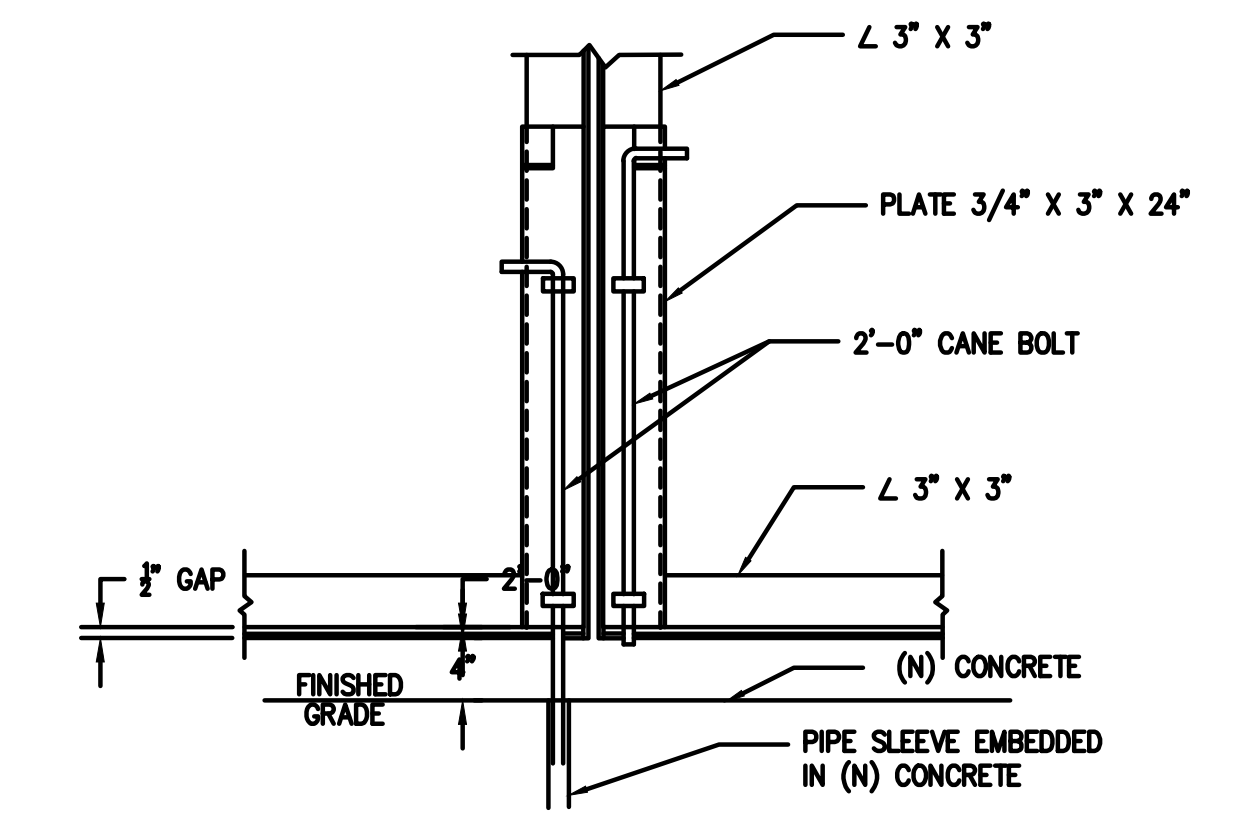
SCREEN PANEL BASE DETAIL
SCALE: NTS

2
A1.2



PANEL BASE ANGLE DETAILS
SCALE: NTS

3
A1.2



GATE CANE BOLT DETAIL
SCALE: NTS

4
A1.2

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M. Ar. S. 5
Ir., CA
4 45 4 4

ENGINEER OF RECORD
FARMAN SHIR., E.
LICENSE # C13



EXP: -09/30/2018 02/06/2017

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REVISION HISTORY		
REV	REVISION ISSUE	DATE
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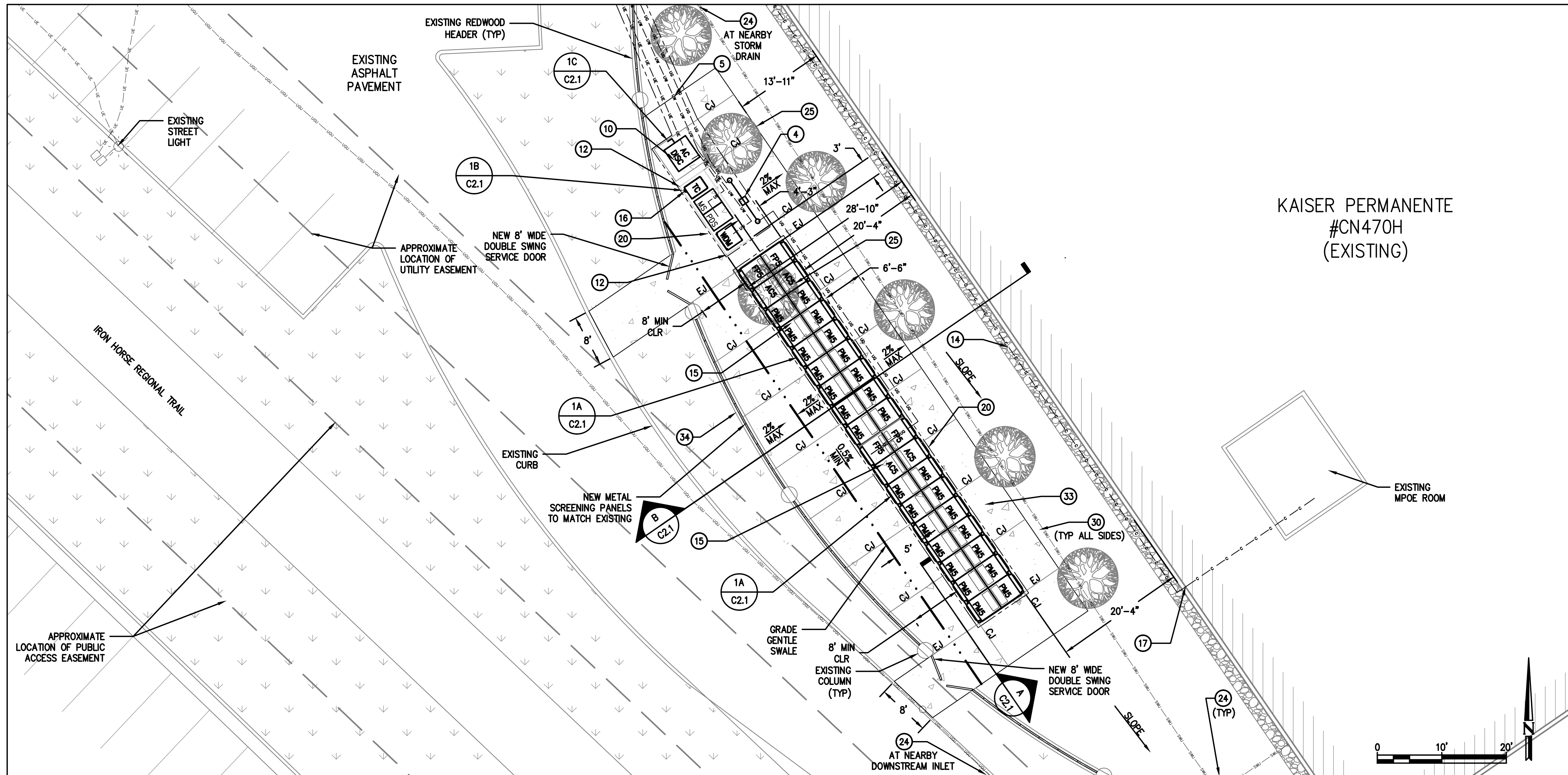
DESIGNED BY BRIAN CURTIS	DATE 08/08/2016
DRAWN BY UMA GURUNATH	DATE 12/12/2016
REVIEWED BY PANTEHA BINER	DATE 02/06/2017
APPROVED BY FARMAN SHIRMOHAMMADI	DATE 02/06/2017

SHEET TITLE
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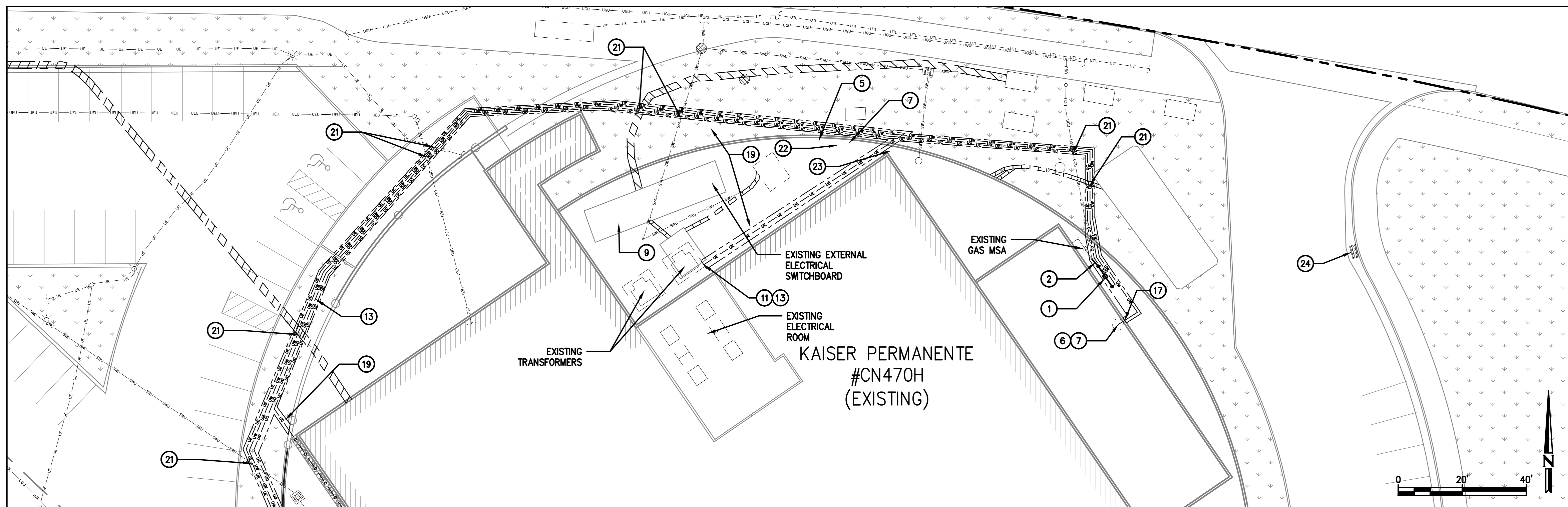
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A1.2

BLOOM DOCUMENT
DOC-1008145

THIS DRAWING IS 24" X 36" AT FULL SIZE
SITE ID: KSR023.0 SHEET 06 OF 14



DETAILED SITE PLAN
SCALE: 1" = 10'
1
C1.1



DETAILED SITE PLAN
SCALE: 1" = 20'
2
C1.1

GENERAL NOTES

- CLEAN AND PRIME ALL NEW WIRE MOUNTED PIPING AND CONDUIT. PIPING AND CONDUIT SHALL BE PAINTED WITH EXTERIOR GRADE PAINT TO MATCH EXISTING.
- CONDUITS AND PIPES MOUNTED TO BUILDING WALL SHALL BE SUPPORTED AS PER LOCAL CODE, RUN AT HEIGHT ABOVE DOORWAYS, AND STAND OFF WALL TO AVOID EXISTING CONDUITS AND PIPES.
- SLOPE LINES SHOWN ARE APPROXIMATE AND INTENDED TO SHOW THE GENERAL DIRECTION OF WATER RUN OFF; SLOPE LINES ARE DRAWN PER VISUAL SURVEY OF SURROUNDING AREA.
- SEE BLOOM ENERGY PRODUCT INSTALLATION DRAWINGS FOR UTILITY CONNECTIONS TO ANCILLARY EQUIPMENT AND ENERGY SERVER.

REFERENCE SHEET NOTES

- NEW UTILITY PROVIDED AND INSTALLED GAS METER ASSEMBLY. CONTRACTOR SHALL PROVIDE PAD PER DETAILS IF REQUIRED BY UTILITY COMPANY. COORDINATE ALL CONNECTIONS WITH GAS UTILITY.
- NEW UNDERGROUND GAS SERVICE TAP BY UTILITY COMPANY. COORDINATE WITH GAS UTILITY. CONTRACTOR SHALL PERFORM COMPACTION AND MATCH EXISTING SURFACE AND GRADE. CONTRACTOR SHALL COORDINATE GAS PIPE SIZING AND INSTALLATION REQUIREMENTS WITH UTILITY.
- NEW PRIVATE GAS REGULATOR SET ASSEMBLY FOR ENERGY SERVER WITH SHUT-OFF VALVE. REFER TO GAS RISER DETAIL FOR ADDITIONAL REQUIREMENTS.
- NEW GAS PIPE SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. REFER TO GAS RISER DETAIL FOR ADDITIONAL REQUIREMENTS.
- TAP EXISTING WATER LINE AT NEAREST ACCESSIBLE LOCATION IN BUILDING AS SHOWN WITH A LOCAL SHUT-OFF VALVE. REFER TO DOMESTIC WATER CONNECTION DETAIL FOR ADDITIONAL REQUIREMENTS.
- NEW WATER PIPE SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. REFER TO WATER RISER DETAIL FOR ADDITIONAL REQUIREMENTS.
- EXISTING UTILITY ELECTRIC METER. REFER TO ELECTRICAL SINGLE LINE DIAGRAM FOR ADDITIONAL REQUIREMENTS.
- NEW BLOOM-PROVIDED, CONTRACTOR-INSTALLED, PAD-MOUNTED DISCONNECT SWITCH. CONTRACTOR TO PROVIDE CONCRETE PAD PER STRUCTURAL DETAILS AND MOUNT DISCONNECT TO PAD PER MANUFACTURER RECOMMENDATIONS.
- CONTRACTOR SHALL TERMINATE ELECTRIC FEEDER AS SHOWN. REFER TO ELECTRICAL SINGLE LINE DIAGRAM FOR ADDITIONAL REQUIREMENTS.
- CONTRACTOR SHALL PROVIDE TWO GROUNDING RODS TO BE PLACED 6' APART MINIMUM. REFER TO ELECTRICAL SINGLE LINE DIAGRAM FOR ADDITIONAL REQUIREMENTS.
- NEW ELECTRICAL FEEDER SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. REFER TO ELECTRICAL SINGLE LINE DIAGRAM FOR ADDITIONAL REQUIREMENTS.
- MOUNT NEW CONDUIT/PIPE TO EXTERIOR WALL. COORDINATE EXACT ROUTING WITH CUSTOMER REPRESENTATIVE IN THE FIELD. REFER TO WALL MOUNTING DETAIL FOR ADDITIONAL REQUIREMENTS.
- NEW BLOOM ENERGY SERVER. REFER TO BLOOM STANDARD INSTALLATION DRAWING SET FOR ADDITIONAL ENERGY SERVER DETAILS.
- FACTORY WIRE ENERGY SERVER EMERGENCY POWER-OFF SWITCH (EPO).
- CONTRACTOR SHALL CORE CONDUIT AND/OR PIPE THROUGH WALL. SCAN WALL PRIOR TO CORING TO AVOID COLLATERAL DAMAGE TO EXISTING PLUMBING AND WIRING. REFER TO WALL PENETRATION DETAIL FOR ADDITIONAL REQUIREMENTS.
- CONTRACTOR SHALL PROVIDE SAWCUT TRENCH FOR UNDERGROUND UTILITIES IN THIS LOCATION AND HAND DIG TRENCHES WHERE THEY CROSS EXISTING UTILITIES. REFER TO UNDERGROUND/TRENCH CONDUIT AND PIPING DETAIL FOR ADDITIONAL REQUIREMENTS.
- CONTRACTOR SHALL EXCAVATE TO ALLOW FOR EXCAVATION UNDER ENERGY SERVER AND ANCILLARY PAD LOCATIONS. REFER TO PAD DETAIL FOR ADDITIONAL EXCAVATION AND BACKFILL REQUIREMENTS.
- PROTECT EXISTING UNDERGROUND UTILITY LINES FROM DAMAGE WHEN CROSSING WITH NEW UNDERGROUND UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY DAMAGED LINES.
- CONTRACTOR SHALL PROVIDE NEW CONDUIT AND CABLE FROM NEW UTILITY GAS MSA TO CUSTOMER MPOE FOR UTILITY BILLING. REFER TO BLOOM ENERGY PRODUCT INSTALLATION DRAWINGS FOR CONNECTION REQUIREMENTS.
- CONTRACTOR SHALL TRANSITION ALL ABOVEGROUND NEW LINES TO UNDERGROUND TOWARD ANCILLARY EQUIPMENT. ABOVE GROUND UTILITIES SHALL BE PROTECTED AS NECESSARY, THEN ROUTED UNDERGROUND TO EQUIPMENT STUB-UP LOCATIONS PER MECHANICAL DETAIL.
- PROVIDE "DANDY SACK" OR EQUAL WITH OUTFLOW PORTS AT STORM DRAIN INLET. REFER TO EROSION CONTROL DETAIL FOR ADDITIONAL REQUIREMENTS.
- CONTRACTOR SHALL REMOVE EXISTING TREE.
- CONTRACTOR SHALL PROVIDE TURF/LANDSCAPE RESTORATION. REFER TO TURF AND LANDSCAPE RESTORATION DETAILS FOR ADDITIONAL REQUIREMENTS. REPAIR/RE-ROUTE EXISTING IRRIGATION LINES AS NECESSARY.
- CONTRACTOR SHALL PROVIDE CONCRETE SERVICE AREA AROUND THE ENERGY SERVER AND ANCILLARY PADS AS SHOWN. NEW CONCRETE PAVING SHALL BE 6" CONCRETE WITH #4 BARS SPACED AT 18" ON CENTER EACH WAY OVER 6" MINIMUM CLASS 2 AGGREGATE BASE COMPACTED TO 95% RELATIVE COMPACTION. CONTROL JOINTS SHALL BE SPACED AT 10' MAX. REFER TO CONCRETE PAVING DETAIL FOR MORE INFORMATION.
- CONCRETE ANCHOR BASE PAD FOR SCREENING PANELS.

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Ir ■■■■, CA ■■■■ ■■■■
■■■■■ 4 ■■■■ ■■■■ 45 ■■■■ ■■■■ 4 ■■■■ ■■■■ 4 ■■■■

ENGINEER OF RECORD
FARMAN SHIR, P.E.
LICENSE # C13000



EXP: -09/30/2018 02/06/2017

CUSTOMER SITE
KAISER PERMANENTE
#CN470H
5840 OWENS DRIVE
PLEASANTON, CA 94588



REVISION HISTORY		
REV	REVISION ISSUE	DATE
0	RELEASED PER IGN-10320	08/08/2016

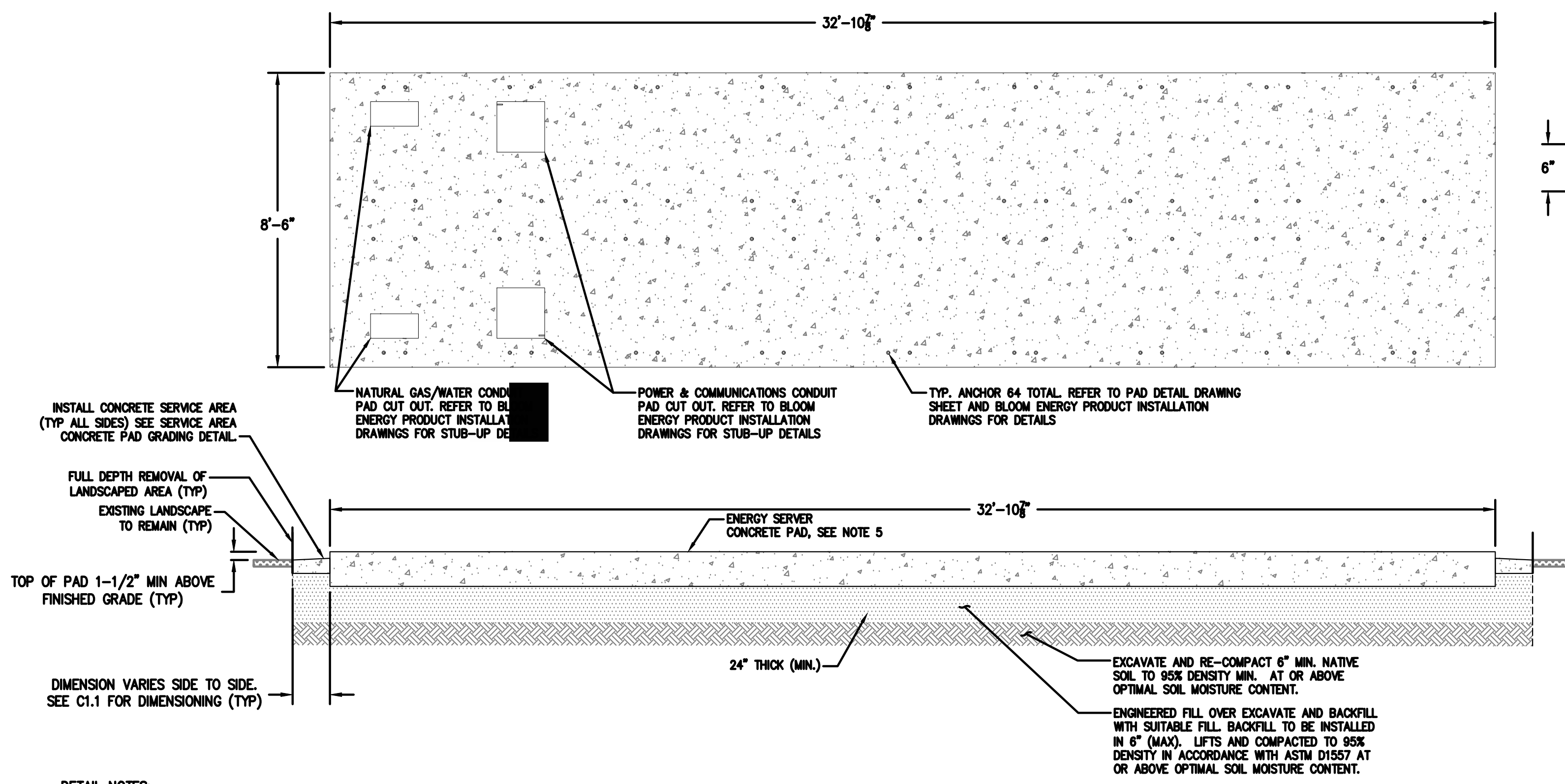
DESIGNED BY	DATE
BRIAN CURTIS	08/08/2016
DRAWN BY	DATE
UMA GURUNATH	12/12/2016
REVIEWED BY	DATE
PANTEHA BINER	02/06/2017
APPROVED BY	DATE
FARMAN SHIRMOHAMMADI	02/06/2017

SHEET TITLE
DETAILED SITE PLAN

DRAWING NUMBER
C1.1

BLOOM DOCUMENT
DOC-1008145

THIS DRAWING IS 24" X 36" AT FULL SIZE
SITE ID: KSR023.0 SHEET 07 OF 14



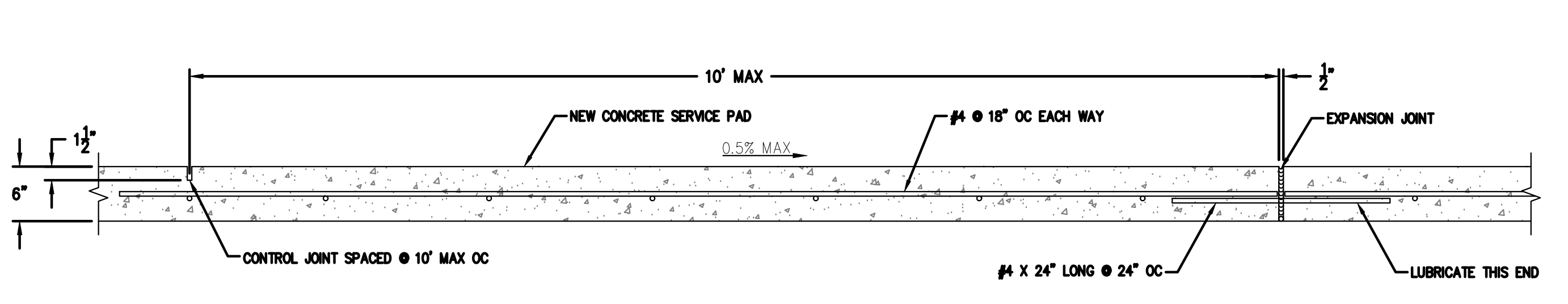
DETAIL NOTES:

- ASSUME MINIMUM SOIL STRENGTH PARAMETERS (1500 PSF) USED IN LIEU OF SOIL INVESTIGATION.
- CONTRACTOR TO STOP WORK IMMEDIATELY AND CONTACT THE ENGINEER OF RECORD IF ANY OF THE FOLLOWING CONDITIONS ARE PRESENT:
 - CONTAMINATED SOIL INDICATED BY ODOR, DARK SOIL OR THE PRESENCE OF TAR LIKE SUBSTANCES;
 - INDICATIONS THAT THE WATER TABLE IS WITHIN 5' OF THE SOIL SURFACE.
- BACKFILL MATERIALS MUST BE CLEAN AND FREE OF ORGANIC MATERIALS AND CONTAMINANTS.
- CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE FOR DIRECTION IN THE EVENT PADS ARE LOCATED WITHIN 15' OF SLOPES EXCEEDING 5' IN HEIGHT. SUBGRADE AND AGGREGATE BASE SHALL BE SAMPLED AND TESTED TO VERIFY COMPLIANCE WITH THE PROJECT PLANS. IN ADDITION, IN-PLACE DENSITY TESTS SHOULD BE CONDUCTED FOR THE SUBGRADE, ANY FILL AND AGGREGATE BASE.
- SYSTEM PAD SLOPE SHALL HAVE A MAXIMUM GRADE OF 2% IN ANY DIRECTION.
- CONTRACTOR SHALL HIRE A THIRD PARTY SOILS INSPECTION AND TESTING AGENCY TO PHOTOGRAPH BOTTOM OF EXCAVATION, VERIFY SOILS ARE SUITABLE, AND VERIFY AND REPORT COMPACTION PER LOCAL CODE. TEST REPORTS AND INSPECTION REPORTS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER.

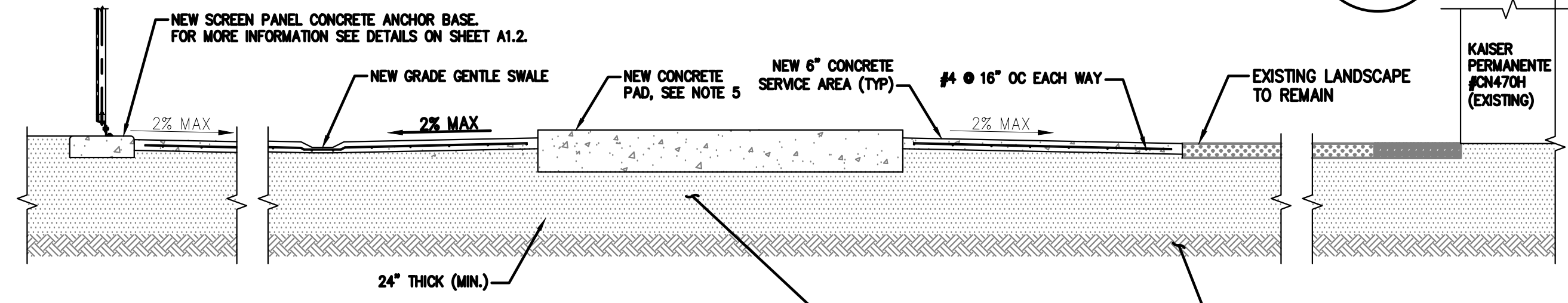
SUITABLE FILL MATERIALS:

- CLASS II AGGREGATE BASE.
- CLEAN AND NON-EXPANSIVE ENGINEERED FILL COMPRISING SILTY SAND OR POORLY GRADED SAND (SM OR SP PER USCS) WITH AN EXPANSION INDEX OF LESS THAN 21 AND CONTAINING LESS THAN 3% ORGANIC MATTER LOSS ON IGNITION TEST.

BACK TO BACK LINEAR ES5 ENERGY SERVER W/ 7 PM5'S UNIVERSAL CONCRETE PAD GRADING (1A)
SCALE: NTS (C2.1)



EXPANSION JOINT AT SERVICE AREA (A)
SCALE: NTS (C2.1)



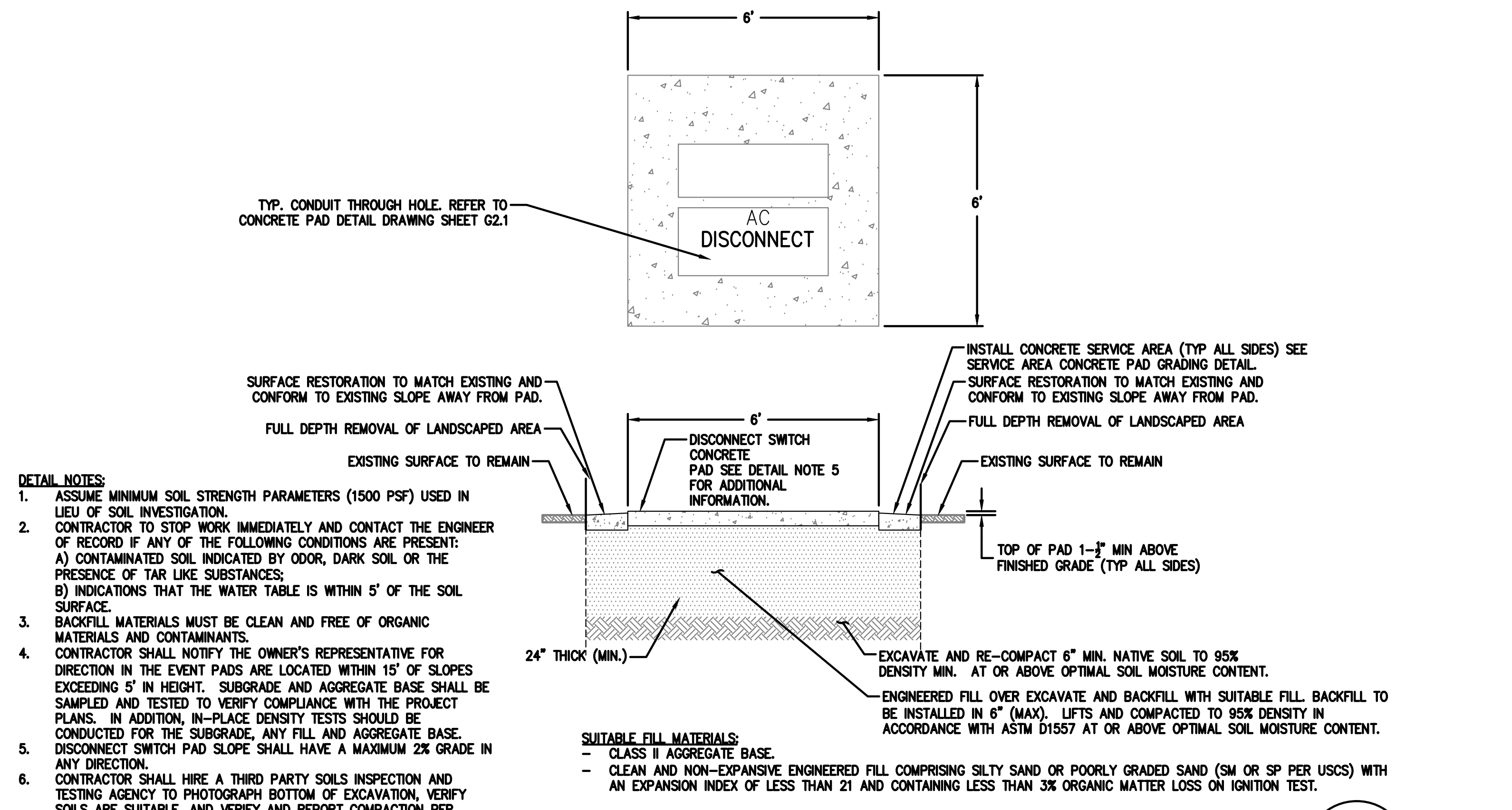
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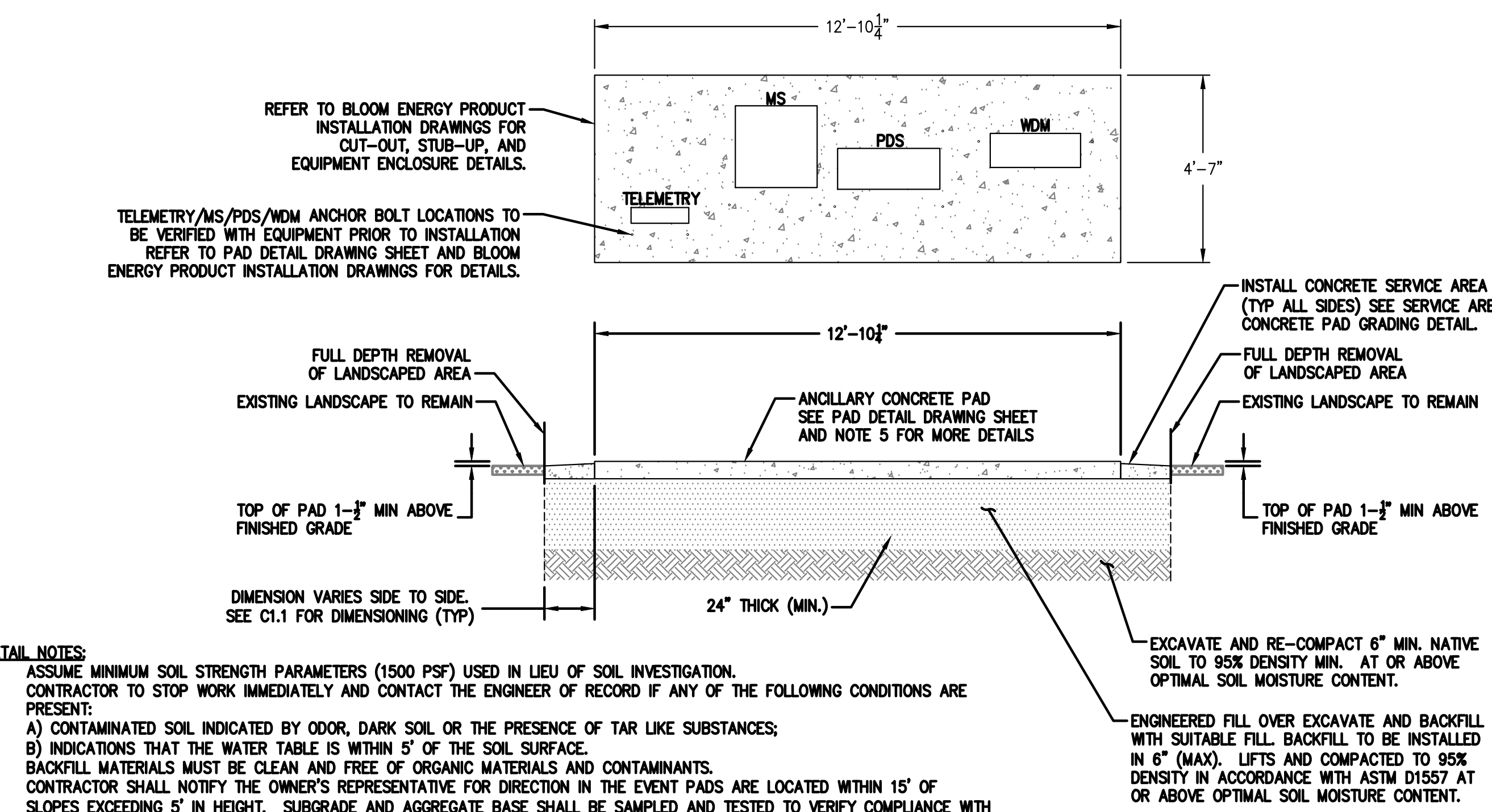
DETAIL NOTES:

- ASSUME MINIMUM SOIL STRENGTH PARAMETERS (1500 PSF) USED IN LIEU OF SOIL INVESTIGATION.
- CONTRACTOR TO STOP WORK IMMEDIATELY AND CONTACT THE ENGINEER OF RECORD IF ANY OF THE FOLLOWING CONDITIONS ARE PRESENT:
 - CONTAMINATED SOIL INDICATED BY ODOR, DARK SOIL OR THE PRESENCE OF TAR LIKE SUBSTANCES;
 - INDICATIONS THAT THE WATER TABLE IS WITHIN 5' OF THE SOIL SURFACE.
- BACKFILL MATERIALS MUST BE CLEAN AND FREE OF ORGANIC MATERIALS AND CONTAMINANTS.
- CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE FOR DIRECTION IN THE EVENT PADS ARE LOCATED WITHIN 15' OF SLOPES EXCEEDING 5' IN HEIGHT. SUBGRADE AND AGGREGATE BASE SHALL BE SAMPLED AND TESTED TO VERIFY COMPLIANCE WITH THE PROJECT PLANS. IN ADDITION, IN-PLACE DENSITY TESTS SHOULD BE CONDUCTED FOR THE SUBGRADE, ANY FILL AND AGGREGATE BASE.
- SYSTEM PAD, ANCILLARY PAD AND DISCONNECT PAD SLOPE SHALL HAVE A MAXIMUM GRADE OF 2% IN ANY DIRECTION.
- CONTRACTOR SHALL HIRE A THIRD PARTY SOILS INSPECTION AND TESTING AGENCY TO PHOTOGRAPH BOTTOM OF EXCAVATION, VERIFY SOILS ARE SUITABLE, AND VERIFY AND REPORT COMPACTION PER LOCAL CODE. TEST REPORTS AND INSPECTION REPORTS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER.

SERVICE AREA CONCRETE PAD GRADING (B)
SCALE: NTS (C2.1)



AC DISCONNECT CONCRETE PAD GRADING (1C)
SCALE: NTS (C2.1)



CONCRETE ANCILLARY PAD GRADING (1B)
SCALE: NTS (C2.1)

Bloomenergy
1299 ORLEANS DRIVE
SUNNYVALE, CA 94089
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t: 949 296 0450 f: 949 296 0479

ENGINEER OF RECORD
FARMAN SHIR, P.E.
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EXP: -09/30/2018 02/06/2017

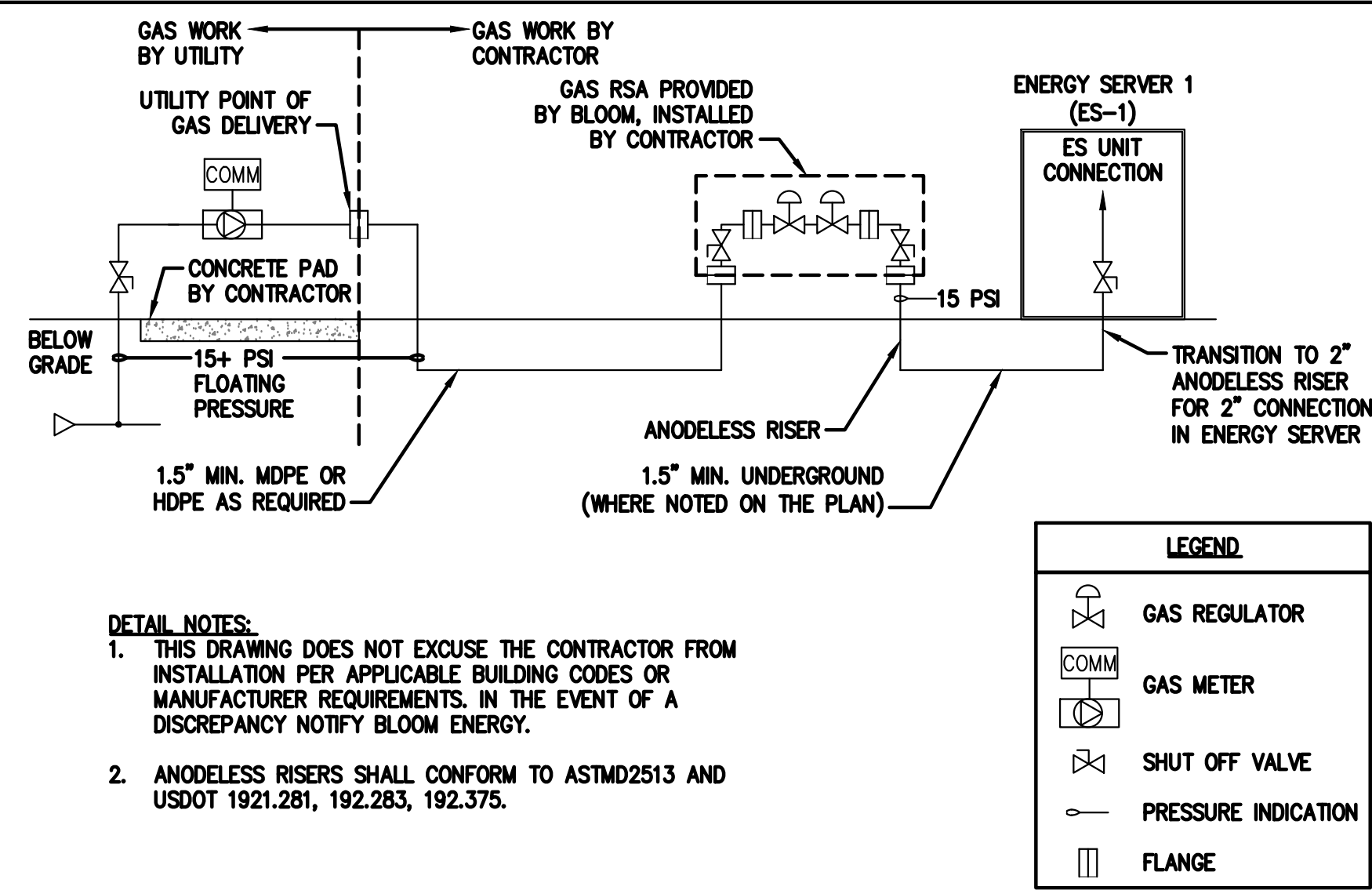
CUSTOMER SITE
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PLEASANTON, CA 94588



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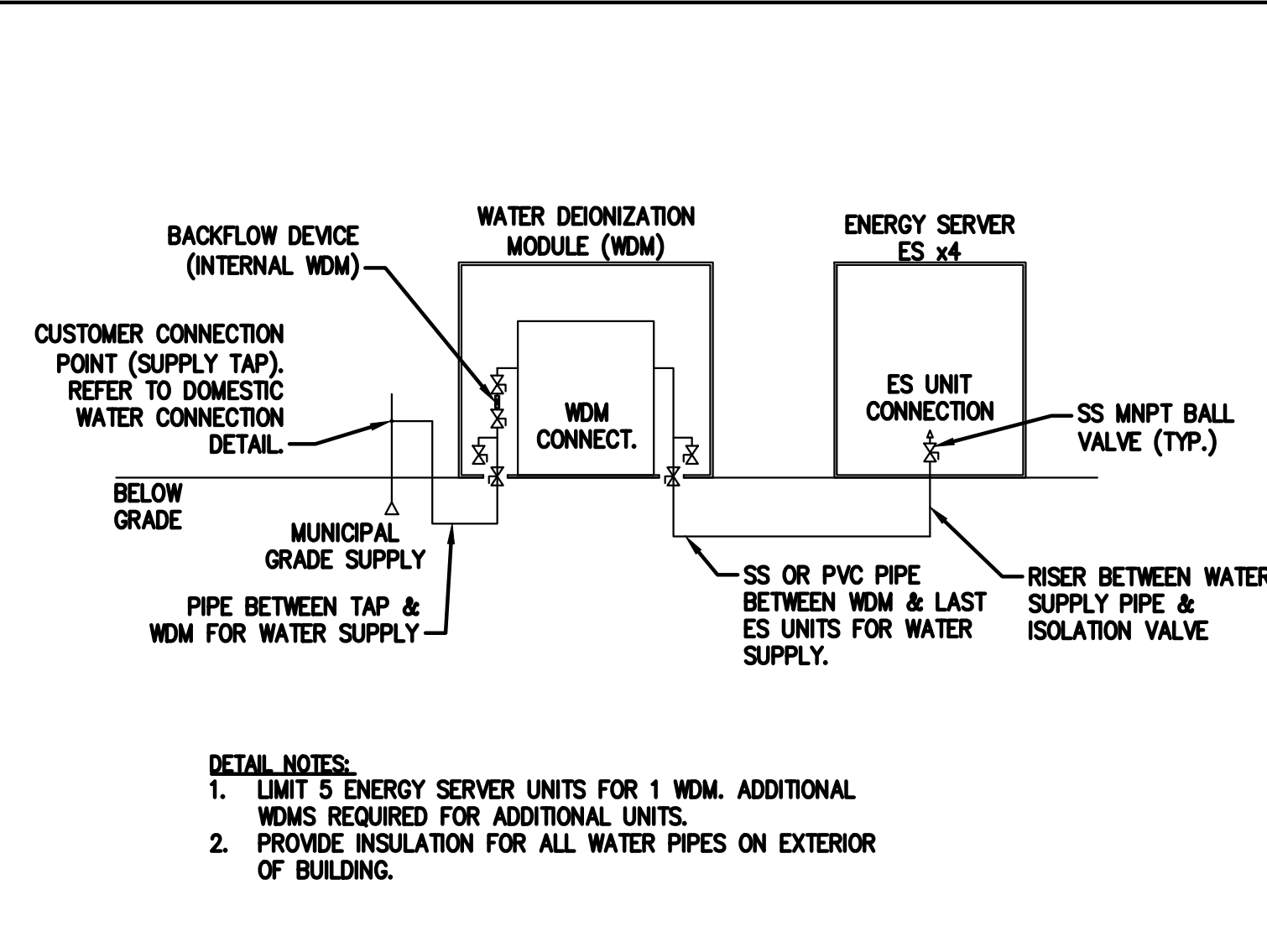
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DETAILS SHEET 1	
DRAWING NUMBER	C2.1
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THIS DRAWING IS 24" X 36" AT FULL SIZE	
SITE ID: KSR023.0	SHEET 08 OF 14



GAS RISER - FLOATING DELIVERY WITH LOCAL PRIVATE RSA

SCALE: NTS

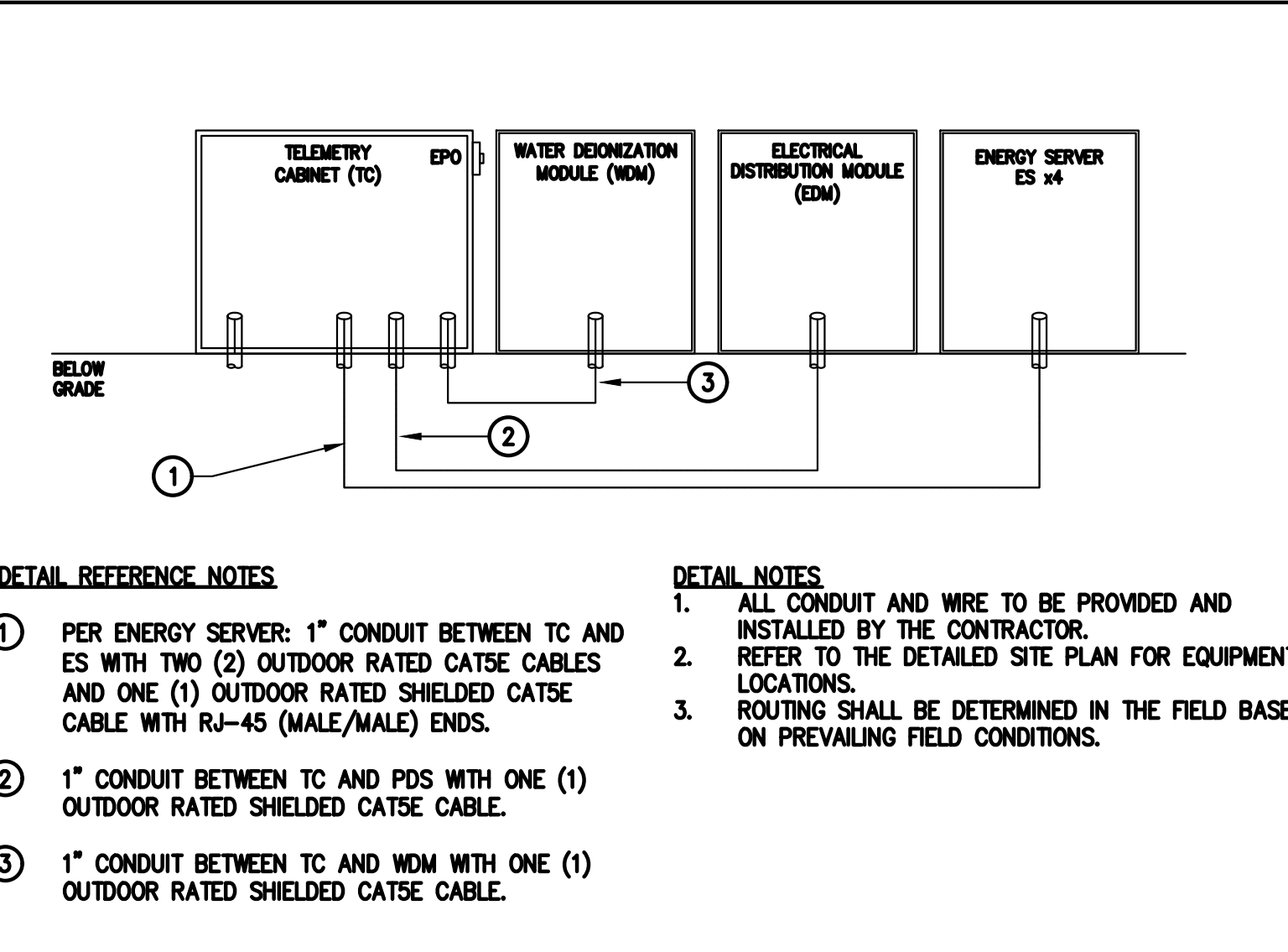
1
C2.2



WATER RISER

SCALE: NTS

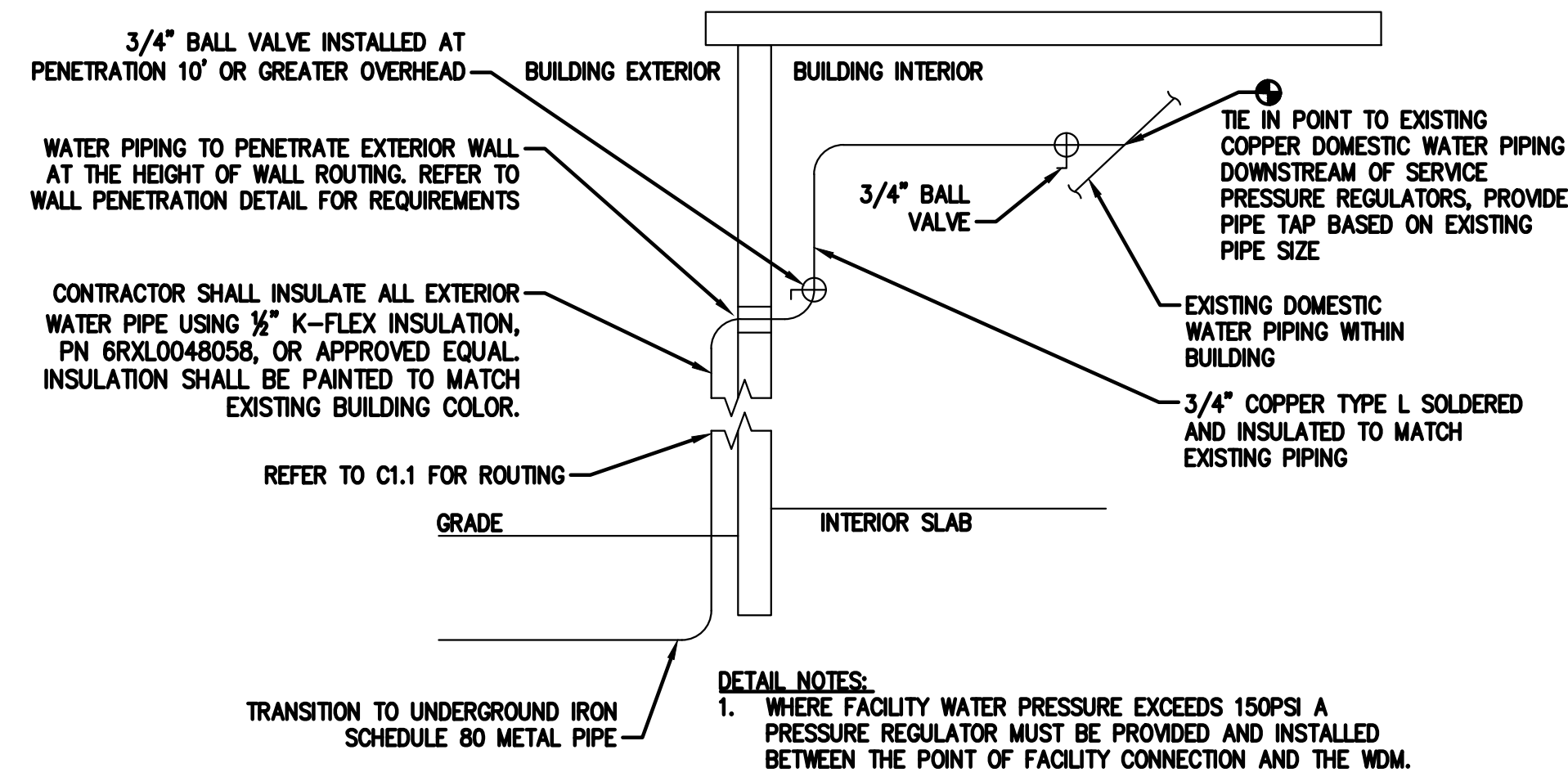
2
C2.2



COMMUNICATIONS RISER DIAGRAM

SCALE: NTS

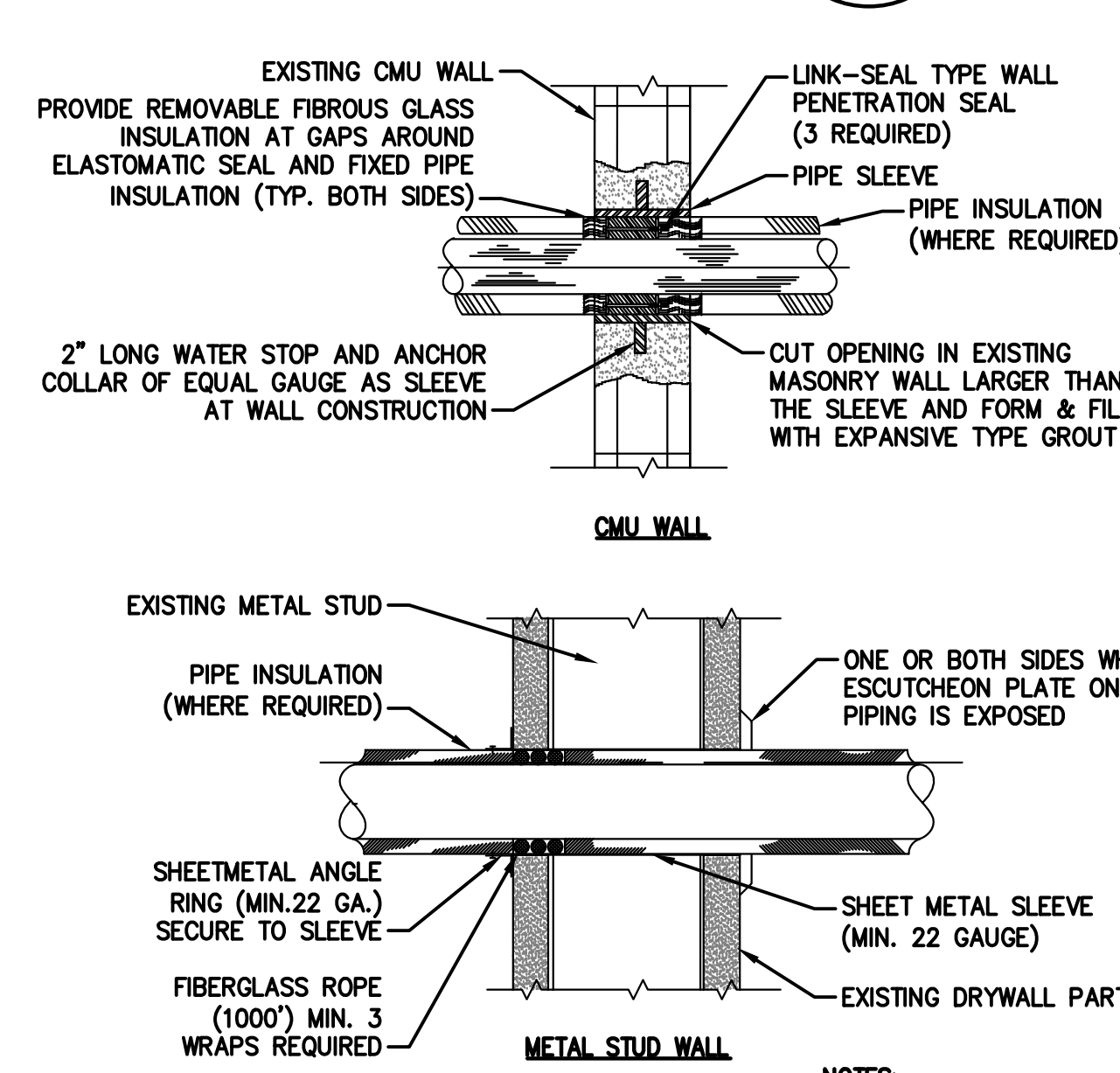
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C2.2



DOMESTIC WATER CONNECTION

SCALE: NTS

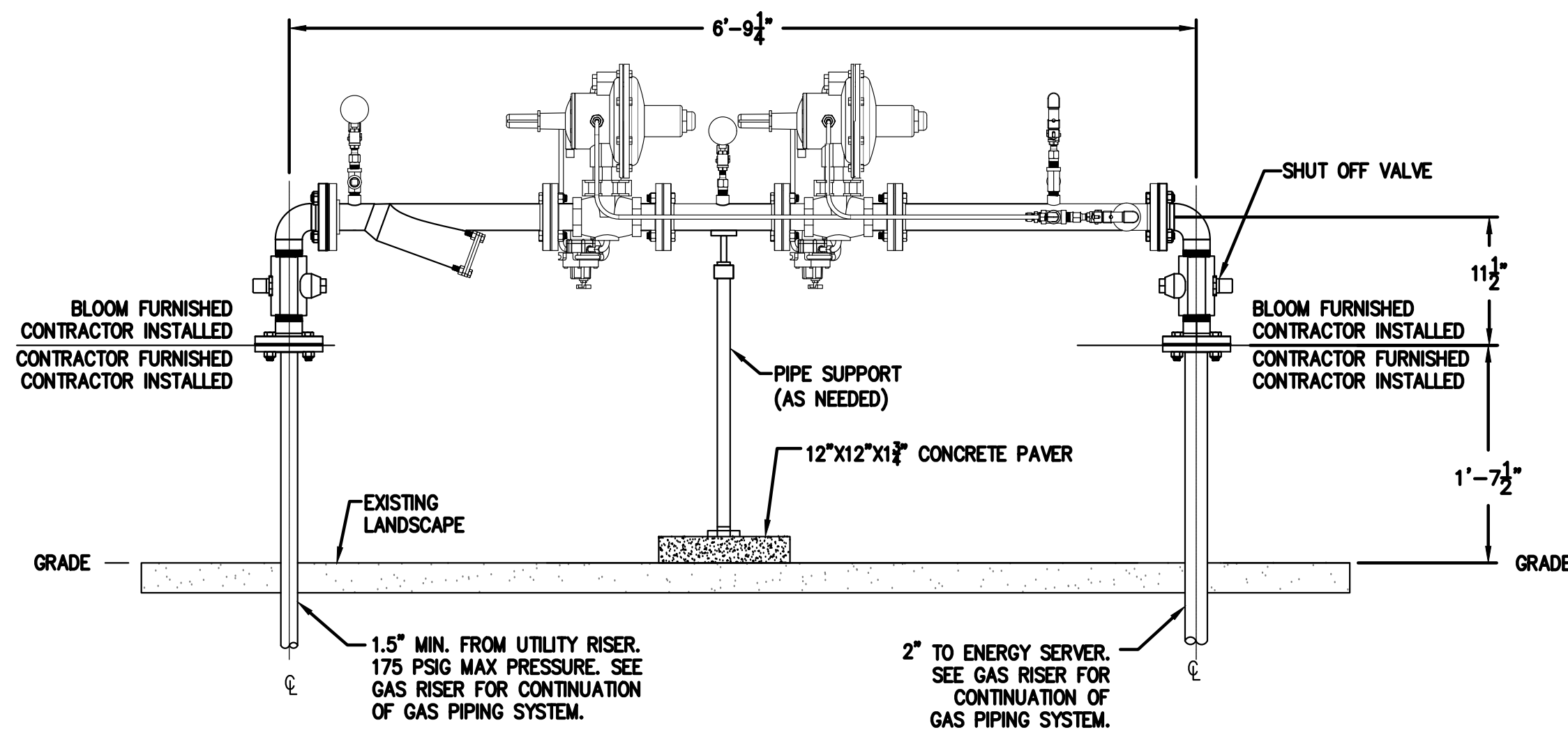
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C2.2



WALL PENETRATION

SCALE: NTS

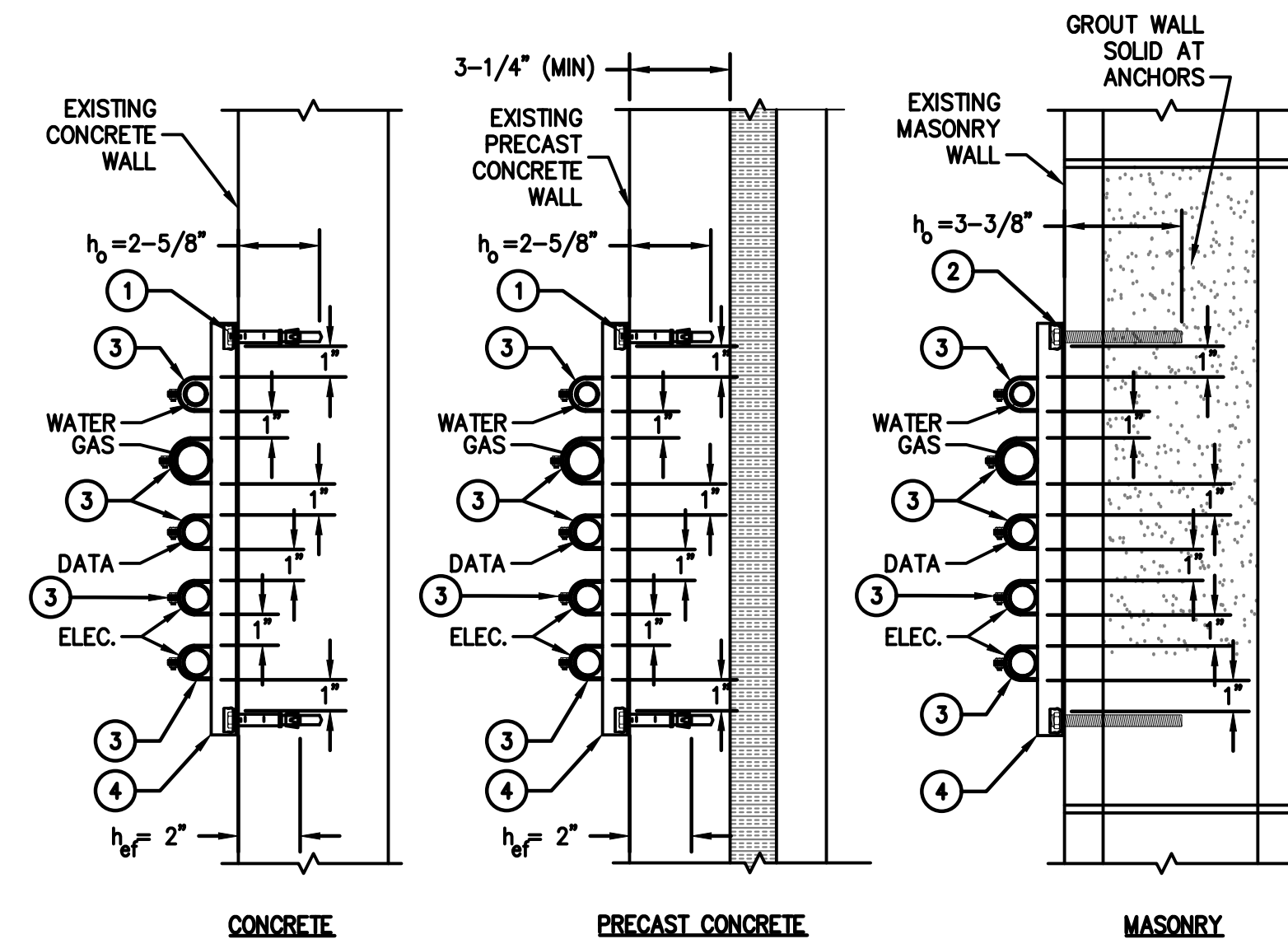
5
C2.2



GAS PRESSURE REGULATOR

SCALE: NTS

6
C2.2



WALL MOUNTING

SCALE: NTS

7
C2.2



REVISION HISTORY		
REV	REVISION ISSUE	DATE
0	RELEASED PER ICM-10320	08/08/2016

DESIGNED BY BRIAN CURTIS	DATE 08/08/2016
DRAWN BY UMA GURUNATH	DATE 12/12/2016
REVIEWED BY OSMAN ELMI	DATE 02/06/2017
APPROVED BY ERIC WOLF	DATE 02/06/2017

SHEET TITLE

DETAILS
SHEET 2

DRAWING NUMBER

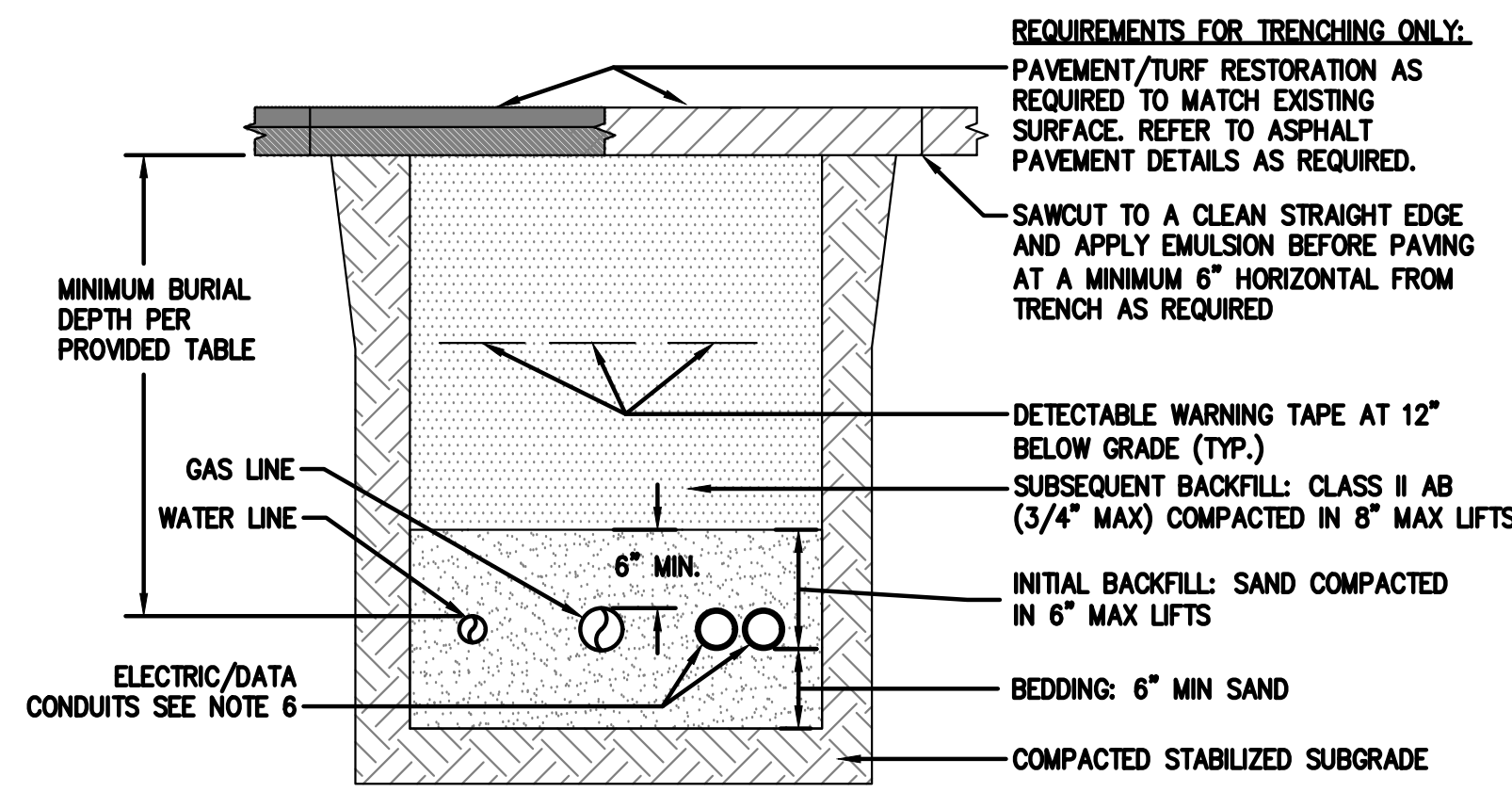
C2.2

BLOOM DOCUMENT

DOC-1008145

THIS DRAWING IS 24" X 36" AT FULL SIZE

SITE ID: KSR023.0 SHEET 09 OF 14



REQUIREMENTS FOR TRENCHING ONLY:
 PAVEMENT/TURF RESTORATION AS REQUIRED TO MATCH EXISTING SURFACE. REFER TO ASPHALT PAVEMENT DETAILS AS REQUIRED.
 SAWCUT TO A CLEAN STRAIGHT EDGE AND APPLY EMULSION BEFORE PAVING AT A MINIMUM 6" HORIZONTAL FROM TRENCH AS REQUIRED.
 DETECTABLE WARNING TAPE AT 12" BELOW GRADE (TYP.)
 SUBSEQUENT BACKFILL: CLASS II AB (3/4" MAX) ASTM C33 SAND AS NOTED AND COMPACTED TO 95% RELATIVE COMPACTION PER ASTM D1557.
 INITIAL BACKFILL: SAND COMPACTED IN 6" MAX LIFTS
 BEDDING: 6" MIN SAND
 COMPACTED STABILIZED SUBGRADE

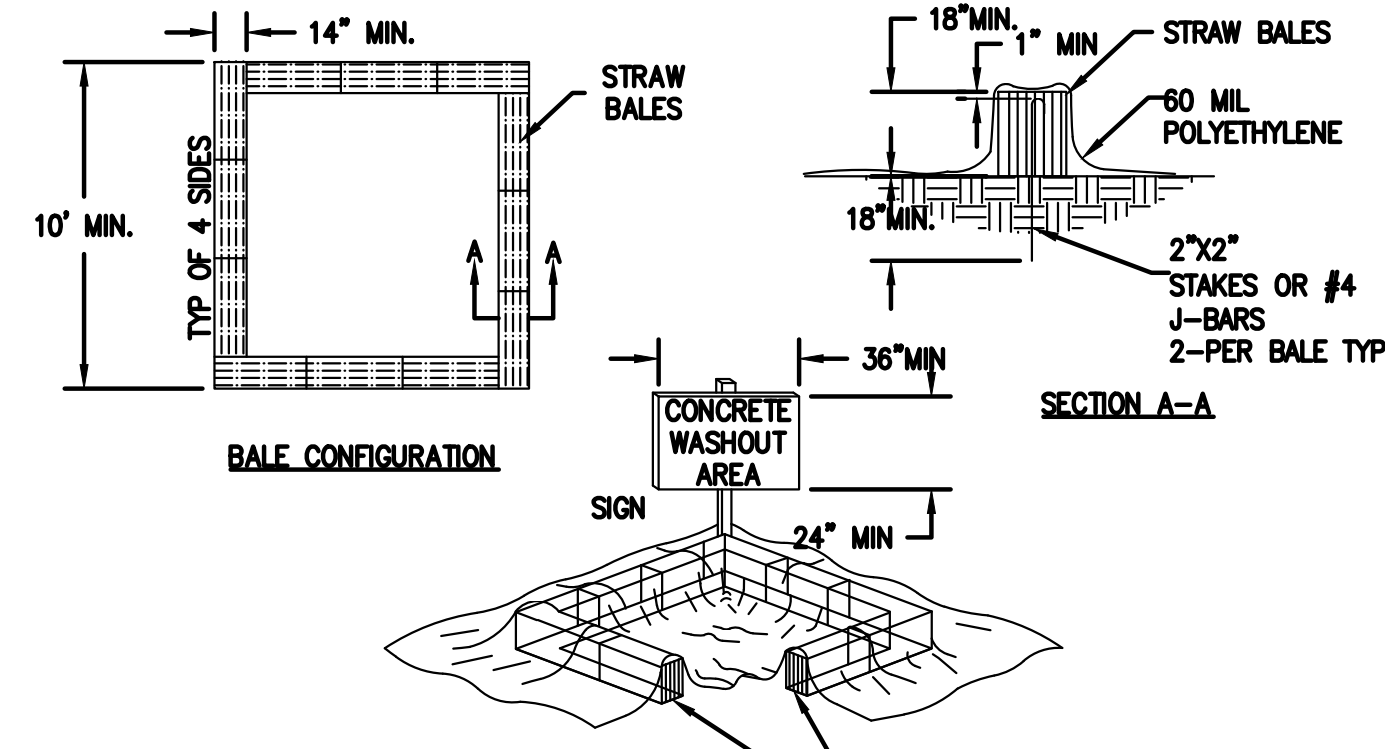
- DETAIL NOTES:**
- WHERE HORIZONTAL DIRECTIONAL DRILLING (HDD) IS EMPLOYED CONTRACTOR SHALL DISREGARD NOTES UNDERNEATH THE HEADING "REQUIREMENTS FOR TRENCHING ONLY," AND THE MINIMUM HORIZONTAL DISTANCE TO ALL TRENCH WALLS. WHEN RESTORING HDD PITS CONTRACTOR SHALL BACKFILL AND PROVIDE SURFACE RESTORATION ACCORDINGLY.
 - REFER TO DETAILED SITE PLAN FOR CONDUIT/PIPE GROUPING REQUIREMENTS.
 - REFER TO ELECTRICAL SINGLE LINE DIAGRAM FOR REQUIRED CONDUIT SIZING AND QUANTITIES.
 - REFER TO WATER/GAS RISERS FOR REQUIRED PIPE SIZING AND QUANTITIES.
 - ALL FILL MATERIAL SHALL BE CLASS II AB (3/4" MAX) ASTM C33 SAND AS NOTED AND COMPACTED TO 95% RELATIVE COMPACTION PER ASTM D1557.
 - SPACING BETWEEN ELECTRICAL CONDUITS SHALL BE IN ACCORDANCE WITH CURRENT APPLICABLE NATIONAL, STATE, AND LOCAL CODES.
 - CONTRACTOR SHALL HIRE A THIRD PARTY SOILS INSPECTION AND TESTING AGENCY TO PHOTOGRAPH BOTTOM OF EXCAVATION, VERIFY SOILS ARE SUITABLE, AND VERIFY AND REPORT COMPACTION PER LOCAL CODE REQUIREMENTS. TEST REPORTS AND INSPECTION REPORTS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER.

CONDUITS/PIPE	MINIMUM BURIAL DEPTH	MINIMUM HORIZONTAL DISTANCE TO LIKE CONDUITS	MINIMUM HORIZONTAL DISTANCE TO DIFFERING CONDUITS/PIPE	MINIMUM HORIZONTAL DISTANCE TO TRENCH WALLS
ELECTRIC/DATA	36"	6"	12"	6"
GAS	36"	6"	12"	6"
WATER	36"	6"	24"	6"

UNDERGROUND/TRENCH CONDUIT AND PIPING

SCALE: NTS

1
C2.3

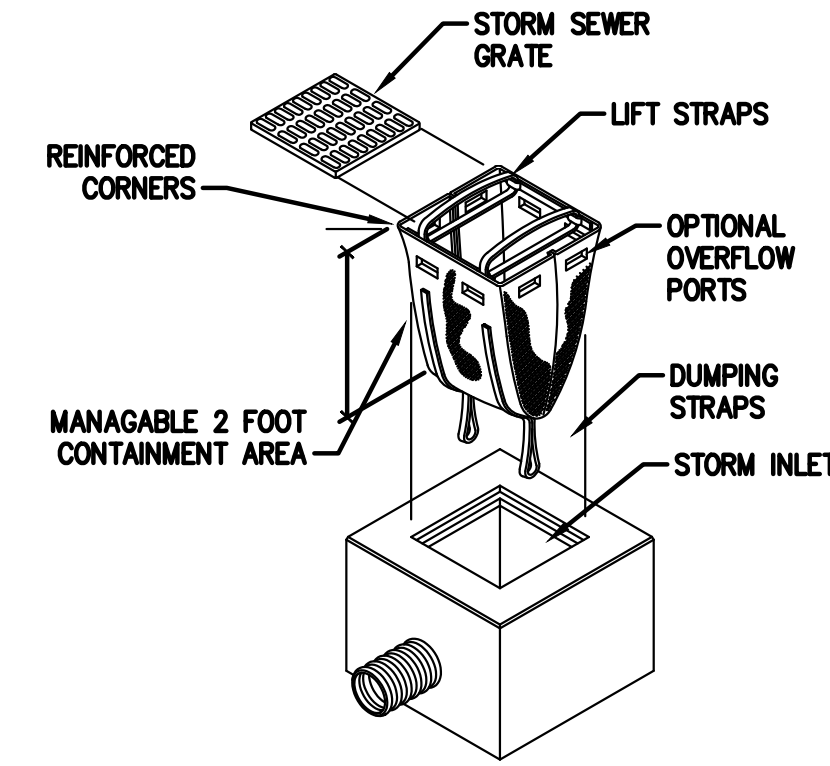


- DETAIL NOTES:**
- FACE SIGN TOWARDS NEAREST STREET OR ACCESS POINT.
 - CONCRETE WASHOUT SHALL BE LOCATED BEHIND THE CURB AND 50 FT. MINIMUM FROM DRAINAGE INLETS OR WATERCOURSES
- THIS SECTION REMOVED FOR GRAPHICAL REPRESENTATION ONLY. STRAW BALE PERIMETER SHALL BE CONTINUOUS.

CONCRETE WASHOUT

SCALE: NTS

2
C2.3

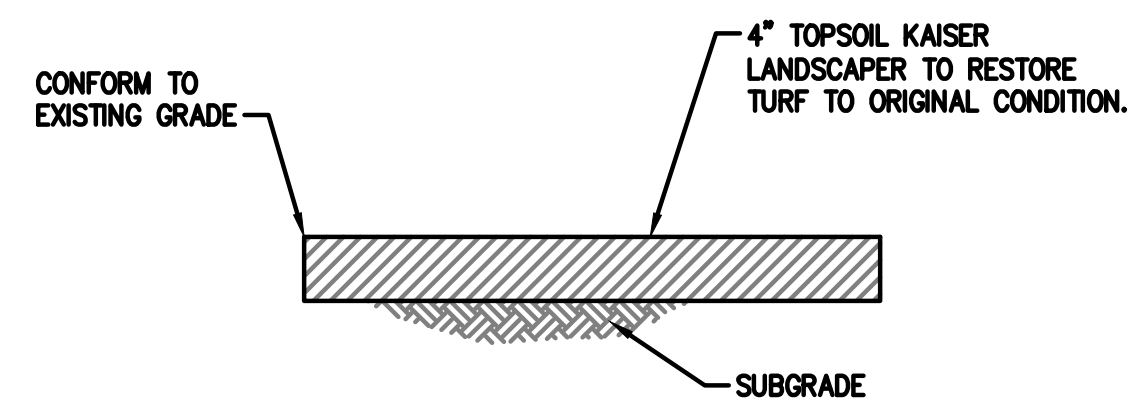


- DETAIL NOTES:**
- THE SPECIFIED INLET PROTECTION CAN BE SUPPLIED IN A VARIETY OF SIZES. CONTRACTOR TO SELECT THE APPROPRIATE DRAINAGE INLET PROTECTION AS REQUIRED.

STORM DRAIN PROTECTION

SCALE: NTS

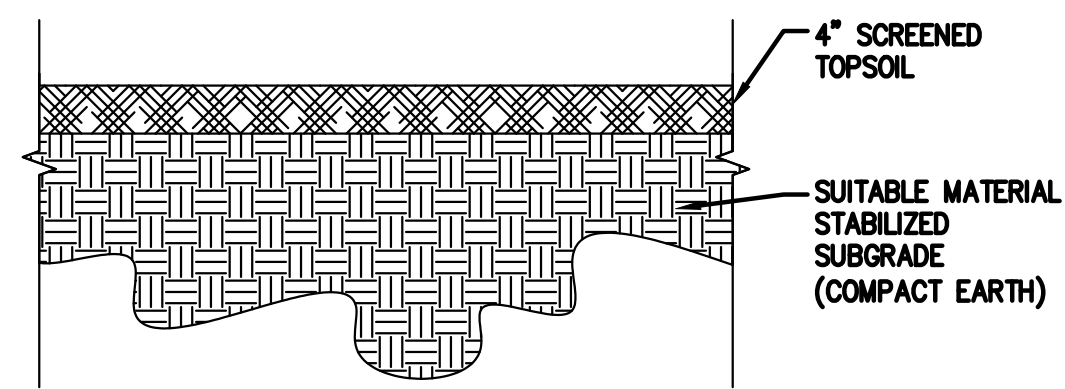
3
C2.3



TURF RESTORATION

SCALE: NTS

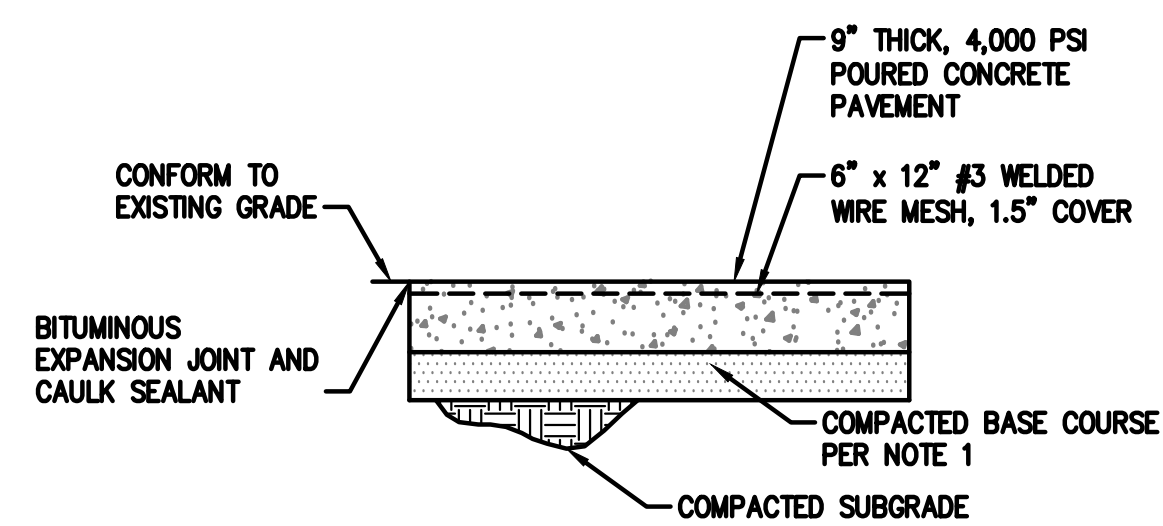
4
C2.3



LANDSCAPE RESTORATION

SCALE: NTS

5
C2.3

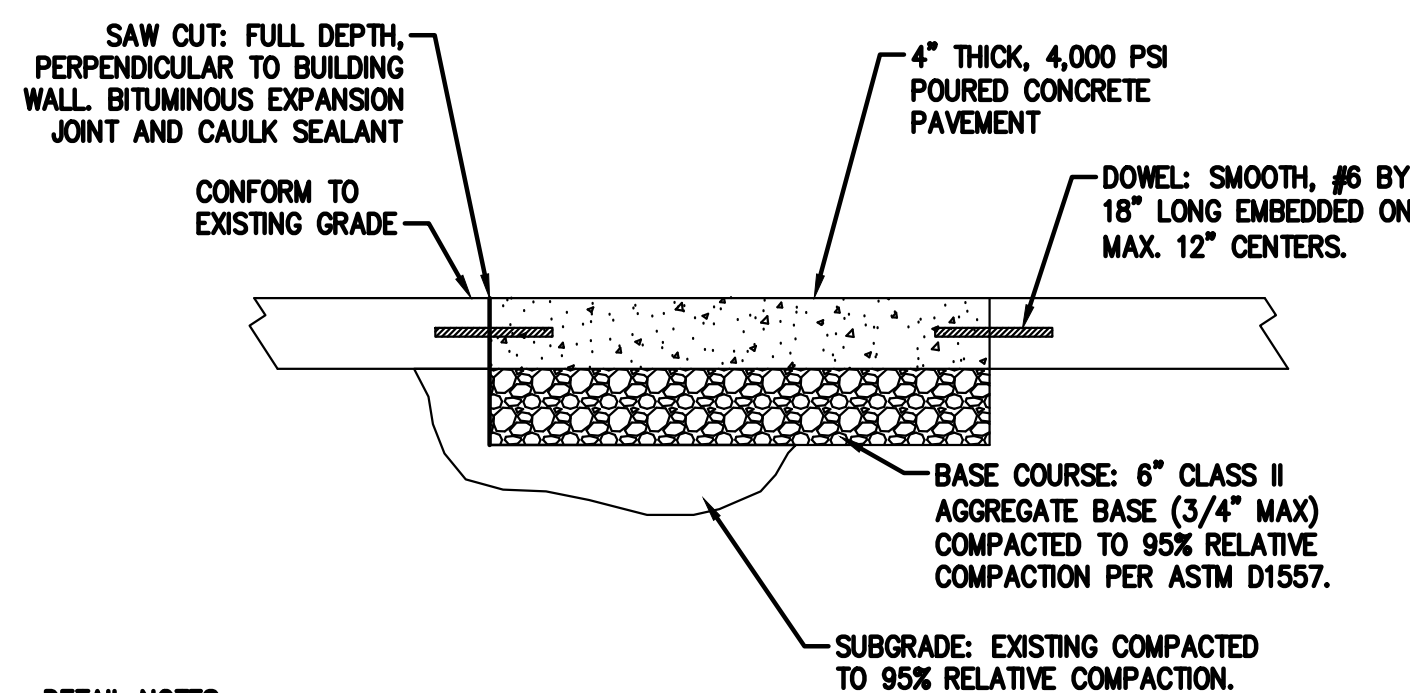


- DETAIL NOTES:**
- REFER TO UNDERGROUND/TRENCH CONDUIT AND PIPING DETAIL OR ENERGY SERVER AND ANCILLARY PRECAST PAD GRADING FOR COMPACTED BASE COURSE REQUIREMENTS.

CONCRETE RESTORATION

SCALE: NTS

6
C2.3



- DETAIL NOTES:**
- MATCH EXISTING SURFACE LEVEL AND BROOMED FINISH.

CONCRETE SIDEWALK

SCALE: NTS

7
C2.3

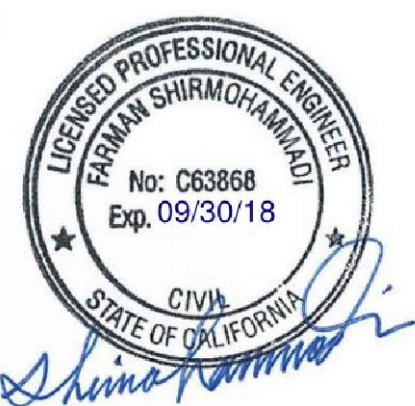
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ENGINEER OF RECORD
 FARMAN SHIR, P.E.
 LICENSE # C63868



EXP: -09/30/2018 02/06/2017

CUSTOMER SITE
 KAISER PERMANENTE
 #CN470H
 5840 OWENS DRIVE
 PLEASANTON, CA 94588



REVISION HISTORY		
REV	REVISION ISSUE	DATE
0	RELEASED PER ICN-10320	08/08/2016

DESIGNED BY BRIAN CURTIS	DATE 08/08/2016
DRAWN BY UMA GURUNATH	DATE 12/12/2016
REVIEWED BY PANTEHA BINER	DATE 02/06/2017
APPROVED BY FARMAN SHIRMOHAMMADI	DATE 02/06/2017

SHEET TITLE
DETAILS SHEET 3

DRAWING NUMBER
C2.3

BLOOM DOCUMENT
DOC-1008145

THIS DRAWING IS 24" X 36" AT FULL SIZE
 SITE ID: KSR023.0 SHEET 10 OF 14

SECTION 26A: ELECTRICAL

26A.1 GENERAL INSTRUCTIONS

26A 1-1 GENERAL REQUIREMENTS

THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.

DRAWINGS ARE GRAPHIC REPRESENTATIONS OF THE WORK UPON WHICH THE CONTRACT IS BASED. THEY SHOW THE MATERIALS AND THEIR RELATIONSHIP TO ONE ANOTHER, INCLUDING SIZES, SHAPES, LOCATIONS, AND CONNECTIONS. THEY ALSO CONVEY THE SCOPE OF WORK, INDICATING THE INTENDED GENERAL ARRANGEMENT OF THE EQUIPMENT, OUTLETS, AND CIRCUITS WITHOUT SHOWING ALL OF THE EXACT DETAILS AS TO ELEVATIONS, OFFSETS, CONTROL LINES, AND OTHER INSTALLATION REQUIREMENTS. USE THE DRAWINGS AS A GUIDE WHEN LAYING OUT THE WORK AND TO VERIFY THAT MATERIALS AND EQUIPMENT WILL FIT INTO THE DESIGNATED LOCATION THIS WILL ENSURE A COMPLETE, COORDINATED, SATISFACTORY, AND PROPERLY OPERATING SYSTEM WHEN INSTALLED PER MANUFACTURERS' REQUIREMENTS.

SPECIFICATIONS DEFINE THE QUALITATIVE REQUIREMENTS FOR PRODUCTS, MATERIALS, AND WORKMANSHIP UPON WHICH THE CONTRACT IS BASED.

26A 1-2 DEFINITIONS

WHENEVER USED IN THESE SPECIFICATIONS OR DRAWINGS, THE FOLLOWING TERMS SHALL HAVE THE INDICATED MEANINGS.

FURNISH: *TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLING, INSTALLING, AND SIMILAR OPERATIONS.*

INSTALL: *TO PERFORM ALL OPERATIONS AT THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO, AND AS REQUIRED, UNLOADING, UNPACKING, ASSEMBLING, ERIGING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE.*

PROVIDE: *TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE.*

FURNISHED BY OWNER (OR OWNER-FURNISHED) OR FURNISHED BY OTHERS: *AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION. INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION.*

ARCHITECT: THE ENTITY RESPONSIBLE FOR GENERATION OF CONSTRUCTION DRAWINGS, SUBMITTALS AND ALL RELEVANT CONSTRUCTION DESIGN DOCUMENTATION.

ENGINEER: WHERE REFERRED TO IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION, AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF, THE ARCHITECT, AS DEFINED IN THE GENERAL AND/OR SUPPLEMENTARY CONDITIONS. WHEN USED IN THIS DIVISION, IT MEANS INCREASED INVOLVEMENT BY, AND OBLIGATIONS TO, THE ENGINEER, IN ADDITION TO INVOLVEMENT BY, AND OBLIGATIONS TO THE "ARCHITECT".

AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY (AUTHORITY) HAVING JURISDICTION OVER THE WORK.

NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 29 CFR 1910.7 (E.G., UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

THE TERMS "APPROVED EQUAL", "EQUIVALENT", OR "EQUAL", ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED." THE TERM "APPROVED" SHALL MEAN LABELED, LISTED, OR BOTH, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

26A 1-3 PRE-BID SITE INSPECTION

INSPECT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED OF CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.

26A 1-4 MATERIAL AND WORKMANSHIP

PROVIDE ALL MATERIAL AND EQUIPMENT IN NEW CONDITION. PROVIDE MARKINGS OR A NAMEPLATE FOR ALL MATERIAL AND EQUIPMENT IDENTIFYING THE MANUFACTURER AND PROVIDING SUFFICIENT REFERENCE TO ESTABLISH QUALITY, SIZE, AND CAPACITY. ALL WORKMANSHIP SHALL BE OF THE FINEST POSSIBLE BY EXPERIENCED MECHANICS OF THE PROPER TRADE. IN GENERAL, PROVIDE COMMERCIAL SPECIFICATION GRADE QUALITY FOR ALL MATERIALS AND EQUIPMENT. LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTABLE. PROVIDE ALL HOIST, SCAFFOLDS, STAGING, RUNWAYS, TOOLS, MACHINERY AND EQUIPMENT REQUIRED TO PERFORM THE ELECTRICAL WORK. STORE AND MAINTAIN MATERIAL AND EQUIPMENT IN CLEAN CONDITION, AND PROTECTED FROM WEATHER, MOISTURE, AND PHYSICAL DAMAGE.

FURNISH ONLY MATERIAL AND EQUIPMENT THAT ARE LISTED, LABELED, OR BOTH, BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL), WHENEVER ANY LISTING OR LABELING EXISTS FOR THE TYPES OF MATERIAL AND EQUIPMENT SPECIFIED.

26A 1-5 COORDINATION

COORDINATE ALL WORK WITH OTHER DIVISIONS AND TRADES SO THAT THE VARIOUS COMPONENTS OF THE ELECTRICAL SYSTEMS ARE INSTALLED AT THE PROPER TIME, FIT THE AVAILABLE SPACE, AND ALLOW PROPER SERVICE ACCESS TO ALL EQUIPMENT. REFER TO ALL DRAWINGS AND TO RELEVANT EQUIPMENT SUBMITTALS AND SHOP DRAWINGS TO DETERMINE THE EXTENT IS CLEAR. MAKE ALL OFFSETS REQUIRED TO CLEAR EQUIPMENT, BEAMS AND OTHER STRUCTURAL MEMBERS, AND TO FACILITATE CONCEALING RACEWAYS IN THE MANNER ANTICIPATED. PROVIDE MATERIALS WITH TRIM THAT WILL FIT PROPERLY WITH THE TYPES OF CEILING, WALL OR FLOOR FINISHES ACTUALLY INSTALLED.

26A 1-6 DIMENSION AND LAYOUTS

DRAWINGS ARE SCHEMATIC IN NATURE, SHOW THE VARIOUS COMPONENTS OF THE SYSTEMS APPROXIMATELY TO SCALE AND ATTEMPT TO INDICATE HOW THEY WILL BE INTEGRATED WITH OTHER PARTS OF THE WORK. FIGURED DIMENSIONS TAKE PRECEDENCE TO SCALED DIMENSIONS. DETERMINE EXACT LOCATIONS BY JOB MEASUREMENTS, BY CHECKING THE REQUIREMENTS OF OTHER TRADES, AND BY REVIEWING ALL CONTRACT DOCUMENTS. CORRECT ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER VERIFICATION AND INSPECTION. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE REPAIRS AT NO ADDITIONAL COST.

26A 1-7 ORDINANCES AND CODES

COMPLY WITH, AT A MINIMUM, NATIONAL FIRE PROTECTION ASSOCIATION CODES, STATE AND LOCAL BUILDING CODES, AND ALL OTHER APPLICABLE CODES AND ORDINANCES FOR PERFORMANCE, WORKMANSHIP, EQUIPMENT, AND MATERIALS. ADDITIONALLY, COMPLY WITH THE RULES AND REGULATIONS OF PUBLIC UTILITIES AND MUNICIPAL DEPARTMENTS AFFECTED BY CONNECTION OF SERVICES.

WHERE CONFLICTS BETWEEN VARIOUS CODES, ORDINANCES, RULES, AND REGULATIONS EXIST, COMPLY WITH THE MOST STRINGENT. WHEREVER REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, EXCEED THOSE OF THE ABOVE ITEMS, THE REQUIREMENTS OF THESE SPECIFICATIONS, DRAWINGS, OR BOTH, SHALL GOVERN CODE COMPLIANCE, AND THE MORE STRINGENT REQUIREMENTS SHALL APPLY. CONSTRUCT NOTHING IN THESE CONSTRUCTION DOCUMENTS AS PERMITTING WORK NOT IN COMPLIANCE, AT A MINIMUM, WITH THESE CODES.

BRING ALL CONFLICTS OBSERVED BETWEEN CODES, ORDINANCES, RULES, REGULATIONS AND THESE DOCUMENTS TO THE ARCHITECT AND ENGINEER'S ATTENTION FOR FINAL RESOLUTION. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW.

PROVIDE AND MAINTAIN ALL NECESSARY SIGNAL LIGHTS AND GUARDS FOR THE SAFETY OF THE PUBLIC. OBTAIN AND PAY FOR ALL PERMITS FOR WORK IN THIS DIVISION.

26A 1-8 MANUFACTURERS

IN OTHER ARTICLES WHERE LISTS OF MANUFACTURERS ARE INTRODUCED, THE FOLLOWING REQUIREMENTS APPLY TO PRODUCT SELECTION:

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.
- B. WHERE A LIST IS PROVIDED, MANUFACTURERS ARE LISTED ALPHABETICALLY AND NOT IN ACCORDANCE WITH ANY RANKING OR PREFERENCE.

26A 1-9 SUBMITTALS

ASSEMBLE AND SUBMIT FOR ARCHITECT AND ENGINEER'S REVIEW, MANUFACTURERS' PRODUCT LITERATURE FOR MATERIAL AND EQUIPMENT TO BE FURNISHED OR INSTALLED UNDER THIS DIVISION, INCLUDING, BUT NOT LIMITED TO, DRAWINGS, MANUFACTURERS' PRODUCT DATA AND PERFORMANCE SHEETS, SAMPLES, AND OTHER SUBMITTALS REQUIRED BY THIS DIVISION. BEFORE SUBMITTING, VERIFY THAT ALL MATERIALS AND EQUIPMENT SUBMITTED ARE MUTUALLY COMPATIBLE AND SUITABLE FOR THE INTENDED USE, AND FIT THE AVAILABLE SPACES, AND ALLOW AMPLI AND CODE-REQUIRED ROOM FOR ACCESS AND MAINTENANCE. SUBMITTALS SHALL CONTAIN THE FOLLOWING INFORMATION. SUBMITTALS NOT SO IDENTIFIED WILL BE REJECTED:

- A. THE PROJECT NAME.
- B. APPLICABLE SPECIFICATION SECTION AND PARAGRAPH.
- C. THE SUBMITTAL DATE.
- D. THE CONTRACTOR'S STAMP, WHICH SHALL CERTIFY THAT THE STAMPED DRAWINGS HAVE BEEN CHECKED BY THE CONTRACTOR, COMPLY WITH THE DRAWINGS AND SPECIFICATIONS, AND HAVE BEEN COORDINATED WITH OTHER TRADES.

TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW TWO WEEKS FOR ENGINEER REVIEW TIME, PLUS MAILING TIME, PLUS A DUPLICATION OF THIS TIME FOR RESUBMITTALS, IF REQUIRED. TRANSMIT SUBMITTALS AS SOON AS POSSIBLE AFTER NOTICE TO PROCEED AND BEFORE CONSTRUCTION STARTS. THE ENGINEER'S SUBMITTAL REVIEWS WILL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, QUANTITIES, OMITTING COMPONENTS, FITTINGS OR COORDINATING ITEMS WITH ACTUAL BUILDING CONDITION.

26A 1-10 ADJUSTING, ALIGNING AND TESTING

ADJUST, ALIGN, AND TEST ALL ELECTRICAL EQUIPMENT ON THIS PROJECT PROVIDED UNDER THIS DIVISION AND ALL ELECTRICAL EQUIPMENT FURNISHED BY OTHERS FOR INSTALLATION OR WIRING UNDER THIS DIVISION, FOR PROPER OPERATION.

TEST ALL SYSTEMS AND EQUIPMENT ACCORDING TO THE REQUIREMENTS IN ACCEPTANCE TESTING SPECIFICATIONS.

MAINTAIN THE FOLLOWING ON THE PROJECT PREMISES AT ALL TIMES: A TRUE RMS READING VOLTMETER, A TRUE RMS READING AMMETER, AND A MEGOHMMETER INSULATION RESISTANCE TESTER. PROVIDE TEST DATA READINGS AS REQUESTED OR AS REQUIRED BY THE ENGINEER.

26A 1-11 OPERATION AND MAINTENANCE INSTRUCTIONS

SUBMIT FOR ENGINEER'S REVIEW, COPIES OF EACH OPERATIONS AND MAINTENANCE INSTRUCTION MANUALS, APPROPRIATELY BOUND INTO MANUAL FORM, INCLUDING APPROVED COPIES OF THE FOLLOWING, REVISED IF NECESSARY TO SHOW SYSTEM AND EQUIPMENT AS ACTUALLY INSTALLED. INCLUDE AT A MINIMUM THE FOLLOWING INFORMATION:

- A. MANUFACTURERS' CATALOG AND PRODUCT DATA SHEETS
- B. WIRING DIAGRAMS
- C. MAINTENANCE INSTRUCTIONS
- D. OPERATING INSTRUCTIONS
- E. PARTS LISTS
- F. TEST REPORTS AS DEFINED IN NETA ATS FOR THE SYSTEMS AND EQUIPMENT PROVIDED AND INSTALLED UNDER THIS CONTRACT.
- G. NAMES, ADDRESSES, TELEPHONE NUMBERS, AND E-MAIL ADDRESSES OF LOCAL CONTACTS FOR WARRANTY SERVICES AND SPARE PARTS.

SUBMIT MANUALS PRIOR TO REQUESTING THE FINAL PUNCH LIST AND BEFORE ANY REQUEST FOR SUBSTANTIAL COMPLETION. ALSO, PROVIDE VERBAL INSTRUCTIONS OF SYSTEM OPERATION TO OWNER'S REPRESENTATIVE PRIOR TO FINAL ACCEPTANCE OF WORK.

26A 1-12 SYSTEM START UP

PRIOR TO STARTING UP THE ELECTRICAL SYSTEMS, CHECK ALL COMPONENTS AND DEVICES; LUBRICATE ITEMS ACCORDINGLY; AND TIGHTEN SCREWS AND BOLTS FOR CONDUCTORS AND TERMINALS ACCORDING TO MANUFACTURERS' PUBLISHED TORQUE-TIGHTENING VALUES. IF MANUFACTURERS' TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A. ADJUST TAPS ON EACH TRANSFORMER FOR RATED SECONDARY VOLTAGE. CHECK AND RECORD BUILDING'S SERVICE ENTRANCE VOLTAGE, GROUNDING CONDITIONS, GROUNDING RESISTANCE, AND PROPER PHASING. BALANCE ALL SINGLE-PHASE LOADS AT EACH PANELBOARD, REDISTRIBUTING BRANCH CIRCUIT CONNECTIONS UNTIL BALANCE IS ACHIEVED. DO NOT TYPE UP FINAL PANELBOARD DIRECTORIES UNTIL ALL RE-BALANCING AND REDISTRIBUTION OF CIRCUITS IS COMPLETE. REPLACE ALL BURNED-OUT LAMPS AND LAMPS USED FOR TEMPORARY CONSTRUCTION LIGHTING IN PERMANENT LIGHT FIXTURES. AFTER ALL SYSTEMS HAVE BEEN INSPECTED AND ADJUSTED, CONFIRM ALL OPERATION FEATURES REQUIRED BY THE DRAWINGS AND SPECIFICATIONS AND MAKE FINAL ADJUSTMENTS AS NECESSARY.

26A 1-13 WARRANTIES

WARRANT EACH ELECTRICAL SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A

LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION, ALSO WARRANT THE FOLLOWING ADDITIONAL ITEMS:

- A. ALL RACEWAYS ARE FREE FROM OBSTRUCTIONS, HOLES, CRUSHING OR BREAKS OF ANY NATURE.
- B. ALL RACEWAY SEALS ARE EFFECTIVE.
- C. THE ENTIRE ELECTRICAL SYSTEM IS FREE FROM ALL SHORT CIRCUITS AND UNWANTED OPEN CIRCUITS AND GROUNDS.

THE ABOVE WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COST TO THE OWNER.

PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.

AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.

26A 2 ELECTRICAL WORK

26A 2-3 CUTTING AND PATCHING

CUT WALLS, FLOORS, CEILINGS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED TO PERFORM WORK UNDER THIS DIVISION. OBTAIN PERMISSION OF THE ENGINEER, OWNER, OR BOTH, BEFORE DOING ANY CUTTING. CUT ALL HOLES AS SMALL AS POSSIBLE. PATCH WALLS, FLOORS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED BY WORK UNDER THIS DIVISION. ALL PATCHING SHALL BE HIGH QUALITY AND SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION, INCLUDING FIRE RATINGS IF APPLICABLE.

26A 2-4 ROUGH-IN

COORDINATE WITHOUT DELAY ALL ROUGHING-IN WITH OTHERS. CONCEAL ALL RACEWAYS EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE INDICATED ON THE DRAWINGS.

26A 2-5 RACEWAYS

ONLY THE FOLLOWING METALLIC CONDUIT AND TUBING SHALL BE USED UNLESS SPECIFIED OTHERWISE BY THE ENGINEER:

- A. ELECTRICAL METALLIC TUBING AND FITTINGS (EMT): ANSI C80.3, UL 797
- B. FLEXIBLE METAL CONDUIT (FMC): ZINC-COATED STEEL, UL 1
- C. INTERMEDIATE METAL CONDUIT (IMC): HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT: ANSI C80.6, UL 1242
- D. LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC): FLEXIBLE STEEL CONDUIT WITH PVC JACKET: UL 360
- E. RIGID METAL CONDUIT (RMC):
 - 1. HOT-DIP GALVANIZED RIGID STEEL CONDUIT (GRS): ANSI C80.1 UL
 - 2. RIGID ALUMINUM CONDUIT (RAC): ANSI C80.5, UL6A
- F. IMC AND RMC FITTINGS: NEMA FB 1+- COMPATIBLE WITH CONDUIT TYPE AND MATERIAL, UL LISTED.

26A 2-6 RACEWAY INSTALLATION

INSTALL ALL CIRCULAR RACEWAYS CONCEALED ABOVE SUSPENDED CEILINGS OR CONCEALED IN WALLS OR FLOORS WHEREVER POSSIBLE EXCEPT WHERE OTHERWISE INDICATED. PROVIDE GRS FOR ALL CONDUITS RUN UNDERGROUND, EXPOSED TO WEATHER, OR EXPOSED TO OTHER HAZARDOUS CONDITIONS. PROVIDE GRS INSTALLED BELOW GRADE WITH CORROSION RESISTANT BONDED-PLASTIC OR APPROVED MASTIC COATING. ALL UNDERGROUND CONDUIT SHALL BE SCHEDULE 40 OR 80 PVC ONLY. THIS SHALL INCLUDE THE 90-DEGREE ELBOW BELOW GRADE AND THE ENTIRE VERTICAL TRANSITION TO ABOVE GRADE. ALL OTHER RACEWAY MAY BE EMT WHERE APPROVED BY LOCAL CODE. USE COMPRESSION TYPE FITTINGS FOR EMT, WITH UL LISTED FITTINGS FOR THE ENVIRONMENT IN WHICH THEY ARE USED. AT CONTRACTOR'S OPTION, UL LISTED PVC CONDUIT MAY BE USED UNDERGROUND WHERE PERMITTED BY LOCAL CODE AND WHERE NOT SPECIFICALLY RESTRICTED BY THESE DOCUMENTS.

USE FMC FOR FINAL CONNECTION TO EACH MOTOR AND TRANSFORMER, AND TO ANY DEVICE THAT WOULD OTHERWISE TRANSMIT MOTION, VIBRATION, OR NOISE. WHERE CONDUIT IS EXPOSED TO LIQUIDS, VAPORS OR SUNLIGHT, USE LFMC. PROVIDE ALL FMC AND LFMC WITH INSULATED GROUND WIRE.

INSTALL RACEWAYS PARALLEL TO BUILDING LINES WHERE POSSIBLE.

INSTALL RACEWAYS TO REQUIREMENTS OF STRUCTURE AND TO REQUIREMENTS OF ALL OTHER WORK ON THE PROJECT. INSTALL RACEWAY TO CLEAR ALL OPENINGS, DEPRESSIONS, PIPES, DUCTS, REINFORCING STEEL, AND OTHER IMMOVABLE OBSTACLES. INSTALL RACEWAYS SET IN FORMS FOR CONCRETE STRUCTURE IN SUCH A MANNER THAT INSTALLATION WILL NOT AFFECT THE STRENGTH OF STRUCTURE. EXCEPT WHERE APPROVED IN WRITING BY THE ENGINEER, INSTALL NO RACEWAY IN A SLAB-ON-GRADE. LOCATE RACEWAY BELOW GRANULAR FILL BELOW SLABS-ON-GRADE.

INSTALL RACEWAYS CONTINUOUS BETWEEN CONNECTION TO OUTLETS, BOXES AND CABINETS WITH A MINIMUM POSSIBLE NUMBER OF BENDS AND NOT MORE THAN THE EQUIVALENT OF FOUR 90-DEGREE BENDS BETWEEN CONNECTIONS. USE MANUFACTURED ELBOWS FOR ALL 45- AND 90- DEGREE BENDS, UNLESS APPROVED BY THE ENGINEER IN WRITING. MAKE SMOOTH BENDS AND EVEN BENDS. USE FLATTENING RACEWAY OR FLAKING GALVANIZED OR ENAMEL. RADI OF BENDS SHALL BE AS LONG AS POSSIBLE AND NEVER SHORTER THAN THE CORRESPONDING TRADE ELBOW. USE LONG RADIUS ELBOWS WHERE NECESSARY, INDICATED, OR BOTH.

SECURELY FASTEN RACEWAYS IN PLACE WITH APPROVED STRAPS, HANGERS AND STEEL SUPPORTS AS REQUIRED. ATTACH RACEWAY SUPPORTS TO THE BUILDING STRUCTURE. HANG SINGLE RACEWAYS FOR FEEDERS WITH MULTIPLE SUPPORT HANGERS WITH ROD AND TURNBUCKLE SUSPENSION FROM INSERTS SPACED NOT OVER 10 FEET APART IN CONSTRUCTION ABOVE. CLAMP GROUPS OF HORIZONTAL FEEDER RACEWAYS TO STEEL CHANNELS THAT ARE SUSPENDED FROM INSERTS SPACED NOT OVER 10 FEET APART IN CONSTRUCTION ABOVE. SECURELY CLAMP VERTICAL FEEDER RACEWAYS TO STRUCTURAL STEEL MEMBERS ATTACHED TO STRUCTURE. INSTALL CABLE CLAMPS FOR SUPPORT OF VERTICAL FEEDERS WHERE REQUIRED. ADD RACEWAY SUPPORTS WITHIN 12 INCHES OF ALL BENDS, ON BOTH SIDES OF THE BENDS. DO NOT SUPPORT RACEWAYS FROM SUSPENDED CEILING COMPONENTS.

THOROUGHLY CLEAN RACEWAYS BEFORE INSTALLATION, AND KEEP CLEAN AFTER INSTALLATION. PLUG OR COVER OPENINGS AND BOXES AS REQUIRED TO KEEP RACEWAYS CLEAN DURING CONSTRUCTION AND FISH ALL RACEWAYS CLEAR OF OBSTRUCTIONS BEFORE PULLING CONDUCTORS. PROVIDE RACEWAYS OF AMPLE SIZE FOR PULLING OF WIRE AND NOT SMALLER THAN CODE REQUIREMENTS AND NOT LESS THAN 1/2-INCH IN SIZE, UNLESS INDICATED OTHERWISE ON DRAWINGS.

PROTECT ALL RACEWAY INSTALLATIONS AGAINST DAMAGE DURING CONSTRUCTION. REPAIR ALL RACEWAYS DAMAGED OR MOVED OUT OF

LINE AFTER ROUGHING-IN TO MEET ENGINEER'S APPROVAL WITHOUT ADDITIONAL COST TO THE OWNER.

ALIGN AND INSTALL TRUE AND PLUMB ALL RACEWAY TERMINATIONS AT PANELBOARDS, SWITCHBOARDS, MOTOR CONTROL, EQUIPMENT AND JUNCTION BOXES.

INSTALL APPROVED EXPANSION/DEFLECTION FITTINGS WHERE RACEWAYS PASS THROUGH OR ACROSS EXPANSION JOINTS.

INSTALL A PULL WIRE IN EACH EMPTY RACEWAY THAT IS LEFT FOR INSTALLATION OF CONDUCTORS OR CABLES UNDER OTHER DIVISIONS OR CONTRACTS. USE POLYPROPYLENE OR MONOFILAMENT PLASTIC LINE WITH NOT LESS THAN 200-LB TENSILE STRENGTH. LEAVE AT LEAST 12 INCHES OF SLACK AT EACH END OF PULL WIRE.

MAKE ALL JOINTS AND CONNECTIONS IN A MANNER THAT WILL ENSURE MECHANICAL STRENGTH AND ELECTRICAL CONTINUITY.

INSTALL CONDUIT-SEALING FITTINGS IN ALL RACEWAYS PASSING FROM NON-HEATED TO HEATED SPACES.

26A 2-7 BUSHINGS AND LOCKNUTS

RIGIDLY CLAMP CONDUITS ENTERING SHEET METAL BOXES TO THE BOX WITH A BUSHING AND LOCKNUT ON THE INSIDE AND A LOCKNUT ON THE OUTSIDE. CONDUIT SHALL ENTER THE BOX SQUARELY. PROVIDE BUSHINGS AND LOCKNUTS MADE OF GALVANIZED MALLEABLE IRON WITH SHARP, CLEAN-CUT THREADS. WHERE EMT ENTERS A BOX, PROVIDE APPROVED EMT COMPRESSION CONNECTORS. USE INSULATED AND/OR GROUNDING BUSHINGS WHEREVER CONNECTION IS SUBJECT TO VIBRATION OR MOISTURE, WHEN REQUIRED BY NFPA 70, OR BOTH.

26A 2-8 SUPPORT SYSTEMS

STEEL SLOTTED SUPPORT SYSTEMS (SLOTTED CHANNEL): COMPLY WITH MFMA-3. FACTORY-FABRICATED COMPONENTS FOR FIELD ASSEMBLY 1/2"-GAUGE, 1-5/8"-INCH BY 1-5/8"-INCH COPPER 9-LINE ERICO INTERNATIONAL CORPORATION, POWER-STRUT, THOMAS BETTS CORPORATION, UNISTRUT.

FINISHES:

METALLIC COATING: HOT-DIP GALVANIZED AFTER FABRICATION AND APPLIED ACCORDING TO MFMA-3

NONMETALLIC COATINGS: MANUFACTURER'S STANDARD PVC, POLYURETHANE, OR POLYESTER COATING APPLIED ACCORDING TO MFMA-3.

PAINTED COATINGS: MANUFACTURER'S STANDARD PAINTED COATING APPLIED ACCORDING TO MFMA-3.

STAINLESS STEEL TYPE 304, PER ASTM A240.

ALUMINUM (EXTRUDED) TYPE 6063-T6, PER ASTM B221

FIELD FABRICATION

WHERE FIELD CUTTING OF STANDARD LENGTHS OF CHANNEL ARE REQUIRED, MAKE CUTS STRAIGHT AND PERPENDICULAR TO MANUFACTURED SURFACES.

FOR FIELD-CUT OR DAMAGED SURFACES OF COATED CHANNELS, DRESS CUT ENDS, DAMAGED SURFACES, OR BOTH, WITH AN ABRASIVE MATERIAL (E.G. FILE, GRINDING STONE, OR SIMILAR) AND CLEANER TO REMOVE OILS, RUST, SHARP EDGES AND SHARDS.

FOR CHANNEL WITH FACTORY-APPLIED COATING, RE-FINISH CUT EDGES WITH A COATING COMPATIBLE WITH THE FACTORY FINISH AND AS RECOMMENDED BY THE MANUFACTURER (E.G., MANUFACTURER'S TOUCH-UP PAINT OR ZINC-RICH COLD-GALVANIZING COMPOUND, AS APPLICABLE).

26A 2-9 CONDUCTORS

PROVIDE CONDUCTORS, WITH UL LABEL, AND 600V INSULATION, UNLESS NOTED OTHERWISE.

SERVICE LATERAL CONDUCTORS TYPE THWN OR XHHW WITH STRANDED CONDUCTORS.

ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE NO. 8 AWG AND LARGER STRANDED, TYPE THWN OR XHHW INSULATION.

ALL CONDUCTORS, NO. 10 AWG AND SMALLER SHALL BE USED FOR POWER AND LIGHTING CIRCUITS SOLID COPPER, TYPE THWN (WET OR DAMP LOCATIONS, OR IN CONDUIT BELOW GRADE OR SLAB), TYPE THHN (DRY LOCATIONS ONLY AND ABOVE GRADE) INSULATION, OR DUAL-RATED TYPE THHN/THWN.

ALL BRANCH CIRCUIT WIRING SHALL NOT BE SMALLER THAN NO. 12 AWG. IF NO CONDUCTOR SIZE IS INDICATED ON THE DRAWINGS FOR A BRANCH CIRCUIT, PROVIDE NO. 12 AWG CONDUCTORS AND A 20A CIRCUIT BREAKER. CONTROL WIRING: STRANDED COPPER CONDUCTORS, 600V INSULATION, OF THE PROPER TYPE, SIZE, AND NUMBER AS REQUIRED TO ACCOMPLISH SPECIFIED FUNCTION. MINIMUM SIZE : NO. 18 AWG, UNLESS OTHERWISE NOTED.

26A 2-10 WIRING INSTALLATION

EXCEPT WHERE SPECIFIED OR INDICATED, FOR LOW-VOLTAGE WIRING, INSTALL ALL WIRING IN APPROVED RACEWAY AND ENCLOSURES.

SUPPORT ALL CONDUCTORS AND CABLES IN VERTICAL INSTALLATIONS, AS REQUIRED BY NFPA 70, BY INSTALLING CABLE SUPPORTS OR PLUG-TYPE CONDUIT RISER SUPPORTS, OR WIRE-MESH SAFETY GRIPS.

INSTALL ALL CONDUCTORS AND CABLE IN RACEWAYS CONTINUOUS WITHOUT TAPS OR SPLICES. SPLICE OR TAP ONLY IN APPROVED BOXES AND ENCLOSURES WITH APPROVED SOLDERLESS CONNECTORS, OR CRIMP CONNECTORS AND TERMINAL BLOCKS FOR CONTROL WIRING, AND KEEP TO THE MINIMUM REQUIRED. INSULATE ALL SPLICES, TAPS, AND JOINTS AS REQUIRED BY CODES.

ALL MATERIAL USED TO TERMINATE, SPLICE, OR TAP CONDUCTORS SHALL BE DESIGNED FOR, PROPERLY SIZED FOR, AND UL LISTED FOR SPECIFIC APPLICATION AND CONDUCTORS INVOLVED, AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS.

WHERE WIRING IS INDICATED AS INSTALLED, BUT THE CONNECTION IS INDICATED "FUTURE" OR "BY OTHER DIVISION, TRADES, OR CONTRACTS", LEAVE A MINIMUM 3-FOOT "PIGTAIL " AT THE BOX, TAPE THE ENDS OF THE CONDUCTORS, AND COVER THE BOX.

THE NUMBER OF CONDUCTORS IN A SPECIFIC RACEWAY "HOME RUN" IS INDICATED WITH CROSS LINES (TICK MARKS) ON EACH "CIRCUIT RUN" ON THE DRAWINGS. IN GENERAL, THE DIRECTION OF BRANCH CIRCUIT "HOME RUN" ROUTING IS INDICATED ON THE DRAWINGS COMPLETE WITH CIRCUIT NUMBERS AND PANEL BOARD DESIGNATION. CONTINUE ALL SUCH "HOME RUN" WIRING TO THE

DESIGNATED PANELBOARD, AS THOUGH "CIRCUIT RUNS" WERE INDICATED IN THEIR ENTIRETY.

WHEN MULTIPLE HOME RUNS ARE COMBINED INTO A SINGLE RACEWAY SUCH THAT THE NUMBER OF CURRENT CARRYING CONDUCTORS EXCEEDS FOUR (CONDUCTOR COUNT IS MADE UP OF ANY COMBINATION OF PHASE AND NEUTRAL CONDUCTORS) WIRING SHALL HAVE INSULATION OF THE PROPER COLOR TO MATCH COLOR CODE SYSTEM IN THE TABLE BELOW. IN LARGER SIZES, WHERE PROPERLY COLORED INSULATION IS NOT AVAILABLE, USE VINYL PLASTIC ELECTRICAL TAPE OF THE APPROPRIATE COLOR AROUND EACH CONDUCTOR AT LL TERMINATION POINTS, JUNCTION, AND PULL BOXES.

SYSTEM VOLTAGE	CONDUCTOR TYPE	COLOR
480Y/277	PHASE A	BROWN
	PHASE B	ORANGE
	PHASE C	YELLOW
	NEUTRAL EQUIPMENT GROUND	GRAY GREEN
208Y/120	PHASE A	BLACK
	PHASE B	RED
	PHASE C	BLUE
	NEUTRAL EQUIPMENT GROUND	WHITE GREEN
	ISOLATED GROUND	W/YELLOWSTRIPE

PROPERLY NUMBER ALL TERMINAL BLOCKS AND WIRE TERMINALS FOR CONTENT WIRING FOR IDENTIFICATION WITH VINYL STICK-ON MARKERS OR EQUIVALENT.

PROVIDE AN EQUIPMENT-GROUNDING CONDUCTOR, OR BONDING JUMPER, AS APPLICABLE, IN ALL BRANCH CIRCUITS AND FEEDERS, SIZED IN ACCORDANCE WITH NFPA 70 TABLES 250.66 OR 250.122, AS APPLICABLE, UNLESS INDICATED AS LARGER ON THE DRAWINGS.

VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 3 PERCENT.

26A 2-11 JUNCTION BOXES, PULL BOXES, CABINETS, AND WIREWAYS

PROVIDE JUNCTION BOXES, PULL BOXES, CABINETS AND WIREWAYS WHEREVER NECESSARY FOR PROPER INSTALLATION OF VARIOUS ELECTRICAL SYSTEMS ACCORDING TO NFPA 70 AND WHERE INDICATED ON THE DRAWINGS. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY NFPA 70, WHICHEVER IS LARGER. CONSTRUCTION SHALL BE OF A NEMA DESIGN SUITABLE FOR THE ENVIRONMENT INSTALLED.

JUNCTION BOXES INSTALLED BEHIND WALL CASES, AND IN OR ON OTHER STORE FIXTURES, EXCEPT WHERE OTHERWISE SPECIFIED, SHALL BE 4-INCH SQUARE OR LARGER, WITH GALVANIZED COVERS.

26A 2-12 OUTLET BOXES

ALL OUTLETS INCLUDING LIGHT FIXTURE, SWITCH, RECEPTACLE, AND SIMILAR OUTLETS; NATIONAL ELECTRICAL, APPLETON, STEEL CITY, RACO, OR APPROVED EQUAL. GALVANIZED STEEL KNOCKOUT BOXES, SUITABLE IN DESIGN TO THE PURPOSE THEY SERVE AND THE SPACE THEY OCCUPY. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY NFPA 70, WHICHEVER IS LARGER. SET ALL OUTLET BOXES IN WALLS, COLUMNS, FLOORS, OR CEILINGS SO THEY ARE FLUSH WITH THE FINISHED SURFACE, ACCURATELY SET, AND RIGIDLY SECURED IN POSITION. PROVIDE PLASTER RINGS, EXTENSION RINGS AND/OR MASONRY RINGS AS REQUIRED FOR FLUSH MOUNTING. PROVIDE APPROVED CAST OUTLET BOXES, WITH HUBS AND WEATHERPROOF COVERS, IN ALL AREAS SUBJECT TO DAMP, WET, OR HARSH CONDITIONS.

26A 2-13 OUTLET LOCATIONS

COORDINATE LOCATIONS OF OUTLETS BOXES, OUTLETS ARE ONLY APPROXIMATELY LOCATED ON THE SMALL SCALE DRAWINGS. USE GREAT CARE IN THE ACTUAL LOCATION BY CONSULTING THE VARIOUS LARGE SCALE DETAILED DRAWINGS USED BY OTHER DIVISION TRADES, AND BY SECURING DEFINITE LOCATIONS FROM THE ARCHITECT.

26A 2-18 FIRESTOPPING FLOOR AND WALL PENETRATIONS

FIRE-RESISTANT PENETRATION SEALANTS: TWO-PART, FOAMED-IN-PLACE, SILICONE SEALANT FORMULATED FOR USE IN THROUGH-PENETRATION FIRE-STOPPING AROUND CABLES, RACEWAYS, AND CABLE TRAY PENETRATIONS THROUGH FIRE-RATED WALLS AND FLOORS. SEALANTS AND ACCESSORIES SHALL HAVE FIRE-RESISTANT RATINGS INDICATED, AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES IN ACCORDANCE WITH ASTM E 814, BY UNDERWRITERS' LABORATORIES, INC. OR OTHER NRTL ACCEPTABLE TO AHJ.

- PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
 - "3M FIRE STOP FOAM 2001," 3M CORP.
 - "METACAULK 835," RECTORSEAL
 - "SPECSEAL PENSL 200 SILICONE FOAM," SPECIFY TECHNOLOGY INC.
 - "FIRE STOP SYSTEM," UNITED STATES GYPSUM COMPANY.

26A 2-19 EQUIPMENT IDENTIFICATION

PROVIDE EQUIPMENT IDENTIFICATION NAMEPLATES ON ALL PANELBOARDS, SWITCHES, AND WHERE INDICATED ON THE DRAWINGS.

- NAMEPLATES:
 - ENGRAVED, CONTRASTING COLOR, THREE-LAYER, LAMINATED PLASTIC INDICATING THE NAME OF THE EQUIPMENT, LOAD, OR CIRCUIT AS DESIGNATED ON THE DRAWINGS AND IN THE SPECIFICATIONS.
 - FIELD-APPLIED PERMANENT EPOXY ADHESIVE, COMPATIBLE WITH THE EQUIPMENT FINISH. ATTACHMENT METHOD SHALL BE ACCEPTABLE TO THE MANUFACTURERS OF THE EQUIPMENT TO WHICH THE NAMEPLATES ARE BEING APPLIED.
 - COLOR: BLACK BACKGROUND WITH WHITE LETTERS FOR NORMAL POWER; LETTER HEIGHT: 1/2-INCH MINIMUM.

26A 2-20 ELECTRICAL EQUIPMENT AND MATERIALS LISTING

ALL ELECTRICAL EQUIPMENT AND MATERIALS USED ON THIS PROJECT SHALL BE LISTED FOR THEIR INTENDED USE BY A NATIONALLY RECOGNIZED TESTING AGENCY.

PART 1 - GENERAL

- 1.01 DESCRIPTION
A. RELATED DOCUMENTS: OTHER CONTRACT DOCUMENTS COMPLEMENT THE REQUIREMENTS OF THIS SECTION AND APPLY TO THIS SECTION.
B. CODES AND REGULATIONS:
1. IN ADDITION TO COMPLYING WITH THE SPECIFIED REQUIREMENTS, COMPLY WITH PERTINENT REGULATIONS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION.
2. IN CASE OF CONFLICT BETWEEN OR AMONG REGULATIONS, THE MORE STRINGENT REQUIREMENTS WILL GOVERN.
C. INCLUDED WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING:
1. PLUMBING
2. EXCAVATION AND BACKFILL
3. RELATED WORK:
A. PAINTING
B. CUTTING AND PATCHING

- 1.02 DEFINITIONS
A. FURNISH: PURCHASE AND DELIVER TO JOB SITE IN NEW CONDITION.
B. INSTALL: RECEIVE AND STORE AT JOB SITE UNTIL REQUIRED. PLACE, SECURE AND CONNECT; FURNISH REQUIRED ACCESSORIES.
C. PROVIDE: FURNISH AND INSTALL AS DEFINED ABOVE.
D. SECTION: REFERS TO A SECTION OF THESE SPECIFICATIONS.
E. STANDARDS: THE MOST RECENT ISSUE APPROVED AND ACCEPTED.

- 1.03 PROJECT RECORD DRAWINGS
A. COMPLY WITH PERTINENT PROVISIONS OF ALL OTHER SECTIONS.

- 1.04 SERVICE INTERRUPTIONS
A. WHEN WORK OF THIS SECTION REQUIRES TEMPORARY SHUTDOWN OF EXISTING SYSTEMS FOR CONNECTIONS, THE SHUTDOWN SHALL BE MADE ONLY DURING PRE-ARRANGED TIMES AGREEABLE TO THE OWNER.

- 1.05 CORRELATION
INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS:
A. THE CONTRACTOR MAY OBTAIN APPROXIMATE DISTANCES AND DIMENSIONS BY SCALING THE PLANS. IT IS DISTINCTLY UNDERSTOOD THAT IT IS DONE AT THE RISK OF THE CONTRACTOR'S RESPONSIBILITY AS THE ACCURACY OF THE DRAWING IS NOT GUARANTEED AND MAY NOT BE SCALE. MECHANICAL AND ELECTRICAL DRAWINGS ARE LARGELY SCHEMATIC AND THEY DO NOT NECESSARILY REPRESENT THE EXACT INSTALLATION. IT SHALL REMAIN THE CONTRACTOR'S RESPONSIBILITY TO COVER ALL CONDITIONS ON PREPARED DRAWINGS AND BY ARRANGEMENT IN THE FIELD. NOTHING ON THESE DRAWING OR SPECIFICATIONS SHALL BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO ALL APPLICABLE CODES AND REGULATIONS.

PART 2 - PRODUCTS

- 2.01 ACCESSIBLE PANELS
A. IF NOT CALLED FOR UNDER OTHER SECTIONS, PROVIDE MILCOR, ELMODOR OR JAY R SMITH ACCESS PANELS WHERE SHOWN ON THE DRAWINGS OR REQUIRED FOR MAINTENANCE ACCESS TO COMPLETED WORK OF THIS SECTION. SUBMIT SIZE, TYPE, AND LOCATION OF PROPOSED ACCESS PANELS NOT SPECIFICALLY SHOWN, FOR REVIEW OF ENGINEER OF RECORD. ACCESS PANELS SHALL BE CONSTRUCTED OF 16 GAUGE PRIME COATED STEEL OR STAINLESS STEEL WITH SCREWDRIVER OPERATED CAM LATCH, CONCEALED HINGES, AND FIRE RATING EQUAL TO ADJACENT CONSTRUCTION.
2.02 PIPE WRAPPING
A. WHERE INDICATED ON THE DRAWINGS AND/OR CALLED FOR IN THIS SPECIFICATION, METALLIC PIPE AND JOINTS BURIED IN THE GROUND SHALL BE PROTECTED WITH 10-MIL TAPE DOUBLE WRAPPED OR APPROVED EQUAL CLEAN PIPE TO BARE METAL. INITIALLY STRETCH FIRST LAYER OF TAPE TO CONFORM TO THE SURFACE, WHILE SPIRALLY HALF-LAPPING. APPLY A SECOND LAYER, HALF-LAPPED AND SPIRALED AS TO THE FIRST LAYER, BUT WITH SPIRALS PERPENDICULAR TO THE FIRST WRAPPING. IN LIEU OF TAPE WRAP: HEAT SHRINKABLE 10-MIL MINIMUM THICK POLYETHYLENE SLEEVE MAY BE USED.
B. WHEN APPLYING TAPE, USE ONLY ENOUGH PULL TO CAUSE THE TAPE TO PROPERLY CONFORM TO THE IRREGULAR SURFACES OF THE PIPE OR FITTING. THE PROPER AMOUNT OF PULL IS REACHED WHEN THE TAPE SURFACE IS SMOOTH WITHOUT ANY WRINKLES. CONTINUE TAPE 4" ABOVE GRADE. END OVERLAPS SHOULD POINT DOWN. TAPE SHALL BE APPLIED PER MANUFACTURER'S INSTRUCTIONS.

PART 3 - EXECUTION

- 3.01 GENERAL EQUIPMENT INSTALLATION REQUIREMENTS
A. INSTALL EQUIPMENT TO PROVIDE GOOD APPEARANCE, EASY ACCESS, AND ADEQUATE SPACE TO ALLOW REPLACEMENT OR MAINTENANCE. PROVIDE BASES, SUPPORTS, ANCHOR BOLTS, AND OTHER ITEMS REQUIRED TO ACHIEVE THIS INSTALLATION SHALL BE LEVEL AND ADEQUATELY BRACED.
3.02 COORDINATION OF WORK
A. COORDINATE WORK OF THIS SECTION WITH WORK OF OTHER SECTIONS TO AVOID CONFLICTS. PROVIDE DRAWINGS WHERE REQUIRED. RELOCATE WORK DONE WITHOUT REGARD TO REQUIREMENTS OF OTHER SECTIONS ONLY AS DIRECTED BY ARCHITECT OR ENGINEER OF RECORD.
B. ENSURE THAT WORK OF OTHER SECTIONS IS SUITABLE TO ACCOMMODATE WORK OF THIS SECTION. CONTRACTOR TO PAY COSTS OF CORRECTIVE WORK.
3.03 ADEQUACY OF FURRING
A. CONCEAL PIPING IN SPACES PROVIDED UNLESS SPECIFICALLY SHOWN OTHERWISE. IF SPACES ARE INADEQUATE, NOTIFY ENGINEER OF RECORD IN TIME TO AVOID UNNECESSARY WORK.
3.04 PROTECTION AND CLEANING
A. PROTECT EQUIPMENT FROM DIRT, MOISTURE, AND MECHANICAL DAMAGE DURING CONSTRUCTION. RESTORE DAMAGED EQUIPMENT TO ORIGINAL CONDITION. NOTIFY ENGINEER OF RECORD OF ANY UN-MITIGATED DAMAGE.
B. KEEP INTERIOR OF PIPING FREE OF FOREIGN MATERIAL DURING CONSTRUCTION. FLUSH PIPING SYSTEMS WITH TEST MEDIUM BEFORE INSTALLING ACCESSORIES OR MAKING FINAL CONNECTIONS.
3.05 CLOSING-IN OF UN-INSPECTED WORK:
A. DO NOT CONCEAL OR COVER WORK BEFORE TESTS AND OBSERVATIONS ARE COMPLETED. UNCOVER WORK PREMATURELY CLOSED-IN AND REPAIR RESULTING DAMAGE TO ALL WORK, IF REQUESTED BY ARCHITECT OR ENGINEER OF RECORD.
3.06 DAMAGE
B. REPAIR OR REPLACE ITEMS DAMAGED BY LEAKS OR OVERFLOW FROM WORK PROVIDED UNDER THIS SECTION AND FOR ANY DAMAGE TO ANY PARTS OF THE PREMISES CAUSED BY THE CONSTRUCTION, FOR A PERIOD OF 1 YEAR AFTER ACCEPTANCE OF THE WORK BY THE ARCHITECT OR ENGINEER OF RECORD. THIS IS IN ADDITION TO AND NOT A LIMITATION OF OTHER RIGHTS THE OWNER MAY HAVE AGAINST THE CONTRACTOR UNDER THE CONTRACT DOCUMENTS.
3.07 TESTS
A. FURNISH ALL TEST PUMPS, GAUGES, AND EQUIPMENT. TEST ALL SAFETY CONTROLS AND DEVICES.
B. FOR AIR TESTS, INSTALL A CALIBRATED TEST PRESSURE GAUGE IN THE PIPING SYSTEM TO OBSERVE ANY LOSS IN PRESSURE. CALIBRATE THE TEST PRESSURE GAUGE WITHIN 15 DAYS BEFORE USE AND CERTIFY BY INITIAL AND DATE ON A STICKER APPLIED TO THE DIAL FACE. MAINTAIN THE REQUIRED TEST PRESSURE FOR THE TIME INDICATED. BRUSH JOINTS WITH A SOAPY WATER SOLUTION TO CHECK FOR LEAKS IF THE REQUIRED

- PRESSURE CANNOT BE MAINTAINED BY APPROVED LEAK DETECTION FLUID. AFTER ANY TEST, REPAIR ALL LEAKS FOUND AS DIRECTED AND RE-TEST AS NECESSARY UNTIL THE SYSTEM IS PROVEN LEAK FREE.
D. BEFORE APPLYING TEST PRESSURE TO ANY PIPING SYSTEMS THE CONTRACTOR SHALL BE RESPONSIBLE FOR ISOLATING ALL EQUIPMENT, INCLUDING CONTROL VALVES, REGULATORS, RELIEF DEVICES, TANKS AND ANY OTHER LINE ACCESSORIES, WHICH WOULD OTHERWISE BE DAMAGED BY THE TEST PRESSURE.
1. WATER: FILL WITH WATER AND TEST AT 150 PSIG. RETAIN FOR FOUR HOURS.
2. GAS PIPING: AIR TEST TO PRESSURE EQUAL TO ONE AND ONE-HALF TIMES THE DESIGN PRESSURE, BUT IN NO CASE LESS THAN 50 PSIG. RETAIN FOR FOUR HOURS.
E. THE EQUIPMENT AND INSTALLATION SHALL BE OPERATED BY THE CONTRACTOR AND SHALL DEMONSTRATE THAT ALL SYSTEMS ARE PERFORMING ACCORDING TO THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS AND TO THE SATISFACTION OF THE ARCHITECT OR ENGINEER OF RECORD.

- 3.08 CUTTING AND PATCHING
A. THE CONTRACTOR SHALL DO ALL CUTTING AND PATCHING WHICH MAY BE REQUIRED FOR THE INSTALLATION OF THE WORK UNDER THIS DIVISION OF THE SPECIFICATIONS. PATCHING SHALL BE OF THE SAME QUALITY, MATERIALS AND FINISH AS AND SHALL MATCH ACCURATELY ALL SURROUNDING CONSTRUCTION. NO CUTTING OF THE STRUCTURE SHALL BE PERMITTED WITHOUT THE APPROVAL OF THE ARCHITECT OR ENGINEER OF RECORD.
B. WHEREVER CONCRETE OR PAVED SURFACES ARE CUT TO PROVIDE FOR THE INSTALLATION UNDER THIS SECTION, THE CONTRACTOR SHALL RESTORE THE SURFACES TO THEIR ORIGINAL CONDITIONS. SUB GRADE MATERIALS, CONCRETE, AND PAVING MATERIALS, ALONG WITH THE PLACEMENT OF SAME, SHALL BE IN ACCORDANCE WITH THE RESPECTIVE SECTIONS OF THIS SPECIFICATIONS AS THEY APPLY TO THE INSTALLATION OF SUCH MATERIAL.
3.09 EXCAVATION AND BACKFILL
A. DIG TRENCHES STRAIGHT AND TRUE TO LINE AND GRADE; BOTTOM SHALL BE LEFT SMOOTHED OF ROCK POINTS. PIPE SHALL BE SUPPORTED FOR THE ENTIRE LENGTH ON SAND AS DESCRIBED IN "B" BELOW. THE MINIMUM TRENCH WIDTH SHALL BE 16" AND ALL PIPES SHALL BE 3 FEET BELOW THE FINISHED GRADE, MINIMUM, WHEREVER CONDITIONS PERMIT. WHENEVER SUBSTANTIAL VARIATIONS OF PIPE BURY IS INDICATED BY FIELD CONDITIONS, THE PROPOSED CHANGES IN DEPTH OF BURY SHALL BE SUBMITTED, IN WRITING, TO THE ENGINEER OF RECORD FOR APPROVAL. ALL PIPING SHALL BE LAID ON A BED OF CLEAN DRY SAND NOT LESS THAN 6" THICK. THE SPACE BETWEEN THE PIPE AND THE SIDES OF THE TRENCH SHALL BE BACKFILLED WITH CLEAN DRY SAND TO A POINT 6" ABOVE THE CROWN OF THE PIPE. BOTH SIDES OF THE PIPE SHALL BE FILLED AT THE SAME TIME.
C. THE REMAINDER OF THE TRENCH SHALL BE BACKFILLED WITH NATIVE SOIL IN LIFTS AS SPECIFIED, WHERE NOT SPECIFIED NO GREATER THAN 12", AND SHALL BE MECHANICALLY COMPACTED BY TAMPING SO TO MAINTAIN A MINIMUM RELATIVE DRY DENSITY OF 95%, DETERMINED BY AHJ STANDARD TEST METHOD.
D. ALL BACKFILLING SHALL BE BROUGHT FLUSH WITH FINISHED SUB GRADE.
E. EXCESS MATERIAL SHALL BE REMOVED FROM THE SITE. TRENCHING SHALL BE BACKFILLED IMMEDIATELY AFTER APPROVAL.

- 3.10 INSTALLATION OF PIPING AND EQUIPMENT
A. THE INSTALLATION OF PIPING, AND EQUIPMENT SHALL BE MADE IN SUCH A MANNER TO CLEAR BEAMS AND OBSTRUCTIONS. DO NOT CUT INTO OR REDUCE THE SIZE OF PLATES OR ANY LOAD CARRYING MEMBERS WITHOUT APPROVAL OF THE ARCHITECT OR ENGINEER OF RECORD. CHECK DRAWINGS AND WORK OF OTHERS TO PREVENT INTERFERENCE, DEVIATIONS OF THE WORK DETERMINED BY THE ARCHITECT OR ENGINEER OF RECORD SHALL BE INSTALLED BY THE CONTRACTOR WITHOUT ADDITIONAL COSTS.
B. INSTALL PIPING AND DUCTWORK PROMPTLY, CAP OR PLUG OPEN ENDS OF PIPE. NO PIPING SHALL BE PERMANENTLY COVERED BY CONSTRUCTION BEFORE INSPECTION AND APPROVAL. PIPING SHALL BE INSTALLED IN A FIRST-CLASS MANNER IN ACCORDANCE WITH BEST PRACTICE AND RECOMMENDATIONS OF THE MANUFACTURER.
C. CONCEAL PIPING UNLESS INDICATED OTHERWISE. INSPECT EACH PIECE OF PIPE TUBING, FITTING, AND EQUIPMENT FOR DEFECTS AND OBSTRUCTIONS. REMOVE DEFECTIVE MATERIAL FROM SITE. INSTALL PIPING LEVEL AND FREE OF TRAPS AND UNNECESSARY BENDS TO CONFORM TO BUILDING REQUIREMENTS, AND PROVIDE SPACE FOR FUTURE WORK. AVOID ANY POSSIBLE GALVANIC ACTION BY ISOLATING DISSIMILAR METALS WITH SUITABLE DIELECTRIC INSULATING FITTINGS.
D. UNLESS OTHERWISE SPECIFIED ALL WATER PIPE IN CONTACT WITH STRUCTURE AND/OR HANGERS SHALL BE SUITABLY ISOLATED. IN THE CASE OF NON-ISOLATED PIPE, "TRI-ISOLATORS" OR EQUAL SHALL BE USED.
E. PROTECT ENAMELED, POWDER-COATED, OR POLISHED EQUIPMENT FROM DAMAGE, TOOL MARKS, ETC.
3.12 WARRANTY
A. THE CONTRACTOR SHALL WARRANTY ALL OF THE SYSTEMS INSTALLED BY THE CONTRACTOR FOR PROPER OPERATION FOR NOT LESS THAN ONE CALENDAR YEAR FROM DATE OF PROJECT COMPLETION. THIS COMPLETION DATE SHALL BE SET BY THE ARCHITECT, ENGINEER OF RECORD OR OWNER.

- 3.11 PLUMBING SECTION
PART 1 - GENERAL
1.01 DESCRIPTION
A. RELATED DOCUMENTS:
1. THE OTHER CONTRACT DOCUMENTS COMPLEMENT THE REQUIREMENTS OF THE SECTION AND APPLY TO THIS SECTION.
2. WHERE REQUIREMENTS OF THIS SECTION EXCEED THOSE IN OTHER CONTRACT DOCUMENTS, CONTRACTOR SHALL COMPLY WITH THE MOST STRINGENT REQUIREMENTS UNLESS PRIOR APPROVAL IS OBTAINED.
B. CODES AND REGULATIONS
1. ALL LOCAL, CITY, STATE AND NATIONAL CODES SHALL BE OBSERVED.
2. IN THE EVENT OF CONFLICT BETWEEN OR AMONG SPECIFIED REQUIREMENTS AND PERTINENT REGULATIONS, THE MORE STRINGENT REQUIREMENTS WILL GOVERN WHEN SO DIRECTED BY THE ARCHITECT OR ENGINEER OF RECORD.
C. SCOPE OF WORK: MATERIALS AND LABOR FOR AND MATERIAL CONNECTIONS TO EQUIPMENT AS APPLIES TO:
1. WATER PIPING
a. WATER DISTRIBUTION SYSTEM
b. CONTRACTOR SHALL PROVIDE ALL CONNECTIONS
2. FUEL GAS PIPING
a. NATURAL GAS DISTRIBUTION SYSTEM.
b. CONTRACTOR SHALL PROVIDE ALL CONNECTIONS, PERMITS, FEES AND ANY ASSOCIATED COSTS, AND COMPLY WITH ALL REQUIRED CONDITIONS.
3. PIPE IDENTIFICATION
4. CONNECTIONS
a. UTILITIES - WATER, GAS.
b. THE JOINING OF PIPE BY ANY METHOD INCLUDING, BUT NOT LIMITED TO, ACETYLENE AND ARC WELDING, BRAZING, PLASTICS WELDING, SOLDERING, WIPED JOINTS, CAULKED JOINTS, EXPANDED OR ROLLED JOINTS, ETC., USED IN CONNECTION WITH ANY OF THE WORK LISTED HEREIN.
5. LAYOUT AND CUTTING
a. HOLES, CHASES, CHANNELS, THE SETTING AND ERECTION OF BOLTS, INSERTS, STANDS, BRACKETS, STANCHIONS, SUPPORTS, SLEEVES, ESCUTCHEON PLATES, THIMBLES, HANGERS, CONDUITS AND BOXES AS REQUIRED IN CONNECTION WITH ANY OF THE WORK LISTED HEREIN.

- 6. EXCAVATION, TRENCHING AND BACKFILL (IN CONNECTION WITH PLUMBING AND PIPING WORK SHOWN HEREIN)
B. ALL VALVES IN COPPER PIPING SHALL BE SOLDERED IN OR HAVE THREADED CONNECTIONS. THREADED VALVES SHALL BE INSTALLED WITH SWEAT TO SCREWED ADAPTERS.
2.04 HANGERS AND SUPPORTS
A. IN GENERAL, ALL PIPE HANGERS OR SUPPORTS SHALL CONFORM TO THE FOLLOWING EXCEPT WHERE SPECIAL PIPE HANGERS AND SUPPORTS ARE DETAILED ON THE DRAWINGS. IN ALL CASES HANGER AND SUPPORT DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENT OVER THE FOLLOWING:
PIPING 6" SIZE AND SMALLER:
ITEMS NUMBER
ROD COUPLING FOR CONNECTION *HILTI H-119
INSERTS IN CONCRETE DECKS A716 OR 701 PIPE CLAMP W/S-716
B. SIMILAR ITEMS BY UNISTRUT, SECURESTRUT, MICHIGAN OR B-LINE WILL BE ACCEPTABLE.
C. REFER TO THE LOCAL CODE REQUIREMENTS FOR MATERIALS NOT LISTED ABOVE.
D. AT ALL POINTS WHERE INSULATED PIPE CONTACTS A HANGER OR SUPPORT, THE POINT OF CONTACT SHALL BE PROTECTED BY A METAL INSULATION PIPE SHIELD #B3153 AS MANUFACTURED BY B-LINE. EQUIVALENT PIPE PROTECTORS AS MANUFACTURED BY UNISTRUT OR SECURESTRUT WILL BE CONSIDERED PROVIDED THE SUBSTITUTE ITEM MEETS THE SAME STANDARDS OF QUALITY AND PERFORMANCE AS THE SPECIFIED ITEM.
2.05 FLOOR PENETRATIONS
A. FLOORS:
1. FLOOR PENETRATIONS SHALL BE PROTECTED WITH U.L. APPROVED FIRE RATED SYSTEM. THE SYSTEM SHALL BE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. FIRE STOPPING MATERIALS BY HILTI, METACALK OR DOW-CORNING ARE CONSIDERED EQUAL. THE MATERIAL SHALL BE THE SAME AS CALLED OUT FOR IN THE U.L. APPROVED SYSTEM.
B. POURED CONCRETE FLOORS:
1. PIPES PENETRATING POURED CONCRETE WALLS AND FLOORS SHALL BE PROTECTED BY PROVIDING THE FOLLOWING:
a. A SCHEDULE 40 PVC SLEEVE ONE (1) SIZE LARGER THAN THE PIPE OR ONE QUARTER (1/4) INCH OF FOAM MATERIAL WRAPPED AROUND AND SECURED TO THE PIPE.
b. PROTECTION SHALL END FLUSH WITH THE WALL OR FLOOR SURFACE.
C. ALL FLOORS PASSING THROUGH FLOORS EXPOSED TO VIEW SHALL BE PROVIDED WITH CHROMIUM PLATED, SPLIT-RING ESCUTCHEON PLATES IN FINISHED AREAS. BRASS OR GALVANIZED ESCUTCHEON PLATES MAY BE USED ELSEWHERE.
2.06 VALVE BOXES
A. PRECAST CONCRETE VALVE BOX, TRAFFIC RESISTANT, H-20 LOADING, RATED FOR WATER, ARMORED BODY WITH A HEAVY CAST IRON RING AND CAST IRON TRAFFIC COVER. THE COVER SHALL BE MARKED WITH THE NAME OF THE SERVICE. PROVIDE BOX EXTENSIONS AS REQUIRED; MODEL 1RT SERIES AS MANUFACTURED BY BROOKS PRODUCTS, INC. ACCEPTABLE MANUFACTURERS-BROOKS PRODUCT, INC., ALHAMBRA FOUNDRY COMPANY AND CHRISTY CO.
2.07 ACCESS BOXES
A. SEE SECTION FOR ACCESS PANELS.
2.08 PRESSURE GAUGES
A. PROVIDE MARSH QUALITY GAUGES OR EQUAL WITH 3-1/2" DIAL, GAUGE COOK, IN TYPE REQUIRED, FOR PUMP SUCTION, PROVIDE COMPOUND TYPE. ARRANGE GAUGES FOR EASY READING.
2.09 BACK FLOW PREVENTERS
A. PROVIDE APPROVED REDUCED PRESSURE BACKFLOW PREVENTER AS REQUIRED BY THE GOVERNMENTAL AUTHORITY HAVING JURISDICTION.
B. BACK FLOW PREVENTERS BY WILKINS, FEBCO, HERSEY, WATTS ARE CONSIDERED EQUAL WHEN THEIR PRESSURE FALL-OFF/LOSS IS EQUAL TO OR LESS THAN THE SPECIFIED PREVENTER'S LOSS FOR THE GIVEN FLOW RATE.
2.10 PIPING AND EQUIPMENT INSULATION
A. FOR WATER PIPING INSTALLED INSIDE MASONRY UNITS OF WALLS, PROVIDE 1" FLEXIBLE UNICELLULAR INSULATION BY ARMACEL.
B. COVER FITTINGS WITH ZESTON, KNAUF, OR EQUAL ONE-PIECE PVC PREMOLDED INSULATING COVERS. FITTING COVERS, JACKETS AND ADHESIVES SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPMENT RATING OF 50 PER ASTM E84. AT ALL ELBOWS AND TEES, FILL VOIDS BETWEEN COVERS AND PIPING WITH FIBERGLASS INSULATION AND TAPE JOINTS. INSTALL PIPE INSULATION IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS. WHERE PREMOLDED INSULATING FITTINGS ARE NOT APPROVED BY LOCAL AUTHORITIES, MITER INSULATION AT FITTINGS.
PART 3 - EXECUTION
3.01 GENERAL CONDITIONS
A. EXAMINE THE AREAS AND CONDITIONS UNDER WHICH WORK OF THIS SECTION WILL BE PERFORMED. CONDITIONS DETRIMENTAL TO TIMELY AND PROPER COMPLETION OF THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER OF RECORD BEFORE THE INSTALLATION OF MATERIALS. DO NOT PROCEED UNTIL UNSATISFACTORY CONDITIONS ARE CORRECTED, INCORRECTLY INSTALLED MATERIALS REQUIRING CHANGES WILL BE AT CONTRACTOR'S EXPENSE.
B. ALL PLUMBING FIXTURES, APPLIANCES AND ACCESSORIES FURNISHED WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL BE INSTALLED PER THOSE INSTRUCTIONS.
3.02 PLUMBING SYSTEM LAYOUT
A. LAYOUT THE PLUMBING SYSTEM IN CAREFUL COORDINATION WITH THE DRAWINGS. DETERMINE PROPER ELEVATIONS FOR ALL COMPONENTS OF THE SYSTEM AND USE ONLY THE MINIMUM NUMBER OF BENDS TO PRODUCE A SATISFACTORILY FUNCTIONING SYSTEM.
B. FOLLOW THE GENERAL LAYOUT SHOWN ON THE DRAWINGS IN ALL CASES EXCEPT WHERE OTHER WORK MAY INTERFERE.
C. LAY OUT PIPES TO FALL WITHIN FLOOR AND TO NOT REQUIRE FURRING OTHER THAN AS SHOWN ON THE DRAWINGS.
3.03 PIPING INSTALLATION
A. SIZES SHOWN IN THE DRAWINGS AND SPECIFICATIONS ARE NOMINAL UNLESS NOTED OTHERWISE. ANY UNSIZED PIPE SECTION SHALL BE THE SAME SIZE AS THE LARGEST PIPE CONNECTED TO IT. RUN PIPE FULL SIZE THROUGH VALVES AND ACCESSORIES AND MAKE SIZE REDUCTIONS FOR UNDERSIZE CONNECTIONS WITHIN THREE (3) PIPE DIAMETERS OF CONNECTION. PIPING SHALL BE THE MINIMUM BRANCH SIZE TO WITHIN 2 FEET OF THE EQUIPMENT.
B. INSTALL PIPING GENERALLY SQUARE WITH BUILDING, FREE OF TRIPS OR AIR POCKETS, AND TRUE TO LINE AND GRADE. KEEP ALL PIPING TIGHT TO THE BUILDING STRUCTURE, UNLESS PIPE SLOPE IS REQUIRED. DO NOT INSTALL PIPING IN ANY LOCATIONS WHERE, IN THE ARCHITECT'S OR ENGINEER'S OPINION, IT WILL INTERFERE WITH THE USE OF THE BUILDING OR CREATE A SAFETY HAZARD. WHERE SPACE IS INADEQUATE, NOTIFY THE ARCHITECT IN TIME TO AVOID UNNECESSARY WORK. INSTALL ALL EXPOSED PIPING AS HIGH AS POSSIBLE WITHOUT INTERFERING WITH OTHER TRADES.
C. MAKE CHANGES IN DIRECTION WITH MANUFACTURED FITTINGS; USE LONG RADIUS ELBOWS, STREET ELBOWS, BUSHINGS, CLOSE NIPPLES AND BENDING OF PIPE OR TUBING WILL NOT BE ALLOWED.
D. ALL NATURAL GAS PIPING UNDER STRUCTURES OR CONCRETE SLABS WILL BE INSTALLED IN A PROTECTIVE VENT SLEEVE. SLEEVES UNDER A

- 1.1. PAINTING, INCLUDING PIPE IDENTIFICATION PAINTING
1.02 GUARANTEES
A. CONTRACTOR SHALL GUARANTEE WORKMANSHIP, EQUIPMENT AND MATERIALS INSTALLED UNDER THIS CONTRACT FOR A PERIOD NOT LESS THAN ONE (1) YEAR FROM THE DATE OF COMPLETION OR AT OWNER'S REQUEST. SHOULD ANY DEFECTS OCCUR DURING THIS PERIOD, THE CONTRACTOR SHALL PROMPTLY REPAIR OR REPLACE THE DEFECTIVE ITEM AND ANY OTHER DAMAGE CAUSED TO THE BUILDING, FACILITIES, OR EQUIPMENT FREE OF CHARGE TO THE OWNERS, INCLUDING COSTS OF LABOR AND MATERIALS.
B. GUARANTEE INCLUDED IN THIS SECTION TO COVER:
1. FAULTY OR INADEQUATE DESIGN OF EQUIPMENT OR MATERIAL INSTALLED.
2. IMPROPER ASSEMBLY OR ERECTION.
3. DEFECTIVE WORKMANSHIP OR MATERIAL.
4. INCORRECT OR INADEQUATE OPERATION OR OTHER FAILURE.
C. FOR EQUIPMENT BEARING A MANUFACTURER'S WARRANTY IN EXCESS OF ONE YEAR, FURNISH A COPY OF THE WARRANTY TO THE OWNER WHO SHALL BE NAMED AS BENEFICIARY.
1.03 PROTECTION OF EQUIPMENT AND MATERIALS
A. PROVIDE ADEQUATE STORAGE FACILITIES FOR EQUIPMENT AND MATERIALS ON THE SITE AND SHALL MAKE PROVISIONS TO PROTECT SUCH MATERIALS AND EQUIPMENT FROM DAMAGE.
D. WITHOUT ADDITIONAL COST TO THE OWNER, PROVIDE SUCH OTHER LABOR AND MATERIALS AS ARE REQUIRED TO COMPLETE THE WORK OF THIS SECTION IN ACCORDANCE WITH THE REQUIREMENTS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION, REGARDLESS OF WHETHER SUCH MATERIALS AND ASSOCIATED LABOR ARE CALLED FOR ELSEWHERE IN THESE CONTRACT DOCUMENTS.
1.04 SUBMITTALS
A. PRODUCT DATA: WITHIN 30 CALENDAR DAYS AFTER THE CONTRACTOR HAS RECEIVED THE NOTICE TO PROCEED, SUBMIT 6 COPIES OF THE FOLLOWING TO THE ARCHITECT OR ENGINEER OF RECORD FOR APPROVAL PRIOR TO ACQUISITION:
1. MATERIALS LIST OF ITEMS PROPOSED TO BE PROVIDED UNDER THIS SECTION.
2. MANUFACTURER'S SPECIFICATIONS, CATALOG, CUTS, AND OTHER DATA NEEDED TO PROVE COMPLIANCE WITH THE SPECIFIED REQUIREMENTS. ALL PIECES OF EQUIPMENT SHALL BE CLEARLY IDENTIFIED ON CORRESPONDING MANUFACTURER LITERATURE BEING SUBMITTED.
3. SHOW DRAWINGS OR OTHER DATA AS REQUIRED TO INDICATE METHOD OF INSTALLING AND ATTACHING EQUIPMENT, EXCEPT WHERE SUCH DETAILS ARE FULLY SHOWN ON THE DRAWINGS.
4. ALL SUBMITTALS FOR THE ENTIRE PROJECT SHALL BE SUBMITTED AT THE SAME TIME. SUBMITTALS SHALL BE PROVIDED IN A TABULATED THREE-RING BINDER. INCOMPLETE OR NON-COMPLIANT SUBMITTALS MAY BE REJECTED.
C. RECORD DRAWINGS:
1. COMPLY WITH PERTINENT PROVISIONS OF GENERAL CONDITIONS OF THESE SPECIFICATIONS.
2. INCLUDE A COPY OF THE RECORD DRAWINGS IN EACH COPY OF THE OPERATION AND MAINTENANCE MANUAL DESCRIBED BELOW.
D. UPON COMPLETION OF THIS PORTION OF THE WORK, AND AS A CONDITION OF ITS ACCEPTANCE, DELIVER TO THE ENGINEER TWO COPIES OF AN OPERATION AND MAINTENANCE MANUAL.

- 1.05 DESIGN CHANGES CAUSED BY PRODUCT SUBSTITUTIONS
A. CONTRACTOR SHALL PAY COSTS OF DESIGN AND INSTALLATION FOR CHANGES RESULTING FROM SUBSTITUTION OF ALTERNATE PRODUCTS.
B. ACCEPTANCE OF ALTERNATE PRODUCTS BY ARCHITECT OR ENGINEER OF RECORD DOES NOT CHANGE THIS REQUIREMENT.
1.06 PRODUCT HANDLING
A. EXCEPT AS OTHERWISE APPROVED BY THE ENGINEER, DETERMINE AND COMPLY WITH MANUFACTURER'S RECOMMENDATIONS ON PRODUCT HANDLING, STORAGE AND PROTECTION AND WITH PERTINENT PROVISIONS.
B. DELIVER PRODUCTS TO THE JOB SITE IN THE ORIGINAL MANUFACTURER'S ORIGINAL PACKAGING, WITH LABELS INTACT AND LEGIBLE.
1. MAINTAIN PACKAGED MATERIALS WITH SEALS UNBROKEN AND LABELS INTACT UNTIL TIME OF USE.
2. PROMPTLY REMOVE DAMAGED MATERIAL AND UNSUITABLE ITEMS FROM THE JOB SITE, AND PROMPTLY REPLACE WITH MATERIAL MEETING THE SPECIFIED REQUIREMENTS, AT NO ADDITIONAL COST TO THE OWNER.
C. THE ENGINEER MAY REJECT AS NON-COMPLYING SUCH MATERIAL AND PRODUCTS THAT DO NOT BEAR IDENTIFICATION SATISFACTORY TO THE ENGINEER AS TO THE MANUFACTURER, GRADE, QUALITY AND OTHER PERTINENT INFORMATION.

- PART 2 - PRODUCTS
2.01 WATER PIPING
A. BELOW GRADE: STAINLESS STEEL, COPPER, PEX OR PVC SHALL BE PERMITTED BETWEEN FACILITY AND HOME BETWEEN HOME AND FUEL CELL MODULES ONLY STAINLESS STEEL, PEX AND PVC SHALL BE PERMITTED.
B. ABOVE GRADE MATERIALS: ALL MATERIALS ALLOWED BY CODE ARE PERMITTED.
2.02 GAS PIPING
A. BELOW GROUND:
1. PROVIDE FACTORY APPLIED PLASTIC-COATED PIPE OR DOUBLE CONTAINED FOR PIPING UNDER THE SLAB.
2. NATURAL GAS YARD PIPING ASTM D22513 WITH FUSION JOINTS. PROVIDE STEEL TRANSITION RISERS AND DETECTABLE WARNING TAPE FOR BURIED PIPING OUTSIDE THE BUILDING.
B. ABOVE GROUND:
1. SCHEDULE 40, SEAMLESS GALVANIZED STEEL PIPE OR BLACK IRON, ASTM A53.
C. ANODELESS RISER.
2.03 VALVES
A. ALL VALVE NUMBERS LISTED ARE NIBCO UNLESS NOTED OTHERWISE. VALVES BY MILWAUKEE, STOCKHAM, HAMMON, WATTS AND GRINNELL ARE CONSIDERED EQUAL.

- TYPE SIZE PART NO.
BALL 3" AND SMALLER 585(580)-70-UL
GAS COCK 3" AND SMALLER 585(580)-70-UL
WATER BALL 2" AND SMALLER T-560-56-R-66-LL

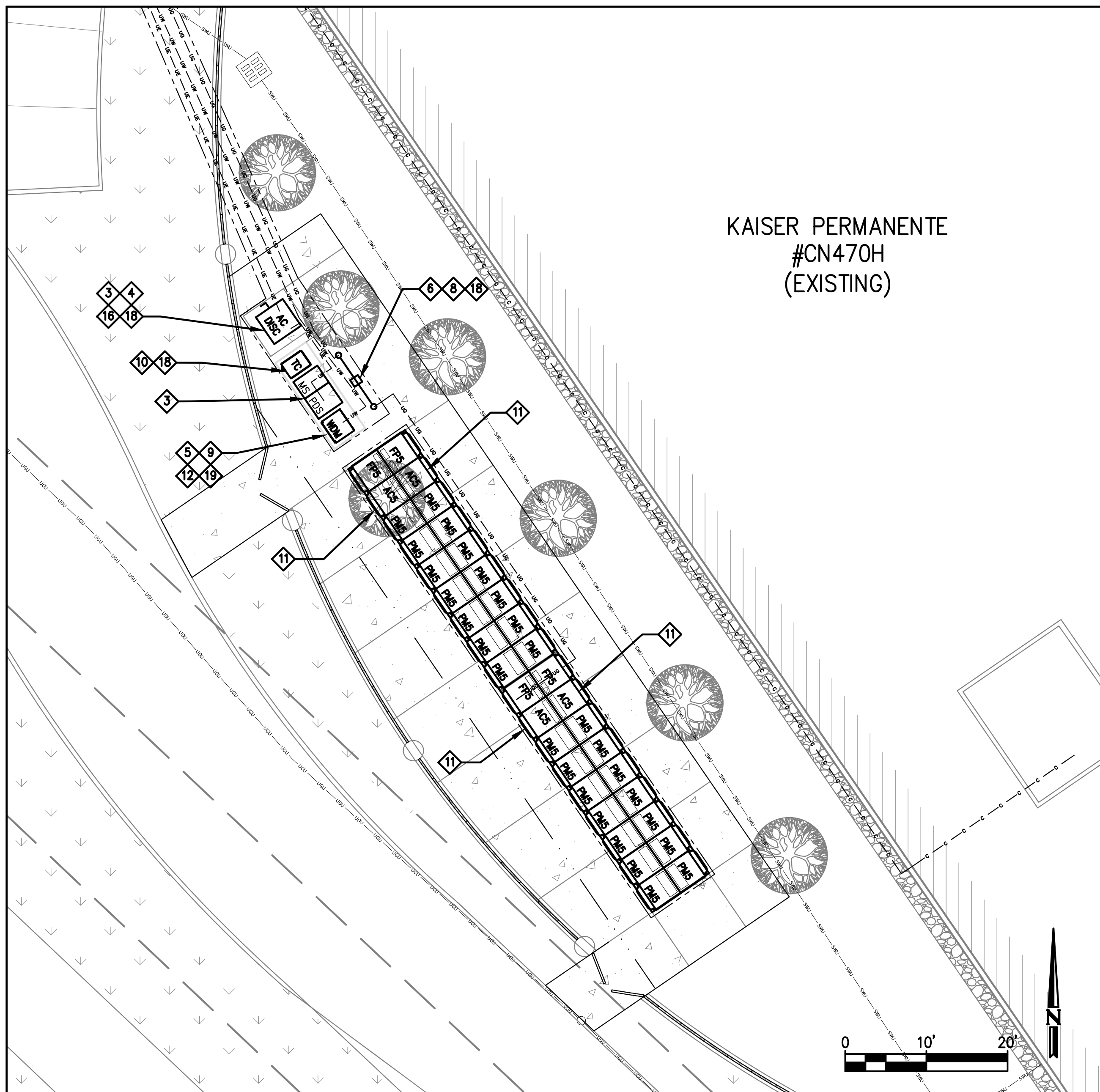
- BUILDING WILL BE VENTED TO OUTSIDE. SLEEVES UNDER CONCRETE SLABS WILL EXTEND A MINIMUM OF 1 FOOT BEYOND THE SLAB. ALL SLEEVES WILL BE SLOPED 1/8" PER FOOT UP TOWARD THE VENTED END. THE VENT END OF SLEEVES UNDER SLABS WILL TERMINATE UNDER A LANDSCAPED OR ASPHALTED AREA.
E. GAS PIPING SHALL BE TRAPPED OFF THE TOP OR SIDE OF PIPE AND ENDS OF MAINS SHALL BE PROVIDED WITH DRIP LEGS.
F. USE FRICTION WRENCHES WHEN INSTALLING BRASS, POLISHED, OR SOFT METAL PIPING, AND WHEN INSTALLING PIPING EXPOSED IN FINISHED AREAS. REPLACE PIPING SHOWING WRENCH MARKS.
G. ATTACH ESCUTCHEON PLATES TO PIPES WITH SET SCREWS OR SPRING CLAMPS WITH CONCEALED HINGES. CONTINUE INSULATION THROUGH ESCUTCHEON PLATES.
H. GENERAL:
1. PROCEED AS RAPIDLY AS THE BUILDING CONSTRUCTION WILL PERMIT.
2. THOROUGHLY CLEAN ITEMS BEFORE INSTALLATION. CAP PIPE OPENINGS TO EXCLUDE DIRT UNTIL EQUIPMENT IS INSTALLED AND FINAL CONNECTIONS HAVE BEEN MADE.
3. CUT PIPE ACCURATELY, AND WORK INTO PLACE WITHOUT SPRINGING OR FORCING, PROPERLY CLEARING WINDOWS, DOORS, AND OTHER OPENINGS. EXCESSIVE CUTTING OR OTHER WEAKENING OF THE BUILDING WILL NOT BE PERMITTED.
4. PROVIDE SUFFICIENT SWING JOINTS, BALL JOINTS, EXPANSION LOOPS, AND DEVICES NECESSARY FOR A FLEXIBLE PIPING SYSTEM WHETHER SHOWN ON THE DRAWINGS OR NOT.
5. SUPPORT PIPING INDEPENDENTLY AT PUMPS, COLLS, TANKS, AND SIMILAR LOCATIONS, SO THAT WEIGHT OF PIPE WILL NOT BE SUPPORTED BY THE EQUIPMENT INDEPENDENTLY FROM THE PIPE.
6. SECURELY BOLT ALL EQUIPMENT, ISOLATORS, HANGERS, AND SIMILAR ITEMS IN PLACE.
3.04 PIPE SUPPORT INSTALLATION
A. SUPPORT PIPES FROM STRUCTURE WITH ASSEMBLIES SPECIFIED. PROVIDE AUXILIARY MEMBERS, ANCHORS, GUIDES, AND SWAY BRACES NECESSARY TO MAINTAIN PIPE ALIGNMENT AND PREVENT EXCESSIVE MOVEMENT OR STRAIN ON PIPING SYSTEM OR COMPONENTS; ALLOW FOR EXPANSION AND CONTRACTION OF PIPING. PROVIDE AT LEAST ONE HANGER FOR EACH BRANCH. DO NOT USE POWER DRIVEN FASTENERS, WIRE, PERFORATED TAPE, NAILS, WOOD BLOCKING, OR OTHER UNSUITABLE DEVICES TO SUPPORT PIPES.
B. ATTACH SUPPORTS TO STRUCTURE WITH BOLTS, SCREWS OR CONCRETE ANCHORS, PER SUPPORT MANUFACTURER'S REQUIREMENTS.
3.05 JOINTS AND CONNECTIONS
A. CUT PIPE SHALL BE REAMED TO FULL INSIDE DIAMETER OF PIPE. CUT THREADS STRAIGHT AND TRUE. ENSURE ALL FILINGS HAVE BEEN REMOVED FROM INSIDE OF THE PIPE. APPLY LIQUID TEFLON TO MAKE PIPE THREADS AND NOT INSIDE FITTINGS. USE GRAPHITE OR CLEANOUT PLUG THREADS.
B. JOINTS IN COPPER TUBE SHALL BE MADE WITH 95-5 TIN-ANTIMONY OR LEAD-FREE SOLDER, APPLIED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS.
C. DISSIMILAR METALS SHALL BE ISOLATED WITH DIELECTRIC COUPLINGS, "EPCCO" OR APPROVED EQUAL. PROVIDE ACCESS PANELS AT ALL HIDDEN COUPLINGS.
3.06 VALVE INSTALLATION
A. PROVIDE VALVES IN THE WATER AND GAS SYSTEMS. LOCATE AND ARRANGE SO AS TO GIVE COMPLETE REGULATION OF APPARATUS, EQUIPMENT, AND FIXTURES.
B. PROVIDE VALVES IN AT LEAST THE FOLLOWING LOCATIONS:
1. ON BOTH SIDES OF APPARATUS AND EQUIPMENT.
2. FOR SHUTOFF OF RISERS AND BRANCH MAINS.
3. FOR FLUSHING AND STERILIZING THE SYSTEM.
4. WHERE SHOWN ON THE DRAWINGS.
C. LOCATE VALVES FOR EASY ACCESSIBILITY AND MAINTENANCE. PROVIDE ACCESS PANELS FOR ALL HIDDEN VALVES.
D. UNIONS SHALL BE INSTALLED DOWNSTREAM OF ALL SCREWED VALVES.
E. ALL GAS PRESSURE REGULATING VALVES SHALL BE VENTED TO THE ATMOSPHERE.
3.07 BACK FLOW PREVENTION INSTALLATION
A. PROTECT EQUIPMENT HAVING PLUMBING CONNECTION, AGAINST POSSIBLE BACK-SIPHONAGE.
B. ARRANGE FOR TESTING OF BACK FLOW DEVICES AS REQUIRED BY THE GOVERNMENTAL AGENCIES HAVING JURISDICTION.
3.08 TESTING AND ADJUSTING
A. PROVIDE PERSONNEL AND EQUIPMENT FOR, AND ARRANGE FOR AND PAY THE COSTS OF, ALL REQUIRED TESTS AND INSPECTIONS REQUIRED BY GOVERNMENTAL AGENCIES HAVING JURISDICTION. SEE SECTION FOR TEST REQUIREMENTS.
B. WHERE TESTS SHOW MATERIALS OR WORKMANSHIP TO BE DEFICIENT, REPLACE OR REPAIR AS NECESSARY, AND REPEAT THE TESTS UNTIL THE SPECIFIED STANDARDS ARE ACHIEVED.
C. ADJUST THE SYSTEM TO OPTIMUM STANDARDS OF OPERATION.
3.09 DISINFECTON
A. CLEAN AND DISINFECT WATER DISTRIBUTION PIPING AS FOLLOWS:
1. PLUG ALL NEW WATER DISTRIBUTION PIPING SYSTEMS AND PARTS OF EXISTING SYSTEMS, WHICH HAVE BEEN ALTERED, EXTENDED, OR REPAIRED PRIOR TO USE.
2. FLUSH THE PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT THE POINTS OF OUTLET.
3. IF REQUIRED BY AHJ SUBMIT WATER SAMPLES IN STERILE BOTTLES TO THE AUTHORITY HAVING JURISDICTION. REPEAT THE PROCEDURE IF THE BIOLOGICAL EXAMINATION MADE BY THE AUTHORITY SHOWS EVIDENCE OF CONTAMINATION.
4. PREPARE REPORTS FOR ALL PURGING ACTIVITIES.
3.10 EXCAVATION, TRENCHING AND BACKFILLING
A. TRENCHING AND BACKFILLING FOR UTILITIES: PIPING SHALL BE INSTALLED PROMPTLY AFTER EXCAVATION IN ORDER TO KEEP THE TRENCHES OPEN AS SHORT A TIME AS POSSIBLE.
B. ANY EXISTING UNDERGROUND PIPING AND CONDUIT THAT IS ENCOUNTERED SHALL BE PROPERLY SHORED AND PROTECTED FROM DAMAGE. ACTIVE PIPING SHALL BE LEFT INTACT AND UNDAAMAGED.
3.11 WARRANTY
A. THE CONTRACTOR SHALL WARRANTY ALL OF THE SYSTEMS FOR PROPER OPERATION INSTALLED BY THE CONTRACTOR FOR NOT LESS THAN ONE CALENDAR YEAR FROM DATE OF PROJECT COMPLETION. THIS COMPLETION DATE SHALL BE SET BY THE ARCHITECT, ENGINEER OF RECORD OR OWNER.
END OF SECTION

- 2.04 HANGERS AND SUPPORTS
A. IN GENERAL, ALL PIPE HANGERS OR SUPPORTS SHALL CONFORM TO THE FOLLOWING EXCEPT WHERE SPECIAL PIPE HANGERS AND SUPPORTS ARE DETAILED ON THE DRAWINGS. IN ALL CASES HANGER AND SUPPORT DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENT OVER THE FOLLOWING:
PIPING 6" SIZE AND SMALLER:
ITEMS NUMBER
ROD COUPLING FOR CONNECTION *HILTI H-119
INSERTS IN CONCRETE DECKS A716 OR 701 PIPE CLAMP W/S-716
B. SIMILAR ITEMS BY UNISTRUT, SECURESTRUT, MICHIGAN OR B-LINE WILL BE ACCEPTABLE.
C. REFER TO THE LOCAL CODE REQUIREMENTS FOR MATERIALS NOT LISTED ABOVE.
D. AT ALL POINTS WHERE INSULATED PIPE CONTACTS A HANGER OR SUPPORT, THE POINT OF CONTACT SHALL BE PROTECTED BY A METAL INSULATION PIPE SHIELD #B3153 AS MANUFACTURED BY B-LINE. EQUIVALENT PIPE PROTECTORS AS MANUFACTURED BY UNISTRUT OR SECURESTRUT WILL BE CONSIDERED PROVIDED THE SUBSTITUTE ITEM MEETS THE SAME STANDARDS OF QUALITY AND PERFORMANCE AS THE SPECIFIED ITEM.
2.05 FLOOR PENETRATIONS
A. FLOORS:
1. FLOOR PENETRATIONS SHALL BE PROTECTED WITH U.L. APPROVED FIRE RATED SYSTEM. THE SYSTEM SHALL BE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. FIRE STOPPING MATERIALS BY HILTI, METACALK OR DOW-CORNING ARE CONSIDERED EQUAL. THE MATERIAL SHALL BE THE SAME AS CALLED OUT FOR IN THE U.L. APPROVED SYSTEM.
B. POURED CONCRETE FLOORS:
1. PIPES PENETRATING POURED CONCRETE WALLS AND FLOORS SHALL BE PROTECTED BY PROVIDING THE FOLLOWING:
a. A SCHEDULE 40 PVC SLEEVE ONE (1) SIZE LARGER THAN THE PIPE OR ONE QUARTER (1/4) INCH OF FOAM MATERIAL WRAPPED AROUND AND SECURED TO THE PIPE.
b. PROTECTION SHALL END FLUSH WITH THE WALL OR FLOOR SURFACE.
C. ALL FLOORS PASSING THROUGH FLOORS EXPOSED TO VIEW SHALL BE PROVIDED WITH CHROMIUM PLATED, SPLIT-RING ESCUTCHEON PLATES IN FINISHED AREAS. BRASS OR GALVANIZED ESCUTCHEON PLATES MAY BE USED ELSEWHERE.
2.06 VALVE BOXES
A. PRECAST CONCRETE VALVE BOX, TRAFFIC RESISTANT, H-20 LOADING, RATED FOR WATER, ARMORED BODY WITH A HEAVY CAST IRON RING AND CAST IRON TRAFFIC COVER. THE COVER SHALL BE MARKED WITH THE NAME OF THE SERVICE. PROVIDE BOX EXTENSIONS AS REQUIRED; MODEL 1RT SERIES AS MANUFACTURED BY BROOKS PRODUCTS, INC. ACCEPTABLE MANUFACTURERS-BROOKS PRODUCT, INC., ALHAMBRA FOUNDRY COMPANY AND CHRISTY CO.
2.07 ACCESS BOXES
A. SEE SECTION FOR ACCESS PANELS.
2.08 PRESSURE GAUGES
A. PROVIDE MARSH QUALITY GAUGES OR EQUAL WITH 3-1/2" DIAL, GAUGE COOK, IN TYPE REQUIRED, FOR PUMP SUCTION, PROVIDE COMPOUND TYPE. ARRANGE GAUGES FOR EASY READING.
2.09 BACK FLOW PREVENTERS
A. PROVIDE APPROVED REDUCED PRESSURE BACKFLOW PREVENTER AS REQUIRED BY THE GOVERNMENTAL AUTHORITY HAVING JURISDICTION.
B. BACK FLOW PREVENTERS BY WILKINS, FEBCO, HERSEY, WATTS ARE CONSIDERED EQUAL WHEN THEIR PRESSURE FALL-OFF/LOSS IS EQUAL TO OR LESS THAN THE SPECIFIED PREVENTER'S LOSS FOR THE GIVEN FLOW RATE.
2.10 PIPING AND EQUIPMENT INSULATION
A. FOR WATER PIPING INSTALLED INSIDE MASONRY UNITS OF WALLS, PROVIDE 1" FLEXIBLE UNICELLULAR INSULATION BY ARMACEL.
B. COVER FITTINGS WITH ZESTON, KNAUF, OR EQUAL ONE-PIECE PVC PREMOLDED INSULATING COVERS. FITTING COVERS, JACKETS AND ADHESIVES SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPMENT RATING OF 50 PER ASTM E84. AT ALL ELBOWS AND TEES, FILL VOIDS BETWEEN COVERS AND PIPING WITH FIBERGLASS INSULATION AND TAPE JOINTS. INSTALL PIPE INSULATION IN COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS. WHERE PREMOLDED INSULATING FITTINGS ARE NOT APPROVED BY LOCAL AUTHORITIES, MITER INSULATION AT FITTINGS.
PART 3 - EXECUTION
3.01 GENERAL CONDITIONS
A. EXAMINE THE AREAS AND CONDITIONS UNDER WHICH WORK OF THIS SECTION WILL BE PERFORMED. CONDITIONS DETRIMENTAL TO TIMELY AND PROPER COMPLETION OF THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER OF RECORD BEFORE THE INSTALLATION OF MATERIALS. DO NOT PROCEED UNTIL UNSATISFACTORY CONDITIONS ARE CORRECTED, INCORRECTLY INSTALLED MATERIALS REQUIRING CHANGES WILL BE AT CONTRACTOR'S EXPENSE.
B. ALL PLUMBING FIXTURES, APPLIANCES AND ACCESSORIES FURNISHED WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL BE INSTALLED PER THOSE INSTRUCTIONS.
3.02 PLUMBING SYSTEM LAYOUT
A. LAYOUT THE PLUMBING SYSTEM IN CAREFUL COORDINATION WITH THE DRAWINGS. DETERMINE PROPER ELEVATIONS FOR ALL COMPONENTS OF THE SYSTEM AND USE ONLY THE MINIMUM NUMBER OF BENDS TO PRODUCE A SATISFACTORILY FUNCTIONING SYSTEM.
B. FOLLOW THE GENERAL LAYOUT SHOWN ON THE DRAWINGS IN ALL CASES EXCEPT WHERE OTHER WORK MAY INTERFERE.
C. LAY OUT PIPES TO FALL WITHIN FLOOR AND TO NOT REQUIRE FURRING OTHER THAN AS SHOWN ON THE DRAWINGS.
3.03 PIPING INSTALLATION
A. SIZES SHOWN IN THE DRAWINGS AND SPECIFICATIONS ARE NOMINAL UNLESS NOTED OTHERWISE. ANY UNSIZED PIPE SECTION SHALL BE THE SAME SIZE AS THE LARGEST PIPE CONNECTED TO IT. RUN PIPE FULL SIZE THROUGH VALVES AND ACCESSORIES AND MAKE SIZE REDUCTIONS FOR UNDERSIZE CONNECTIONS WITHIN THREE (3) PIPE DIAMETERS OF CONNECTION. PIPING SHALL BE THE MINIMUM BRANCH SIZE TO WITHIN 2 FEET OF THE EQUIPMENT.
B. INSTALL PIPING GENERALLY SQUARE WITH BUILDING, FREE OF TRIPS OR AIR POCKETS, AND TRUE TO LINE AND GRADE. KEEP ALL PIPING TIGHT TO THE BUILDING STRUCTURE, UNLESS PIPE SLOPE IS REQUIRED. DO NOT INSTALL PIPING IN ANY LOCATIONS WHERE, IN THE ARCHITECT'S OR ENGINEER'S OPINION, IT WILL INTERFERE WITH THE USE OF THE BUILDING OR CREATE A SAFETY HAZARD. WHERE SPACE IS INADEQUATE, NOTIFY THE ARCHITECT IN TIME TO AVOID UNNECESSARY WORK. INSTALL ALL EXPOSED PIPING AS HIGH AS POSSIBLE WITHOUT INTERFERING WITH OTHER TRADES.
C. MAKE CHANGES IN DIRECTION WITH MANUFACTURED FITTINGS; USE LONG RADIUS ELBOWS, STREET ELBOWS, BUSHINGS, CLOSE NIPPLES AND BENDING OF PIPE OR TUBING WILL NOT BE ALLOWED.
D. ALL NATURAL GAS PIPING UNDER STRUCTURES OR CONCRETE SLABS WILL BE INSTALLED IN A PROTECTIVE VENT SLEEVE. SLEEVES UNDER A

- 7. TEMPERARY PIPING IN CONNECTION WITH:
a. BUILDING AND CONSTRUCTION WORK
b. EXCAVATING AND UNDERGROUND CONSTRUCTION
8. PIPE HANGERS, SUPPORTS, ANCHORS, GUIDES, EXPANSION JOINTS.
a. INCLUDING:
1) SUPPORTS FOR EQUIPMENT TO WHICH PIPE IS CONNECTED, SUCH AS TANK SUPPORTS
2) ISOLATORS - DIELECTRIC AND VIBRATION
3) ANCHORS AND THRUST BLOCKS OF CONCRETE, METAL, ETC.
4) SEISMIC BRACING
9. TESTS
a. PIPING, FOR TIGHTNESS
b. EQUIPMENT FOR PERFORMANCE
c. OPERATING INSTRUCTIONS
d. FINAL OPERATION
10. CONCRETE FORMED AND POURED ON THE JOB SITE
11. PAINTING, INCLUDING PIPE IDENTIFICATION PAINTING
1.02 GUARANTEES
A. CONTRACTOR SHALL GUARANTEE WORKMANSHIP, EQUIPMENT AND MATERIALS INSTALLED UNDER THIS CONTRACT FOR A PERIOD NOT LESS THAN ONE (1) YEAR FROM THE DATE OF COMPLETION OR AT OWNER'S REQUEST. SHOULD ANY DEFECTS OCCUR DURING THIS PERIOD, THE CONTRACTOR SHALL PROMPTLY REPAIR OR REPLACE THE DEFECTIVE ITEM AND ANY OTHER DAMAGE CAUSED TO THE BUILDING, FACILITIES, OR EQUIPMENT FREE OF CHARGE TO THE OWNERS, INCLUDING COSTS OF LABOR AND MATERIALS.
B. GUARANTEE INCLUDED IN THIS SECTION TO COVER:
1. FAULTY OR INADEQUATE DESIGN OF EQUIPMENT OR MATERIAL INSTALLED.
2. IMPROPER ASSEMBLY OR ERECTION.
3. DEFECTIVE WORKMANSHIP OR MATERIAL.
4. INCORRECT OR INADEQUATE OPERATION OR OTHER FAILURE.
C. FOR EQUIPMENT BEARING A MANUFACTURER'S WARRANTY IN EXCESS OF ONE YEAR, FURNISH A COPY OF THE WARRANTY TO THE OWNER WHO SHALL BE NAMED AS BENEFICIARY.
1.03 PROTECTION OF EQUIPMENT AND MATERIALS
A. PROVIDE ADEQUATE STORAGE FACILITIES FOR EQUIPMENT AND MATERIALS ON THE SITE AND SHALL MAKE PROVISIONS TO PROTECT SUCH MATERIALS AND EQUIPMENT FROM DAMAGE.
D. WITHOUT ADDITIONAL COST TO THE OWNER, PROVIDE SUCH OTHER LABOR AND MATERIALS AS ARE REQUIRED TO COMPLETE THE WORK OF THIS SECTION IN ACCORDANCE WITH THE REQUIREMENTS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION, REGARDLESS OF WHETHER SUCH MATERIALS AND ASSOCIATED LABOR ARE CALLED FOR ELSEWHERE IN THESE CONTRACT DOCUMENTS.
1.04 SUBMITTALS
A. PRODUCT DATA: WITHIN 30 CALENDAR DAYS AFTER THE CONTRACTOR HAS RECEIVED THE NOTICE TO PROCEED, SUBMIT 6 COPIES OF THE FOLLOWING TO THE ARCHITECT OR ENGINEER OF RECORD FOR APPROVAL PRIOR TO ACQUISITION:
1. MATERIALS LIST OF ITEMS PROPOSED TO BE PROVIDED UNDER THIS SECTION.
2. MANUFACTURER'S SPECIFICATIONS, CATALOG, CUTS, AND OTHER DATA NEEDED TO PROVE COMPLIANCE WITH THE SPECIFIED REQUIREMENTS. ALL PIECES OF EQUIPMENT SHALL BE CLEARLY IDENTIFIED ON CORRESPONDING MANUFACTURER LITERATURE BEING SUBMITTED.
3. SHOW DRAWINGS OR OTHER DATA AS REQUIRED TO INDICATE METHOD OF INSTALLING AND ATTACHING EQUIPMENT, EXCEPT WHERE SUCH DETAILS ARE FULLY SHOWN ON THE DRAWINGS.
4. ALL SUBMITTALS FOR THE ENTIRE PROJECT SHALL BE SUBMITTED AT THE SAME TIME. SUBMITTALS SHALL BE PROVIDED IN A TABULATED THREE-RING BINDER. INCOMPLETE OR NON-COMPLIANT SUBMITTALS MAY BE REJECTED.
C. RECORD DRAWINGS:
1. COMPLY WITH PERTINENT PROVISIONS OF GENERAL CONDITIONS OF THESE SPECIFICATIONS.
2. INCLUDE A COPY OF THE RECORD DRAWINGS IN EACH COPY OF THE OPERATION AND MAINTENANCE MANUAL DESCRIBED BELOW.
D. UPON COMPLETION OF THIS PORTION OF THE WORK, AND AS A CONDITION OF ITS ACCEPTANCE, DELIVER TO THE ENGINEER TWO COPIES OF AN OPERATION AND MAINTENANCE MANUAL.

- 2.01 ACCESSIBLE PANELS
A. IF NOT CALLED FOR UNDER OTHER SECTIONS, PROVIDE MILCOR, ELMODOR OR JAY R SMITH ACCESS PANELS WHERE SHOWN ON THE DRAWINGS OR REQUIRED FOR MAINTENANCE ACCESS TO COMPLETED WORK OF THIS SECTION. SUBMIT SIZE, TYPE, AND LOCATION OF PROPOSED ACCESS PANELS NOT SPECIFICALLY SHOWN, FOR REVIEW OF ENGINEER OF RECORD. ACCESS PANELS SHALL BE CONSTRUCTED OF 16 GAUGE PRIME COATED STEEL OR STAINLESS STEEL WITH SCREWDRIVER OPERATED CAM LATCH, CONCEALED HINGES, AND FIRE RATING EQUAL TO ADJACENT CONSTRUCTION.
2.02 PIPE WRAPPING
A. WHERE INDICATED ON THE DRAWINGS AND/OR CALLED FOR IN THIS SPECIFICATION, METALLIC PIPE AND JOINTS BURIED IN THE GROUND SHALL BE PROTECTED WITH 10-MIL TAPE DOUBLE WRAPPED OR APPROVED EQUAL CLEAN PIPE TO BARE METAL. INITIALLY STRETCH FIRST LAYER OF TAPE TO CONFORM TO THE SURFACE, WHILE SPIRALLY HALF-LAPPING. APPLY A SECOND LAYER, HALF-LAPPED AND SPIRALED AS TO THE FIRST LAYER, BUT WITH SPIRALS PERPENDICULAR TO THE FIRST WRAPPING. IN LIEU OF TAPE WRAP: HEAT SHRINKABLE 10-MIL MINIMUM THICK POLYETHYLENE SLEEVE MAY BE USED.
B. WHEN APPLYING TAPE, USE ONLY ENOUGH PULL TO CAUSE THE TAPE TO PROPERLY CONFORM TO THE IRREGULAR SURFACES OF THE PIPE OR FITTING. THE PROPER AMOUNT OF PULL IS REACHED WHEN THE TAPE SURFACE IS SMOOTH WITHOUT ANY WRINKLES. CONTINUE TAPE 4" ABOVE GRADE. END OVERLAPS SHOULD POINT DOWN. TAPE SHALL BE APPLIED PER MANUFACTURER'S INSTRUCTIONS.

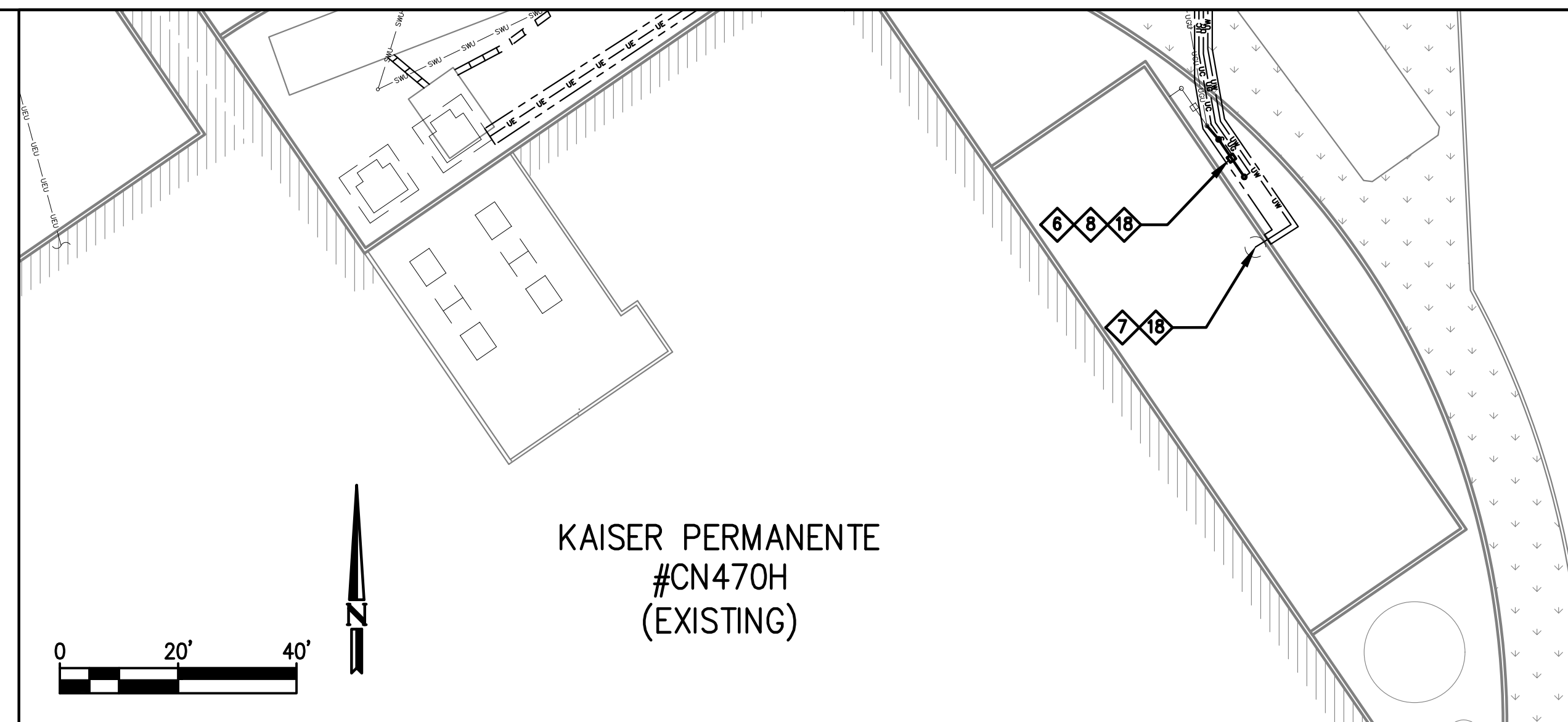
- 3.01 GENERAL EQUIPMENT INSTALLATION REQUIREMENTS
A. INSTALL EQUIPMENT TO PROVIDE GOOD APPEARANCE, EASY ACCESS, AND ADEQUATE SPACE TO ALLOW REPLACEMENT OR MAINTENANCE. PROVIDE BASES, SUPPORTS, ANCHOR BOLTS, AND OTHER ITEMS REQUIRED TO ACHIEVE THIS INSTALLATION SHALL BE LEVEL AND ADEQUATELY BRACED.
3.02 COORDINATION OF WORK
A. COORDINATE WORK OF THIS SECTION WITH WORK OF OTHER SECTIONS TO AVOID CONFLICTS. PROVIDE DRAWINGS WHERE REQUIRED. RELOCATE WORK DONE WITHOUT REGARD TO REQUIREMENTS OF OTHER SECTIONS ONLY AS DIRECTED BY ARCHITECT OR ENGINEER OF RECORD.
B. ENSURE THAT WORK OF OTHER SECTIONS IS SUITABLE TO ACCOMMODATE WORK OF THIS SECTION. CONTRACTOR TO PAY COSTS OF CORRECTIVE WORK.
3.03 ADEQUACY OF FURRING
A. CONCEAL PIPING IN SPACES PROVIDED UNLESS SPECIFICALLY SH



ES AREA PLACARD PLAN

SCALE: 1" = 10'

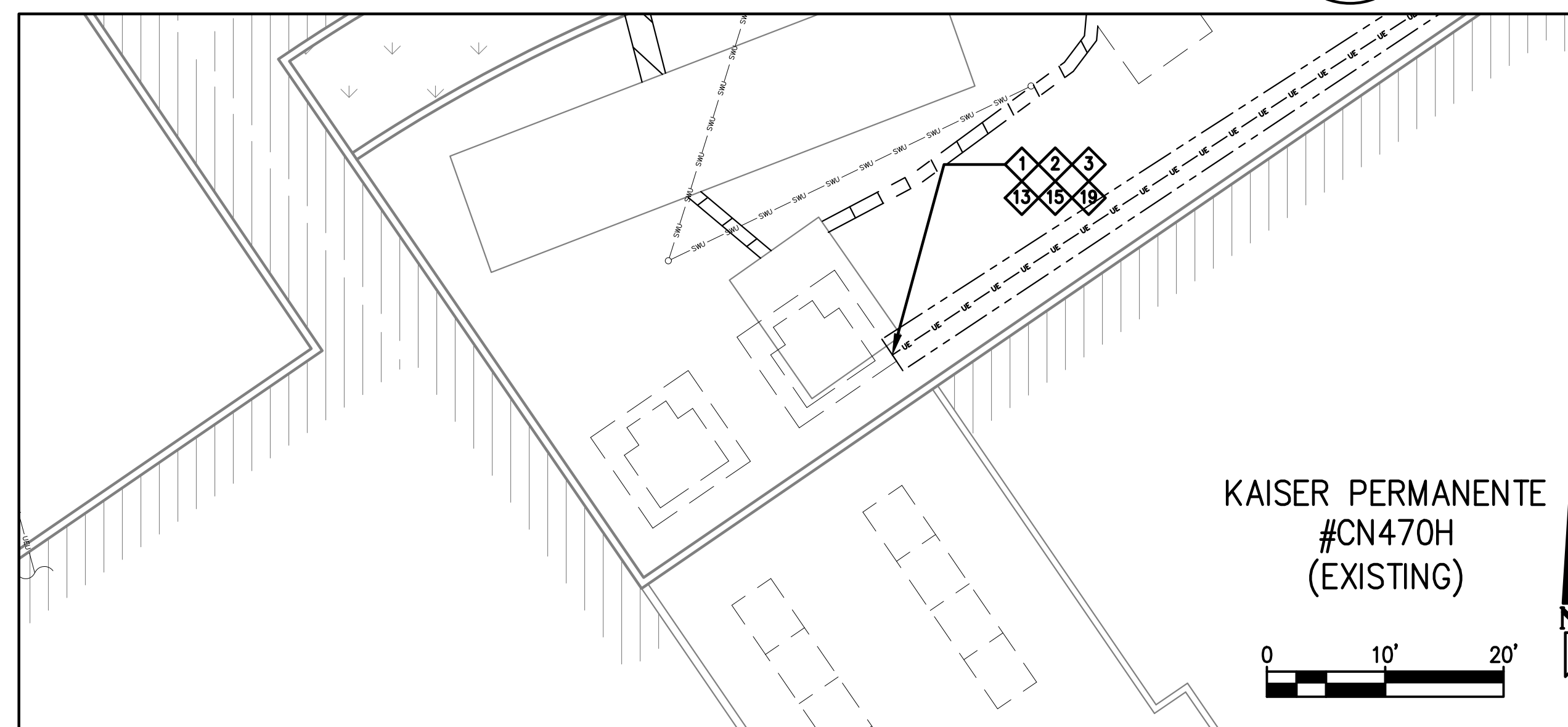
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WATER TAP & GAS METER PLACARD PLAN

SCALE: 1" = 20'

2
M1.1



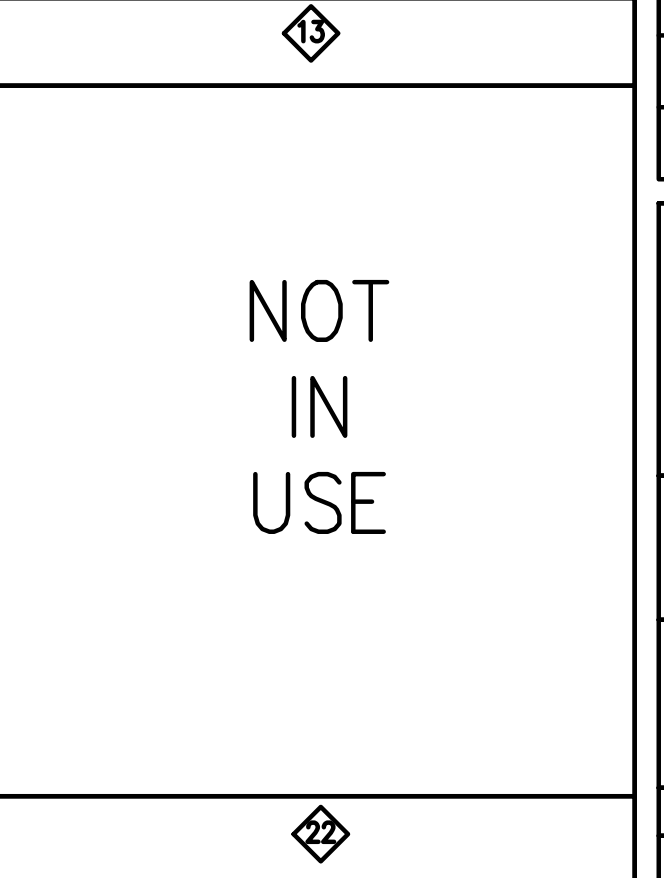
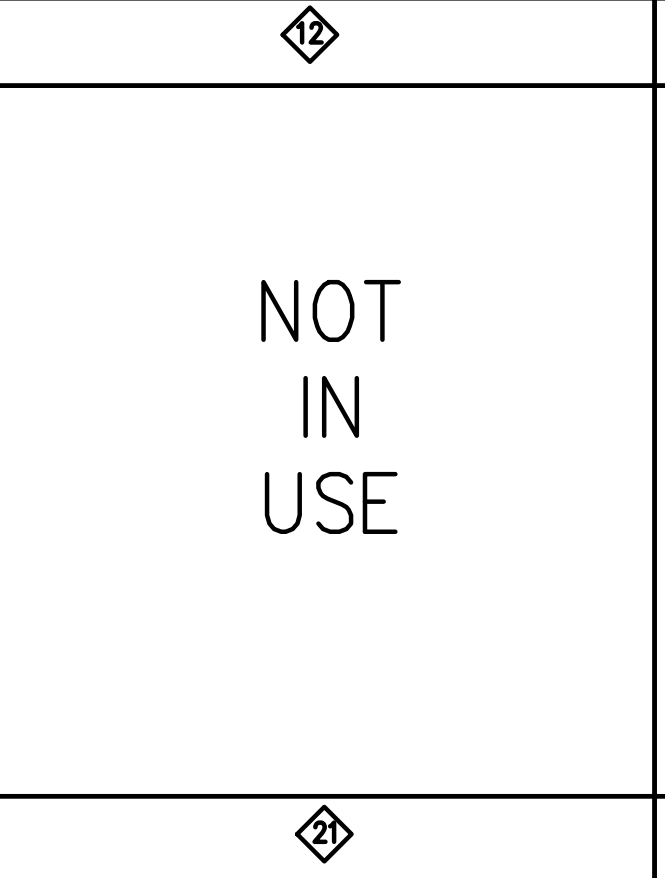
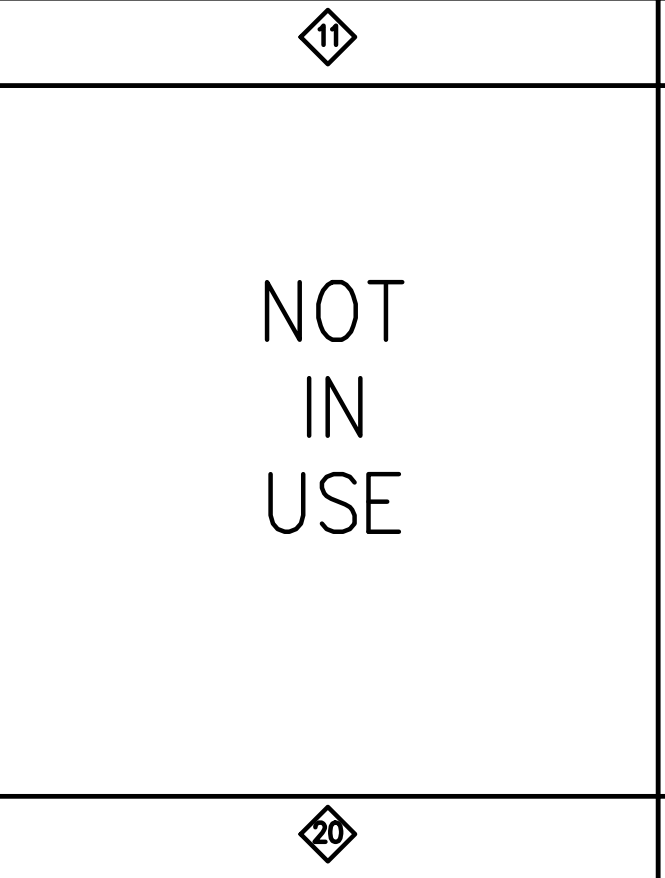
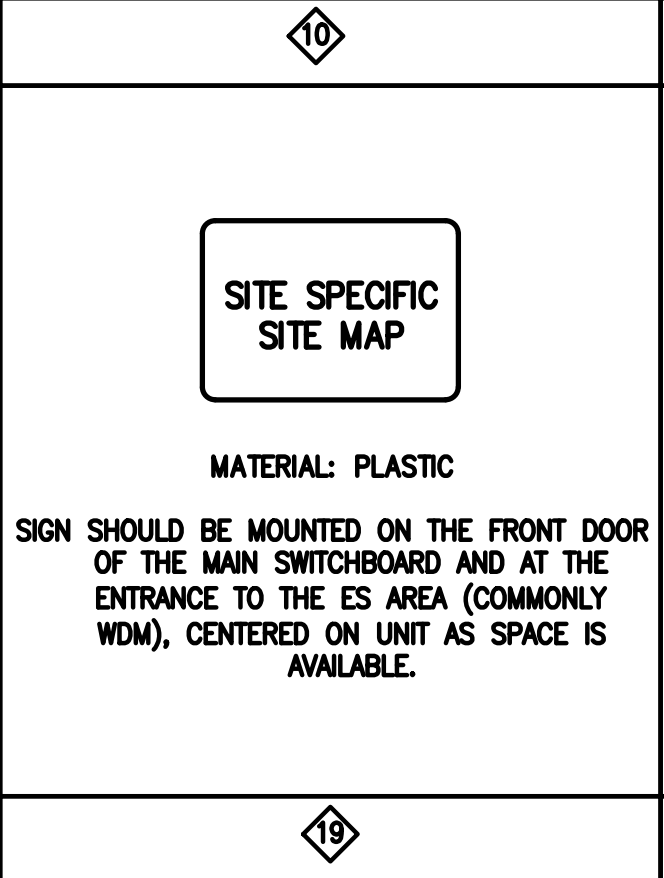
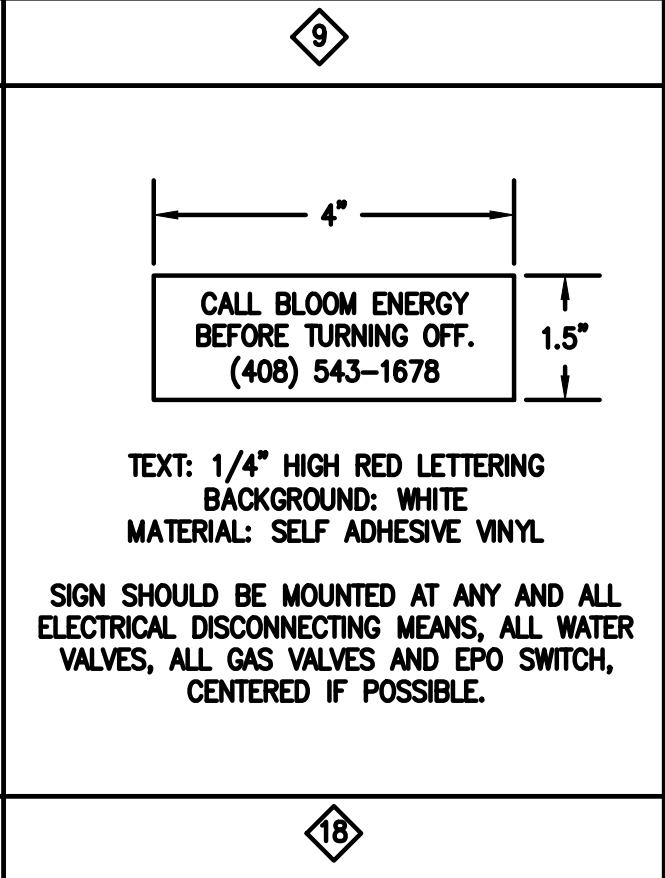
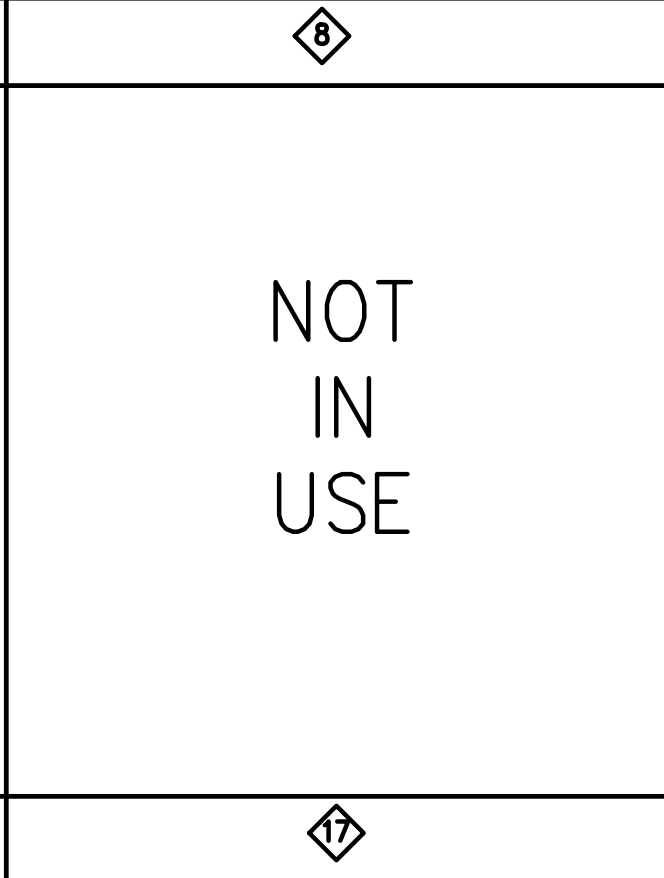
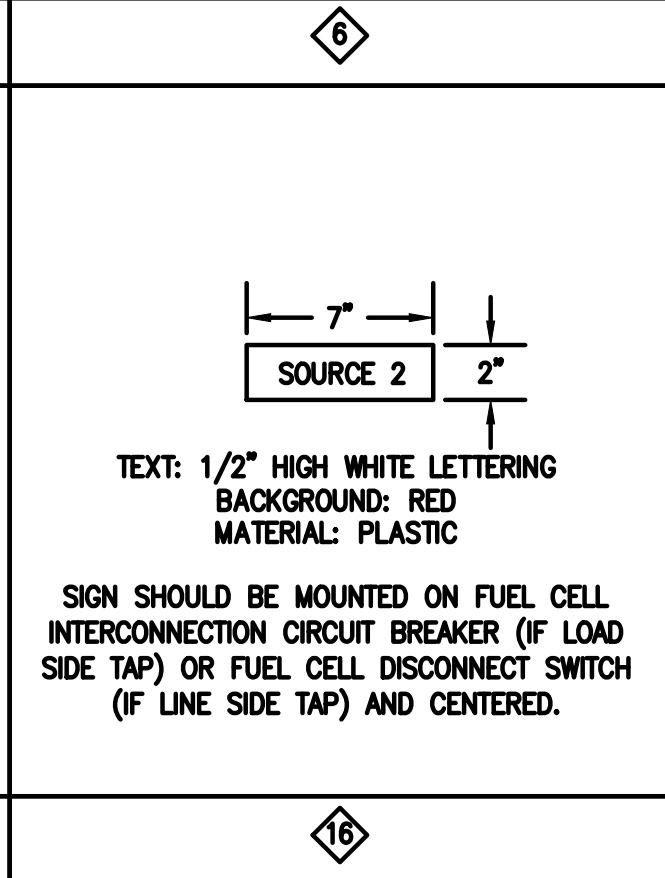
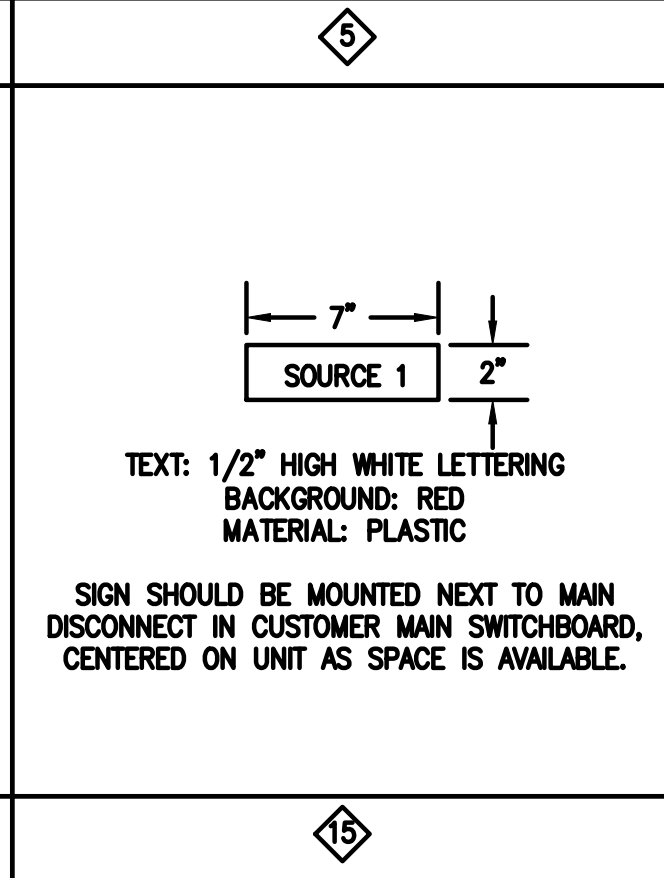
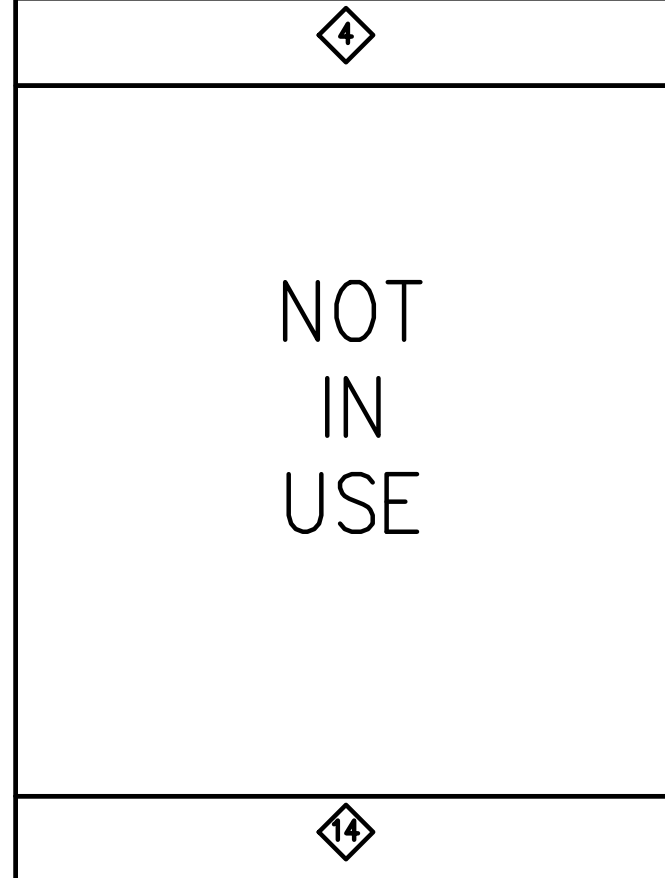
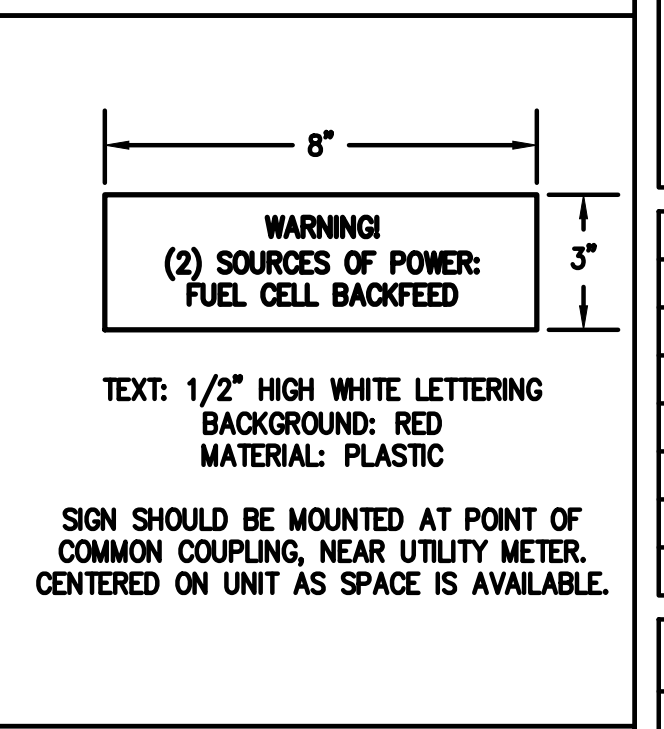
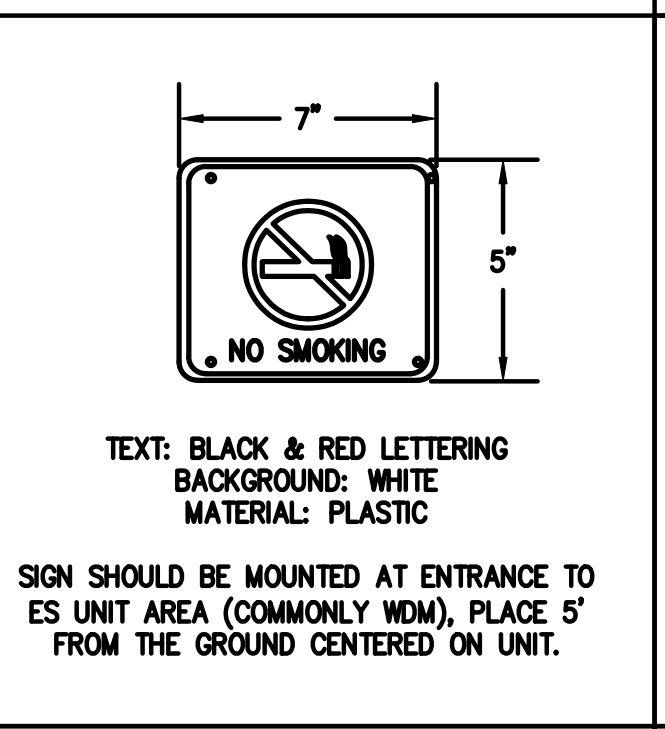
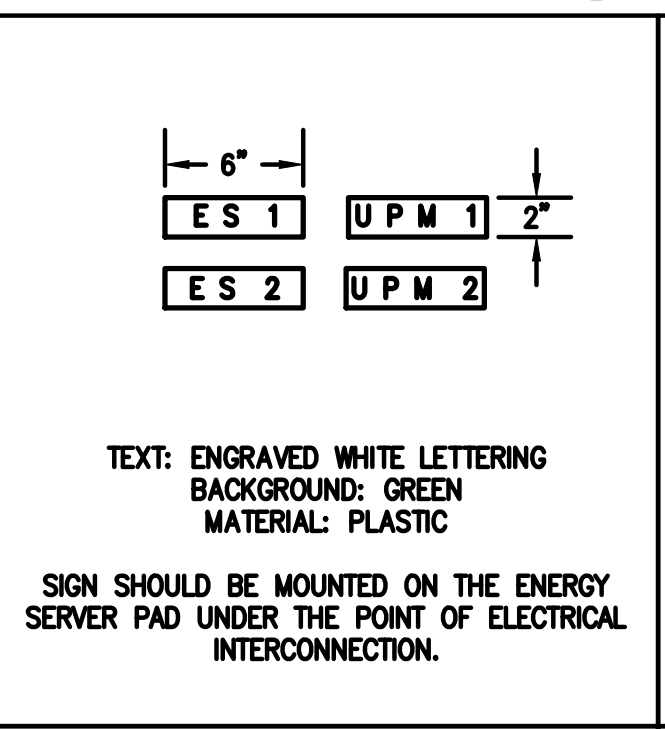
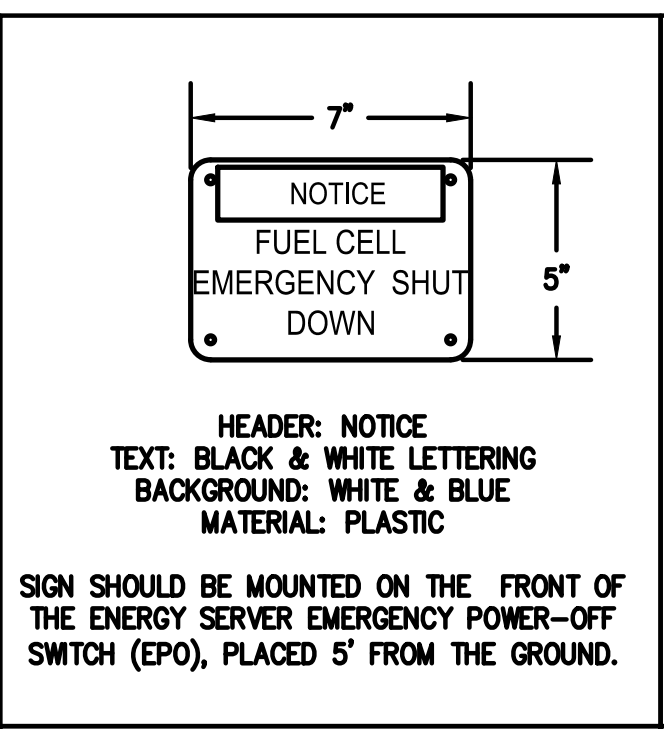
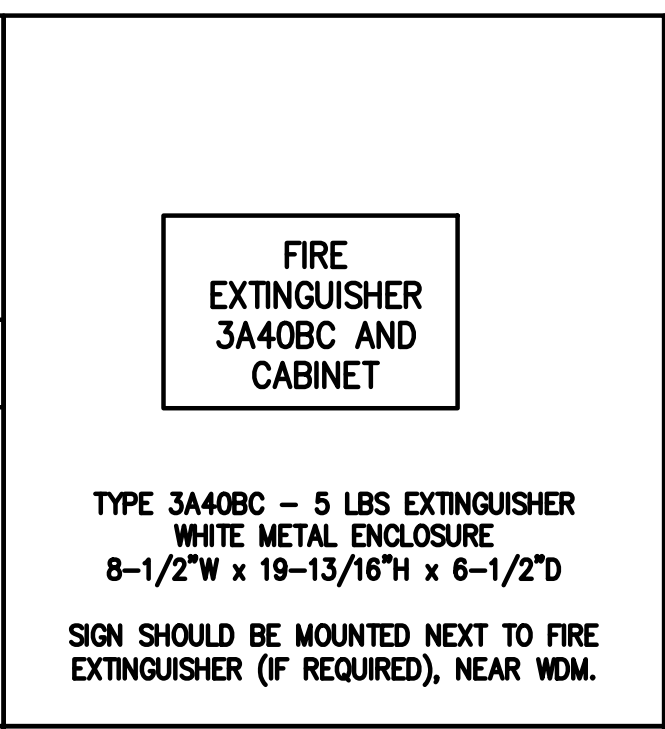
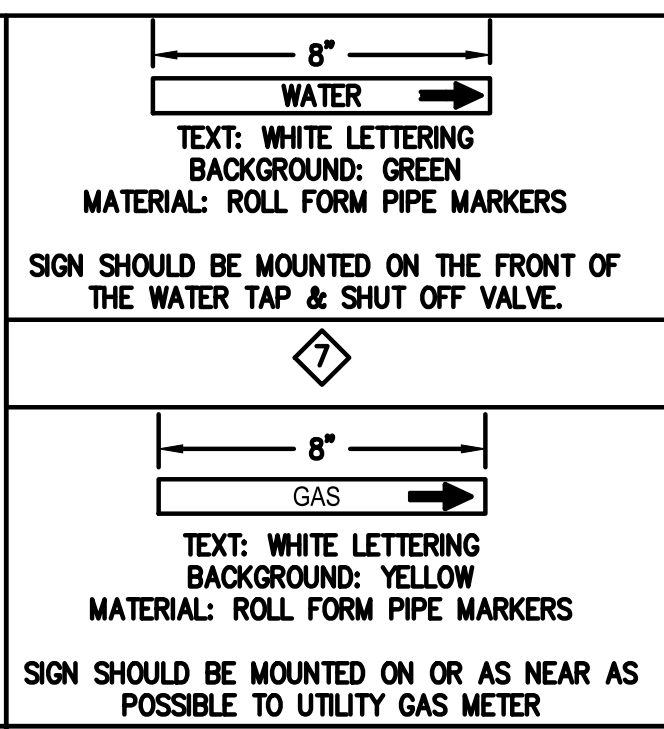
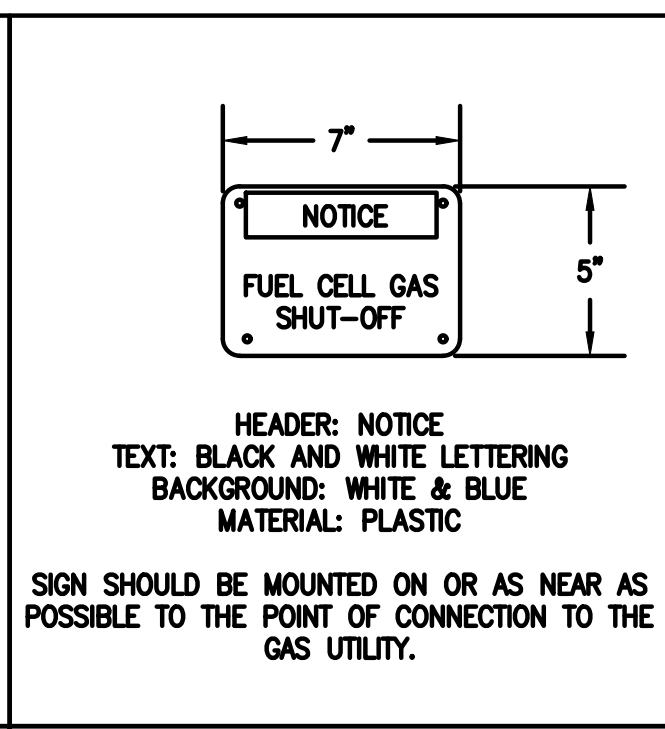
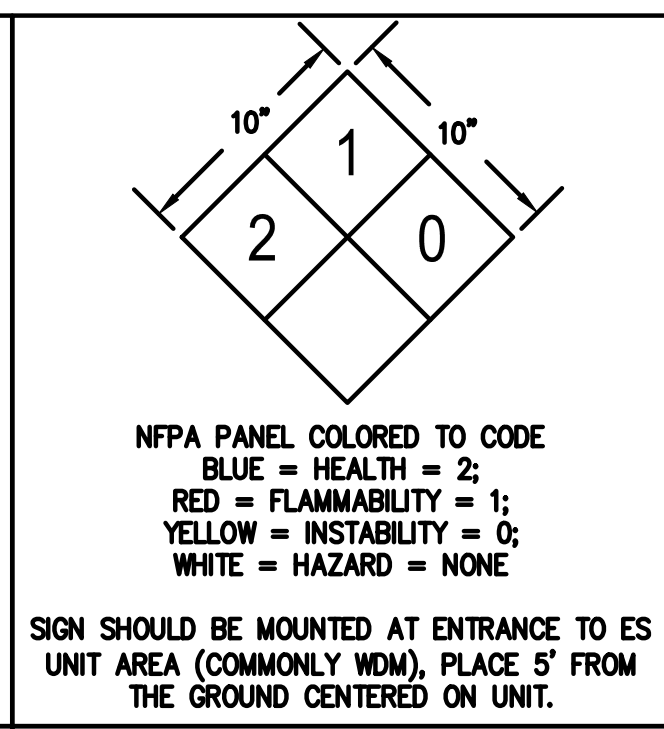
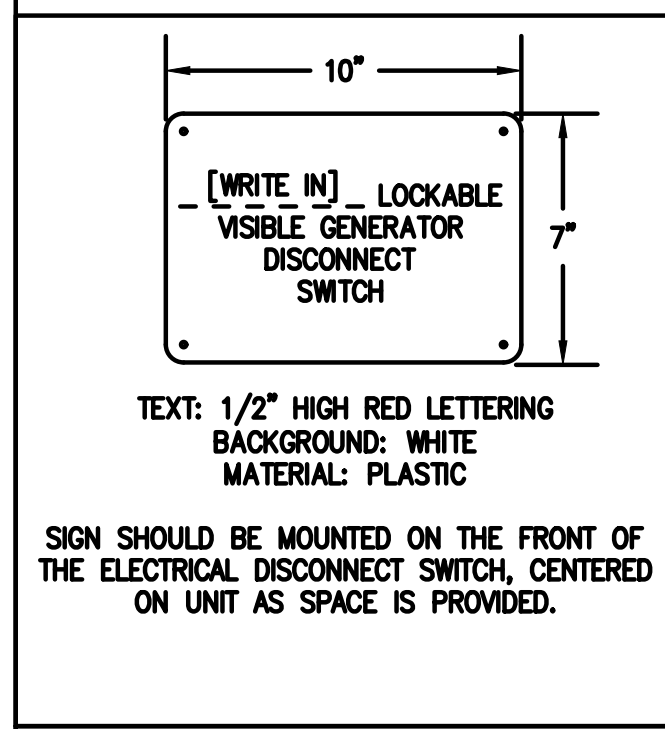
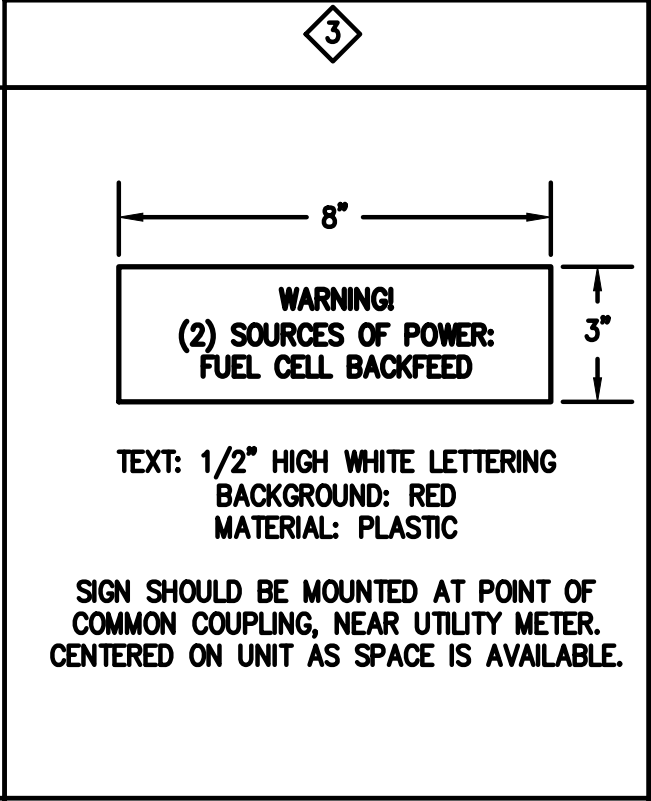
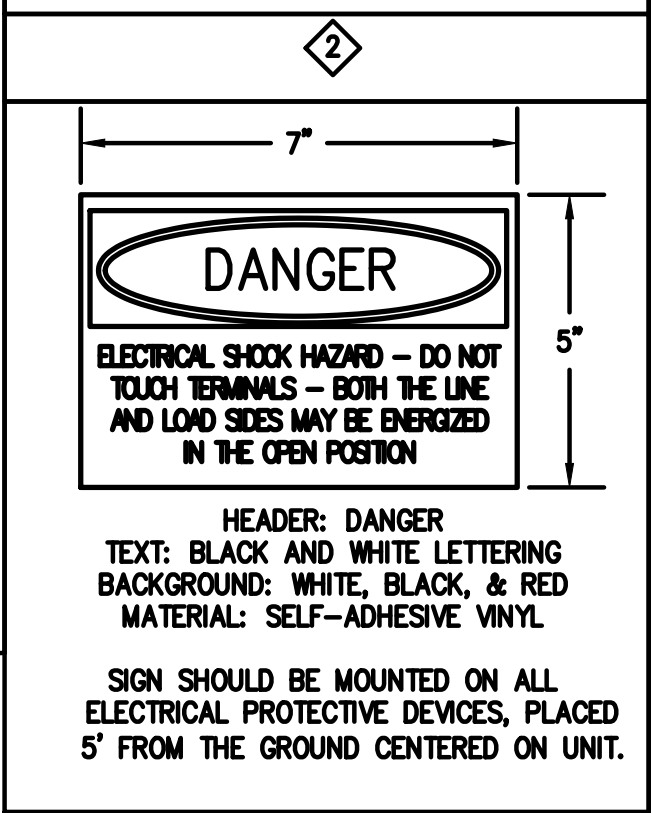
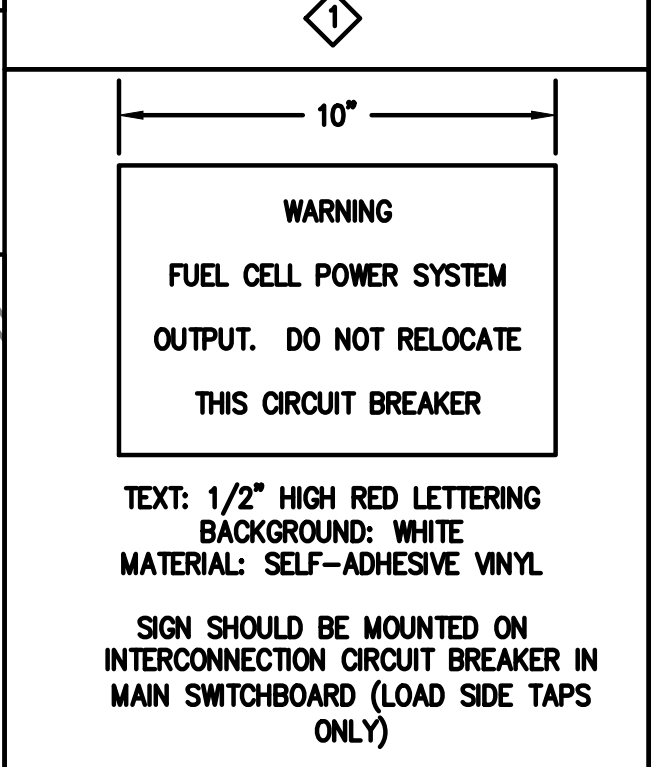
ELEC TIE IN PLACARD PLAN

SCALE: 1" = 10'

3
M1.1

GENERAL NOTES

- BELOW SIGNS ARE FURNISHED BY BLOOM ENERGY AND INSTALLED BY THE CONTRACTOR.
- ANY ADDITIONAL SIGNS NEEDED BY AHJS AND UTILITIES TO BE PROVIDED AND INSTALLED BY CONTRACTOR.



REVISION HISTORY		
REV	REVISION ISSUE	DATE
0	RELEASED PER ICG-10320	08/08/2016

DESIGNED BY BRIAN CURTIS	DATE 08/08/2016
DRAWN BY UMA GURUNATH	DATE 12/12/2016
REVIEWED BY OSMAN ELM	DATE 02/06/2017
APPROVED BY ERIC WOLF	DATE 02/06/2017

SHEET TITLE PLACARD PLAN
DRAWING NUMBER M1.1
BLOOM DOCUMENT DOC-1008145
THIS DRAWING IS 24" X 36" AT FULL SIZE SITE ID: KSR023.0 SHEET 14 OF 14